# APPENDIX A

# ORGANIZATIONS INVOLVED IN NFHS-2 FIELDWORK

| Field Organization | State(s) |
|---|---|
| **ACNielsen Research Services Pvt. Ltd.**<br>B–4/58, 2nd Floor, Safdarjung Enclave<br>New Delhi–110 029 | Assam<br>Uttar Pradesh |
| **Centre for Operations Research and Training**<br>402, Woodland Apartments, Race Course<br>Vadodara–390 007 | Maharashtra<br>Rajasthan |
| **Centre for Population and Development Studies**<br>G–3, Shanthi Apartments<br>Anand Nagar Colony, Khairatabad<br>Hyderabad–500 004 | Madhya Pradesh<br>Orissa |
| **Centre for Research in Rural and Industrial Development**<br>2–A, Sector 19–A<br>Madhya Marg, Chandigarh–160 019 | Haryana<br>Himachal Pradesh<br>Punjab |
| **Economic Information Technology**<br>S–4, Metropolitan Co-operative Housing Society Ltd.<br>Sector A, Lane No. 8<br>Calcutta–700 039 | Sikkim<br>West Bengal |
| **Indian Institute of Health and Family Welfare**<br>Vengalrao Nagar<br>Hyderabad–500 038 | Andhra Pradesh |
| **ORG Centre for Social Research**<br>A Division of ORG-MARG Research Ltd.<br>D-24, South Extension Part I<br>New Delhi–110 049 | Bihar<br>Jammu and Kashmir<br>Kerala |
| **Population Research Centre**<br>Department of Statistics<br>Faculty of Science<br>M.S. University of Baroda<br>Lokmanya Tilak Road, Vadodara–390 002 | Gujarat |
| **Population Research Centre**<br>Institute for Social and Economic Change<br>Nagarbhavi P.O., Bangalore–560 072 | Karnataka |
| **Population Research Centre**<br>Institute of Economic Growth<br>University Enclave<br>Delhi–110 007 | Delhi |
| **Population Research Centre**<br>J.S.S. Institute of Economic Research<br>Vidyagiri, Dharwad–580 004 | Goa |
| **Population Research Centre**<br>The Gandhigram Institute of Rural Health<br>and Family Welfare Trust<br>Ambathurai R.S., Dindigul District<br>Tamil Nadu–624 302 | Tamil Nadu |
| **TNS Mode Research Private Limited**<br>1796–A Kotla Mubarkpur<br>Behind NDSE–I<br>New Delhi–110 003 | Arunachal Pradesh, Manipur,<br>Meghalaya, Mizoram,<br>Nagaland, Tripura |

# APPENDIX B

# SAMPLE CHARACTERISTICS FOR STATES

The sample design for NFHS-2 is described in Chapter 1 and more detailed information about the sample design for each state is contained in the individual state reports for NFHS-2. Table B.1 summarizes the basic characteristics of the sample design in each state including the variables used for rural stratification and the number of primary sampling units (PSUs) selected in urban and rural areas. A total of 1,021 urban PSUs and 2,144 rural PSUs were selected for the sample. In rural areas, the sample was stratified according to a number of variables in each state, including regions (group of districts, *tehsils,* or *talukas*), subregions, village size, percent of males in the nonagricultural sector, percent of scheduled castes and scheduled tribes, and female literacy.

Table B.1  Sample characteristics

| State | Population[1] (1991) | Variables for rural stratification | Urban | Rural | Total |
|---|---|---|---|---|---|
| | | | Number of primary sampling units | | |
| Andhra Pradesh | 66,508,008 | Region (group of districts)<br>Village size<br>Percent of SC/ST population<br>Female literacy (implicit) | 36 | 97 | 133 |
| Arunachal Pradesh | 864,558 | Region (group of *tehsils*)<br>Village size<br>Percent of SC/ST population<br>Female literacy (implicit) | 6 | 44 | 50 |
| Assam | 22,414,322 | Region (group of districts)<br>Village size<br>Percent of SC/ST population<br>Female literacy (implicit) | 33 | 67 | 100 |
| Bihar | 86,374,465 | Region (group of districts)<br>Subregions<br>Village size<br>Percent of SC/ST population<br>Female literacy (implicit) | 31 | 202 | 233 |
| Delhi | 9,420,664 | Village size<br>Female literacy (implicit) | 90 | 10 | 100 |
| Goa | 1,169,793 | Region (group of *talukas*)<br>Female literacy (implicit) | 20 | 30 | 50 |
| Gujarat | 41,309,582 | Region (group of districts)<br>Village size<br>Percent of SC/ST population<br>Female literacy (implicit) | 46 | 87 | 133 |
| Haryana | 16,463,648 | Region (group of districts)<br>Village size<br>Percent of males in nonagricultural sector<br>Female literacy (implicit) | 33 | 67 | 100 |
| Himachal Pradesh | 5,170,877 | Region (group of districts)<br>Village size<br>Percent of SC/ST population<br>Female literacy (implicit) | 33 | 67 | 100 |
| Jammu & Kashmir | 7,718,700 | Region (group of districts)<br>Village size<br>Female literacy (implicit) | 50 | 67 | 117 |
| Karnataka | 44,977,201 | Region (group of districts)<br>Village size<br>Percent of SC/ST population<br>Female literacy (implicit) | 41 | 92 | 133 |
| Kerala | 29,098,518 | Region (group of districts)<br>Village size<br>Female literacy<br>Percent of males in nonagricultural sector (implicit) | 33 | 67 | 100 |
| Madhya Pradesh | 66,181,170 | Region (group of districts)<br>Village size<br>Percent of males in nonagricultural sector<br>Percent of SC/ST population<br>Female literacy (implicit) | 56 | 177 | 233 |
| Maharashtra | 78,937,187 | Region (group of districts)<br>Village size<br>Percent of SC/ST population<br>Female literacy (implicit) | 136 | 82 | 218 |

