

## A.1 SAMPLE DESIGN

The primary objective of the 2004 Malawi Demographic and Health Survey (MDHS) is to provide estimates with acceptable precision for important population characteristics such as fertility, contraceptive prevalence, selected health indicators, and infant mortality rates.

Administratively, Malawi is divided into twenty-seven districts. In turn, each district is sub-divided into smaller administrative units. In 1998, the National Statistical Office (NSO) carried out a Housing and Population Census. In the census, each administrative unit was sub-divided into enumeration areas (EAs), which is totally classified as urban or rural. For each EA, a sketch map was drawn. The sketch shows the EA boundaries, location of buildings, and other landmarks. The list of EAs serves as the frame for the 2004 MDHS sample.

The 2004 MDHS is designed to present important characteristics for Malawi as a whole, urban and rural areas separately, and each of ten large districts. These districts are: Blantyre, Kasungu, Machinga, Mangochi, Mzimba, Salima, Tyolo, Zomba, Lilongwe, and Mulanje. In the interest of presenting estimates for the remaining 17 districts in Malawi in as much breakdown as possible, these districts are grouped as follows:

- Group 1: The rest of the Northern region (Chitipa, Karonga, Rumphi, Likoma, and Nkhata Bay)
- Group 2: Dowa, Dedza, and Nkhotakota
- Group 3: Mchinji and Ntchisi
- Group 4: Mwanza, Chikwawa, and Nsanje
- Group 5: Phalombe and Chiradzulu
- Group 6: Balaka and Ntcheu

### A.1.1 Sample Allocation

The target sample for the 2004 MDHS sample is about 15,140 households. Based on the level of non-response found in the 2000 MDHS, approximately 13,000 women with completed interviews are expected to be obtained. A sample of households will be selected from each EA, and all women age 15 to 49 identified in these households were interviewed. One in every three sampled households was selected for the male survey and HIV testing. All men age 15-54 in these households are eligible for individual interview. The selected households will be distributed in 522 EAs, 64 in the urban and 458 in the rural areas.

### A.1.2 Sample Selection

The 2004 MDHS sample will be selected using a stratified two-stage cluster design. In each domain, the clusters are selected with a probability proportional to household size (based on the 1998 census). An average of 29 households will be selected in each cluster. The selection is done using the following formula:

$$P_{1i} = (b * M_i) / (\sum_i M_i)$$

where

$b$ : is the number of clusters selected in DHS sample for a given domain,

$M_i$ : is the number of households of the  $i$ -th EA reported in the 1998 census information,

$\sum M_i$ : is the number of households in the given domain according to the 1998 census information.

If a selected PSU contains two or more standard segments, then segmentation is recommended to choose only one segment with equal probability. Complete household listing is to be implemented in each segment. Households will be selected to achieve a self-weighted sampling fraction in each domain. However, since the 2004 MDHS sample is not proportional among domains, a final adjustment procedure (using weights) is necessary to provide estimates for each domain.

In a given domain, if

1. the overall sampling fraction ( $f$ ) has been calculated,
2.  $s_{2i}$  is the number of segments in the selected cluster, and
3.  $c_i$  is the number of households selected out of the total households ( $L_i$ ) found in the 2004 MDHS listing for the  $i$ -th cluster,

then the self-weighting condition can be expressed as

$$f = P_{1i} * (1/ s_{2i}) * ( c_i / L_i )$$

The final number of households in the  $i$ -th cluster can be calculated as

$$c_i = ( f * L_i ) / ( P_{1i} * (1/s_{2i}) )$$

and the household selection interval for the  $i$ -th cluster is

$$I_i = L_i / c_i$$

$$I_i = ( P_{1i} * (1/(s_{2i})) ) / f$$

### A.1.3 Sample Implementation

The results of the sample implementation for the households and the individual interviews are shown in Tables A.1. The results indicate that 15,041 potential households were selected. Of these, the 2004 MDHS fieldwork teams successfully completed interviews in 13,664 households, yielding a household response rate of 98 percent. The main reasons for failure to interview were because the dwelling was vacant or the address was not a dwelling (4 percent). The household response rate varies little across region and urban-rural residence.

