Barbados - Multiple Indicator Cluster Survey 2012

United Nations Children's Fund, Barbados Statistical Service

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Sampling

Sampling Procedure

The primary objective of the sample design for the Barbados Multiple Indicator Cluster Survey (MICS) was to produce statistically reliable estimates of most indicators, at the national level, for urban and rural areas and for the four regions of the country. The four regions were defined as the sampling strata.

Regarding the strata used, it should be noted that the first stratum (St. Michael) covers the capital Bridgetown and surrounding area in the south-west of the island; the second (Christ Church and St. Philip) covers the south and south-east coastal areas; the third (St. James, St. George and St. Thomas) covers the mid-west coast and the centre of the country; and the fourth (containing the remaining five parishes) covers the north and north-east.

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

The target sample size for the Barbados MICS was calculated as 3,600 households. The first step in the process of calculating this sample size was to choose one or more relevant statistical indicators that were considered of particular importance in the national context. Using the expected values of these indicators and other key information then facilitated the calculation of the sample size required for the survey in order to obtain estimates with a certain degree of precision. In the absence of suitable health and education indicators, calculation of the sample size were made using three hypothetical indicators with values of 0.3, 0.5 and 0.7. These calculations were done for three groups: women aged 15-49, women aged 15-24, and children under 5.

The 2010 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 estimated sizes of the enumeration areas from the 2010 Population Census. The first stage of sampling was thus completed by selecting the required number of enumeration areas from each of the four strata.

Since the sampling frame (the 2010 Population 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 each enumeration area and listed the occupied households. These teams consisted of some permanent field staff of the Barbados Statistical Service and some temporary recruits for the MICS exercise. Each team member was allocated individual clusters to list by the two field supervisors, who were senior permanent field officers. The listing exercise started around November 2011 and was extended to May 2012.

The sampling procedures are more fully described in "Multiple Indicator Cluster Survey 2012 - Final Report" pp.146-150.

Response Rate

Of the 3,600 households selected for the sample, 3,287 were found to be occupied. Of these, 2,872 were successfully interviewed for a household response rate of 87.4 percent. In the interviewed households, 1,916 women aged 15-49 years were identified. Of these, 1,543 were successfully interviewed, yielding a response rate of 80.5 percent within interviewed households. There were 491 children under age 5 listed in the household questionnaire. Questionnaires were completed for 465 of these children, which corresponds to a response rate of 94.7 percent within interviewed households. Overall response rates of 70.4 percent and 82.7 per cent are calculated for the women's and under-5's interviews respectively.

Weighting

The Barbados 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 size 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 (h) and PSU(i). The term fhi, the sampling fraction for the i-th sample PSU in the h-th stratum, is the product of probabilities of selection at every stage in each sampling stratum. Where pshi is the probability of selection of the sampling unit at stage s for the i-th sample PSU in the h-th sampling stratum.

A second 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 is equal to the inverse value of: RRh = Number of interviewed households in stratum h/ Number of occupied households listed in stratum h

After the completion of fieldwork, response rates were calculated for each sampling stratum. These were used to adjust the sample weights calculated for each cluster.

Similarly, the adjustment for non-response at the individual level (women and under-5 children) for each stratum is equal to the inverse value of:
RRh = Completed women's (or under-5's) questionnaires in stratum h / Eligible women (or under-5s) in stratum h

The non-response adjustment factors for the women's and under-5's questionnaires are applied to the adjusted household weights. Numbers of eligible women and under-5 children were obtained from the roster of household members from the household questionnaire where interviews were completed.

The design weights for the households were calculated by multiplying the above factors 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 the total sample size at the national level. Normalization is performed by dividing the aforementioned design weights by the average design weight at the national level. This involves 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 non-response). A similar standardization procedure was followed in obtaining standardized weights for the women's and under-5's questionnaires. Adjusted (normalized) weights varied between 0.291523 and 2.127810 in the 120 sample enumeration areas (clusters).

Sample weights were appended to all data sets and analyses were performed by weighting each household, woman or under-5 with these sample weights.

Questionnaires

Overview

The questionnaires for the Generic MICS were structured questionnaires based on the MICS4 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 household listing form, education, water and sanitation, household characteristics, child labour, child discipline, hand washing and salt iodization.

In addition to a household questionnaire, questionnaires were administered in each household for women age 15-49 and children under age five. For children, 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 and communications technology, desire for last birth, maternal and newborn health, post-natal health checks, contraception, unmet need for contraception, attitudes toward domestic violence, marriage/union, sexual behavior, HIV/AIDS, tobacco and alcohol use, and life satisfaction.

The children's questionnaire includes child's age, birth registration, early childhood development, breastfeeding, care of illness, and anthropometry.