Table B.1  Sample characteristics (contd.)

| State | Population[1] 1991 | Variables for rural stratification | Number of primary sampling units | | |
|---|---|---|---|---|---|
| | | | Urban | Rural | Total |
| Manipur | 1,837,149 | Region (group of *tehsils*)<br>Village size<br>Female literacy (implicit) | 14 | 36 | 50 |
| Meghalaya | 1,774,778 | Region (group of *tehsils*)<br>Village size<br>Female literacy (implicit) | 9 | 41 | 50 |
| Mizoram | 689,756 | Region (group of *tehsils*)<br>Village size<br>Female literacy (implicit) | 23 | 27 | 50 |
| Nagaland | 1,209,546 | Region (group of *tehsils*)<br>Village size<br>Female literacy (implicit) | 9 | 41 | 50 |
| Orissa | 31,659,736 | Region (group of districts)<br>Village size<br>Female literacy<br>Percent of SC/ST population (implicit) | 33 | 100 | 133 |
| Punjab | 20,281,969 | Region (group of districts)<br>Village size<br>Percent of SC/ST population<br>Female literacy (implicit) | 33 | 67 | 100 |
| Rajasthan | 44,005,990 | Region (group of districts)<br>Village size<br>Percent of SC/ST population<br>Female literacy (implicit) | 53 | 180 | 233 |
| Sikkim | 406,457 | Region (group of districts)<br>Village size<br>Female literacy (implicit) | 5 | 45 | 50 |
| Tamil Nadu | 55,858,946 | Region (group of districts)<br>Village size<br>Percent of SC/ST population<br>Female literacy (implicit) | 70 | 88 | 158 |
| Uttar Pradesh | 139,112,287 | Region (group of districts)<br>Subregions<br>Village size<br>Percent of SC/ST population<br>Percent of males in nonagricultural sector<br>Female literacy (implicit) | 67 | 266 | 333 |
| West Bengal | 68,077,965 | Region (group of districts)<br>Village size<br>Percent of SC/ST population<br>Female literacy (implicit) | 61 | 97 | 158 |
| India | 841,523,272 | -- | 1021 | 2144 | 3165 |

SC: Scheduled caste
ST: Scheduled tribe
[1]The population shown is the 1991 Census population, excluding persons living in villages with fewer than five households.

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# APPENDIX C

# ESTIMATES OF SAMPLING ERRORS

Two types of errors affect the estimates from a sample survey: (1) nonsampling errors and (2) sampling errors. Nonsampling errors are the result of errors committed during data collection and data processing, such as failure to locate and interview the correct household, misunderstanding of the questions on the part of either the interviewer or the respondent, and data entry errors. Although numerous efforts were made during the implementation of NFHS-2 to minimize nonsampling errors, they are impossible to avoid and difficult to evaluate statistically.

Sampling errors, on the other hand, can be evaluated statistically. The sample of women selected in NFHS-2 is only one of many samples that could have been selected from the same population, using the same design and expected sample size. Each of these samples would yield results that differ somewhat from the results of the actual sample selected. The sampling error is a measure of the variability among all possible samples. Although the degree of variability is not known exactly, it can be estimated from the survey results.

The sampling error is usually measured by the *standard error* for a particular statistic (for example, a mean or percentage), which is the square root of the variance. The standard error can be used to calculate confidence intervals within which the true value for the population can reasonably be assumed to fall. For example, for any given statistic calculated from a sample survey, the value of that statistic will fall within a range, calculated as the value of the statistic plus or minus two times the standard error of that statistic in 95 percent of all possible samples of identical size and design.