Table A.1 Sample implementation: women						
Percent distribution of households and eligible women by results of the household and individual interviews, and household, eligible women and overall response rates, according to urban-rural residence and region, Malawi 2004						
Result	Residence		Region			Total
	Urban	Rural	Northern	Central	Southern	
<b>Selected households</b>						
Completed (C)	86.9	91.4	91.4	91.0	90.6	90.8
Household present but no competent respondent at home (HP)	2.3	1.1	1.0	1.2	1.3	1.3
Postponed (P)	0.1	0.0	0.0	0.0	0.0	0.0
Refused (R)	1.0	0.4	0.1	0.2	0.8	0.5
Dwelling not found (DNF)	0.5	0.2	0.2	0.4	0.2	0.2
Household absent (HA)	2.2	1.3	1.9	1.0	1.6	1.4
Dwelling vacant/address not a dwelling (DV)	6.0	4.1	3.6	4.4	4.5	4.4
Dwelling destroy (DD)	1.1	1.3	1.7	1.7	1.0	1.3
Other (O)	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number of sampled households	1,984	13,057	1,772	5,443	7,826	15,041
Household response rate (HRR) <sup>1</sup>	95.8	98.1	98.5	98.0	97.6	97.8
<b>Eligible women</b>						
Completed (EWC)	94.6	95.8	95.3	95.2	96.1	95.7
Not at home (EWNH)	2.3	2.1	2.9	2.2	1.8	2.1
Postponed (EWP)	0.1	0.0	0.0	0.0	0.0	0.0
Refused (EWR)	1.7	0.8	0.7	1.0	1.0	1.0
Partly completed (EWPC)	0.4	0.4	0.2	0.5	0.3	0.4
Incapacitated (EWI)	0.8	0.8	0.8	1.0	0.6	0.8
Other (EWO)	0.1	0.1	0.1	0.2	0.1	0.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number of women	1,733	10,496	1,676	4,411	6,142	12,229
Eligible women response rate (EWRR) <sup>2</sup>	94.6	95.8	95.3	95.2	96.1	95.7
Overall response rate (ORR) <sup>3</sup>	90.7	94.0	93.9	93.3	93.8	93.6

<sup>1</sup> Using the number of households falling into specific response categories, the household response rate (HRR) is calculated as:  

$$100 * \frac{C}{C + HP + P + R + DNF}$$

<sup>2</sup> Using the number of eligible women falling into specific response categories, the eligible woman response rate (EWRR) is calculated as:  

$$100 * \frac{EWC}{EWC + EWNH + EWP + EWR + EWPC + EWI + EWO}$$

<sup>3</sup> The overall response rate (ORR) is calculated as:  $ORR = HRR * EWRR/100$

**Table A.2 Sample implementation: men**

Percent distribution of households and eligible men by results of the household and individual interviews, and household, eligible men and overall response rates, according to urban-rural residence and region Malawi 2004

Result	Residence		Region			Total
	Urban	Rural	Northern	Central	Southern	
<b>Selected households</b>						
Completed (C)	87.2	91.7	91.2	92.1	90.3	91.1
Household present but no competent respondent at home (HP)	2.4	1.1	1.0	1.2	1.3	1.2
Postponed (P)	0.2	0.0	0.0	0.1	0.0	0.0
Refused (R)	1.2	0.5	0.0	0.2	1.0	0.6
Dwelling not found (DNF)	0.8	0.3	0.3	0.6	0.2	0.3
Household absent (HA)	2.3	1.4	1.9	1.0	1.9	1.6
Dwelling vacant/address not a dwelling (DV)	5.3	3.7	3.7	3.4	4.3	3.9
Dwelling destroy (DD)	0.8	1.4	1.9	1.5	1.0	1.3
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number of sampled households	663	4,366	593	1,816	2,620	5,029
Household response rate (HRR) <sup>1</sup>	95.1	98.0	98.5	97.8	97.3	97.7
<b>Eligible men</b>						
Completed (EMC)	80.2	87.0	88.5	88.6	83.1	85.9
Not at home (EMNH)	14.6	8.2	8.5	7.3	10.9	9.2
Postponed (EMP)	0.2	0.0	0.0	0.0	0.1	0.1
Refused (EMR)	4.3	2.4	2.1	1.6	3.7	2.7
Partly completed (EMPC)	0.0	0.2	0.0	0.2	0.2	0.2
Incapacitated (EMI)	0.2	1.2	0.8	1.3	0.9	1.0
Other (EMO)	0.6	1.0	0.0	1.1	1.1	0.9
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number of men	632	3,165	515	1,424	1,858	3,797
Eligible men response rate (EMRR) <sup>2</sup>	80.2	87.0	88.5	88.6	83.1	85.9
Overall response rate (ORR) <sup>3</sup>	76.3	85.3	87.3	86.6	80.9	83.9

<sup>1</sup> Using the number of households falling into specific response categories, the household response rate (HRR) is calculated as:  

$$100 * \frac{C}{C + HP + P + R + DNF}$$

<sup>2</sup> Using the number of eligible men falling into specific response categories, the eligible woman response rate (EMRR) is calculated as:  

$$100 * \frac{EMC}{EMC + EMNH + EMP + EMR + EMPC + EMI + EMO}$$

<sup>3</sup> The overall response rate (ORR) is calculated as:  $ORR = HRR * EMRR/100$

In the interviewed households, 12,229 eligible women were identified, of whom 96 percent were successfully interviewed. The overall individual women's response rate was 94 percent (Table A.1). This rate varies some across the urban and rural areas (91 percent and 94 percent, respectively), but does not vary across regions.

A total of 3,797 men were eligible for individual interview. However, interviews were completed for only 3,261 men. For eligible men, the overall response rate is much lower than that for women (84 percent). The main reasons for failure to interview men were because the men were not at home when the MDHS team visited the EA (9 percent). This is particularly true in urban areas (14 percent).

