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The major features of sample design and implementation for the Turkish Demographic and Health Survey, 2003 (TDHS-2003) are described in this section. Sample design features that are discussed include: target sample size, choice of domains, sampling stages, stratification, degree of clustering, and the relationship of design decisions to the nature of the sample frame<sup>1</sup>. Aspects of the sample implementation include the cartographic and listing work that was needed to update, improve, or generate the ultimate sample lists of households or individuals, as well as the procedures for the final household selection.

This section also presents information on fieldwork, including descriptions of the recruitment and training of interviewers, the composition of interviewing teams, quality control procedures, and various practical problems encountered. Response rates<sup>2</sup> for urban and rural areas and regions are presented. An account is also given of the data processing and analysis, including a description of the calculation of the final weighting factors (design and non-response weights).

### **B.1 Sample Design and Implementation**

A weighted, multistage, stratified cluster sampling approach was used in the selection of the TDHS-2003 sample. The sample was designed in this fashion because of the need to provide estimates for a variety of characteristics for various domains. These domains, which are frequently employed in the tabulation of major indicators from the survey, are:

- Turkey as a whole;
- Urban and rural areas (each as a separate domain);
- Each of the conventional major five regions of the country, namely the West, South, Central, North, and East regions
- The 12 NUTS 1<sup>3</sup> regions, for selected indicators which are based on sufficient number of observations

The major objective of the TDHS-2003 sample design was to ensure that the survey would provide estimates with acceptable precision for these domains for most of the important demographic characteristics, such as fertility, infant and child mortality, and contraceptive prevalence, as well as for the health indicators. The different populations covered by the TDHS-

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<sup>1</sup> For an additional description of these aspects of sample designs for DHS surveys, see the *DHS Sampling Manual*, Basic Documentation Series, No. 8, pp. 59-66, 1996.

<sup>2</sup> For a more complete discussion of the calculation of response rates, see the *DHS Sampling Manual*, Basic Documentation Series, No. 8, pp. 55-57, 1996.

<sup>3</sup> Information is provided on NUTS regions in the sections that follow.

2003 survey were defined as the total population for the Household Questionnaire and all ever-married women younger than age 50 for the Individual Questionnaire. The aim was to survey these populations by designing a sample of households and interviewing an adult member of the household in order to collect information on household members. All ever-married women age 15-49 in the household who were identified as eligible in the household schedule were interviewed. In addition, some information was collected for households and women in a sub-sample of one-half of all households.

## **B.2 Sample Frame**

Different criteria have been used to describe "urban" and "rural" settlements in Turkey. In the demographic surveys of the 1970s, a population size of 2,000 was used to differentiate between urban and rural settlements. In the 1980s, the cut-off point was increased to 10,000 and, in some surveys in the 1990s, to 20,000. A number of surveys used information on the administrative status of settlements in combination with population size for the purpose of differentiation. The urban frame of the TDHS-2003 consisted of a list of provincial centers, district centers, and other settlements with populations larger than 10,000, regardless of administrative status. The rural frame consisted of all district centers, sub-districts and villages not included in the urban frame. The urban-rural definitions of the TDHS-2003 are identical with those in the TDHS-1998.

Initial information on all settlements in Turkey was obtained from the 2000 General Population Census. The results of 2000 General Population Census provided a computerized list of all settlements (provincial and district centers, sub-districts and villages), their populations and the numbers of households.

## **B.3 Stratification**

Currently Turkey is divided administratively into 81 provinces. For purposes of selection in prior surveys in Turkey, these provinces have been grouped into five regions. This regional breakdown has been popularized as a powerful variable for understanding the demographic, social, cultural, and economic differences between different parts of the country. The five regions, West, South, Central, North, and East regions, include varying numbers of provinces. Information on provinces in each of these regions is provided in Table B.1.

In addition to the conventional five geographic regions, a new system of regional breakdown was adopted in late 2002. In accordance with the accession process of Turkey to the European Union, the State Planning Office and the State Institute of Statistics constructed three levels of NUTS regions, which have since become official (Law No. 2002/4720). "NUTS" stands for "*The Nomenclature of Territorial Units for Statistics*". NUTS is a statistical region classification that is used by member countries of European Union (EU). The 81 provinces were designated as regions of NUTS 3 level; these were further aggregated into 26 regions to form the NUTS 2 regions. NUTS 1 regions were formed by aggregating NUTS 2 regions into 12 regions.

Table B.1 List of strata by region, NUTS 1 region, residence, type and province, Turkey 2003