If the sample of women had been selected as a simple random sample, it would have been possible, for many statistics, to use straightforward formulas for calculating sampling errors. However, the NFHS-2 sample is the result of a multi-stage stratified sample design, and it is therefore necessary to use more complex formulas. The computer software used to calculate sampling errors for NFHS-2 is ISSA (the Integrated System for Survey Analysis). The linear Taylor series approximation method for variance estimation is used for estimates of means, proportions and ratios. The JACKKNIFE repeated replication method is used with ISSA for variance estimation for more complex statistics such as fertility and mortality rates.

The ISSA package treats any percentage or average as a ratio estimate, $r = y/x$, where $y$ represents the sample value for variable $y$, and $x$ represents the number of cases in the group or subgroup under consideration. The variance of $r$ is computed using the formula given below, with the standard error being the square root of the variance:

$$\text{var}(r) = \frac{1-f}{x^2} \sum_{h=1}^{H} \left[ \frac{m_h}{m_h-1} \left( \sum_{i=1}^{m_h} z_{hi}^2 - \frac{z_h^2}{m_h} \right) \right]$$

in which

$$z_{hi} = y_{hi} - rx_{hi}$$

$$z_h = y_h - rx_h$$

where

$h$ = the stratum that varies from 1 to H,
$m_h$= the total number of PSUs selected in the $h^{th}$ stratum,
$y_{hi}$= the sum of the values of variable y in PSU i in the $h^{th}$ stratum,
$x_{hi}$= the sum of the number of cases in PSU i in the $h^{th}$ stratum,
$f$ = the overall sampling fraction, which is so small that the program ignores it.

In addition to the standard error, ISSA computes the design effect (DEFT) for each estimate, which is defined as the ratio of the standard error using the given sample design to the standard error that would result if a simple random sample had been used. A DEFT value of 1.0 indicates that the sample design is as efficient as a simple random sample, while a value greater than 1.0 indicates the increase in the sampling error due to the use of a more complex and less statistically efficient design. ISSA also computes the relative standard error and confidence limits for the estimates.

Sampling errors for NFHS-2 are calculated for selected variables considered to be of primary interest. The results in this appendix are presented for the country as a whole and for urban and rural areas separately, except for the variable on salt iodization for which the results are shown separately for large cities, small cities, towns, and rural areas. For each variable, the type of statistic (mean, proportion, ratio, or rate) and the base population are given in Table C.1. Table C.2 presents the value of the statistic (R), its standard error (SE), the relative standard error (SE/R), and the 95 percent confidence limits (R±2SE), for each variable. In addition, for all variables except the fertility and mortality rates, the table shows the unweighted number of cases (N), the weighted number of cases (WN), the standard error assuming a simple random sample (SER), and the design effect (DEFT).

Table C.1  List of selected variables for sampling errors, India, 1998–99


| Variable | Estimate | Base population |
|---|---|---|
| Sex ratio | Ratio | *De facto* household population |
| Illiterate | Proportion | *De facto* household population age 6 and above |
| Have tuberculosis | Rate | 1,000 *de jure* household population |
| Salt iodized at 15 ppm or more | Proportion | Households |
| Illiterate | Proportion | Ever-married women 15–49 |
| High school complete and above | Proportion | Ever-married women 15–49 |
| Currently married | Proportion | Ever-married women 15–49 |
| Number of children ever born | Mean | Currently married women 15-49 |
| Number of children surviving | Mean | Currently married women 15-49 |
| Have ever used any method | Proportion | Currently married women 15-49 |
| Currently using any method | Proportion | Currently married women 15–49 |
| Currently using any modern method | Proportion | Currently married women 15–49 |
| Currently using pills | Proportion | Currently married women 15–49 |
| Currently using IUD | Proportion | Currently married women 15–49 |
| Currently using condoms | Proportion | Currently married women 15–49 |
| Currently using female sterilization | Proportion | Currently married women 15–49 |
| Currently using male sterilization | Proportion | Currently married women 15–49 |
| Currently using rhythm/safe period | Proportion | Currently married women 15–49 |
| Using public source for modern method | Proportion | Current users of modern methods |
| Do not want any more children | Proportion | Currently married women 15–49 |
| Want to delay birth at least 2 years | Proportion | Currently married women 15–49 |
| Ideal number of children | Mean | Ever-married women 15–49 |
| Ideal number of sons | Mean | Ever-married women 15–49 |
| Ideal number of daughters | Mean | Ever-married women 15–49 |
| Visited by health/family planning worker | Proportion | Ever-married women 15–49 |
| Received no antenatal check-up | Proportion | Births in the past 3 years |
| Received iron and folic acid tablets or syrup | Proportion | Births in the past 3 years |
| Received medical assistance during delivery | Proportion | Births in the past 3 years |
| Received postpartum check-up | Proportion | Noninstitutional births in the past 3 years |
| Had diarrhoea in the past 2 weeks | Proportion | Children under 3 years |
| Treated with ORS packets | Proportion | Children under 3 with diarrhoea in past 2 weeks |
| Taken to a health facility/provider for diarrhoea | Proportion | Children under 3 with diarrhoea in past 2 weeks |
| Showing a vaccination card | Proportion | Children 12–23 months |
| Received BCG vaccination | Proportion | Children 12–23 months |
| Received DPT vaccination (3 doses) | Proportion | Children 12–23 months |
| Received polio vaccination (3 doses) | Proportion | Children 12–23 months |
| Received measles vaccination | Proportion | Children 12–23 months |
| Fully vaccinated | Proportion | Children 12–23 months |
| Received Vitamin A | Proportion | Children 12–35 months |
| Had reproductive health problem | Proportion | Currently married women 15–49 |
| Not involved in any decisionmaking | Proportion | Ever-married women 15–49 |
| Ever beaten or physically mistreated | Proportion | Ever-married women 15–49 |
| Not worked in past 12 months | Proportion | Ever-married women 15–49 |
| Anaemic women | Proportion | Ever-married women 15–49 |
| Anaemic children | Proportion | Children age 6–35 months |
| Fertility rates | Rate | All women, population |
| Mortality rates | Rate | Births, population |