Data Collection

Data Collection Dates

Start	**End**	**Cycle**
2012-05	2012-10	N/A

Data Collection Mode

Face-to-face [f2f]

DATA COLLECTION NOTES

Training of 53 persons for the fieldwork was conducted over 12 days from 23 April to 9 May 2012. Training included lectures on interviewing techniques and the contents of the questionnaires as well as mock interviews between trainees to gain practice in asking questions. All field staff were also trained in the use of the anthropomorphic measuring tools. Towards the end of the training period, trainees spent two days in practice interviewing in the following strata: Stratum 1 - four urban areas in St. Michael; Stratum 2 - one urban area in Christ Church and one urban area in St. Philip; and Stratum 4 - one rural area in St. John.

The data were collected by six teams, each of which was comprised of four interviewers, one editor, one measurer and a supervisor. Fieldwork began in May 2012 and concluded in October 2012.

Data Collectors

Name	**Abbreviation**	**Affiliation**
Barbados Statistical Service		

SUPERVISION

There is one supervisor for each of the 6 data collection teams in the field.

Data Processing

Data Editing

Using the CSPro software, data were entered on six microcomputers at the BSS office by six data entry operators, one secondary editor and one data entry supervisor. In order to ensure quality control, all questionnaires were double entered and internal consistency checks were performed. Procedures and standard computer programs developed under the global MICS4 programme and adapted to the Barbados questionnaire were used throughout. Data processing began simultaneously with data collection in May 2012 and was completed on 7 November 2012. Data were analyzed using the Statistical Package for Social Sciences (SPSS) software program, Version 18, and the model syntax and tabulation plans developed by UNICEF were used for this purpose. Both data processing and data analysis received the technical assistance of UNICEF Latin America and Caribbean Regional Office (LACRO) and UNICEF NY-HQ.

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): Sampling errors are usually measured in terms of standard errors for particular indicators (means, proportions, etc). Standard error is the square root of the variance of the estimate. The Taylor linearization method is used for the estimation of standard errors.
- Coefficient of variation (se/r) is the ratio of the standard error to the value 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. 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 is as efficient as a simple random sample, 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, SPSS Version 18 Complex Samples module has 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.

Sampling errors are calculated for indicators of primary interest, for the national level and for urban and rural areas. One of the selected indicators is based on households, 7 are based on household members, 19 are based on women and 8 are based on children under 5. All indicators presented here are in the form of proportions.

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 under-5s in household and under-5 questionnaires
- Women's completion rates by socio-economic characteristics of households
- Completion rates for under-5 questionnaires by socio-economic characteristics of households
- Completeness of reporting
- Completeness of information for anthropometric indicators
- Heaping in anthropometric measurements
- Observation of places for hand washing
- Observation of women's health cards
- Observation of under-5s birth certificates
- Presence of mother in the household and the person interviewed for the under-5 questionnaire
- Selection of children aged 2–14 years for the child discipline module
- School attendance by single age

The results of each of these data quality tables are shown in appendix D in document "Multiple Indicator Cluster Survey 2012 - Final Report" pp.166-179.

Related Materials

Questionnaires

Barbados Multiple Indicator Cluster Survey 2012 - Questionnaire

Title	Barbados Multiple Indicator Cluster Survey 2012 - Questionnaire
Country	Barbados
Language	English
Table of contents	Household questionnaire modules Household member questionnaire modules Women questionnaire modules Children questionnaire modules
Filename	Barbados Questionnaire 2012 MICS_English.pdf

MICS4 Changes To Questionnaires v2.1 to v3.0

Title	MICS4 Changes To Questionnaires v2.1 to v3.0
Language	English
Filename	http://www.childinfo.org/mics4_questionnaire.html

MICS4 Questionnaire Form For Child Disability v3.0

Title	MICS4 Questionnaire Form For Child Disability v3.0
Language	English
Filename	http://www.childinfo.org/mics4_questionnaire.html

MICS4 Questionnaire Form For Vaccinations At Health Facility v3.0

Title	MICS4 Questionnaire Form For Vaccinations At Health Facility v3.0
Language	English
Filename	http://www.childinfo.org/mics4_questionnaire.html

Reports

Barbados Multiple Indicator Cluster Survey 2012 - Report

Title	Barbados Multiple Indicator Cluster Survey 2012 - Report
Author(s)	United Nations Children's Fund (UNICEF) Barbados Statistical Service
Date	2014-09-01
Country	Barbados
Language	English
Filename	https://mics-surveys-prod.s3.amazonaws.com/MICS4/Latin%20America%20and%20Caribbean/Barbados/2012/Final/Barbados%202012%20MICS_English.pdf

Technical documents

Changes to MICS Tabulation Plan, Data Quality Tabulations, and Sampling Error

Tables since Version 2.1

Title	Changes to MICS Tabulation Plan, Data Quality Tabulations, and Sampling Error Tables since Version 2.1
Language	English
Filename	http://www.childinfo.org/mics4_plan.html

MICS4 01 Household Sample and Survey Characteristics (HH)

Title	MICS4 01 Household Sample and Survey Characteristics (HH)
Language	English
Filename	http://www.childinfo.org/mics4_plan.html

MICS4 02 Child Mortality (CM)

