Chapter XXII
The Demographic and Health Surveys

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Abstract

The present chapter provides an overview of the main procedures followed in the international Demographic and Health Surveys (DHS) programme in the execution of large-scale household and individual surveys. It provides an overview of the general content of the surveys, the sampling procedures, response rates and design effects, as well as a description of the procedures and approaches followed for all the important survey components, from training to data processing and report writing. The chapter also contains a listing of the main lessons learned so far, from executing this survey programme.

Key terms: household surveys, response rates, survey sampling, sampling errors, design effects, survey fieldwork.

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A. Introduction

1.   The Demographic and Health Surveys (DHS) programme has been conducting household surveys in developing countries worldwide since 1984. The main purpose of the DHS surveys is to provide countries with the data needed to monitor and evaluate population, health and nutrition programmes on a regular basis. Increasing emphasis by donors and countries on the utilization of objective indicators to measure such progress has increased the reliance on regular household survey data, given the absence of appropriate information that is available from administrative statistics and other routine data-collection systems. In a DHS survey, a sample of households is selected throughout the entire country and then interviewed using a household questionnaire to collect housing characteristics, and to identify all household members and their basic characteristics. Women between the ages of 15 and 49 are also interviewed using a woman's questionnaire to collect information mainly on background characteristics, reproductive behaviour, contraceptive knowledge and use, children and women's health, and other issues. The average duration of an interview is about 35-40 minutes with a general spread of between 10 and 90 minutes, although some interviews take longer. Samples vary considerably in size, ranging from 5,000 to 30,000 women. In some countries, a sample of men between the ages of 15 and 59 are also interviewed. Often this is a subsample of the sample used for selecting the women. Interviews of men take an average of about 25 minutes to complete. The following sections present the history of the DHS programme along with the general content of its surveys, an overview of its sampling procedures and an analysis of unit non-response. Sampling design effects are also presented as well as the different phases of the survey implementation and lessons learned from conducting the Demographic and Health Surveys in developing countries.

B. History

2.   The Demographic and Health Surveys are the follow-on to two earlier household survey programmes: the World Fertility Surveys (WFS) and Contraceptive Prevalence Surveys (CPS). The World Fertility Surveys took place from 1973 to 1984, and the Contraceptive Prevalence Surveys from 1977 to 1985. The WFS programme carried out surveys in 41 developing countries and collaborated on surveys in 20 developed countries. The World Fertility Surveys were geared mostly towards information on fertility, family planning and, to some extent, child health. The programme was funded jointly by the United States Agency for International Development (USAID) and the United Nations Population Fund (UNFPA), with assistance from the Governments of the United Kingdom of Great Britain and Northern Ireland, the Netherlands and Japan.

3.   The CPS programme carried out 43 surveys in 33 countries and was more narrowly focused on family planning. It was funded by USAID, and surveys were limited to countries that had received development assistance from USAID.

4.   The Demographic and Health Surveys started in 1984. By the end of 2003, about 150 surveys of women, 75 surveys of men and 10 surveys of health facilities would have taken place in about 70 countries. Surveys typically take place once every five years, although a few countries have surveys at lesser intervals. The surveys take place mostly in countries that receive

assistance from USAID, although some countries have participated with funding from the World Bank or UNFPA. In many countries, the surveys enjoy the support of donors other than USAID, such as the Department for International Development (DFID) of the United Kingdom, the United Nations Children's Fund (UNICEF), and the Governments of Japan and Sweden, among others. The Demographic and Health Surveys provide a comprehensive overview of population and maternal and child health issues in participating countries and the data are freely accessible to agencies for monitoring and evaluation purposes. The content of the surveys has changed over the years to adapt to changing circumstances and priorities.

C. Content

5.   The core content of every round of the Demographic and Health Surveys is standard across countries in order to maximize the comparability of the information. In addition to this core content, countries can choose to add questionnaire modules that deal with issues of particular interest for each country. The core content of the questionnaires for countries in sub-Saharan Africa is somewhat different from that of other countries, mainly in terms of its complexity.

6.   The core questionnaires for the period 1997-2002 covered the following:

Household questionnaire. This questionnaire obtained basic data on age, sex, survivorship of the parents and schooling for members of the household. It also obtained information on water supply and household amenities. The household questionnaire also collected information on the height and weight of women aged 15-49 and children under age 5 as well as on their haemoglobin levels for the measurement of anaemia.

Women's questionnaire. This questionnaire, applied to women of fertile age, contained the following sections:

- Respondent's background characteristics
- Reproduction history
- Contraception
- Pregnancy, post-natal care and breastfeeding
- Immunization, health and nutrition
- Marriage and sexual activity
- Fertility preferences
- Husband's background and woman's work
- HIV/AIDS and other sexually transmitted infections

Some surveys included testing for HIV/AIDS or syphilis or other biomarkers.

7.   There also is a Men's questionnaire. This questionnaire covers some of the same topics as the woman's questionnaire. It is not applied in all countries. A questionnaire for family planning and health-care providers is also available, but it is separate from the household survey and administered instead to service providers. It is called the Service Provision Assessment (SPA)

questionnaire. This questionnaire covers all aspects of service provision through questions to service providers and clients and observation of the delivery of services.

8.   The DHS programme has developed a number of modules that countries can add to their questionnaire. Modules are available on:

- Female genital mutilation
- Maternal mortality
- Pill-taking behaviour
- Sterilization experience
- Consanguinity (marriage between blood relatives)
- Verbal autopsy (detailed questions on cause of death)
- HIV/AIDS
- Children's education
- Women's status
- Domestic violence
- Malaria
- Household health expenditures

9.   Owing to the length of the core instrument, it is generally not possible for a given country to add more than two or three modules, although this may vary with the length of the modules that are chosen (visit www.measuredhs.com for questionnaires and other materials).

D. Sampling frame

10.   The issue of the availability of a suitable sampling frame is obviously addressed in the early stages of planning a Demographic and Health Survey. A Demographic and Health Survey collects data on individuals residing in private households, but an up-to-date list of such individuals or households is generally not available. The sampling frame used in most Demographic and Health Surveys is, by definition, a list of non-overlapping area units that cover the entire national territory. Essential characteristics of these units, for frame purposes, are well-defined boundaries and clearly delineated maps. Each area unit also has a unique identification code. It must also have a current or estimated measure of size (population and/or number of households). Other characteristics such as the urban/rural classification usually exist for each area unit and these may be used for stratification purposes.

11.   In most countries, the desired area units correspond to census enumeration areas (EAs), which provide a convenient frame for the first sampling stage. In some countries, these EAs may be large in population size; in others, they may be small. Whatever their size, the EAs are usually the primary sampling units (PSUs). In some surveys, they also are the ultimate area units if small enough. If they are used as PSUs and are found to be too large in size (households or population), segmentation as an intermediate stage of selection is then introduced into the sample design.

12.   As mentioned above, the frame, whether comprising census EAs or other units, may not be current. Steps usually have to be taken either (a) to update the entire frame; or (b) to update it partially by compiling a current list of households in the penultimate stage of selection.