Table C.2  Sampling errors, India, 1998–99

| Variable/residence | Value (R) | Standard error (SE) | Number of cases Unweighted (N) | Number of cases Weighted (WN) | Standard error assuming SRS (SER) | Design effect (DEFT) | Relative standard error (SE/R) | Confidence limits R-2SE | Confidence limits R+2SE |
|---|---|---|---|---|---|---|---|---|---|
| Sex ratio (*De facto* household population) | | | | | | | | | |
| Urban | 936 | 5.626 | 79447 | 66790 | 3.687 | 1.526 | 0.006 | 925 | 947 |
| Rural | 968 | 3.517 | 169322 | 181223 | 2.649 | 1.327 | 0.004 | 961 | 975 |
| Total | 960 | 2.995 | 248769 | 248014 | 2.154 | 1.391 | 0.003 | 954 | 966 |
| Illiterate (*De facto* household population age 6 and above) | | | | | | | | | |
| Urban | 0.199 | 0.006 | 136015 | 113959 | 0.001 | 5.178 | 0.028 | 0.188 | 0.210 |
| Rural | 0.433 | 0.004 | 282860 | 303095 | 0.001 | 4.278 | 0.009 | 0.425 | 0.441 |
| Total | 0.369 | 0.004 | 418875 | 417055 | 0.001 | 5.262 | 0.011 | 0.361 | 0.377 |
| Have tuberculosis (1,000 *de jure* household population) | | | | | | | | | |
| Urban | 3.898 | 0.252 | 155344 | 130336 | 0.158 | 1.595 | 0.065 | 3.393 | 4.402 |
| Rural | 6.002 | 0.212 | 336709 | 360764 | 0.133 | 1.594 | 0.035 | 5.578 | 6.427 |
| Total | 5.444 | 0.171 | 492053 | 491100 | 0.105 | 1.632 | 0.031 | 5.101 | 5.786 |
| Salt iodized at 15ppm or more (Households) | | | | | | | | | |
| Large city | 0.768 | 0.014 | 11682 | 6745 | 0.004 | 3.527 | 0.018 | 0.740 | 0.795 |
| Small city | 0.677 | 0.022 | 5850 | 7393 | 0.006 | 3.559 | 0.032 | 0.633 | 0.720 |
| Town | 0.665 | 0.018 | 12903 | 11106 | 0.004 | 4.228 | 0.026 | 0.630 | 0.700 |
| Rural | 0.416 | 0.007 | 60761 | 65953 | 0.002 | 3.378 | 0.016 | 0.402 | 0.429 |
| Total | 0.493 | 0.006 | 91196 | 91196 | 0.002 | 3.812 | 0.013 | 0.481 | 0.506 |
| Illiterate (Ever-married women age 15-49) | | | | | | | | | |
| Urban | 0.332 | 0.010 | 27862 | 23370 | 0.003 | 3.391 | 0.029 | 0.313 | 0.351 |
| Rural | 0.670 | 0.005 | 61337 | 65829 | 0.002 | 2.896 | 0.008 | 0.659 | 0.681 |
| Total | 0.582 | 0.006 | 89199 | 89199 | 0.002 | 3.461 | 0.010 | 0.570 | 0.593 |
| High school complete and above (Ever-married women age 15-49) | | | | | | | | | |
| Urban | 0.328 | 0.010 | 27862 | 23370 | 0.003 | 3.383 | 0.029 | 0.309 | 0.347 |
| Rural | 0.077 | 0.003 | 61337 | 65829 | 0.001 | 2.332 | 0.033 | 0.072 | 0.082 |
| Total | 0.143 | 0.004 | 89199 | 89199 | 0.001 | 3.275 | 0.027 | 0.135 | 0.150 |
| Currently married women (Ever-married women age 15-49) | | | | | | | | | |
| Urban | 0.937 | 0.002 | 27862 | 23370 | 0.001 | 1.462 | 0.002 | 0.932 | 0.941 |
| Rural | 0.938 | 0.001 | 61337 | 65829 | 0.001 | 1.485 | 0.002 | 0.935 | 0.941 |
| Total | 0.938 | 0.001 | 89199 | 89199 | 0.001 | 1.486 | 0.001 | 0.935 | 0.940 |
| Number of children ever born (Currently married women age 15–49) | | | | | | | | | |
| Urban | 2.703 | 0.029 | 26132 | 21888 | 0.012 | 2.445 | 0.011 | 2.645 | 2.761 |
| Rural | 3.110 | 0.016 | 57700 | 61761 | 0.009 | 1.741 | 0.005 | 3.078 | 3.142 |
| Total | 3.004 | 0.014 | 83832 | 83649 | 0.007 | 1.947 | 0.005 | 2.975 | 3.032 |
| Number of children surviving (Currently married women age 15–49) | | | | | | | | | |
| Urban | 2.458 | 0.025 | 26132 | 21888 | 0.010 | 2.371 | 0.010 | 2.408 | 2.507 |
| Rural | 2.672 | 0.012 | 57700 | 61761 | 0.008 | 1.606 | 0.005 | 2.647 | 2.696 |
| Total | 2.616 | 0.011 | 83832 | 83649 | 0.006 | 1.806 | 0.004 | 2.593 | 2.638 |
| Have ever used any method (Currently married women age 15–49) | | | | | | | | | |
| Urban | 0.672 | 0.007 | 26132 | 21888 | 0.003 | 2.256 | 0.010 | 0.659 | 0.685 |
| Rural | 0.508 | 0.006 | 57700 | 61761 | 0.002 | 2.723 | 0.011 | 0.497 | 0.520 |
| Total | 0.551 | 0.005 | 83832 | 83649 | 0.002 | 2.757 | 0.009 | 0.542 | 0.561 |

