Appendix B

SAMPLE DESIGN
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The main objective of the Egypt Demographic and Health Survey sample design is to provide reliable estimates of fertility and mortality and of the use of contraceptive methods at the national level, for urban and rural areas and for three geographic units (the Urban Governorates, Lower Egypt and Upper Egypt). In addition, separate contraceptive prevalence estimates were desired for each of 21 governorates. To achieve these objectives, a three-stage probability sample was implemented. The first stage involved the selection of 228 primary sampling units (shiakhas/towns in urban areas and villages in rural areas). The second stage included the selection of two segments within each selected primary sampling unit. The third and final stage consisted of the selection of a sample households living in those segments.

Household data were to be collected from all households in the sample, and individual questionnaires were to be completed for all ever-married women 15-49 who were present in the household during the night before the interview. To obtain information on maternal mortality, a special module was administered during the household interview in a subsample of one-half of the total sample. Data on weight and length of children 3-36 months born to women interviewed in the EDHS in the subsample were also obtained in order to obtain insight into the nutrition status of Egyptian children.

The following describes in detail the EDHS sample design. A description of the field activities involved in the implementation of the design is included in Chapter 1 of this report.

B.1 COVERAGE OF THE SAMPLE

Egypt is divided into 26 governorates. The EDHS was carried out in only 21 of these governorates. The five Frontier Governorates (Red Sea, New Valley, Matruh and North and South Sinai) were excluded from coverage in the EDHS because it would have required disproportionate resources to survey the dispersed population in these governorates. The net effect on national estimates of excluding these governorates is negligible because of their small size.

B.2 SAMPLE SIZE

A criterion in determining the sample size for the EDHS was the necessity for the number of ever-married women interviewed in the survey from relevant subpopulations to
be sufficiently large to allow for meaningful analysis. The target sample was fixed at 11,250 interviews of ever-married women age 15-49, who were expected to be found in around 12,500 households. The size of the target sample was set based on an assumption of a non-response rate of 10 percent.

The target sample was generally divided among the governorates in proportion to their size. In five governorates (Port Said, Suez, Ismailia, Damietta and Aswan), the sample design called for more households to be selected than the would have been sampled if a strictly proportional allocation had been observed; the decision to oversample in these governorates was made in order to obtain a sufficient number of households to allow for governorate-level contraceptive prevalence estimates.

B.3 SAMPLE FRAME

In selecting the EDHS sample, shiakhas/towns in urban areas and villages in rural areas constituted the frame of the primary sampling units (PSUs). A list of shiakhas and villages grouped by governorate was prepared using preliminary results from 1986 Egyptian census, which were provided by the Central Agency for Public Mobilization and Statistics. In order to provide for implicit stratification by geographic location, the lists of shiakhas and villages within each governorate from which the first-stage units selected were arranged in serpentine order geographically, beginning from the northwest corner of the governorate, using the map of each governorate. In preparing the lists, any unit with a total population of less than 270 as reported in 1986 Census was combined with a neighboring PSU in the same governorate.

For the second stage selection, a frame was required only for the PSUs selected during the first stage. Before carrying out the second stage of selection, maps were obtained for these PSUs.

B.4 SAMPLE SELECTION

First Stage

In this stage a total of 228 PSUs were selected from 21 governorates (108 shiakhas/towns and 120 villages). A list of PSUs allocated according to governorate and residential sector (urban/rural) is given in Table B.1. Figure B.1 shows the geographic distribution of the 228 sampling units selected in the EDHS.

Within each governorate and residential sector (urban/rural), the sample of PSUs was selected systematically with probabilities proportional to the 1986 Census population in the group using the equation:
\[ P_1 = \frac{a M_i}{\sum M_i} \]

where:

- \( a \) = the total number of PSUs to be selected from the governorate-residential sector;
- \( M_i = \frac{1}{270} \)-th of the total population in the PSU rounded to the nearest whole integer;
- \( \sum M_i = \) the sum of the \( M_i \) values for all PSUs in the governorate-residential sector.

**Second Stage**

At the second stage, two segments were selected from each PSU (i.e., a total of 456 segments). In order to select the segments, detailed maps for each selected PSU were obtained and divided into approximately equal-sized segments. In the segmentation process, a main requirement was that the resulting segments have well-defined boundaries. After the segmentation operation was completed, the segments were listed in a serpentine order by geographic location within the PSU, beginning from the Northwest corner of the PSU.

In order to obtain a measure of size for each segment, different procedures were adopted in urban and rural areas. For urban PSUs, a quick count operation was carried out in order to obtain an estimate of the size of each segment (For a description of the quick count operation, see Chapter 1). For rural PSUs, an estimate of the number of households in each segment was obtained by measuring on the village maps the proportion of the total residential area within the village included in the segment and multiplying that figure by \( \frac{1}{5} \)-th of the village population reported in the 1986 Census. Any segment with less than 15 households was combined with the next segment.