13.   In some surveys, a pre-existing master sample is used as the sampling frame if it is determined that its design can accommodate the measurement objectives of the Demographic and Health Survey.

E. Sampling stages

14.   As for any sample design, the characteristics of the sampling frame and the survey objectives determine the number of sampling stages. Although not standardized across countries, the sample design for each Demographic and Health Survey is guided by the same general principles: simplicity, probability sampling (non-zero known probability of selection), clustering and stratification. In the Demographic and Health Surveys, two or more stages of selection are usually required, depending on the measure of size of the area units in the sampling frame.

15.   The basic design involves the selection of area units in the first stage with probability proportional to size, the size being the population counts or the number of households in each area unit. This first stage of selection marks the point beyond which the sampling operations move out of the office and into the field for mapping and, if necessary, household listing in the selected area units. Mapping consists of drawing a sketch map showing the boundaries of each selected PSU and the location of dwellings within the PSU. In countries where detailed and accurate maps of PSUs are available, mapping consists simply of updating the location of dwellings. When the frame is not thought to be completely up to date, current household lists are constructed in each selected PSU by listing all households in each occupied dwelling, including households that are absent at the time of the visit of the listing team. The lists obtained serve as the sampling frame for the systematic selection of households in the second stage.

16.   The cluster size for any household survey (number of households/women to be selected per PSU or cluster) depends on the variable under consideration. For variables that are highly clustered with comparisons often required between geographical areas (such as contraceptive prevalence and its determinants), the optimum cluster size has been determined to be 15-20 women per cluster. Other fertility variables are less clustered, and when comparisons of interest are non-geographical (for example, comparisons between age groups or levels of education), the optimum cluster size can be higher. The DHS use a cluster size of about 30-40 women for the rural sector. In urban areas, the cost advantage of a large cluster size is generally smaller, and the DHS use cluster size of 20-25 women. Where a pre-existing recent household list is available, these figures are reduced, since the factor favouring large cluster size is saving in respect of listing operations (ORC Macro, 1996). As DHS also collects data on children's health, and these children are of sampled women, the cluster size must also be sufficiently large to yield the required number of children for analysis.

17.   All eligible individuals in selected households are included in the final sample. Although in most DHS samples the number of households selected per PSU varies from one PSU to another, a fixed sample take has been used in some surveys.

18.   Often, the selected PSUs are too large in size to be directly listed. Segmentation is introduced in the design to reduce the amount of listing and to keep an even workload between PSUs. Each large PSU is divided into segments of which one is retained in the sample with probability proportional to size (PPS).

19.   The majority of DHS sample designs is clustered and stratified. Explicit stratification is usually based on geographical criteria such as the urban/rural breakdown and is introduced only at the first stage of sampling. PSUs are selected independently in each stratum. Implicit stratification is achieved through the use of the systematic selection technique. Typically, the number of PSUs is large, ranging from about 300 to 550 for a sample of 10,000 households.

20.   The DHS strive to keep their sample design as simple as possible in order to facilitate accurate implementation of the design. However, the basic design is modified to meet the country's specific conditions. These modifications include the use of the standard segment design with or without compact clusters; compact clusters are defined as those where each sample household is geographically contiguous to another, while geographically dispersed sample households define non-compact clusters. This is a variation of the sample design in which a predetermined standard segment size, that is to say, the ultimate area unit as specified, is as small as seems practical. Each PSU or enumeration area i in the country is allocated a number of segments s_i by dividing its census population by the standard segment size. The PSUs are then sampled with probability proportional to size (PPS) where the measure of size equals the number of segments s_i. Within each selected PSU, one segment is then selected at random. The case of the standard segment with compact cluster is that where segments are made of average size T, where T is the desired cluster size. In this way, a listing operation could be avoided by using the "take-all" approach (ORC Macro, 1996).

21.   The DHS estimates are presented for both the country as a whole and for particular geographical domains such as urban, rural and region. Since the domains are often variable in population size, the sample is usually designed to oversample the small ones in order to provide adequate sample sizes needed for analysis. This, of course, introduces a potential bias in national estimates that is corrected by appropriately weighting the sample data. The main component of sample weights is the design weight based upon the probabilities of selection. Non-response at both household and individual levels is also taken into account in the weighting. A final stage of weighting may be used in which a post-stratification adjustment is made whenever an out-of-date area frame was used for sample selection, using population projections from reliable sources.

F. Reporting of non-response

22.   The replacement of non-responding units (households or individuals) is not allowed in the DHS, which in this regard, are unlike many other surveys. In order to achieve the target number of sample units, non-response rates for sample units are estimated from past or similar

surveys at the time of the sample design and are then used to determine the required number of units to be selected. Moreover, numerous efforts are made during fieldwork to ensure high response rates. A review of the DHS response rates follows, including a comparison of these rates over time and across the different regions.

23.   As mentioned earlier, DHS data are collected at two levels: households and individuals. Eligible individuals are mostly women of childbearing ages, but in some countries men between the ages of 15 and 59 are also interviewed. In the Demographic and Health Surveys, non-response refers to the failure to interview households or individuals selected for the sample. Response rates for households and individuals are measured by keeping accurate accounts of all households and eligible individuals. The operational computation of response rates uses response codes that are entered on the questionnaires. The household questionnaire identifies all eligible individuals within each household. Only individuals who are eligible for the survey are assigned an individual questionnaire.

24.   Response codes at the household level are:

        1H   Completed interview
        2H   No household member at home or no competent respondent at home
        3H   Entire household absent for extended period
        4H   Postponed
        5H   Refused
        6H   Dwelling vacant or address not a dwelling
        7H   Dwelling destroyed
        8H   Dwelling not found
        9H   Other

The household response rate is then

$$R_H = \frac{1H}{1H + 2H + 4H + 5H + 8H}$$

25.   In DHS, those households with codes 3H, 6H, 7H and 9H are considered ineligible, and thus are not included in the denominator. [43] Code 9H is usually recoded by the supervisors into one of the explicit codes and is thus almost always non-existent. The few cases of households remaining 9H can be categorized as ineligible. It should be noted that owing to the lack of a good address system in many countries, the DHS listing operation first identifies dwellings in terms of the names of the occupying households, which names are then used in place of addresses. When a new household moves into a dwelling between the listing operation and the interview, this does not mean that a replacement of a sampling unit has occurred, because the

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[43]   Since the households with code 3H ("entire household absent for extended period") are considered ineligible for DHS, this method of computing household response rate is comparable with the RR5 method established by the American Association for Public Opinion Research (AAPOR) 2000 standards. This method slightly overstates the true response rate in that a small number of those households coded 3H are eligible but are not included in the calculation.

dwelling is the true basis for selection. Also, the case where a household moves out after the listing and another does not move in, does not constitute non-response.