Table C.2  Sampling errors, India, 1998–99 (contd.)

| Variable/ residence | Value (R) | Standard error (SE) | Number of cases | | Standard error assuming SRS (SER) | Design effect (DEFT) | Relative standard error (SE/R) | Confidence limits | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Unweighted (N) | Weighted (WN) | | | | R-2SE | R+2SE |
| Currently using any method (Currently married women age 15–49) | | | | | | | | | |
| Urban | 0.582 | 0.007 | 26132 | 21888 | 0.003 | 2.138 | 0.011 | 0.569 | 0.595 |
| Rural | 0.447 | 0.006 | 57700 | 61761 | 0.002 | 2.662 | 0.012 | 0.436 | 0.458 |
| Total | 0.482 | 0.005 | 83832 | 83649 | 0.002 | 2.644 | 0.009 | 0.473 | 0.491 |
| Currently using any modern method (Currently married women age 15–49) | | | | | | | | | |
| Urban | 0.512 | 0.007 | 26132 | 21888 | 0.003 | 2.128 | 0.013 | 0.499 | 0.525 |
| Rural | 0.399 | 0.005 | 57700 | 61761 | 0.002 | 2.688 | 0.014 | 0.388 | 0.410 |
| Total | 0.428 | 0.005 | 83832 | 83649 | 0.002 | 2.644 | 0.011 | 0.419 | 0.438 |
| Currently using pills (Currently married women age 15–49) | | | | | | | | | |
| Urban | 0.027 | 0.002 | 26132 | 21888 | 0.001 | 1.583 | 0.059 | 0.024 | 0.030 |
| Rural | 0.019 | 0.001 | 57700 | 61761 | 0.001 | 1.975 | 0.060 | 0.016 | 0.021 |
| Total | 0.021 | 0.001 | 83832 | 83649 | 0.000 | 1.871 | 0.044 | 0.019 | 0.023 |
| Currently using IUD (Currently married women age 15–49) | | | | | | | | | |
| Urban | 0.035 | 0.002 | 26132 | 21888 | 0.001 | 1.597 | 0.052 | 0.031 | 0.039 |
| Rural | 0.010 | 0.001 | 57700 | 61761 | 0.000 | 1.342 | 0.056 | 0.009 | 0.011 |
| Total | 0.016 | 0.001 | 83832 | 83649 | 0.000 | 1.521 | 0.041 | 0.015 | 0.018 |
| Currently using condoms (Currently married women age 15–49) | | | | | | | | | |
| Urban | 0.072 | 0.003 | 26132 | 21888 | 0.002 | 1.906 | 0.042 | 0.066 | 0.078 |
| Rural | 0.016 | 0.001 | 57700 | 61761 | 0.001 | 1.485 | 0.048 | 0.014 | 0.018 |
| Total | 0.031 | 0.001 | 83832 | 83649 | 0.001 | 1.824 | 0.035 | 0.029 | 0.033 |
| Currently using female sterilization (Currently married women age 15–49) | | | | | | | | | |
| Urban | 0.360 | 0.007 | 26132 | 21888 | 0.003 | 2.485 | 0.020 | 0.346 | 0.375 |
| Rural | 0.335 | 0.005 | 57700 | 61761 | 0.002 | 2.641 | 0.015 | 0.325 | 0.345 |
| Total | 0.342 | 0.004 | 83832 | 83649 | 0.002 | 2.625 | 0.013 | 0.333 | 0.350 |
| Currently using male sterilization (Currently married women age 15–49) | | | | | | | | | |
| Urban | 0.018 | 0.001 | 26132 | 21888 | 0.001 | 1.672 | 0.076 | 0.015 | 0.021 |
| Rural | 0.019 | 0.001 | 57700 | 61761 | 0.001 | 2.124 | 0.063 | 0.017 | 0.022 |
| Total | 0.019 | 0.001 | 83832 | 83649 | 0.000 | 2.052 | 0.051 | 0.017 | 0.021 |
| Currently using rhythm/safe period (Currently married women age 15–49) | | | | | | | | | |
| Urban | 0.039 | 0.002 | 26132 | 21888 | 0.001 | 1.792 | 0.055 | 0.034 | 0.043 |
| Rural | 0.027 | 0.001 | 57700 | 61761 | 0.001 | 1.836 | 0.046 | 0.025 | 0.030 |
| Total | 0.030 | 0.001 | 83832 | 83649 | 0.001 | 1.821 | 0.036 | 0.028 | 0.032 |
| Using public source for modern method (Current users of modern methods) | | | | | | | | | |
| Urban | 0.601 | 0.010 | 13343 | 11213 | 0.004 | 2.342 | 0.017 | 0.581 | 0.621 |
| Rural | 0.832 | 0.005 | 22504 | 24628 | 0.002 | 2.066 | 0.006 | 0.822 | 0.843 |
| Total | 0.760 | 0.005 | 35847 | 35841 | 0.002 | 2.357 | 0.007 | 0.749 | 0.771 |
| Do not want any more children (Currently married women age 15–49) | | | | | | | | | |
| Urban | 0.322 | 0.007 | 26132 | 21888 | 0.003 | 2.468 | 0.022 | 0.307 | 0.336 |
| Rural | 0.259 | 0.004 | 57700 | 61761 | 0.002 | 2.100 | 0.015 | 0.251 | 0.267 |
| Total | 0.275 | 0.003 | 83832 | 83649 | 0.002 | 2.221 | 0.012 | 0.268 | 0.282 |
| Want to delay birth at least two years (Currently married women age 15–49) | | | | | | | | | |
| Urban | 0.115 | 0.003 | 26132 | 21888 | 0.002 | 1.449 | 0.025 | 0.109 | 0.120 |
| Rural | 0.139 | 0.002 | 57700 | 61761 | 0.001 | 1.5325 | 0.016 | 0.135 | 0.144 |
| Total | 0.133 | 0.002 | 83832 | 83649 | 0.001 | 1.540 | 0.014 | 0.129 | 0.137 |

Table C.2  Sampling errors, India, 1998–99 (contd.)