Title	MICS4 02 Child Mortality (CM)
Language	English
Filename	http://www.childinfo.org/mics4_plan.html

MICS4 03 Nutrition (NU)

Title	MICS4 03 Nutrition (NU)
Language	English
Filename	http://www.childinfo.org/mics4_plan.html

MICS4 04 Child Health (CH)

Title	MICS4 04 Child Health (CH)
Language	English
Filename	http://www.childinfo.org/mics4_plan.html

MICS4 05 Water and Sanitation (WS)

Title	MICS4 05 Water and Sanitation (WS)
Language	English
Filename	http://www.childinfo.org/mics4_plan.html

MICS4 06 Reproductive Health (RH)

Title	MICS4 06 Reproductive Health (RH)
Language	English
Filename	http://www.childinfo.org/mics4_plan.html

MICS4 07 Child Development (CD)

Title	MICS4 07 Child Development (CD)
Language	English
Filename	http://www.childinfo.org/mics4_plan.html

MICS4 08 Education (ED)

Title	MICS4 08 Education (ED)

Language English
Filename http://www.childinfo.org/mics4_plan.html

MICS4 09 Child Protection (CP)

Title MICS4 09 Child Protection (CP)
Language English
Filename http://www.childinfo.org/mics4_plan.html

MICS4 10 HIV-AIDS, Sexual Behaviour and Orphanhood (HA)

Title MICS4 10 HIV-AIDS, Sexual Behaviour and Orphanhood (HA)
Language English
Filename http://www.childinfo.org/mics4_plan.html

MICS4 11 Access to Mass Media and ICT Technology (MT)

Title MICS4 11 Access to Mass Media and ICT Technology (MT)
Language English
Filename http://www.childinfo.org/mics4_plan.html

MICS4 12 Subjective Well-Being (SW)

Title MICS4 12 Subjective Well-Being (SW)
Language English
Filename http://www.childinfo.org/mics4_plan.html

MICS4 13 Tobacco and Alcohol Use (TA)

Title MICS4 13 Tobacco and Alcohol Use (TA)
Language English
Filename http://www.childinfo.org/mics4_plan.html

MICS4 Data Quality Tabulation Plan (DQ)

Title MICS4 Data Quality Tabulation Plan (DQ)
Language English
Filename http://www.childinfo.org/mics4_plan.html

MICS4 Sampling Errors (SE)

Title MICS4 Sampling Errors (SE)
Language English
Filename http://www.childinfo.org/mics4_plan.html

MICS4 Changes To Indicator List v2.1 to v3.0

Title MICS4 Changes To Indicator List v2.1 to v3.0
Language English
Filename http://www.childinfo.org/mics4_questionnaire.html

MICS4 List of Indicators v3.0

Title   MICS4 List of Indicators v3.0
Language English
Filename http://www.childinfo.org/mics4_questionnaire.html

MICS4 Manual-Anthropometry

Title   MICS4 Manual-Anthropometry
Language English
Filename http://www.childinfo.org/mics4_manual.html

MICS4 Manual-Data Editing Guidelines

Title   MICS4 Manual-Data Editing Guidelines
Language English
Filename http://www.childinfo.org/mics4_manual.html

MICS4 Manual-Designing and Selecting the Sample

Title   MICS4 Manual-Designing and Selecting the Sample
Language English
Filename http://www.childinfo.org/mics4_manual.html

MICS4 Manual-Designing the Questionnaires

Title   MICS4 Manual-Designing the Questionnaires
Language English
Filename http://www.childinfo.org/mics4_manual.html

MICS4 Manual-Getting Started

Title   MICS4 Manual-Getting Started
Language English
Filename http://www.childinfo.org/mics4_manual.html

MICS4 Manual-Global Positioning Systems

Title   MICS4 Manual-Global Positioning Systems
Language English
Filename http://www.childinfo.org/mics4_manual.html

MICS4 Manual-Instructions for Interviewers

Title   MICS4 Manual-Instructions for Interviewers
Language English
Filename http://www.childinfo.org/mics4_manual.html

MICS4 Manual-Instructions for Supervisors Editors and Measurers

Title   MICS4 Manual-Instructions for Supervisors Editors and Measurers

Language English
Filename http://www.childinfo.org/mics4_manual.html

MICS4 Manual-Model Questionnaires

Title   MICS4 Manual-Model Questionnaires
Language English
Filename http://www.childinfo.org/mics4_manual.html

MICS4 Manual-Preparing for Data Collection and Conducting Fieldwork

Title   MICS4 Manual-Preparing for Data Collection and Conducting Fieldwork
Language English
Filename http://www.childinfo.org/mics4_manual.html

MICS4 Manual-Processing the Data

Title   MICS4 Manual-Processing the Data
Language English
Filename http://www.childinfo.org/mics4_manual.html

MICS4 Manual-Salt Iodization Testing

Title   MICS4 Manual-Salt Iodization Testing
Language English
Filename http://www.childinfo.org/mics4_manual.html