26.   Response codes at the individual level are:

> 1I   Completed interview
> 2I   Not at home
> 3I   Postponed
> 4I   Refused
> 5I   Partly completed
> 6I   Incapacitated
> 7I   Other

The individual response rate is

$$R_I = \frac{1I}{1I + 2I + 3I + 4I + 5I + 6I + 7I}$$

27.   Unweighted household and individual response rates are calculated separately for each stratum or reporting domain and presented in the DHS country report along with overall response rates. The overall response rate is the product of the response rates at the household and individual levels. In Demographic and Health Surveys, response rates are similar across domains. Since the sample is usually approximately self-weighted within each domain, weighted and unweighted response rates for a country as a whole are very close. It should be noted that the above response codes have been used in most Demographic and Health Surveys but they are modified in some surveys to take into account the situation in a particular country.

G. Comparison of non-response rates

28.   Using the above formulae, both household and woman response rates were computed for 66 surveys conducted in 44 countries between 1990 and 2000. The results are presented in the annex for the following regions of the world: Asia, Eurasia, Latin America, Near East and Sub-Saharan Africa.

29.   The data show that the household response rates for these surveys ranged between 87.9 and 99.5 per cent with an average of 97.5 per cent, indicating that the vast majority of households identified in DHS samples were successfully interviewed. For the same surveys, the woman response rate was between 86.5 and 99.3 per cent with an average of 95 per cent. A complete interview was therefore obtained from most eligible women.

30.   Except in Latin America, where the overall household response rate was 95 per cent, all other regions had an average household response rate of about 98 per cent. As for households, the average woman response rate was lower in Latin America than in the other regions covered

by the DHS programme: 92 per cent versus 97 per cent. Within each region, both household and woman response rates varied little across countries, the coefficient of variation ranging between 0.4 and 3.7 per cent.

31.   The average household response rate remained high at 97 per cent during the last three phases of the DHS programme (DH II, DHS III and MEASURE-DHS$^+$)[44], while the average woman response rate increased slightly from 94 to 96 per cent over time.

32.   The high response rates at both household and individual levels in DHS surveys are the results of rigorous training of field staff and close supervision of the fieldwork. Moreover, in every survey care is taken to ensure that the time of the listing operation and that of the interviewing, are not too far apart. Also, as opposed to surveys in developed countries, household surveys in developing countries usually benefit from a high level of cooperation on the part of potential respondents. Over time, the average household and individual response rates have been remarkably similar in each region.

H. Sample design effects from the DHS

33.   The present section provides a brief summary of some design effects and intra-class correlation coefficient values ($\bar{\rho}$) found in the Demographic and Health Surveys [see Lê and Verma (1997) for more detail; and Kish, Groves and Krotki (1976) and Verma, Scott and O'Muircheartaigh (1980) for similar analyses of WFS sampling errors].

34.   The design effect is the ratio of the sampling variance of any estimate obtained from a complex sample design to the variance of the same estimate that would apply with a simple random sample or unrestricted sample of the same sample size (Kish, 1965), that is to say

$$D^2(y) = \frac{Var_{complex}(y)}{Var_{unrestricted}(y)}$$

35.   Design effects result from stratification, unequal selection probabilities, sample weighting adjustments (for non-response), population weighting adjustments (for non-coverage and for improved precision) and clustering all elements of a complex sample design.

36.   The estimated design effect due to weighting can be computed from the sample as

$$d^2(\hat{y}) = 1 + cv^2(w_j)$$

where cv^2 is the square of the coefficient variation of the sampling weights w_j.

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[44]   MEASURE is an overarching project of USAID, of which MEASURE DHS+ is a part. "MEASURE" stands for "Monitoring and Evaluation to Assess and Use Results".

37.   The design effect due to the effect of clustering can be computed as

$$D^2\left(\hat{y}\right) = 1 + (b-1)\rho$$

where b is the average cluster size and ρ is the intra-class correlation.

38.   A complete discussion of design effects and intra-class correlation coefficients - definitions, components of design effects, use of design effects and intra-class correlation coefficients in designing sample surveys – is presented in chapter VI of this publication. To understand the effect of a complex sample design on standard errors, it is common to use the square root of the design effect, $d(\hat{y})$.

39.   As mentioned before, DHS surveys are based on nationally representative household samples with a standard multistage stratified probability sample design that includes a fairly large number of PSUs. Estimates are usually produced at the national level, for urban and rural areas, and smaller geographical regions usually coinciding with administrative regions in many countries.

40.   Lê and Verma (1997) studied sampling errors in 48 Demographic and Health Surveys conducted between 1985 and 1993. For overall national estimates, the average root design effect $d(\overline{y})$, where $\overline{y}$ was often a proportion averaged over 37 variables and 48 surveys, was about 1.50, with averages ranging from 1.13 for Trinidad and Tobago to 2.07 for Nigeria. This means that the clustering, weighting and other aspects of the designs increased the standard errors of the estimates by, on average, a factor of 1.5 (or the variances of the estimates by a factor of 2.25) over those for an unrestricted sample of the same size.

41.   Similar cluster sizes were used in the urban and rural areas in most countries (average cluster size of 24 in urban areas and 30 in rural areas). As a result, the difference in the average urban and rural $d(\overline{y})$ values was small, 1.4 for urban and 1.5 for rural. This pattern was also seen in $d(\overline{y})$ values by geographical regions. Within each country, $d(\overline{y})$ values were very similar across different regions, being only marginally smaller than the corresponding total country $d(\overline{y})$, again reflecting the same design used across all regions in the country. By contrast, $d(\overline{y})$ values were appreciably smaller than the national values for subgroups defined in terms of demographic and socio-economic characteristics of individual respondents. Since these subgroups cut across the PSUs, the relevant cluster sizes (b_d) were smaller than the cluster sizes for the total sample (b), hence the subgroup design effects tended to be smaller. For example, in the Tunisia DHS, the $d(\overline{y})$ values for the variable "Ideal family size" were 1.56 and 1.70 for the subgroups of working women and non-working women, respectively, compared with the total sample $d(\overline{y})$ value of 1.79.

42.   Differential sampling rates for urban and rural areas or for geographical regions in the Demographic and Health Surveys required weighting of the sample data. Weighting was also necessary to compensate for differential non-response and other shortcomings in sample implementation. Such weighting tended to inflate sampling errors. The design effect due to

variable weights was computed for the Demographic and Health Surveys for estimates based on the total samples. In the early surveys of 1985-1990, the average $d(\bar{y})$ due to weighting was 1.08 (representing a 17 per cent increase in variance). It increased to 1.15 per cent (representing a 32 per cent increase in variance) in the later Demographic and Health Surveys of 1990-1993 which departed more from the custom of using epsem (equal probability) samples within urban and rural areas in order to allow for regional estimates.

43.   As can be seen in table XXII.1, the values of $d(\bar{y})$ for the total sample averaged across countries vary markedly by variable, with $d(\bar{y})$ values ranging from a low of about 1.1 or 1.2 for infant mortality variables to a high of 2.5 for an estimate of whether the birth was medically delivered. This reflects the higher correlation within geographical clusters of available medical care. In reviewing the variability in these $d(\bar{y})$ values, the differences in the sample bases in different parts of the table should be noted. For example, the top set of estimates is based on all women aged 15-49, the second set is based on only currently married women in this age range, and the following set is based on all births in the past five years. The changing sample bases result in different b values in the design effects for clustering, and this factor contributes to the variability in $d(\bar{y})$ values in table XXII.1.