Two segments then were selected systematically from each PSU with probability proportional to size using the following equation:

\[ P_2 = \frac{2 M'_{ij}}{\left( \sum_j M'_{ij} \right)} \]

where:

- \( M'_{ij} = \frac{1}{27} \)-th of the estimated number of households assigned to the \( j \)-th segment in the \( i \)-th PSU;
- \( \sum_j M'_{ij} = \) the sum of the measures of sizes for all segments in the \( i \)-th PSU.
Third Stage

A list of all households living within each of the segments selected at the second stage was prepared for third stage sample selection (See Chapter 1 for a description of the household listing). Using the household lists, a systematic sample of households was selected, with the selection interval:

\[ I = \left( \frac{aM_i}{\sum_j M_j} \right) \left( \frac{2M_i^*}{\sum_j M_j^*} \right) / f' \]

where:

\[ f' = kf, \] the overall sampling fraction for each governorate

and

\[ f = \frac{11,250}{10,279,000} = 0.0011, \] the overall sampling fraction based on proportional sampling with an initial sample size of 10,000 adjusted by a 10 percent non-response

\[ k = \text{factor (1, 2, 3, 4, or 5) used to adjust the overall sampling fraction in governorates which were oversampled.} \]

During the sample implementation in rural PSUs, there was frequently significant variation between the target and actual number of households. This was largely due to the imprecision in assigning measures of size in some rural PSUs, since some of the maps used were 10 years old. In terms of the overall sample, the deviations in the rural sample were not a major problem. However, in five governorates, the overall sample size fell below the number of households that was considered necessary to provide reliable estimates of the contraceptive prevalence rate, one of EDHS goals. In four of these governorates (Damietta, Kafr El-Sheikh, Fayoum and Beni Suef), the final stage selection procedures were adjusted to increase the sample take from the segments already selected for the EDHS to provide the number of households needed for prevalence estimates. In the fifth governorate (Ismailia), additional segments were selected and listed; the sample drawn from these additional segments was only used in preparing separate prevalence estimates for the governorate and was not included in estimating figures for Egypt as a whole.

Weighting of the Sample Results

In order to obtain the estimates presented in this report, the sample cases (households and eligible women) are weighted to take into account oversampling in eight governorates (Port Said, Suez, Ismailia, Damietta, Aswan, Kafr El-Sheikh, Fayoum and Beni Suef). The weights were standardized so that the weighted number of completed cases at the national level is equal to the unweighted total.
### Table B.1 List of Primary Sampling Units by Governorate, Egypt DHS, 1988

#### URBAN GOVERNORATES

<table>
<thead>
<tr>
<th>Cairo</th>
<th>Borham</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assad</td>
<td>EL-Zawia El-Hamraa El-Balad</td>
</tr>
<tr>
<td>El-Ezab</td>
<td>EL-Zayton El-Gharbia</td>
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<td>El-Mataria El-Gharbia</td>
</tr>
<tr>
<td>EL-Masaken El-Amiria El-Shamalia</td>
<td>El-Zahraa And Masaken El-Helmia</td>
</tr>
<tr>
<td>Ain Shams</td>
<td>El-Nozha</td>
</tr>
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<td>El-Salam El-Sharkia</td>
<td>El-Koba</td>
</tr>
<tr>
<td>El-Montaza</td>
<td>El-Shamasheryg</td>
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<td>Mohamed Mazher</td>
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<td>Souk El-Selah</td>
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<tr>
<td>El-Tounsi</td>
<td>Fom EL-Khalig And Dir El-Nahas</td>
</tr>
<tr>
<td>Abo-El-Seoud And EL-Madabegh</td>
<td>Ezbat Nafae</td>
</tr>
<tr>
<td>El-Essawia</td>
<td>Helwan El-Sharkia</td>
</tr>
<tr>
<td>El-Massara El-Baled</td>
<td></td>
</tr>
</tbody>
</table>

| Alexandria             |                             |
| El-Dekhila             |                             |
| El-Riada               | El-Ibrahimia Bahary         |
| Dona El-Gadida         | El-Akssaa And Bakous       |
| El-Scouf kebly         | San Stefano                |
| El-Amriah Sharek       | El-Mohagrin                |
| Raghcb Basha           | El-Sobhia And Ezbat Sharkes |
| El-Wardian Shark       | Gheit El-Enab Sharky       |

| Port Said              |                             |
| El-Galaa               | Adly                        |
| El-Manakh              | El-Abassy                  |
| El-Ezab                | Port Fouad                 |
| El-Kaboutty            |                             |

| Suez                   |                             |
| Faisal                 | El-Sabah                   |
| El-Ganaien             | Kism Thales El-Arbain      |
| Kism Thales El-Arbain  | Kism Rabia EL-Arbain       |
### LOWER EGYPT