| Variable/ residence | Value (R) | Standard error (SE) | Number of cases | | Standard error assuming SRS (SER) | Design effect (DEFT) | Relative standard error (SE/R) | Confidence limits | |
| | | | Unweighted (N) | Weighted (WN) | | | | R-2SE | R+2SE |
|---|---|---|---|---|---|---|---|---|---|
| Ideal number of children (Ever-married women age 15–49) | | | | | | | | | |
| Urban | 2.317 | 0.017 | 26725 | 22041 | 0.005 | 3.265 | 0.007 | 2.282 | 2.351 |
| Rural | 2.771 | 0.014 | 57767 | 60956 | 0.005 | 3.176 | 0.005 | 2.742 | 2.800 |
| Total | 2.650 | 0.012 | 84492 | 82996 | 0.004 | 3.379 | 0.005 | 2.626 | 2.675 |
| Ideal number of sons (Ever-married women age 15–49) | | | | | | | | | |
| Urban | 1.063 | 0.017 | 26706 | 22027 | 0.005 | 3.458 | 0.016 | 1.030 | 1.096 |
| Rural | 1.469 | 0.012 | 57727 | 60911 | 0.004 | 3.278 | 0.008 | 1.445 | 1.494 |
| Total | 1.361 | 0.011 | 84433 | 82939 | 0.003 | 3.499 | 0.008 | 1.340 | 1.383 |
| Ideal number of daughters (Ever-married women age 15–49) | | | | | | | | | |
| Urban | 0.819 | 0.010 | 26706 | 22027 | 0.004 | 2.888 | 0.013 | 0.798 | 0.840 |
| Rural | 1.018 | 0.007 | 57727 | 60911 | 0.003 | 2.465 | 0.006 | 1.005 | 1.032 |
| Total | 0.965 | 0.006 | 84433 | 82939 | 0.002 | 2.696 | 0.006 | 0.954 | 0.977 |
| Visited by health/family planning worker (Ever-married women age 15–49) | | | | | | | | | |
| Urban | 0.100 | 0.006 | 27862 | 23370 | 0.002 | 3.535 | 0.064 | 0.087 | 0.113 |
| Rural | 0.140 | 0.004 | 61337 | 65829 | 0.001 | 2.838 | 0.028 | 0.132 | 0.148 |
| Total | 0.130 | 0.003 | 89199 | 89199 | 0.001 | 3.016 | 0.026 | 0.123 | 0.136 |
| Received no antenatal check-up (Births in past 3 years) | | | | | | | | | |
| Urban | 0.136 | 0.009 | 8498 | 7191 | 0.004 | 2.303 | 0.069 | 0.117 | 0.155 |
| Rural | 0.398 | 0.009 | 24224 | 25202 | 0.003 | 2.536 | 0.022 | 0.381 | 0.416 |
| Total | 0.340 | 0.008 | 32722 | 32393 | 0.003 | 2.665 | 0.022 | 0.325 | 0.355 |
| Received iron and folic acid tablets or syrup (Births in past 3 years) | | | | | | | | | |