Table XXII.1. Average $d(\bar{y})$ and $\hat{\rho}$ values for 48 DHS Surveys, 1984-1993

Proportion/mean	$d(\bar{y})$	$\hat{\rho}$
All women aged 15-49 [a]		
Currently married	1.43	0.03
Number of children ever born	1.35	0.02
Number of births in last five years	1.44	0.03
Number of living children under age 5	1.41	0.02
Number of children ever born to women aged 40-49	1.26	0.02
Currently married women aged 15-49		
Wanting no more children	1.32	0.02
Wanting to delay next birth for two or more years	1.24	0.01
Knowing a contraceptive method	2.01	0.14
Knowing a modern contraceptive method	2.08	0.15
Knowing a source of contraceptive supply	1.94	0.12
Currently using any contraceptive method	1.50	0.05
Currently using a modern contraceptive method	1.43	0.04
Currently using intrauterine device (IUD)	1.42	0.04
Currently using pill	1.41	0.04
Currently using condom	1.38	0.03
Currently using a public source of contraceptive supply	1.36	0.03
Sterilized	1.36	0.03
All births in past five years		
Whether mother received medical care at delivery	2.54	0.22
Whether mother received tetanus toxoid	2.02	0.12

Child under age 5		
Whether had diarrhoea in the last two weeks	1.34	0.03
Of above, whether child received ORS <u>b/</u> treatment	1.25	0.12
Children aged 6-35 months		
Height for age less than 2 standard deviations below norm	1.33	0.05
Weight for age less than 2 standard deviations below norm	1.29	0.04
Weight for height less than 2 standard deviations below norm	1.19	0.02
Children aged 12-23 months		
Whether has health card	1.33	0.15
Of above, whether child is fully immunized	1.31	0.21
Children born 1-4 years or 5-9 years ago		
Infant mortality rate 1-4 years preceding the survey	1.23	0.02
Infant mortality rate 5-9 years preceding the survey	1.14	0.01

<u>a/</u>   In approximately one-fourth of the surveys, the sample, and hence all variables in this group, was restricted to ever-married women.

<u>b/</u>   Oral rehydration salts.

44.   The measure of homogeneity ρ is more useful than the design effect due to clustering for planning future surveys, since the design effect depends on both ρ and the cluster size b. The design effect for a past survey will be applicable to the new survey only if both these parameters are the same. However, the possibility of changing b should be considered, since the cluster size can be controlled by the sampler while the intra-class correlation cannot. If an estimate of ρ is available, the effect of changing b may be examined by computing the design effects from clustering for different values of b. Thus, ρ is the key factor of interest. Estimates of average $\bar{\rho}$ were computed from the Demographic and Health Surveys, and the results are also displayed in table XXII.1. As can be seen from the table, the $\bar{\rho}$ values vary considerably, ranging from a low of 0.01 to a high of 0.22. As expected, estimates that depend on the availability of local health facilities tend to have large $\bar{\rho}$ values.

45.   An important finding from the sampling error analyses for the DHS programme is that estimates of $\bar{\rho}$ for a given estimate are fairly portable across countries, provided that the sample designs are comparable. Thus, in designing a new survey in one country, empirical data on sampling errors from a similar survey in a neighbouring country may be employed if necessary and if due care is taken to check on comparability.

I. Survey implementation [45]

46.   While much attention is paid to scientific sampling and the calculation of sampling errors, it should not be forgotten that there are multiple sources of errors in surveys. Errors related to sampling variability can typically be quantified while other errors typically cannot

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[45]   Much of the mateial in the sections on survey organization and the characteristics of the Demographic and Health Surveys have been taken from the draft DHS Survey Organization Manual, drafted by one of the authors of the present chapter.

easily be quantified. Nonetheless, non-sampling errors are often likely to be bigger than sampling errors. This is particularly the case if insufficient attention is paid to training and recruitment of field and data-processing staff. Thus, the control of non-sampling error is a major objective in every Demographic and Health Survey.

47.   With respect to implementation, many Demographic and Health Surveys are carried out in countries where it is difficult to recruit highly qualified field staff and where fieldwork poses significant challenges of transportation, lodging, hygiene, food supply, etc. The need for field staff to travel around the country also opens up issues of security and supervision. These and others are the main reasons that the DHS programme pays great attention to the training of field staff and to supervision in the field and in the office. Yet, even with this emphasis on supervision, there have been instances where the systems were not properly implemented and issues of data quality arose. The steps below describe the typical steps that go into the implementation of a Demographic and Health Survey, emphasizing the need for detailed preparation, extensive training and supervision.

48.   Another important aspect of surveys is the extent to which the survey data become available in a timely manner and are accessible to decision makers, programme managers and analysts. There are too many surveys, particularly in developing countries, that have never been properly analysed or disseminated. The DHS programme is geared towards ensuring that all surveys are analysed in a timely fashion, that the results are published and disseminated and that the data are available for further research. The process required to achieve this is described below.

J. Preparing and translating survey documents

49.   The survey documents in each participating country typically consist of a household questionnaire, individual questionnaire(s) for women and/or men and corresponding manuals. The questionnaires include the DHS core questions, country-specific adaptations and optional modules. DHS staff work with local counterparts on the adaptation of questionnaires, bearing in mind the needs of the country. The DHS model questionnaires are lengthy, so that additions need to be carefully considered in view of the overall length of the instruments. Data quality is likely to suffer if the questionnaires become unwieldy and take too long to implement. The core Interviewer and Supervisor's Manuals are adapted in each country to reflect the country-specific content of the questionnaire.

50.   DHS policy is to have questionnaires translated into and printed in all the major local languages to ensure that the interviews are conducted in the language of the respondents. Any language group that constitutes 10 per cent or more of the sample should have its own translated questionnaire. The need for on-the-spot translation by the interviewer or someone else often cannot be avoided totally, as there may be no adequate language version of a questionnaire for some respondents who fall within the sample. However, the need for on-the-spot translation should be minimized.

51.   Translation is not an easy task and requires both strong linguistic skills as well as an understanding of terms and expressions that are typical in Demographic and Health Surveys. Seldom are all these skills to be found in only one person, particularly where multiple languages are to be used in the same country.

52.   The DHS approach to translation entails having one person translate the DHS questionnaire into the required local language, using the English, French or Spanish version of the core questionnaire. In case there has been an earlier DHS or similar survey that was translated, that translation should certainly be taken into account. Typically, if the same questions are to be asked one would expect the translation to be the same as well, except in cases where the earlier translation was judged to be deficient.

53.   The translated questionnaire is then translated back into its original language by an independent translator. It is important that the back-translation be carried out without reference to the original questionnaire, so as to ensure full independence of the two versions. The next step is to have the two translators and the senior survey staff get together to study the original and the back-translation with a view to resolving discrepancies. This is an important process particularly in the case of languages that are not commonly written, inasmuch as their translation is not a straightforward process.

