

A.1 SAMPLE SIZE AND ALLOCATION

The Armenia Demographic and Health Survey (ADHS) required a nationally representative sample of women age 15-49 and men age 15-54. The sample was designed to provide estimates of most survey indicators (including fertility, abortion and contraceptive prevalence) for Armenia as a whole, for three residence categories (Yerevan, other urban and rural areas) and for each of ten administrative regions (marz). The design also called for estimates of infant and child mortality at the national level and for the three residence categories (Yerevan, other urban and rural areas).

The target sample size of 6,500 completed interviews with women in the childbearing ages was allocated as follows: 1,500 to Yerevan, and 500 to each of the ten regions. Within each region, the sample was allocated between urban and rural strata in proportion to the population size. This yielded 21 sample strata. Table A.1. Overall, the sample allocation resulted in 1,500 female respondents in Yerevan, 2,300 in other urban areas and 2,700 in the rural areas.

A two-stage sample design was used. The first stage selected 260 area units (i.e., sample clusters) from the sampling frame provided by the National Statistical Service. The second stage selected households in which all women 15-49 were eligible to be interviewed. The sample was developed to yield, on average, 25 female respondents from each sample cluster. Additional description of the sampling frame and the two stages of selection are provided below.

Interviews were completed with 6,430 women. Men age 15-54 were interviewed in every third household; this yielded 1,719 completed interviews.

A.2 AREA FRAME

The frame consisted of the list of the area units in the 1996 Data Base of Addresses and Households, a household listing carried out by the National Statistical Service in 1996 covering the whole country. There were a total of 1,023 areas demarcated in the frame. Except for the two largest cities, which were divided into sectors, each area listed in the frame corresponded to a whole town or village. The frame provided identification information for each region, subregion (if applicable), and locality, as well as urban-rural classification and the altitude of the area (classified into three categories: <1,300 meters, 1,300-1,700 meters and >1,700 meters).

The measures of size in urban areas were the 1996 population counts of individual areas. In rural areas, the measures of size were defined as the number of households in the village, multiplied by the average household size in the rural part of the region in which the village was located. The reason for this decision was some uncertainty in the population figures for individual villages, while the information on the number of households appeared more reliable. Note that, when summed over the rural sector of a region, the total rural measure of size remained equal to the total population count of the 1966 Data Base, so that the figures in Table 1 were not affected.

Table A.1 Sample allocation by region and by residence

| Region/ residence | Residence | Number of households (1996) | Population (1996) | Target sample | Number of primary sampling units |
|----------------------|-----------|-----------------------------------|----------------------|------------------|---|
| Region | | | | | |
| Yerevan | 1 | 252,840 | 1,036,279 | 1500 | 60 |
| Aragatsotn | 1 | 9,918 | 44,046 | 146 | 6 |
| | 2 | 30,794 | 107,263 | 354 | 14 |
| Ararat | 1 | 18,981 | 81,071 | 142 | 6 |
| | 2 | 57,525 | 204,999 | 358 | 14 |
| Armavir | 1 | 22,648 | 105,795 | 178 | 8 |
| | 2 | 62,048 | 191,602 | 322 | 12 |
| Gegharkunik | 1 | 22,937 | 92,369 | 179 | 8 |
| | 2 | 48,641 | 165,544 | 321 | 12 |
| Lori | 1 | 53,578 | 201,767 | 315 | 12 |
| | 2 | 34,222 | 118,516 | 185 | 8 |
| Kotayk | 1 | 41,321 | 172,026 | 296 | 12 |
| | 2 | 29,394 | 118,324 | 204 | 8 |
| Shirak | 1 | 61,399 | 233,853 | 338 | 14 |
| | 2 | 29,671 | 111,746 | 162 | 6 |
| Syunik | 1 | 25,988 | 101,178 | 338 | 14 |
| | 2 | 14,415 | 48,554 | 162 | 6 |
| Vayots Dzor | 1 | 6,179 | 26,316 | 198 | 8 |
| | 2 | 11,537 | 40,104 | 302 | 12 |
| Tavush | 1 | 14,015 | 57,599 | 192 | 8 |
| | 2 | 26,761 | 92,729 | 308 | 12 |
| Residence | | | | | |
| Yerevan | | 252,840 | 1,036,279 | 1,500 | 60 |
| Other urban | | 276,964 | 1,116,020 | 2,321 | 96 |
| Rural | | 345,008 | 1,199,381 | 2,679 | 104 |
| Armenia | | 874,812 | 3,351,680 | 6,500 | 260 |
| 1 = Urban | | | | | |
| 2 = Rural | | | | | |

For the selection of the sample, areas were arranged according to the following five variables, in the order specified:

1. Region (i.e. marz) (00-10)
2. Urban-rural (1-2)
3. Altitude (1-3)
4. Subregion (where specified)
5. Population (i.e. measure of size) of the area.