| Urban | 0.757 | 0.011 | 8498 | 7191 | 0.005 | 2.412 | 0.015 | 0.734 | 0.779 |
| Rural | 0.525 | 0.008 | 24224 | 25202 | 0.003 | 2.578 | 0.016 | 0.508 | 0.541 |
| Total | 0.576 | 0.007 | 32722 | 32393 | 0.003 | 2.670 | 0.013 | 0.562 | 0.591 |
| Received medical assistance during delivery (Births in past 3 years) | | | | | | | | | |
| Urban | 0.733 | 0.012 | 8498 | 7191 | 0.005 | 2.278 | 0.016 | 0.709 | 0.757 |
| Rural | 0.335 | 0.007 | 24224 | 25202 | 0.003 | 2.198 | 0.022 | 0.321 | 0.350 |
| Total | 0.423 | 0.007 | 32722 | 32393 | 0.003 | 2.455 | 0.017 | 0.409 | 0.438 |
| Received postpartum check-up (Noninstitutional births in past 3 years) | | | | | | | | | |
| Urban | 0.196 | 0.013 | 2856 | 2495 | 0.007 | 1.730 | 0.066 | 0.170 | 0.222 |
| Rural | 0.161 | 0.005 | 18425 | 18896 | 0.003 | 1.923 | 0.032 | 0.151 | 0.171 |
| Total | 0.165 | 0.005 | 21281 | 21391 | 0.003 | 1.900 | 0.029 | 0.155 | 0.175 |
| Had diarrhoea in the past 2 weeks (Children under 3 years) | | | | | | | | | |
| Urban | 0.196 | 0.008 | 8007 | 6768 | 0.004 | 1.766 | 0.040 | 0.180 | 0.211 |
| Rural | 0.190 | 0.004 | 22227 | 23096 | 0.003 | 1.543 | 0.021 | 0.182 | 0.199 |
| Total | 0.192 | 0.004 | 30234 | 29864 | 0.002 | 1.594 | 0.019 | 0.184 | 0.199 |
| Treated with ORS packets (Children under 3 with diarrhoea in past 2 weeks) | | | | | | | | | |
| Urban | 0.327 | 0.017 | 1567 | 1324 | 0.012 | 1.398 | 0.051 | 0.294 | 0.361 |
| Rural | 0.250 | 0.009 | 4466 | 4397 | 0.007 | 1.293 | 0.036 | 0.233 | 0.268 |
| Total | 0.268 | 0.008 | 6033 | 5721 | 0.006 | 1.323 | 0.029 | 0.252 | 0.284 |
| Taken to a health facility/provider for diarrhoea (Children under 3 with diarrhoea in past 2 weeks) | | | | | | | | | |
| Urban | 0.752 | 0.013 | 1567 | 1324 | 0.011 | 1.175 | 0.017 | 0.726 | 0.778 |
| Rural | 0.599 | 0.010 | 4466 | 4397 | 0.008 | 1.282 | 0.017 | 0.579 | 0.619 |
| Total | 0.634 | 0.009 | 6033 | 5721 | 0.006 | 1.328 | 0.014 | 0.617 | 0.651 |

Table C.2  Sampling errors, India, 1998–99 (contd.)