54.   This process should result in questionnaires that are well understood by the respondents who are to be interviewed in their language. However, it is also necessary to test the translations in the field before adopting them for the survey. It is not necessary to conduct a large number of interviews in the field, but at least from three to five should be carried out in each language, prior to finalizing the translations. It is important to remember that the purpose of the translation is to ensure that every respondent is asked the same question. This does not mean, however, that translation should be literal. A good translation will transmit the same meaning, although it may not be a word-for-word translation. Demographic and Health Surveys are often repeated in countries although the questionnaires for the different rounds may be somewhat different in content. Old translations of most questions and the experience gained during earlier pre-tests and fieldwork can therefore also be used.

55.   Survey documentation such as interviewers' and supervisors' manuals should be translated into the language understood by all the field staff, if the English, French or Spanish versions cannot be used.

K. The pre-test

56.   A pre-test constitutes a crucial means of testing the translations, the skip patterns in the questionnaire, the interviewers' and supervisors' manuals and other survey procedures. It is also a mechanism through which the senior survey staff may gain experience in training field staff prior to the main training course. The DHS country manager typically participates in the pre-test interviews.

57.   For the pre-test, a small number of field staff is trained, usually for about two weeks. Training is provided through local staff, with assistance from the DHS country manager. It is

DHS practice to train future supervisors as interviewers for the pre-test. They later attend interviewer training as supervisors. This ensures that they have very extensive training, that their role is already established during interviewer training, and that there is sufficient staff available to correct and guide the practice sessions and tests that take place during interviewer training.

58.   The pre-test typically covers 100-200 households and interviewing takes about a week to complete. Pre-test interviews are carried out in urban and rural areas that have not been selected for the main survey in order to prevent contamination of the survey results. The body of experience that has accumulated in DHS with this type of survey is by now very extensive, so that the pre-test can be small and does not need to cover many different areas of the country.

59.   Pre-test fieldwork follows the same procedures that will be followed during the main fieldwork. Thus, households are listed so that teams become acquainted with following procedures and using their control forms. The senior survey staff actively supervise all the stages of the pre-test so that they may become familiar with problems that are encountered and may recommend solutions.

60.   The pre-test experience is the basis on which the survey questionnaires and manuals are revised. Errors need to be corrected and improvements made on the basis of the work observed during the pre-test. Key to this activity is the keeping of a running log of all the problems that are found during the training, the practices and the actual interviews. Problems found during the latter are documented through reports by the survey staff that observe pre-test interviews and through a daily debriefing of the pre-test interviewers. It is important that all staff involved in the pre-test take notes on what they observe.

61.   Care is also taken to make sure that any post-pre-test revisions do not introduce new errors. Indeed, if extensive revision of the questionnaires is necessary, a few field interviews with the new instrument are conducted to ensure that the revisions are made correctly and no new problems were introduced.

L. Recruitment of field staff

62.   The quality of a household survey depends to a significant extent on the quality of the field staff. Therefore, the best possible people are recruited for the job. In developing countries, few organizations have a permanent field force of interviewers and supervisors; and even if they do, the interviewers tend to be predominantly men. Female interviewers are required for a Demographic and Health Survey unless the survey is one of men. Therefore, a DHS is generally fielded with staff that have been especially recruited for the job. As the data-collection or fieldwork stage typically lasts from three to six months, recruits are usually people who are not currently holding jobs and who are willing and able to spend several months away from home. In some countries where surveys have more extensive health content, medical staff working for the Ministry of Health have been seconded as interviewers and supervisors.

63.   Recruitment takes into account the number of staff needed to speak each of the languages in which the survey will be conducted. The number of trainees recruited is at least 10-15 per cent

higher than the number needed for fieldwork to allow for attrition and dismissal of candidates who prove to be inadequate. Recruitment is based on an objective test of the candidates' abilities rather than any other characteristics. Candidates should be presentable, able to walk long distances and able to establish good rapport with the people they will need to interview. Having a good team spirit is a further necessary requirement. Under no circumstances should recruitment be based on the candidates' relationship to survey staff, favouritism or other unacceptable recruitment practices.

64.   The supervisor and field editor positions require people that can be team leaders. They need self-confidence, strong motivation and excellent team spirit. All these characteristics are desirable in interviewer candidates as well. However, the main characteristics of a good interviewer are the ability to ask questions in a fluent and natural manner, the ability to put the respondent at ease and the ability to correctly record the answers that are given.

M. Interviewer training

65.   Interviewer training is very similar to the pre-test training, except that it is generally from three to four weeks long, partly because of the larger number of trainees. Candidate interviewers complete at least 5-10 practice interviews in the field during training. Training is provided by local staff, who are assisted by the staff that was trained for the pre-test and the DHS country manager.

66.   Final selection of interviewers is based on their performance on a series of written tests as well as on the observation of their performance during practice interviews in the office and the quality of their pre-test interviews. It is extremely important that the selection criteria be objective. In many places, there is much pressure on survey staff from other individuals to fill the available jobs with those individuals' particular choices. However, the only way to select staff is through a review of their qualifications for the job and an objective rating of their performance during training. Indeed, having objective written tests during training can help survey staff document the reasons why certain candidates could not be accepted.

N. Fieldwork

67.   DHS policy calls for a team approach to fieldwork. The reasons for working in teams are many, but the main one is the ability to achieve a higher level of supervision of the work. An additional reason is the need for special means of transportation for most interviewers. In many countries, the need to safeguard to the well-being of the field staff is another important reason.

68.   Teams generally consist of one supervisor (team leader), one female field editor, one health technician and from three to four female interviewers. If a survey of men is also incorporated, the team usually includes one male interviewer. In most countries, a vehicle is assigned to each team, accompanied by a driver. The size of the team is sometimes limited by the carrying capacity of the vehicles that are used.

69.   The supervisor is in overall charge of the team and the daily organization and supervision of the team's work. The field editor is mainly in charge of checking the quality of the interviews. In actual practice, the supervisor and the field editor will need to share each other's responsibilities in order to build and maintain a good interviewing team.

70.   The main considerations in determining the number of teams are the number of PSUs, the size of the clusters and the anticipated duration of the fieldwork. However, other important considerations are the number of vehicles available, the number of capable interviewers and supervisors that can be recruited and the number of languages spoken in the country. Fieldwork should last from three to six months. Shorter durations are sometimes possible. However, to achieve good data quality, the number of interviewers is kept relatively low owing to constraints on training, availability of good candidates, etc. This in turn limits the number of teams that can be used and determines the duration of the fieldwork.

71.   If possible, all teams start fieldwork in the same general geographical location (such as the same province), in order to make supervision of all teams by senior survey staff possible during the time that supervision is most needed. If teams scatter all across the country from the beginning, it is very difficult to visit all teams immediately.

72.   Survey teams are assigned sample areas taking into account languages spoken and other requirements and the need to ensure that the travel times per team are minimized as much as possible. Generally, teams work six days per week and work away from home for several weeks or months at a time.