Stratum	Region	NUTS 1 Region	Type	Province
1	West	İstanbul	Urban/Metropol/Slum	İstanbul
2	West	İstanbul	Urban/Metropol/Non-slum	İstanbul
3	West	İstanbul	Urban	İstanbul
4	West	İstanbul	Rural	İstanbul
5	West	West Marmara	Urban	Edirne, Kırklareli, Tekirdağ, Balıkesir, Çanakkale
6	West	West Marmara	Rural	Edirne, Kırklareli, Tekirdağ, Balıkesir, Çanakkale
7	West	Aegean	Urban/Metropol	İzmir
8	West	Aegean	Urban	İzmir, Aydın, Denizli, Muğla, Manisa
9	West	Aegean	Rural	İzmir, Aydın, Denizli, Muğla, Manisa
10	Central	Aegean	Urban	Afyon, Kütahya, Uşak
11	Central	Aegean	Rural	Afyon, Kütahya, Uşak
12	West	East Marmara	Urban/Metropol	Bursa
13	West	East Marmara	Urban	Bursa
14	West	East Marmara	Rural	Bursa
15	West	East Marmara	Urban/Earthquake	Kocaeli, Sakarya, Yalova
16	West	East Marmara	Rural/Earthquake	Kocaeli, Sakarya, Yalova
17	Central	East Marmara	Urban	Bilecik, Eskişehir
18	Central	East Marmara	Rural	Bilecik, Eskişehir
19	Central	East Marmara	Urban/Earthquake	Bolu, Düzce
20	Central	East Marmara	Rural/Earthquake	Bolu, Düzce
21	Central	West Anatolia	Urban/Metropol	Ankara
22	Central	West Anatolia	Urban	Ankara, Konya, Karaman
23	Central	West Anatolia	Rural	Ankara, Konya, Karaman
24	South	Mediterranean	Urban/Metropol	Adana
25	South	Mediterranean	Urban	Antalya, Burdur, Isparta, Adana, İçel, Hatay, K. Maraş, Osmaniye
26	South	Mediterranean	Rural	Antalya, Burdur, Isparta, Adana, İçel, Hatay, K. Maraş, Osmaniye
27	Central	Central Anatolia	Urban	Kırşehir, Nevşehir, Niğde, Aksaray, Kırıkkale, Kayseri, Sivas, Yozgat
28	Central	Central Anatolia	Rural	Kırşehir, Nevşehir, Niğde, Aksaray, Kırıkkale, Kayseri, Sivas, Yozgat
29	North	West Black Sea	Urban	Zonguldak, Bartın, Karabük, Kastamonu, Sinop, Samsun
30	North	West Black Sea	Rural	Zonguldak, Bartın, Karabük, Kastamonu, Sinop, Samsun
31	Central	West Black Sea	Urban	Çankırı, Amasya, Çorum, Tokat
32	Central	West Black Sea	Rural	Çankırı, Amasya, Çorum, Tokat
33	North	East Black Sea	Urban	Artvin, Giresun, Gümüşhane, Ordu, Rize, Trabzon
34	North	East Black Sea	Rural	Artvin, Giresun, Gümüşhane, Ordu, Rize, Trabzon
35	East	Northeast Anatolia	Urban	Erzincan, Erzurum, Bayburt, Ağrı, Kars, Ardahan, Iğdır
36	East	Northeast Anatolia	Rural	Erzincan, Erzurum, Bayburt, Ağrı, Kars, Ardahan, Iğdır
37	East	Central East Anatolia	Urban	Bingöl, Elazığ, Malatya, Tunceli, Bitlis, Hakkari, Muş, Van
38	East	Central East Anatolia	Rural	Bingöl, Elazığ, Malatya, Tunceli, Bitlis, Hakkari, Muş, Van
39	East	Southeast Anatolia	Urban	Adıyaman, Gaziantep, Kilis, Diyarbakır, Şanlıurfa, Mardin, Siirt, Batman, Şırnak
40	East	Southeast Anatolia	Rural	Adıyaman, Gaziantep, Kilis, Diyarbakır, Şanlıurfa, Mardin, Siirt, Batman, Şırnak

Two of the NUTS 1 regions, İstanbul and the Southeastern Anatolia, were given special attention in the sample design process and a comparatively larger share of the total sample was allocated to these regions to ensure that statistically sound estimates for a larger number of indicators would be obtained than would be the case for the remaining 10 NUTS 1 regions. Policymakers, researchers and other concerned circles had voiced interest in information on demographic and health indicators for İstanbul and the Southeastern Anatolian regions in the past. Furthermore, as an add-on study, the İstanbul metropolitan area was designated by UN-Habitat as one of the mega-cities in their International Slum Survey series. In co-operation with UN-Habitat, HUIPS wished to be able to produce estimates for slum<sup>4</sup> and non-slum areas within İstanbul; for this reason, the total sample size for İstanbul was kept at a relatively high magnitude.

One of the priorities of the TDHS-2003 was to produce a sample design that was methodologically and conceptually consistent with the designs of previous demographic surveys carried out by the Hacettepe Institute of Population Studies. In surveys prior to the TDHS-1993, the five-region breakdown of the country was used for stratification. In TDHS-1993, a more detailed stratification taking into account subregions was employed to obtain a better dispersion of the sample. The criteria for subdividing the five major regions into subregions were the infant mortality rates of each province, estimated from the 1990 Population Census using indirect techniques.<sup>5</sup> Using the infant mortality estimates as well as geographic proximity, the provinces in each region were grouped into 14 subregions at the time of the TDHS-1993. The sub-regional division developed during the TDHS-1993 was used in TDHS-1998.

However, the new NUTS regions necessitated further steps for sample design, namely that the sample design of the TDHS-2003 would allow using the conventional five regions as well as the NUTS 1 regions as sample domains. The conventional five regions cannot be obtained by aggregating the 12 NUTS 1 regions. To ensure both regional breakdowns were served by the sample design, 20 mutually exclusive strata had to be created, which, when appropriately aggregated, would produce the five conventional regions or the NUTS 1 regions. It became clear during this exercise, however, that if slight modifications were made to the boundaries of the 5 regions a smaller number of strata would be sufficient for reflecting both breakdowns in the sample design. More specifically, changing the regions to which only 6 provinces out of 81 were included would make it possible to construct 15 strata and serve the same purpose. This exercise was undertaken; also, a series of statistical tests were carried out to make sure that the modification to the regional boundaries would not make any difference in terms of regional indicators.

As a result of these considerations and exercises, 40 separate strata were created for the sample design of the TDHS-2003. This included the designation of 15 “divisions” by urban and rural stratum, the two strata within İstanbul (slum and non-slum), and metropolitan cities as mutually exclusive strata. The stratification also makes possible to combine provinces, which were affected by the earthquake in 1999.

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<sup>4</sup> For convenience purposes, the term “slum” is used to refer to irregularly formed/developed housing areas, irrespective of whether they are subsequently regularized or not. These areas are known to predominantly house lower middle income and poor households.

<sup>5</sup> See Hancıoğlu, A. 1991. *Indirect estimation of mortality from information on the survival status of a close relative: Turkey 1970-1985*, Unpublished Doctoral Dissertation, Hacettepe Institute of Population Studies, Ankara.

## B.4 Sample Allocation

The target sample size of the TDHS-2003 was set at 13,160 households, some 30 percent larger than that of the TDHS-1998. This increase is mainly related with the designation of new strata, the special attention given to İstanbul and Southeast Anatolia region, and with the adjustment of optimum allocation among the NUTS 1 regions. The targeted number was allocated among the five major regions as similar as possible to the TDHS-1998 (Table B.2). However, since İstanbul and Southeast Anatolia regions are over-sampled, the number of observations is higher for West and East regions relative to the previous survey. It was also aimed to target not less than 740 households for each NUTS 1 region. Based on previous experience in sample surveys, the target number of 13,160 households was expected to yield about 11,000 completed household interviews.