**Damietta**
- **Urban**
  - Kism Awel
  - Faraskour City
- **Rural**
  - El-Mohamdia
  - El-Sawalem
  - Shat El-Sheikh Dorgham
  - Ezab El-Basarta
  - Kafr El-Arab

**Dakahlia**
- **Urban**
  - El-Mataria City
  - Kism Awel Meet Talkha
  - Kism Kafr El-Bedmas
  - Meet Ghamr City
- **Rural**
  - Hafeer Shehab El-Din
  - El-Gamamla
  - El-Nahda El-Gadida
  - Kafr Abo-Zekry
  - Traanis El-Baher
  - Bahout
  - El-KHazardar
  - Meet Demsis And Kafr Abo-Garag
  - Shoubra Sendy
  - Beshla
  - Meet Mohsen

**Sharkia**
- **Urban**
  - Abo-Kabeer City
  - EL-Eshara
  - Belbeis City
- **Rural**
  - El-Manasafour
  - Shenait El-Garaboua
  - El-Malakein El-Baharia
  - El-Haggagin El-Mostagada
  - Kafr El-Olmaa
  - Mobasher
  - Shoubak Basta
  - El-Mahmodia
  - Kesheik
  - Meet Gaber
  - Shalhalamon

**Kalyubia**
- **Urban**
  - Banha El-Gadida
  - El-Kanater El-Khairia
  - Bahtim
  - Mostorod
  - Bigam
- **Rural**
  - Tesfa
  - Marsafa and Kafr Ahmed Hashesh
  - Monshaa El-Keram
  - Kafr El-Amaar
  - Kronfil
  - Abo-Zabal
Kafr El-Sheikh

Urban
Desouk City

Rural
Sad Khamis
El-Kaf El-Gadid
El-Marazik

Gharbia

Urban
Naser
Koubry El-Mahata

Rural
El-Sheen
Mahalat Mohsen
Eshenaway
Mahalat Rouh

Menoufia

Urban
Berket El-Sabaa City

Rural
Kafr El-Saddat
Meet Baraa And Kafr El Shaheed
Balmusht
El-Barania

Bchcra

Urban
Kafr El Dawar

Rural
Shoubra
El-Sahel
El-Nameria
Nediba
Abo-Hamada
Kom Sherik

Ismailia

Urban
Hai El-Sheikh Zaid
El-Tal El-Kabir City

Rural
Abo-Sower Balad
El-Kassassin El-Gadida
UPPER EGYPT

Giza
Urban
El-Mounira
Meet Okbaa
Monshaa Elian
Sakiet Meky
El-Ayaat City
Rural
El-Sabil
Warak El-Arab
Zahran And Gaber
El-Kedaia

Abdel-Naim
Boulak El-Dakrour
El-Haram
Monshet El-Bakary

Safet El-Laban
Nazlet El-Ashter
Kafr Hamed

Beni-Suef
Urban
El-Mermah And El-Ezab

El-Fashn City

Rural
Efwa
Sanour
Mazoura

Bani Addi
Bani Ahmed

Fayoum
Urban
Sanoures City
Kism Thany El-Fayoum

Rural
El-Mashrek Kebly
Dar El-Salam
Garado
El-Kabas El-Gadida
Siala

Menya
Urban
Maghagha City
Kism Rabaa

Rural
Gaziret Sharouna
Marzouk
Zawiat Soultan
El-Ashmounin
Nazlet El-Badrman
El-Sheikh Fadel
Tahha El-Amidaa
El-Sembelawein
Ezbet Galal
Assiut
Urban
Dairout City
El-Walidia

Rural
Kaser Hedar
El-Hamam
El-Wasta
El-Nawamis

Sheiakha Thania

Souhag
Urban
Tema City
El-Kabtsh

Rural
Gaziret Shandwil
El-Sheikh Youssef
Awlad Yehia Bahry
El-Attamna

Mounshat Khashaba
Beni Hussein
Bakour

Qena
Urban
Kism Thalth

Rural
Kousir Bakhanes
El-Sabriat
El-Hela
El-Rayayna

Armant city
El-Kaser
El-Salhia
El-Zawaida
Kiman El-Mataana

Aswan
Urban
Kom Ombo City
Mantekat Khazan Asswan

Sheiakha Thania

Rural
El-Ramady Bahry
El-Mansouria

El-Madik
El-Koubania
Figure B.1
Distribution of Sampling Points
Egypt Demographic and Health Survey, 1988

Lower Egypt

Urban Governorates

Upper Egypt

Urban
Rural
Urban Gov.