73.   If an interview is not completed on the first visit, further attempts are made with the sampled household or respondent, up to three times and over three different days, before classifying the case as non-response. The subsequent contacts are scheduled at times when the respondent is more likely to be at home. When most members of the team have finished work, but one or two callbacks are remaining for another day, it is not uncommon for the team to move to a new cluster and to leave one interviewer behind to "clean up". This is possible when the new cluster is not too distant and the team vehicle can pick up the clean-up interviewer. In other circumstances, the whole team stays until all work in the cluster is completed. As mentioned earlier, there is no replacement for households or individuals that refuse to be interviewed or are otherwise classified as non-response.

74.   Teams need to have a sufficient supply of questionnaires and materials with them to ensure that work can continue at full speed at all times. Completed questionnaires need to be packed, protected from the elements and safeguarded until they can be transmitted to the home office, usually via the roving field supervisors who periodically visit each team.

75.   Heavy emphasis on supervision is a hallmark of a Demographic and Health Survey. Experience suggests that without continuous supervision, data quality will suffer considerably. Therefore, several levels of supervision are employed. The team supervisor and the field editor are required to observe interviewers from time to time and check each questionnaire thoroughly for completeness and accuracy. Where major problems are found, interviewers are required to return to the interviewed person to obtain the correct information. Moreover, the supervisor is

usually responsible for re-interviewing a subsample of about 10 per cent of selected households to ensure that the initial interview was conducted and that all eligible women were correctly identified.

76.   The survey director and DHS staff provide further supervision during the fieldwork. Teams are visited in the field on a regular basis to check on the work of the interviewers, the editors and the supervisors. During this check, at least one or two questionnaires of each interviewer are scrutinized after the field editor has reviewed them. In this way, both interviewer and editor mistakes can be caught at the same time. Supervisory field visits are extremely important. It is not uncommon for some supervisors and editors not to be doing a really good job. This will affect the quality of the work of the interviewers and should be rectified as soon as possible. Field visits are the main mechanism through which this rectification is achieved. A helpful tool during these field visits are the "data quality tables" that are run at regular intervals during the fieldwork to pinpoint specific problems and problems with specific survey teams and interviewers. The data quality tables contain information on the age of the respondents and the age of small children that may be used to check that respondents were properly selected by the interviewers. In addition, they contain information on infant and child deaths in order to gauge the level of omission of dead children. Household and individual response rates are also included to gauge the productivity of each team and interviewer and to see if households and/or respondents are being willfully omitted from the survey. Problems found during the examination of these data quality tables are communicated to the field, so that they can be avoided in the future (see also sect. O below).

77.   The household listing that is part of the household sampling stage is not described in the present section on fieldwork. It is a separate operation that takes place from two to three months before fieldwork by specialized household listing staff, as described in section E. Keeping the listing operation separate from the main fieldwork ensures that listing can be well supervised and that households can be sampled by qualified personnel in the office prior to the main fieldwork. Sample selection as an office operation helps avoid potential biases that often occur if households are selected by the field staff, especially when the "lister" and "sampler" are the same person.

O. Data processing

78.   In Demographic and Health Surveys, data processing generally starts from one to two weeks after the start of fieldwork and is usually completed within a month after the completion of fieldwork. The data entry staff is trained on the questionnaires, by attending either part of the interviewer-training course or a special two- or three-day training. The data-processing coordinator typically attends the entire interviewer-training course.

79.   Data entry takes place in a separate room, where the staff is not disturbed and where the questionnaires are secure. This room should be close to the space where completed questionnaires are stored. All questionnaires are handled several times during data entry and editing, and proximity between the storage and data entry facilities can considerably reduce workload and stress. Data entry staff does not work more than six hours per day, owing to the mechanically intense nature of the operation. Depending on the number of computers available

for the data entry operation, more than one shift of data entry staff may be necessary in order to finish data entry and editing shortly after the end of fieldwork. Double shifts are avoided if possible, since they can lead to inconsistencies as a result of having multiple supervisors and office editors.

80.   DHS policy is to enter the data from all questionnaires twice ("double entry"), compare the results and resolve any discrepancies. Such 100 per cent verification greatly reduces the amount of secondary editing needed to resolve inconsistencies and results in a cleaner, more accurate data set. Double data entry is carried out by two different data entry staff, to ensure the best results. During data entry, range, skip and consistency checks are performed on each questionnaire.

81.   One aspect of the data entry and editing relates directly to the control of data quality. It is DHS procedure to produce a selected set of tables periodically during data entry and editing, with a view to checking for problems that cannot be easily identified during manual editing and data entry of individual questionnaires. These "field check tables" are geared towards discovering whether, for example, interviewers are manipulating the ages of respondents or their children in order reduce their workload, underreporting infant and child deaths, or correctly recording the age at death. These tables are run once a sufficient number of questionnaires have been entered, say, 300, and biweekly thereafter, so that deviant patterns of response or respondent's characteristics can be identified by the interviewer or interviewer team. Staff from the implementing organization and from DHS reviews these tables. Problems are communicated to the appropriate teams, so that corrective action can be taken.

82.   The basic tabulations that are produced for each country are those that were designed on the basis of the data collected in the core questionnaire. Tabulations of data that are derived from questions that were added to the core questionnaire are designed in collaboration with the persons/institutions that requested these extra tables. This work needs to be done early on to ensure that the tabulation process is smooth. All tabulations are checked thoroughly, both by DHS staff and by country counterparts.

83.   Because of the complexity of the data entry, editing, imputation, and tabulation programs, they are developed by DHS data-processing staff, who visit the country to install the programs and set up the process. Typically, the data processing specialist returns at the end of the data processing to help review the final data set, recode some variables, impute missing dates, attach the sample weighting factors, and run the previously designated set of tables for the preliminary and final reports. In tabulating the data, both weighted and unweighted numbers of cases are presented in the reports, although calculations always use final sample weights.

P. Analysis and report writing

84.   The basis for the analysis is the set of DHS model tabulations as modified by the DHS country manager and host country staff to fit the questionnaires used. These tabulations are supplemented by country-specific tables that present the additional data that have been collected in each country. The analysis results in a comprehensive report on the survey data.

85.   A small report on key findings is also produced, with a view to achieving the widest possible dissemination of the data. The report on key findings is produced immediately after or concurrent with the main survey report and is available at the time of the national seminar (see sect. Q on dissemination below).

86.   In addition to producing with these survey reports, DHS assists countries in conducting more in-depth "further analysis" of the survey data. These analyses typically result in a research paper of 30-60 pages and address topics of special interest to the country or funding agencies; but they can also consist of special tabulations and short analytic statements that permit a country to respond to policy-relevant and/or other issues.

Q. Dissemination

87.   Dissemination of the survey results to all the relevant audiences is a key objective of the survey programme. The survey reports are distributed widely at the local level and are also made available to cooperating agencies and other institutions that work in the respective countries. Survey reports are also available for viewing and downloading on the DHS web site. Wall charts, chart books, calendars, posters and other materials are also developed in conjunction with the national seminar to achieve wider dissemination of the survey results.

88.   In addition, a national seminar is held to present the main survey findings to policy makers, programme managers, researchers and representatives of donor organizations. The seminar is generally covered in the mass media, thus helping to generate utilization of these data for policy and programme purposes. Some countries organize regional seminars to ensure that the results are known and utilized beyond the national policy and programme level.