Regional categories	TDHS-1993	TDHS-1998	TDHS-2003
<b>Region</b>			
West	2,700	2,800	4,330
South	1,700	1,800	1,840
Central	2,100	2,100	2,450
North	1,500	1,500	1,580
East	2,000	1,800	2,960
Total	10,000	10,000	13,160
<b>NUTS 1 Regions</b>			
İstanbul	-	-	2,080
West Marmara	-	-	740
Aegean	-	-	1,000
East Marmara	-	-	1,040
West Anatolia	-	-	890
Mediterranean	-	-	1,840
Central Anatolia	-	-	740
West Black Sea	-	-	1,030
East Black Sea	-	-	840
Northeast Anatolia	-	-	740
Central East Anatolia	-	-	740
Southeast Anatolia	-	-	1,480
Total			13,160

Note: The number of households for TDHS-1993 and TDHS-1998 are not given NUTS 1 regions has been used since 2002.

To have an adequate representation of clusters within each of the five major regions, it was decided to select 25 households per standard urban segment (under the assumption of each cluster consisting of 100 households) and 15 households per standard rural segment. One exception to this was the selection of 12 households from the two urban segments in İstanbul (slum and non-slum). It was also determined that any of the strata should consist of at least 4

clusters, in order to make easier the sampling error calculations. On this basis, the total number of selected standard segments by regions is shown in Table B.3.

Table B.3 Distribution of sample clusters			
Number of clusters by region, NUTS 1 Regions and urban-rural residence, Turkey 2003			
Regional categories	Urban segments (Population > 10000) (Cluster size= 25 HHs)	Rural segments (Population < 10000) (Cluster size= 15 HHs)	Number of segments
<b>Region</b>			
West*	230	44	274
South	52	36	88
Central	68	50	118
North	44	32	76
East	80	64	144
<b>NUTS 1 Regions</b>			
İstanbul*	164	4	168
West Marmara	20	16	36
Aegean	28	20	48
East Marmara	32	16	48
West Anatolia	26	16	42
Mediterranean	52	36	88
Central Anatolia	20	16	36
West Black Sea	28	22	50
East Black Sea	24	16	40
Northeast Anatolia	20	16	36
Central East Anatolia	20	16	36
Southeast Anatolia	40	32	72
<b>Total</b>	<b>474</b>	<b>226</b>	<b>700</b>

\*The cluster size is 12 households for the 160 metropolitan segments of İstanbul.

## B.5 Sample Selection

### Selection Procedures

For the first-stage sample selection, settlements were grouped within each of the 40 strata, and a systematic random sample of settlements with probability proportional to size (PPS) based on the 2000 General Population Census was selected from the settlement lists. The output from this first stage of the selection was a list of all of the settlements included in the TDHS-2003 sample along with the number of clusters to be drawn from each settlement.

The first stage selection for the two strata of İstanbul metropolitan area was performed by using a more detailed settlement list due to the need for stratification of the city into slum-and non-slum strata. Quarters of İstanbul were classified as slum or non-slum using expert opinion, simply to create probabilistic stratification and taking care of selection probabilities. Similar to settlement selection in other strata in the sample, quarters were selected systematically from these two strata in the first stage.

In Turkey, settlements are not divided into small area units with well-defined boundaries (e.g., census enumeration areas) that can be used for conducting surveys. For some settlements, however, household lists were available from the Structure Schedules that were prepared in 2000 by municipalities in collaboration with the State Institute of Statistics (SIS). Some of these lists were updated in 2002. For 563 clusters, SIS was able to provide household lists from the Structure Schedules. For those settlements, the household lists were subdivided into segments of approximately 100 households with the exception of the two İstanbul metropolitan strata, where the segments included approximately 50 households. The list of these segments constituted the frame for the selection of the 563 clusters. For each of the selected clusters, SIS provided a list of the dwellings units with their full addresses (quarter, area, avenue/street, building and door number).

SIS was not able to provide household lists from the Structure Schedules for settlements without municipalities from which 137 clusters were to be drawn for the TDHS-2003. For these settlements, the list of households had to be prepared in the field. In the case of small settlements (less than 250 households), the entire settlement was listed. In the case of the small number of settlements in which there were more than 250 households, 250 households were listed and an estimate of the remaining number of households in the settlement was obtained through a quick count.

### **Listing and Mapping Activities**

Although the SIS had dwelling lists for many clusters, they did not have the corresponding maps. For this reason, the selected clusters had to be formed with streets that were not always adjacent to each other. Moreover, the lists provided by the SIS did not reflect changes that may have occurred during the period from the 2000 or 2002 to the survey date. Two types of changes were possible: those that could be updated during listing, such as the construction of a new building on the street, a change in the use of a building (e.g., a flat can be used as an office instead of a dwelling), or changes in the names of streets, and those that were more problematic, e.g., the appearance of new quarters in urban centers.

In an effort to develop strategies for dealing with these as well as other possible problems that might arise, a pilot listing activity was undertaken in the capital, Ankara, before the actual listing activity began. The final listing forms, sketch map formats, and listing and mapping manuals were developed based on this pilot activity.

Forty university students/graduates were trained for the main listing activity. Listing teams were formed following a three-day training program in the beginning of November 2003. Each team was provided with maps describing the location of the settlements they were expected to visit, as well as other materials needed for the listing. Sixteen listing teams were formed, each including one mapper and one lister. The listing operation started on 5<sup>th</sup> of November and it was carried under the supervision of the research assistants and regional coordinators from the Hacettepe Institute of Population Studies.

The cluster (standard segment) size was around 100 households (50 households for İstanbul metropolitan) for most of the clusters in urban areas. Only five urban clusters had extremely low numbers of households; in order to obtain 100 households in these clusters,

adjacent streets were added to the original cluster. In some of the selected villages, the total populations were too small, and the original cluster did not include 100 households. In these cases, the village that was nearest to the selected village was included in the sample, and the names of these villages were provided to the listing teams; the lists of 100 households were completed from the two neighboring villages.