## **A.2 FIELDWORK AND DATA ANALYSIS**

### **A.2.1 Recruitment of Field Staff**

NSO recruited the field staff through its regional offices in Mzuzu, Lilongwe, and Blantyre. The candidates were interviewed and selection of successful applicants was done at NSO Headquarters in Zomba by the Survey Director assisted by the human resource personnel. A total of 180 people were recruited for the survey; 30 were NSO permanent staff and the remaining 150 were temporary workers. Of the temporary workers, 40 have medical background.

### **A.2.2 Field Staff Training**

Training for the field staff was conducted at Magomero Training Center which provided class rooms, accommodation and meals. The training lasted for 5 weeks from August 23 to October 1, 2004. The training was done in two stages. In the first stage, the training was specifically conducted for field staff who were going to be assigned to do the collection of blood samples for anemia and HIV testing. The participants include 34 persons (25 females and 9 males) with medical background, and 16 women and 10 men with no medical background. The training in blood sample collection was conducted by Dr. Ben Chilima of the Community Health Sciences Unit (CHSU), Ministry of Health (MOH). He was assisted by three laboratory technicians: M. Yasin from CHSU, J. Gondwe of Lilongwe Central Hospital, and A. Kashoti of Mzuzu Central Hospital.

In the following four weeks, the 60 persons who were trained in taking blood samples were joined by 109 people who are being trained to be interviewers. The training is patterned after standard DHS training procedures, including class lectures, talk by resource persons, demonstration and practice interviews, and written examinations. To enhance the participants' knowledge on issues covered in the questionnaires, guest lecturers are invited, to either give a presentation on specific subjects or facilitate in the training as resource persons. Training on interviewing procedures was conducted by CSO senior staff (E. Phiri, J. Kaphuka, D. Zanera, S. Kang'oma, M. Mwale) and W. Kazembe of MOH. Sri Poedjastoeti and Adrienne Cox of ORC Macro facilitated the questionnaire training.

Apart from class work, field practices in interviews and taking blood samples were also conducted. Since class exercises did not include taking blood from children, field staff assigned to do blood work was taken to health facilities to practice with children.

The participants were also be trained in the use of the Global Positioning System (GPS) unit, which identified the location of the sample points in the Geographic Information System (GIS).

### **Fieldwork**

Prior to the visit of the interviewing teams to the selected EAs, NSO sent listing teams whose main task was to list all households residing in these EAs. The listing teams were also instructed to draw a sketch map which include the EA boundaries and all structures found in the EA.

In addition to listing households in the selected EAs, the listing teams were entrusted with two additional tasks; 1) informing local authorities about the implementation of MDHS, including

the drawing blood samples for anemia and HIV testing and 2) to obtain information on the estimate the transportation cost from the EA to the nearest VCT facility.

Data was collected by 22 mobile teams. Each team comprises one supervisor, one field editor, four female interviewers, one male interviewer, and a driver. Quality control was assured through supervision and monitoring of teams during fieldwork. The supervisor and field editor held work sessions frequently with their team, with the goal of reinforcing the training received and correcting all data collection errors.

Five senior NSO staff and one senior MOH staff coordinated and supervised the field activities. The three laboratory technicians supervised the blood sample collection to assure that collection of blood samples was done properly.

Specially designed tables were run once a week by NSO during fieldwork to check the data that were entered. Any problems that appear from review of these tables were discussed with the appropriate teams, and attempts will be made to ensure that they do not persist. The field checks tables included data necessary to monitor the response rates for anemia and HIV testing.

### **Social Mobilization**

In order to ensure a successful survey, the public was informed about the survey, particularly because for the first time the survey includes taking blood samples from the respondents. Social mobilization started with the household listers who were instructed to meet with Districts Commissioners, Traditional Authorities and other local community leaders to inform them about the survey, particularly about the collection of blood samples for HIV testing.

Publicity of the survey during data collection included using the mass media: press releases in daily newspapers, radio slots, radio drama (Pamajiga). In addition, meetings were held with district assembly staff, chiefs of the areas, and representatives of the local governments of areas that had been selected in the survey.

### **Data Processing**

Completed questionnaires were sent to NSO headquarters in Zomba for processing. Data processing commenced on 24th November 2004. The questionnaires are entered, verified, and edited using Census and Survey Processing System (CSPPro), a computer package developed by ORC Macro and U.S. Bureau of Census.

About 39 people working in two shifts were involved in the data process activities that include registry, editing and data keying, and secondary editing. Data processing was completed on 30th May 2005.

### **A.3 CHARACTERISTICS OF THE SAMPLE**

This section covers how representative the achieved sample is of the population and the interrelationships among key explanatory variables. The evaluation of how representative the achieved sample is of the population can be made by comparison with other sources of information. The age, residential, and educational characteristics of the sample are probably the most important aspects to discuss with regard to representation.