89.   All DHS survey data are entered into the DHS data archive. Nearly all countries that participate in the programme have authorized the use of their data by responsible researchers worldwide. The data archive team at DHS tracks data requests and provides data and documentation to those who are authorized to use them. Data are now available without charge via the Internet, after proper electronic registration and authorization of each user. By the end of 2002, ORC Macro had provided access to DHS data files and sub-files more than 80,000 times. The web site address is: www.measuredhs.com. Further information on the DHS programme is also available on this web site.

R. Use of DHS data

90.   DHS data are typically used to monitor and evaluate progress in maternal and child health and population programmes in participating countries. The availability of repeat-survey information provides countries with the trend data necessary to gauge progress. Data are sometimes used for immediate-action programmes entailing, for example, the provision of iron supplementation in places where anaemia is rampant. More often, they are used to shape policy and to change intervention programme objectives, as well as for long-term health and population

planning. DHS data have been instrumental in galvanizing support for family planning programmes in sub-Saharan Africa and elsewhere by showing that change is possible and is occurring even in some of the poorest countries.

S. Capacity-building

46. 91. One of the aims of the DHS programme is to increase the capacity of participating countries to collect and analyse data through large-scale national-level household surveys. The main mechanism by which this is to be achieved is the development of state-of-the-art basic documentation, such as questionnaires and manuals; the development of software programs that facilitate survey processing in the context of developing countries, and on-the-job training of local counterparts during all stages of the country surveys.

92.   A major contribution to capacity-building is the development of new software. Initially, DHS developed the Integrated System for Survey Analysis (ISSA) program for survey processing. The availability of that software was instrumental in achieving early availability of clean data files and reports. To adapt to new basic hardware and software developments, DHS has launched new survey data-processing software called Census and Survey Processing (CSPro), in collaboration with the United States Bureau of the Census and a software development firm. It is expected that this software will be very widely used and will supplant the variety of programs used by different institutions for the processing of large-scale surveys. The United States Bureau of the Census is already supporting extensive training programmes in the use of this software and it is envisaged that the software will become the standard in most developing countries. This will greatly help capacity-building efforts.

93.   The DHS programme has always provided continuous training and feedback to local counterparts by means of detailed basic documentation for survey implementation, regular technical assistance visits (10-14 per country) and joint work on the preparation of the survey reports. The basic documentation includes manuals on all the important stages of survey execution. These three mechanisms remain the main vehicles for capacity-building in participating countries.

T. Lessons learned

94.   Many valuable lessons for household surveys in developing countries have been learned during the execution of the DHS and its predecessors, for example:

- Sampling frames in many countries need costly field updating in order to be usable for surveys that intend to collect high-quality data. Household listings are often out of date or non-existent. Quality control makes it necessary to select the households in the office rather than leave the selection to field staff, thereby ensuring that all households have a known probability of selection. Selecting households in the office eliminates problems caused by the tendency of interviewers to visit those homes that are more accessible and to leave out those that are more remote. Selecting from a

household list in the office provides un unbiased sampling of the listed households and also permits easy supervision of sample selection in the field.

- Sample updating, when done at the penultimate sampling stage, needs to be closely supervised in order for a full listing of all households to be achieved. It has also been observed in a number of surveys that household listers may be tempted to leave out dwellings that are more remote or that are located in difficult or dangerous areas. Without good supervision, the listing produced by the household listers may be biased.

- Response rates are generally very good, both at the household and at the individual respondent level (see sect. F on response rates).

- Sampling errors and design effects must be calculated for a representative set of survey items of every survey in order to evaluate the effectiveness of the sample design and the precision of the survey estimates.

- A cluster size of 15-20 women is optimum in Demographic and Health Surveys where the need is to balance the variety of demographic and health items - some more clustered than others, some involving small children of sampled women - and the cost of data collection.

- The design effect due to clustering is an increasing function of the cluster size b and the intra-class correlation coefficient ρ. Since ρ is fairly portable across countries with comparable sample designs, ρ, b and the design effects from one survey can be used to design a new comparable survey in another country, as described in chapter VI.

- Training interviewers and supervisors on complex surveys takes from three to four weeks to accomplish. DHS training typically takes three weeks. However, there have been many occasions where training was extended for an additional week or more to achieve proper preparation of the field staff. Most of the problems with the surveys emanate from the field staff, not from the respondents. Proper training and supervision are the main tools with which to avoid those problems.

- Interviewers and supervisors can cause serious problems for a survey. Continuous supervision and quality control are therefore necessary in order that sloppy work and/or deliberate manipulation of the sample or the interview by some interviewers and supervisors to lighten their workload, may be avoided. DHS surveys have provided ample evidence that interviewers have a tendency to code women and/or children out of eligible age ranges so as not to have to interview them. While this problem does not generally involve all the field staff, it does exist and often is confined to only a few of the interviewing teams. Continued vigilance during the whole of the fieldwork is a must.

- An interview that, on average, takes no more than one hour should be striven for. This statement is based not on actual field experimentation with different survey durations, but rather on feedback from field staff. Demographic and Health Surveys vary enormously in length depending on the characteristics of the respondents and the ease with which they can recall dates and events. The duration can vary from as little as 10 minutes for a single woman without children and sexual activity to more than an hour and a half for women with a large number of children who do not easily recall the events that constitute the content of the survey.

- One of the major obstacles with respect to field logistics is associated with the availability of suitable vehicles to transport the survey teams. Vehicles for fieldwork are expensive to acquire and operate because they need to be the large variety of an all-terrain vehicle in order to accommodate the whole survey team. Lack of proper vehicles costs time and impacts negatively on team morale. Even with proper vehicles, interviewers and supervisors will need to walk long distances to reach certain dwellings. Therefore, transporting them to the general survey area should be made as painless as possible.

- One of the most difficult aspects of field logistics is matching the right interviewer with the right respondent and the right questionnaire in the case of countries where multiple languages are used for the interview. The composition of teams according to language capabilities, combined with a detailed deployment plan that takes into account the linguistic requirements for the teams, is a necessity for ensuring that most respondents are interviewed in their native language by an interviewer who speaks that language, using a questionnaire in that language.

- Data entry staff needs to follow the interviewer's training course so as to be able to handle data entry and editing. DHS questionnaires are quite complicated. Participation in interviewer's training gives data entry staff a good understanding of the flow of the questionnaire and of how different parts of the questionnaire are related. They need this knowledge in order to make corrections during the interactive data entry and editing process.

- Double data entry will save time on editing, although it may appear to be costly. In the early Demographic and Health Surveys, data were entered only once. The later surveys have used double data entry to detect those errors that cannot be detected through the range and consistency checking programs and to ensure that the minimum number of questionnaires will need corrections during the editing stage. DHS data-processing staff has decided that the beneficial impact of double data entry on data editing far outweighs its cost.

- Continuous feedback to the field about problems encountered in completed questionnaires during data entry is necessary to achieve data of high quality. Particularly in the early stages of a survey, field staff needs to be told immediately what errors they are committing, so that those errors can be avoided in the future.

Interactive data entry provides a very good mechanism for the early identification of field problems.