The listing operation was implemented in three stages due to seasonal conditions and completed in April 2004. Overall, the quality of the listing work produced by the listers was good although it varied somewhat largely in response to problems the listing teams experienced in working in some geographic areas. Finally, ten clusters were not listed due to problems of accessibility; information on these clusters is presented later in this Appendix.

## **B.6 Questionnaire Development and Pre-test**

### **Questionnaires**

Two main types of questionnaires were used to collect the TDHS-2003 data: the Household Questionnaire and the Individual Questionnaire for ever-married women of reproductive ages. The contents of these questionnaires were based on the DHS Model "A" Questionnaire, which was designed for the DHS program for use in countries with high contraceptive prevalence. Additions, deletions and modifications were made to the DHS model questionnaire in order to collect information particularly relevant to Turkey. Attention also was paid to ensuring the comparability of the TDHS-2003 findings with previous demographic surveys carried out by the Hacettepe Institute of Population Studies. In the process of designing the TDHS-2003 questionnaires, national and international population and health agencies were consulted for their comments.

All TDHS-2003 questionnaires were developed in Turkish and translated into English. English versions of the Household and Individual questionnaires are reproduced in Appendix E.

The Household Questionnaire was used to enumerate all usual members of and visitors to the selected households and to collect information relating to the socioeconomic position of the households. In the first part of the Household Questionnaire, basic information was collected on the age, sex, educational attainment, recent migration and residential mobility, employment, marital status, and relationship to the head of household of each person listed as a household member or visitor. The objective of the first part of the Household Questionnaire was to obtain the information needed to identify women who were eligible for the individual interview as well as to provide basic demographic data for Turkish households. The second part of the Household Questionnaire included questions on never married women age 15-49, with the objective of collecting information on basic background characteristics of women in this age group. The third section was used to collect information on the welfare of the elderly people. The final section of the Household Questionnaire was used to collect information on housing characteristics, such as the number of rooms, the flooring material, the source of water, and the type of toilet facilities, and on the household's ownership of a variety of consumer goods. This section also incorporated a module that was only administered in İstanbul metropolitan households, on house ownership, use of municipal facilities and the like, as well as a module that was used to collect information, from one-half of households, on salt iodization. In households where salt was present, test kits

were used to test whether the salt used in the household was fortified with potassium iodine or potassium iodate, i.e. whether salt was iodized.

The Individual Questionnaire for ever-married women obtained information on the following subjects:

- Background characteristics
- Reproduction
- Marriage
- Knowledge and use of family planning
- Maternal care and breastfeeding
- Immunization and health
- Fertility preferences
- Husband's background
- Women's work and status
- Sexually transmitted diseases and AIDS
- Maternal and child anthropometry.

The Individual Questionnaire also included a monthly calendar, which was used to record fertility, contraception, and marriage for a period of 6 to 6.5 years (depending on the month of interview) beginning in January 1998 up to the survey month. In addition, fieldwork teams measured the heights and weights of children under age five and of all women at ages 15-49.

### **Pre-test**

In July 2004, a three-day pre-test was conducted to ensure that the questions in the TDHS-2003 questionnaires were in a logical sequence, that the wording of the questions was comprehensible, appropriate and meaningful, and that the pre-coded answers were adequate.

Eleven interviewers were trained at the Hacettepe Institute of Population Studies for a period of ten days. The training period included both classroom training and interviews in the field. The interviewers were mostly university students and graduates. In addition to the interviewers, research assistants, who would later become supervisors and regional coordinators, also received training.

Fieldwork for the pre-test was carried out in one district in central Ankara, one district in squatter housing areas of Ankara, and one village in Ankara province. A total of 176 households and 123 ever-married women interviews were completed during the pre-test. Frequency distributions and cross tabulations were obtained shortly after the completion of the interviews. Based on the evaluation of these results and on the feedback obtained from the interviewers, as well as from the Ministry of Health, several minor changes were made to the TDHS-2003 questionnaires.

## **B.7 Data Collection Activities**

### **Staff Recruitment and Training**

Candidates for the positions of interviewers, field editors, supervisors and measurers were solicited in announcements sent to all universities in Ankara. All candidates for the field staff positions were interviewed in four groups by the staff of the Institute of Population Studies using interview guidelines prepared for this purpose. Individuals who met a number of the requirements and had the necessary qualifications were accepted into the training program.

All candidates for the field staff positions were at least high school graduates and the majority was university students and university graduates. Previous survey experience was not among the qualifications for the candidates for the position of interviewers in order to ensure that the trainees had no biases that might result from their previous experience. Approximately 120 applicants were accepted for the training program.

Training of the candidates for the fieldwork positions was conducted in November 2003 for three weeks at the Hacettepe Institute of Population Studies. The training program included general lectures related to the demographic situation in Turkey, family planning and mother and child health, questionnaire training, role playing and mock interviews, field practice in areas not covered in the survey and quizzes to test the progress and capabilities of the candidates. A variety of materials were used during the training sessions, including manuals for supervisors and editors, and for interviewers.

All trainees received the same classroom training during the first two weeks of the training period; at the end of the third week, supervisors, field editors, and measurers were selected from among the candidates, and a number of unsuccessful candidates were eliminated at this stage. Separate classroom training sessions were organized for supervisors, field editors, and measurers.

After the completion of classroom training, a two-day pilot study was conducted in the urban and rural areas of Ankara to complement the training program. Based on the performance of candidates during the training and pilot study, 98 individuals were selected for the main fieldwork activities.

### **Fieldwork**

Fieldwork for the TDHS-2003, including initial interviews, call-backs and re-interviews began in the first week of December 2003, and was completed at the middle of May 2004. Fieldwork teams visited 80 of the 81 provinces in Turkey.

Fieldwork activities were completed in four stages (Table B.4). In the first stage, data collection was carried out by 14 teams, each consisting of a supervisor, a field editor, a measurer, and 4 or 5 female interviewers, depending on the workload of that specific team. The first stage of the fieldwork was completed by the end of January 2004, at which point a number of fieldwork staff, as agreed initially, discontinued working in the field. Six new teams were set up from among the staff of the 14 teams that had worked in the first stage of fieldwork. In the first two stages, 60 percent of all clusters were covered by fieldwork teams. The teams at the second and following stages had the same composition as those in the first stage. These teams continued with data collection activities until the mid of May 2004.