The first two variables were used to define the explicit strata for the purpose of selection (i.e. for each region a pre-specified number of urban and rural primary sampling units (PSUs) were selected independently. The remaining three variables provided implicit ordering of the list for systematic selection.

A.3 SELECTION OF PRIMARY SAMPLING UNITS

The initial phase of the selection of PSUs required two steps: first the selection of area units from the 1,023 areas in the sampling frame by systematic sampling with probability proportional to size (PPS). A total of 211 areas were selected.

However, 25 of the selected areas were particular large (i.e., self-representing and were selected more than once by the systematic PPS sampling), so it was necessary to select more than one PSU from those 25 areas. From those 25 areas, a total of 74 PSUs were created. Overall, these 74 PSUs and the 186 (211-25) non self-representing PSUs provided a total of 260 PSUs.

At this point, the overall sampling probability for each region (f) and an initial first stage sampling probability for each selected PSU (f_1) were known.

A.4 SECONDARY SAMPLING UNITS AND SEGMENTATION

From the perspective of cost and the availability of resources, most of the 260 PSUs were too large to perform a complete household listing operation. Accordingly almost all PSUs were subdivided into a pre-specified number a of secondary sampling units (SSUs). The creation of SSUs, when possible, was done in the office based on the boundaries and landmarks shown in the mapping materials from the 1996 database. The created SSUs had clearly identifiable boundaries and a known measure of size.

One of the created SSUs was selected with PPS, i.e. with probability

$$p_i = \frac{M_i}{M} \quad \text{with} \quad M = \sum_{i=1}^a M_i$$

where M_i is the measure of size for the i^{th} SSU.

The task of household listing was further reduced by segmentation. Each SSU was divided into 8 segments. The segment boundaries were identified in the field. The segments were grouped to form 4 pairs, grouping the largest segment with the smallest, the next largest with the next smallest, etc. Measure of size, s_{ij} , for every pair of segments was obtained either from the 1996 Data Base or from a quick count done in the field. Let s_{ij} be the measure of population size for pair j within SSU i . One of the pairs was selected with PPS, i.e. with probability

$$p_{ij} = s_{ij} / s_i \quad \text{with} \quad s_i = \sum_j s_{ij}$$

After segmentation, the first stage sampling probability of the selected PSUs was:

$$f'_1 = p_i \cdot p_{ij} \cdot f_1, \quad (p_i \cdot p_{ij} < 1)$$

A.5 HOUSEHOLD LISTING AND SELECTION

A complete household listing was conducted within the selected pairs of segments in order to construct the sampling frame for the selection of households.

The required household stage sampling rate was:

$$f'_2 = (f) / (f'_1)$$

In all PSUs the sampling rate for the selection of households within listed segments was close to one in eight (i.e., 0.125). This outcome was by design. The number of SSUs created in each PSU was set to obtain this result. A relatively similar sampling rate across sample segments meant a variable take from each although, on average, the target number of completed interviews with female respondents remained 25 per PSU.

A.6 ADJUSTMENT OF HOUSEHOLD SAMPLING RATE AFTER LISTING

Since there was some doubt about the population size measures in the 1996 database, the second stage sampling rates were adjusted so as to control the final sample size. This was an overall adjustment, the same for the whole sample, so as not to affect the planned relative sampling rates. For each PSU (sample area k in domain j), let:

L_{jk} = the number of households listed in the selected PSU (the selected pair of segments as defined above or the whole area if not segmented).

$f'_{2\ jk}$ = the second stage sampling fraction for the household selection in a PSU.

This means that the number of households expected to be selected is

$$h_{jk} = L_{jk} \cdot f'_{2\ jk}$$

Let X_j be the conversion factor from households to completed women interviews in domain j :

$$X_j = H_j \cdot W_j \cdot r_j$$

where H_j is the average household size, W_j is the proportion of the population who are women age 15-49 (i.e., the expected number of eligible women per person in the population) and r_j the expected response rate in the domain. Overall country-level figures were used: $H_j = 3.84$, $W_j = 0.278$ and $r_j = 0.94$ (6 percent non-response).

This gives the expected number of completed interviews as

$$n' = \sum_j [X_j \cdot \sum_k (L_{jk} \cdot f_{2'jk})]$$

summed over all PSUs (segments or localities) in the sample.