- It is necessary to run some tables to reveal response patterns that will not be obvious from editing individual questionnaires. For example, do interviewers purposely code potential respondents as older or younger in order to avoid having to interview them? Only by studying age patterns of respondents over several hundred interviews can problems of this nature be clearly identified.

- In many countries, producing the survey report is one of the most challenging tasks. Capacity-building in survey research is one of the aims of the Demographic and Health Survey programme. Report writing is one of the areas where a strong effort is made to build capacity through interactive work with local authors. More recently, report writing workshops, during which all authors work on chapters of the report with the collaboration of DHS staff, have come to be considered one of the more effective ways of transferring capacity. Nonetheless, report writing is also something of an art and not everyone, irrespective of any advanced degrees in demography or health, is equally good at it.

- Technical assistance is most needed in sampling, data processing and report writing. For other areas, such assistance often takes the form of ensuring that the different survey steps are executed in a timely fashion. The above-mentioned areas have presented the greatest difficulties for local staff in many, if not most, of the Demographic and Health Surveys. In comparison, training and fieldwork are conducted very well by many local agencies. It is therefore necessary to make the needed technical assistance available in order that weaknesses in one or more of the more troublesome areas may be overcome.

- Countries are willing to share their survey data with responsible researchers. Plans for this should be agreed upon prior to survey implementation. The Demographic and Health Surveys programme has been very successful in securing the approval of participating countries with respect to sharing their data with responsible researchers on future research projects. This has created a unique multi-country database which has become invaluable for countries and donors alike. To achieve this goal, agreements need to be reached with the authorities in participating countries at the time the survey is agreed upon. If such agreements are not reached at that time, it is often not possible to negotiate them later because the government may have changed and different people may be in charge of the government department(s) that were in place when the survey was initially being planned.

Annex: Household and woman response rates for 66 surveys in 44 countries, 1990-2000, selected regions

Region	Country	Survey year	Phase	Number of households	Household response rate (percentage)	Number of women	Woman response rate (percentage)
Asia	Bangladesh	1994	DHS III	9 255	99.1	9 900	97.4
	Bangladesh	1997	DHS III	8 762	99.1	9 335	97.8
	Indonesia	1991	DHS II	27 106	99.1	23 470	97.6
	Indonesia	1997	DHS III	34 656	98.8	29 317	98.3
	Pakistan	1991	DHS II	7 404	97.2	6 910	95.7
	Philippines	1993	DHS III	13 065	99.5	15 332	98.0
	Philippines	1998	DHS III	12 567	98.7	14 390	97.2
Eurasia	Kazakhstan	1995	DHS III	4 232	98.7	3 899	96.7
	Kazakhstan	1999	MEASURE	5 960	98.1	4 906	97.8
	Kyrgyzstan	1997	DHS III	3 695	99.4	3 954	97.3
	Turkey	1993	DHS III	8 900	96.8	6 862	95.0
	Turkey	1998	MEASURE	8 596	93.8	9 468	90.6
	Uzbekistan	1996	DHS III	3 763	98.4	4 544	97.2
Latin America	Bolivia	1994	DHS III	9 335	97.6	9 316	92.3
	Bolivia	1997	DHS III	12 281	98.6	1 831	94.6
	Brazil	1991	DHS II	6 416	94.5	6 864	90.7
	Brazil	1996	DHS III	14 252	93.2	4 579	86.5
	Colombia	1990	DHS II	8 106	91.4	9 715	89.0
	Colombia	1995	DHS III	11 297	89.5	2 086	92.2
	Colombia	2000	MEASURE	11 747	92.8	2 531	92.5
	Dominican Republic	1991	DHS II	8 131	87.9	8 200	89.3
	Dominican Republic	1996	DHS III	9 026	97.8	9 034	93.2
	Guatemala	1995	DHS III	11 754	96.1	3 388	92.6
	Haiti	1994	DHS III	4 944	97.5	5 709	93.8

	Nicaragua	1997	DHS III	11 726	98.3	4 807	92.1
	Paraguay	1990	DHS II	5 888	96.5	6 262	93.1
	Peru	1992	DHS II	13 711	98.3	17 149	92.6
Near East	Egypt	1992	DHS II	10 950	98.3	9 978	98.9
	Egypt	1995	DHS III	15 689	99.2	14 879	99.3
	Morocco	1992	DHS II	6 635	99.1	9 587	96.5
	Yemen	1991	DHS II	12 934	99.2	6 515	92.2
Sub-Saharan Africa	Benin	1996	DHS III	4 562	98.6	5 719	96.0
	Burkina Faso	1992	DHS II	5 283	97.3	6 848	92.8
	Burkina Faso	1999	DHS III	4 871	98.8	6 740	95.6
	Cameroon	1991	DHS II	3 647	97.0	4 147	93.3
	Cameroon	1998	DHS III	4 791	98.0	5 760	95.5
	Central African Republic	1994	DHS III	5 583	99.4	6 005	98.0
	Chad	1997	DHS III	6 930	98.7	7 705	96.7
	Comoros	1996	DHS III	2 277	98.9	3 160	96.5
	Côte d'Ivoire	1994	DHS III	5 977	99.3	8 271	97.9
	Ghana	1993	DHS III	5 919	98.4	4 700	97.1
	Ghana	1999	MEASURE	6 055	99.1	4 970	97.4
	Guinea	1999	MEASURE	5 216	97.6	7 117	94.9
	Kenya	1993	DHS III	8 185	97.1	7 952	94.8
	Kenya	1998	DHS III	8 661	96.8	8 233	95.7
	Madagascar	1992	DHS II	6 027	98.6	6 520	96.0
	Madagascar	1997	DHS III	7 349	97.6	7 424	95.1
	Malawi	1992	DHS II	5 409	98.4	5 020	96.6
	Mali	1996	DHS III	8 833	98.7	10 096	96.1
	Mozambique	1997	DHS III	9 681	95.9	9 590	91.5
	Namibia	1992	DHS II	4 427	92.6	5 847	92.7

Niger	1992	DHS II	5 310	98.7	6 750	96.3
Niger	1997	DHS III	6 007	98.7	7 863	96.4
Nigeria	1990	DHS II	9 173	98.1	9 200	95.4
Nigeria	1999	MEASURE	7 736	98.8	10 529	93.2
Rwanda	1992	DHS II	6 292	99.4	6 947	94.3
Senegal	1993	DHS II	3 563	99.0	6 639	95.0
Senegal	1997	DHS III	4 855	98.3	9 186	93.5
Togo	1998	DHS III	7 620	98.6	8 964	95.6
Uganda	1995	DHS III	7 671	98.4	7 377	95.8
United Republic of Tanzania	1992	DHS II	8 560	97.3	9 647	95.8
United Republic of Tanzania	1996	DHS III	8 141	97.9	8 501	95.5
Zambia	1992	DHS II	6 245	99.4	7 247	97.4
Zambia	1996	DHS III	7 365	98.9	8 298	96.7
Zimbabwe	1994	DHS III	6 075	98.5	6 408	95.6
Zimbabwe	1999	MEASURE	6 512	97.8	6 208	95.2

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