Table B.4 Stages of fieldwork, completed number of clusters in each stage, and number of teams in each stages

Stages	Completed		
	Percentage of clusters	Number of clusters	Number of teams
First	45.5	313	14
Second	15.0	103	6
Third	21.8	150	8
Fourth	17.7	122	5
Total	100.0	688	33

The fieldwork was planned by taking into consideration the climatic conditions in Turkey. Therefore, in the first months the fieldwork was concentrated in the provinces located in the West, the South and the Central Anatolia regions where the winter conditions were expected not to have adverse effects on field operations. The North and the Eastern Anatolia provinces were included to the fieldwork as time passed. The fieldwork was finalized without any interruptions in the period under consideration.

Senior academic staff of the Institute was responsible for visiting the fieldwork teams in turn, checking the quality of data collected, and reporting periodically to the field director in Ankara.

A total of 700 clusters were selected for the TDHS-2003 sample. Of these, interviews were successfully completed in 688 clusters. Due to problems of access, 10 clusters were not listed and, consequently, were not visited by the fieldwork teams; in addition, two clusters that had been listed could not be visited by the fieldwork teams.

## B.8 Data Processing and Analysis

The questionnaires were returned to the Hacettepe Institute of Population Studies by the fieldwork teams for data processing as soon as interviews were completed in a province. The office editing staff checked that the questionnaires for all the selected households and eligible respondents were returned from the field.

The data were entered and edited on microcomputers using the Census and Survey Processing System (CSPPro) software. CSPPro is designed to fulfill the census and survey data processing needs of data-producing organizations worldwide. CSPPro is developed by MEASURE partners, the U.S. Bureau of the Census, ORC Macro's MEASURE DHS+ project, and SerPro S.A.. CSPPro allows range, skip, and consistency errors to be detected and corrected at the data entry stage. The machine entry and editing activities were initiated within three weeks after the beginning of the fieldwork, and were completed a week after the completion of the fieldwork.

During data entry process, full verification was reached by entering each questionnaire to the computers twice by different data editors.

## **B.9 Calculation of Sample Weights**

As mentioned earlier, the TDHS-2003 sample is not a self-weighted one. In particular, a disproportionate number of sample units were chosen from some of the strata, since there would have been inadequate numbers of observations for these areas if the target number of households had been proportionally allocated across regions. The following describes the procedure for calculating the weights to be used in the analysis of the TDHS-2003 results. Since the final selection was not implemented proportionally in strata, and since there was some variation in urban and rural non-response rates, separate weights are calculated for each of the 40 strata.

The major component of the weight is the reciprocal of the sampling fraction employed in calculating the number of units in that particular stratum:

$$W_h = 1 / f_h$$

The term  $f(h)$ , the sampling fraction at the  $h^{th}$  stratum, is the product of the probabilities of selection at every stage in a stratum:

$$f_h = P_{1h} * P_{2h} * P_{3h}$$

where  $P_{ih}$  is the probability of the sample unit in the  $i$ -th sample stage for the  $h$ -th strata.

A second component taken into account in the calculation of the weights is the level of nonresponse for the household and the individual interviews. The adjustment for household nonresponse is equal to the inverse value of:

$$R_{hh} = \text{Completed households/Eligible households.}$$

Eligible households include households where interviews were completed, households where there were no competent respondents, households where interviews were postponed and eventually not completed, refusals, and those dwellings that were not found by the fieldwork teams.

Similarly, the adjustment for non-response in the women's survey is equal to the inverse value of:

$$R_{ww} = \text{Completed women questionnaires/Eligible women.}$$

Approximately half of the households were selected for some sets of questions for both in household questionnaires and in individual questionnaires. The rule for the selection of a household for a half sample was very simple. If the cluster was even-numbered, then the households whose number was even were selected for half samples or vice versa. A separate set

of sampling weights was calculated for the half samples by following procedures similar to those described above. For the half samples, the adjustment for nonresponse is defined as:

$$R_{hs} = \text{Completed questionnaires for half samples} / \text{Eligible households (women) for half sample}$$

The weights for the subregions regions and the factors compensating for nonresponse are shown in Table B.5.1 for women and Table B.5.2 for half sample.

The weights for the TDHS-2003 also include an adjustment for the 12 missing clusters.

The unadjusted weights for the households were calculated by multiplying the above factors for each stratum; they were then standardized by multiplying these weights by the ratio of the number of completed interviewed households to the total unadjusted weighted number of households. A similar standardization procedure was followed in obtaining the weights for the individual women's and half sample data. The final weights for households and individual women and the half sample are shown in Table B.6.