To achieve the required sample size $n = 6,500$ completed interviews, the second stage sampling fractions was adjusted throughout by the factor $(n/n' = 6500/5403 = 1.20)$, i.e. modified in each area as

$$f_{2''jk} = \left(\frac{n}{n'}\right) \cdot f_{2'jk}$$

On the basis of the final sampling fractions, households were selected systematically from geographically ordered household listings.

A.7 RESPONSE RATES

Tables A.1 and A.2 present detailed information on the results of the household and individual interviews. Household interviews were completed for 97 percent of the occupied households. A total of 6,685 eligible women from these households and 1,913 eligible men from every third household were identified for the individual interviews. Of the eligible women identified, 96 percent were successfully interviewed; of the eligible men, 90 percent were successfully interviewed. The principal reason for non-response among eligible women and men was the failure to find them at home despite repeated visits to the household. The refusal rate was low. There is no difference by urban-rural residence in the response rates for eligible women and men.

Table A.2 Sample Implementation: women

Percent distribution of households and eligible women in the DHS sample by result of the interview and household, eligible women and overall response rates, according to region and urban rural Area, Armenia 2000

| Result of interview and response rate | Urban | Rural | Total |
|--|-------|-------|-------|
| Household interviews | | | |
| Completed (C) | 89.8 | 94.0 | 91.7 |
| No competent respondent (HP) | 2.2 | 1.1 | 1.7 |
| Refused (R) | 1.2 | 0.4 | 0.8 |
| Dwelling not found (DNF) | 0.1 | 0.0 | 0.1 |
| Absent (A) | 5.6 | 4.1 | 4.9 |
| Dwelling vacant (DV) | 1.1 | 0.4 | 0.8 |
| Total percent | 100.0 | 100.0 | 100.0 |
| Number | 3,629 | 2,895 | 6,524 |
| Response rate (HRR) ¹ | 96.3 | 98.4 | 97.2 |
| Women interviews | | | |
| Completed (EWC) | 95.8 | 96.6 | 96.2 |
| Not at home (EWNH) | 2.5 | 1.9 | 2.2 |
| Refused (EWR) | 1.2 | 0.6 | 1.0 |
| Partly completed (EWPC) | 0.1 | 0.2 | 0.1 |
| Incapacitated (EWI) | 0.4 | 0.6 | 0.5 |
| Total percent (EWO) | 100.0 | 100.0 | 100.0 |
| Number | 3,699 | 2,986 | 6,685 |
| Response rate (EWRR) ² | 95.8 | 96.6 | 96.2 |
| Overall response rate (ORR) ³ | 92.3 | 95.1 | 93.5 |

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

$$\frac{100 \times C}{C + HP + R + DNF}$$

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

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

³ The overall response rate (ORR) is calculated as:

$$ORR = HRR * EWRR/100$$

Table A.3 Sample Implementation: men

Percent distribution of households and eligible men in the DHS sample by result of the interview and household, eligible men and overall response rates, according to region and urban rural Area, Armenia 2000

| Result of interview and response rate | Urban | Rural | Total |
|--|-------|-------|-------|
| Household interviews | | | |
| Completed (C) | 89.4 | 92.3 | 90.7 |
| No competent respondent (HP) | 2.4 | 1.7 | 2.1 |
| Refused (R) | 1.3 | 0.4 | 0.9 |
| Dwelling not found (DNF) | 0.2 | 0.0 | 0.1 |
| Absent (A) | 6.0 | 5.0 | 5.6 |
| Dwelling vacant (DV) | 0.7 | 0.5 | 0.6 |
| Total percent | 100.0 | 100.0 | 100.0 |
| Number | 1,224 | 967 | 2,191 |
| Response rate (HRR) ¹ | 95.9 | 97.8 | 96.7 |
| Men interviews | | | |
| Completed (EMC) | 90.2 | 89.4 | 89.9 |
| Not at home (EMNH) | 7.0 | 8.1 | 7.5 |
| Refused (EMR) | 1.8 | 1.3 | 1.6 |
| Partly completed (EMPC) | 0.1 | 0.0 | 0.1 |
| Incapacitated (EMI) | 0.9 | 1.3 | 1.0 |
| Total percent (EMO) | 100.0 | 100.0 | 100.0 |
| Number | 1,045 | 868 | 1,913 |
| Response rate (EMRR) ² | 90.2 | 89.4 | 89.9 |
| Overall response rate (ORR) ³ | 86.5 | 87.4 | 86.9 |

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

$$\frac{100 \times C}{C + HP + R + DNF}$$

² Using the number of eligible men falling into specific response categories, the eligible man response rate (EMRR) is calculated as:

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

³ The overall response rate (ORR) is calculated as:

$$ORR = HRR * EMRR/100$$