Table B.5.1. Design weights and nonresponse factors

Design weights and nonresponse factors by strata for the women, Turkey 2003

Strata	Region	NUTS 1 Region	Residence	Inverse of sampling fraction	Household level	Women level
1	West	İstanbul	Urban/Metropol/Slum	1160555 / 960	891 / 779	672 / 630
2	West	İstanbul	Urban/Metropol/Non-slum	1587651 / 960	870 / 682	478 / 449
3	West	İstanbul	Urban	24989 / 100	68 / 63	52 / 50
4	West	İstanbul	Rural	76858 / 60	46 / 46	35 / 34
5	West	West Marmara	Urban	469931 / 500	410 / 391	285 / 269
6	West	West Marmara	Rural	362247 / 240	220 / 218	119 / 115
7	West	Aegean	Urban/Metropol	685892 / 400	348 / 300	195 / 183
8	West	Aegean	Urban	686133 / 150	144 / 137	96 / 94
9	West	Aegean	Rural	667273 / 240	211 / 204	139 / 135
10	Central	Aegean	Urban	202772 / 150	129 / 127	94 / 89
11	Central	Aegean	Rural	211704 / 60	48 / 47	50 / 48
12	West	East Marmara	Urban/Metropol	352876 / 400	348 / 300	225 / 200
13	West	East Marmara	Urban	129118 / 100	83 / 75	46 / 46
14	West	East Marmara	Rural	109307 / 60	33 / 33	27 / 26
15	West	East Marmara	Urban/Earthquake	377921 / 100	90 / 86	70 / 62
16	West	East Marmara	Rural/Earthquake	148605 / 60	56 / 56	39 / 38
17	Central	East Marmara	Urban	182284 / 100	86 / 85	68 / 65
18	Central	East Marmara	Rural	65446 / 60	45 / 45	21 / 21
19	Central	East Marmara	Urban/Earthquake	47999 / 100	80 / 77	57 / 55
20	Central	East Marmara	Rural/Earthquake	83237 / 60	55 / 55	44 / 43
21	Central	West Anatolia	Urban/Metropol	915073 / 500	451 / 386	287 / 260
22	Central	West Anatolia	Urban	431779 / 150	128 / 124	99 / 99
23	Central	West Anatolia	Rural	298404 / 240	173 / 172	116 / 107
24	South	Mediterranean	Urban/Metropol	276431 / 400	361 / 349	276 / 270
25	South	Mediterranean	Urban	1052242 / 900	808 / 734	593 / 557
26	South	Mediterranean	Rural	681896 / 540	470 / 446	302 / 286
27	Central	Central Anatolia	Urban	523267 / 500	457 / 438	354 / 343
28	Central	Central Anatolia	Rural	373756 / 240	210 / 205	162 / 159
29	North	West Black Sea	Urban	336258 / 500	427 / 395	275 / 267
30	North	West Black Sea	Rural	318422 / 240	207 / 204	156 / 153
31	Central	West Black Sea	Urban	224473 / 200	180 / 176	138 / 136
32	Central	West Black Sea	Rural	201222 / 90	82 / 82	60 / 59
33	North	East Black Sea	Urban	310851 / 600	497 / 474	362 / 355
34	North	East Black Sea	Rural	349165 / 240	203 / 199	136 / 126
35	East	Northeast Anatolia	Urban	212359 / 500	462 / 452	392 / 384
36	East	Northeast Anatolia	Rural	218260 / 240	200 / 199	158 / 151
37	East	Central East Anatolia	Urban	371366 / 500	478 / 449	383 / 371
38	East	Central East Anatolia	Rural	257644 / 240	227 / 220	208 / 195
39	East	Southeast Anatolia	Urban	756933 / 1000	922 / 877	762 / 742
40	East	Southeast Anatolia	Rural	356146 / 480	455 / 449	416 / 403

Table B.5.2 Design weights and nonresponse factors: half sample

Design weights and nonresponse factors by strata for the half samples, Turkey 2003

Strata	Region	NUTS 1 Region	Residence	Inverse of sampling fraction	Household level	Women level
1	West	İstanbul	Urban/Metropol/Slum	2 * 1160555 / 960	437 / 387	330 / 307
2	West	İstanbul	Urban/Metropol/Non-slum	2 * 1587651 / 960	438 / 346	234 / 216
3	West	İstanbul	Urban	2 * 24989 / 100	35 / 32	30 / 29
4	West	İstanbul	Rural	2 * 76858 / 60	21 / 21	17 / 16
5	West	West Marmara	Urban	2 * 469931 / 500	209 / 201	147 / 138
6	West	West Marmara	Rural	2 * 362247 / 240	112 / 111	61 / 61
7	West	Aegean	Urban/Metropol	2 * 685892 / 400	169 / 151	96 / 91
8	West	Aegean	Urban	2 * 686133 / 150	72 / 69	49 / 48
9	West	Aegean	Rural	2 * 667273 / 240	106 / 104	78 / 76
10	Central	Aegean	Urban	2 * 202772 / 150	65 / 65	49 / 46
11	Central	Aegean	Rural	2 * 211704 / 60	21 / 20	23 / 23
12	West	East Marmara	Urban/Metropol	2 * 352876 / 400	175 / 150	106 / 95
13	West	East Marmara	Urban	2 * 129118 / 100	44 / 41	27 / 27
14	West	East Marmara	Rural	2 * 109307 / 60	17 / 17	13 / 12
15	West	East Marmara	Urban/Earthquake	2 * 377921 / 100	44 / 43	39 / 36
16	West	East Marmara	Rural/Earthquake	2 * 148605 / 60	27 / 27	22 / 22
17	Central	East Marmara	Urban	2 * 182284 / 100	45 / 44	38 / 37
18	Central	East Marmara	Rural	2 * 65446 / 60	23 / 23	11 / 11
19	Central	East Marmara	Urban/Earthquake	2 * 47999 / 100	41 / 41	30 / 30
20	Central	East Marmara	Rural/Earthquake	2 * 83237 / 60	28 / 28	22 / 22
21	Central	West Anatolia	Urban/Metropol	2 * 915073 / 500	228 / 195	148 / 137
22	Central	West Anatolia	Urban	2 * 431779 / 150	67 / 66	51 / 51
23	Central	West Anatolia	Rural	2 * 298404 / 240	85 / 84	69 / 62
24	South	Mediterranean	Urban/Metropol	2 * 276431 / 400	179 / 169	134 / 133
25	South	Mediterranean	Urban	2 * 1052242 / 900	408 / 380	311 / 292
26	South	Mediterranean	Rural	2 * 681896 / 540	234 / 224	145 / 134
27	Central	Central Anatolia	Urban	2 * 523267 / 500	228 / 216	170 / 165
28	Central	Central Anatolia	Rural	2 * 373756 / 240	106 / 102	86 / 85
29	North	West Black Sea	Urban	2 * 336258 / 500	206 / 191	136 / 129
30	North	West Black Sea	Rural	2 * 318422 / 240	101 / 100	77 / 76
31	Central	West Black Sea	Urban	2 * 224473 / 200	94 / 92	73 / 72
32	Central	West Black Sea	Rural	2 * 201222 / 90	41 / 41	28 / 27
33	North	East Black Sea	Urban	2 * 310851 / 600	252 / 246	191 / 187
34	North	East Black Sea	Rural	2 * 349165 / 240	103 / 100	70 / 64
35	East	Northeast Anatolia	Urban	2 * 212359 / 500	230 / 225	183 / 179
36	East	Northeast Anatolia	Rural	2 * 218260 / 240	100 / 99	81 / 77
37	East	Central East Anatolia	Urban	2 * 371366 / 500	239 / 222	194 / 190
38	East	Central East Anatolia	Rural	2 * 257644 / 240	112 / 109	109 / 104
39	East	Southeast Anatolia	Urban	2 * 756933 / 1000	458 / 439	375 / 369
40	East	Southeast Anatolia	Rural	2 * 356146 / 480	229 / 225	209 / 202

Table B.6. Final sample weights

Final weights by strata, Turkey 2003

Strata	Region	NUTS 1 Region	Residence	Household weight in entire sample	Women weight in entire sample	Household weight in half sample	Women weight in half sample
1	West	İstanbul	Urban/Metropol/Slum	1.032975	1.076474	1.025306	1.071969
2	West	İstanbul	Urban/Metropol/Non-slum	1.596013	1.659981	1.592331	1.677833
3	West	İstanbul	Urban	0.268666	0.272980	0.273714	0.275406
4	West	İstanbul	Rural	0.956966	0.962433	0.962123	0.994289
5	West	West Marmara	Urban	0.775002	0.802196	0.772645	0.800518
6	West	West Marmara	Rural	1.137929	1.150401	1.143873	1.112580
7	West	Aegean	Urban/Metropol	1.485965	1.546953	1.441432	1.479031
8	West	Aegean	Urban	3.591818	3.583791	3.585003	3.559570
9	West	Aegean	Rural	2.291544	2.305124	2.270295	2.266295
10	Central	Aegean	Urban	1.025788	1.058475	1.015326	1.051955
11	Central	Aegean	Rural	2.692010	2.739621	2.782636	2.706509
12	West	East Marmara	Urban/Metropol	0.764496	0.840259	0.773033	0.838945
13	West	East Marmara	Urban	1.067484	1.042909	1.040752	1.012279
14	West	East Marmara	Rural	1.814642	1.841054	1.824420	1.922384
15	West	East Marmara	Urban/Earthquake	2.954615	3.259059	2.904523	3.060484
16	West	East Marmara	Rural/Earthquake	1.850288	1.855263	1.860258	1.809366
17	Central	East Marmara	Urban	1.377795	1.408203	1.400228	1.398730
18	Central	East Marmara	Rural	0.814869	0.796109	0.819259	0.796846
19	Central	East Marmara	Urban/Earthquake	0.372553	0.377212	0.360515	0.350652
20	Central	East Marmara	Rural/Earthquake	1.036388	1.036076	1.041972	1.013466
21	Central	West Anatolia	Urban/Metropol	1.597460	1.722755	1.607218	1.688764
22	Central	West Anatolia	Urban	2.219800	2.168697	2.194777	2.134732
23	Central	West Anatolia	Rural	1.067723	1.130884	1.079977	1.169028
24	South	Mediterranean	Urban/Metropol	0.534028	0.533328	0.549772	0.538752
25	South	Mediterranean	Urban	0.988958	1.028638	0.969779	1.004624
26	South	Mediterranean	Rural	1.052607	1.085906	1.049071	1.104133
27	Central	Central Anatolia	Urban	0.815738	0.822517	0.829705	0.831461
28	Central	Central Anatolia	Rural	1.191784	1.186317	1.215547	1.196202
29	North	West Black Sea	Urban	0.543111	0.546506	0.544785	0.558634
30	North	West Black Sea	Rural	1.005744	1.001856	1.006473	0.991819
31	Central	West Black Sea	Urban	0.857532	0.850111	0.861320	0.849391
32	Central	West Black Sea	Rural	1.670282	1.659488	1.679282	1.693834
33	North	East Black Sea	Urban	0.405822	0.404297	0.398618	0.396006
34	North	East Black Sea	Rural	1.108709	1.169152	1.125501	1.197338
35	East	Northeast Anatolia	Urban	0.324309	0.323444	0.326088	0.324255
36	East	Northeast Anatolia	Rural	0.780347	0.797725	0.788514	0.806783
37	East	Central East Anatolia	Urban	0.590703	0.595771	0.600574	0.596441
38	East	Central East Anatolia	Rural	0.827499	0.862345	0.828494	0.844570
39	East	Southeast Anatolia	Urban	0.594489	0.596458	0.593126	0.586280
40	East	Southeast Anatolia	Rural	1.032975	1.076474	1.025306	1.071969

## **B.10 Coverage of the Sample**

The results of sample implementation for the household and the individual interviews for the country as a whole, for urban and rural areas, and for the five regions of Turkey are shown in Tables B.7.1 and for NUTS 1 regions in Table B.7.2. The results indicate that, of the 13,049 households selected, the TDHS fieldwork teams successfully completed interviews with 10,836 (83 percent). The main reasons that eligible households were not interviewed were that some of the listed dwelling units were found to be vacant at the time of the interview or the household was away for an extended period. A total of 11,659 households were located and visited, of which 10,836 households were successfully interviewed. Overall, the household response rate was calculated as 93 percent.

The household response rate was higher in rural areas than in urban areas and highest in the East, North and South regions. Among NUTS 1 regions the response rates in İstanbul is the lowest with 84 percent whereas it is more than 98 percent in Northeast Anatolia.

In the interviewed households, 8,477 eligible women were identified, of whom 96 percent were interviewed. Among the small number of eligible women not interviewed in the survey, the principal reason for non-response was the failure to find the woman at home after repeated visits to the household.

The eligible woman response rate was similar in urban and rural areas; the rates for the five regions were 3 percent within each other. Surprisingly, the response rate for eligible women in İstanbul (95 percent) is not the lowest value among the NUTS 1 regions. The response rates of 12 NUTS 1 ranged between 93 and 98 percent. The highest response rate was calculated for the West Blacksea region and the lowest was calculated for the West Anatolia region.

The overall response rate for women in the TDHS-2003 was calculated as 89 percent. It ranged from 83 percent in the Central region to 93 percent in the East region. In terms of NUTS 1 regions, the overall response rates ranged from 79 percent (İstanbul) to 96 percent (Northeast Anatolia region).

Table B.7.1 Sample implementation according to residence and region

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, Turkey 2003

Result	Residence		Region				Total	
	Urban	Rural	West	South	Central	North		East
<b>Selected households</b>								
Completed (C)	81.6	87.4	79.0	85.1	83.0	80.2	89.2	83.0
Household present but no competent respondent at home (HP)	2.9	1.2	3.4	3.1	2.1	1.8	1.3	2.5
Postponed (P)	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Refused (R)	4.4	0.4	6.3	2.4	2.0	1.8	1.7	3.4
Dwelling not found (DNF)	0.3	0.2	0.4	0.6	0.0	0.3	0.2	0.3
Household absent (HA)	5.0	7.4	4.7	4.2	8.0	9.9	3.6	5.6
Dwelling vacant/address not a dwelling (DV)	5.4	3.1	5.5	4.6	4.6	6.0	3.6	4.8
Dwelling destroy (DD)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Partly completed (PC)	0.2	0.1	0.3	0.1	0.1	0.1	0.1	0.1
Other (O)	0.1	0.2	0.3	0.1	0.1	0.1	0.2	0.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100
Number of sampled households	9,754	3,295	4,267	1,797	2,433	1,587	2,965	13,049
Household response rate (HRR) <sup>1</sup>	91.3	97.9	88.3	93.3	95.1	95.4	96.4	92.9
<b>Eligible women</b>								
Completed (EWC)	95.5	95.9	94.1	95.0	95.7	97.0	96.9	95.6
Not at home (EWNH)	2.4	3.1	3.1	2.7	2.7	2.5	2.0	2.6
Postponed (EWP)	0.1	0.0	0.1	0.0	0.2	0.0	0.0	0.1
Refused (EWR)	1.3	0.0	1.7	1.0	0.7	0.1	0.6	1.0
Partly completed (EWPC)	0.4	0.3	0.6	0.9	0.3	0.0	0.2	0.4
Other (EWO)	0.3	0.6	0.4	0.3	0.3	0.4	0.3	0.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100
Number of women	6,259	2,188	2,478	1,171	1,550	929	2,319	8,447
Eligible women response rate (EWRR) <sup>2</sup>	95.5	95.9	94.1	95.0	95.7	97.0	96.9	95.6
Overall response rate (ORR) <sup>3</sup>	87.1	93.9	83.0	88.7	91.0	92.5	93.4	88.8

Note: The household response rate is calculated for completed households as a proportion of completed, no competent respondent, postponed, refused, dwelling not found and Partly completed. The eligible woman response rate is calculated for completed interviews as a proportion of completed, not at home, postponed, refused, partially completed and "other." The overall response rate is the product of the household and woman response rates.

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

$$\frac{C}{C + HP + P + R + DNF + PC}$$

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

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

<sup>3</sup> The overall response rate (ORR) is calculated as:

$$ORR = HRR * EWRR$$

Table B.7.2 Sample implementation according to NUTS 1 regions

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 NUTS 1 regions, Turkey 2003

Result	İstan- bul	West Mar- mara	Ae- gean	East Mar- mara	West Ana- tolia	Mediterranean	Central Ana- tolia	West Black Sea	East Black Sea	North- east Ana- tolia	Central East Ana- tolia	South- east Ana- tolia	Total
<b>Selected households</b>													
Completed (C)	76.4	84.6	81.8	79.0	79.0	85.1	86.7	82.8	79.5	91.2	90.3	87.8	83.0
Household present but no competent respondent at home (HP)	5.3	0.4	1.7	1.8	3.6	3.1	2.0	1.2	2.4	0.3	3.1	1.0	2.5
Postponed (P)	0.1	0.0	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Refused (R)	8.7	1.7	4.1	3.9	4.3	2.4	0.9	2.1	0.8	0.8	1.5	2.3	3.4
Dwelling not found (DNF)	0.3	0.7	0.3	0.4	0.0	0.6	0.1	0.4	0.0	0.3	0.1	0.1	0.3
Household absent (HA)	3.8	8.6	5.7	6.3	7.3	4.2	7.1	7.6	11.1	4.8	3.0	3.4	5.6
Dwelling vacant/address not a dwelling (DV)	4.5	3.9	5.5	8.4	5.4	4.6	3.0	5.7	6.1	2.5	1.9	5.0	4.8
Dwelling destroy (DD)	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Partly completed (PC)	0.4	0.1	0.4	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.1
Other (O)	0.5	0.0	0.2	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.3	0.2
Total	100 2,05	100	100	100	100	100	100	100	100	100	100	100	100 13,04
Number of sampled households	6	720	996	1,028	863	1,797	742	1,035	847	714	741	1,510	9
Household response rate (HRR)	83.7	96.7	92.6	92.7	90.7	93.3	96.4	95.6	96.1	98.3	94.9	96.3	92.9
<b>Eligible women</b>													
Completed (EWC)	94.0	95.0	95.6	93.1	92.8	95.0	97.3	97.8	96.6	97.3	95.8	97.2	95.6
Not at home (EWNH)	2.8	3.2	1.9	4.7	4.6	2.7	1.6	1.9	2.6	2.4	3.0	1.3	2.6
Postponed (EWP)	0.2	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Refused (EWR)	1.8	0.7	1.6	1.7	1.4	1.0	0.4	0.2	0.0	0.0	0.3	1.1	1.0
Partly completed (EWPC)	0.8	0.5	0.3	0.0	0.6	0.9	0.4	0.0	0.0	0.0	0.2	0.3	0.4
Other (EWO)	0.3	0.5	0.5	0.5	0.0	0.3	0.4	0.2	0.8	0.4	0.7	0.2	0.4
Total	100 1,23	100	100	100	100	100	100	100	100	100	100	100	100
Number of women	7	404	574	597	502	1,171	516	629	498	550	591	1,178	8,447
Eligible women response rate (EWRR)	94.0	95.0	95.6	93.1	92.8	95.0	97.3	97.8	96.6	97.3	95.8	97.2	95.6
Overall response rate (ORR)	78.7	91.9	88.6	86.3	84.2	88.7	93.8	93.5	92.9	95.7	90.9	93.6	88.8