| Variable/ residence | Value (R) | Standard error (SE) | Number of cases | | Standard error assuming SRS (SER) | Design effect (DEFT) | Relative standard error (SE/R) | Confidence limits | |
| | | | Unweighted (N) | Weighted (WN) | | | | R-2SE | R+2SE |
|---|---|---|---|---|---|---|---|---|---|
| Showing a vaccination card (Children 12–23 months) | | | | | | | | | |
| Urban | 0.459 | 0.014 | 2707 | 2282 | 0.010 | 1.478 | 0.031 | 0.431 | 0.488 |
| Rural | 0.301 | 0.008 | 7404 | 7795 | 0.005 | 1.561 | 0.028 | 0.284 | 0.318 |
| Total | 0.337 | 0.007 | 10111 | 10076 | 0.005 | 1.573 | 0.022 | 0.322 | 0.352 |
| Received BCG vaccination (Children 12–23 months) | | | | | | | | | |
| Urban | 0.868 | 0.010 | 2707 | 2282 | 0.007 | 1.553 | 0.012 | 0.847 | 0.888 |
| Rural | 0.671 | 0.009 | 7404 | 7795 | 0.006 | 1.702 | 0.014 | 0.652 | 0.690 |
| Total | 0.716 | 0.008 | 10111 | 10076 | 0.005 | 1.772 | 0.011 | 0.700 | 0.732 |
| Received DPT vaccination (3 doses) (Children 12–23 months) | | | | | | | | | |
| Urban | 0.734 | 0.015 | 2707 | 2282 | 0.009 | 1.733 | 0.020 | 0.704 | 0.763 |
| Rural | 0.498 | 0.010 | 7404 | 7795 | 0.006 | 1.761 | 0.021 | 0.477 | 0.519 |
| Total | 0.551 | 0.009 | 10111 | 10076 | 0.005 | 1.831 | 0.017 | 0.533 | 0.570 |
| Received polio vaccination (3 doses) (Children 12–23 months) | | | | | | | | | |
| Urban | 0.782 | 0.012 | 2707 | 2282 | 0.008 | 1.529 | 0.016 | 0.758 | 0.807 |
| Rural | 0.583 | 0.010 | 7404 | 7795 | 0.006 | 1.671 | 0.017 | 0.563 | 0.602 |
| Total | 0.628 | 0.008 | 10111 | 10076 | 0.005 | 1.730 | 0.013 | 0.611 | 0.645 |
| Received measles vaccination (Children 12–23 months) | | | | | | | | | |
| Urban | 0.692 | 0.015 | 2707 | 2282 | 0.009 | 1.683 | 0.022 | 0.662 | 0.722 |
| Rural | 0.453 | 0.010 | 7404 | 7795 | 0.006 | 1.744 | 0.023 | 0.432 | 0.473 |
| Total | 0.507 | 0.009 | 10111 | 10076 | 0.005 | 1.799 | 0.018 | 0.489 | 0.525 |
| Fully vaccinated (Children 12–23 months) | | | | | | | | | |
| Urban | 0.605 | 0.016 | 2707 | 2282 | 0.009 | 1.749 | 0.027 | 0.572 | 0.637 |
| Rural | 0.366 | 0.010 | 7404 | 7795 | 0.006 | 1.799 | 0.028 | 0.346 | 0.387 |
| Total | 0.420 | 0.009 | 10111 | 10076 | 0.005 | 1.850 | 0.022 | 0.402 | 0.439 |
| Received Vitamin A (Children 12–35 months) | | | | | | | | | |
| Urban | 0.387 | 0.013 | 5425 | 4559 | 0.007 | 1.840 | 0.032 | 0.365 | 0.413 |
| Rural | 0.270 | 0.007 | 14732 | 15331 | 0.004 | 1.976 | 0.028 | 0.255 | 0.285 |
| Total | 0.297 | 0.007 | 20157 | 19889 | 0.003 | 1.983 | 0.022 | 0.284 | 0.310 |
| Had reproductive health problem (Currently married women 15–49) | | | | | | | | | |
| Urban | 0.367 | 0.008 | 26132 | 21888 | 0.003 | 2.546 | 0.021 | 0.352 | 0.382 |
| Rural | 0.401 | 0.004 | 57700 | 61761 | 0.002 | 2.172 | 0.011 | 0.392 | 0.410 |
| Total | 0.392 | 0.004 | 83832 | 83649 | 0.002 | 2.278 | 0.010 | 0.384 | 0.400 |
| Not involved in any decisionmaking (Ever-married women age 15–49) | | | | | | | | | |
| Urban | 0.071 | 0.003 | 27862 | 23370 | 0.002 | 1.956 | 0.042 | 0.065 | 0.077 |
| Rural | 0.103 | 0.003 | 61337 | 65829 | 0.001 | 2.076 | 0.025 | 0.097 | 0.108 |
| Total | 0.094 | 0.002 | 89199 | 89199 | 0.001 | 2.107 | 0.022 | 0.090 | 0.098 |
| Ever beaten or physically mistreated (Ever-married women age 15–49) | | | | | | | | | |
| Urban | 0.168 | 0.005 | 27862 | 23370 | 0.002 | 2.364 | 0.031 | 0.158 | 0.179 |
| Rural | 0.225 | 0.003 | 61337 | 65829 | 0.002 | 2.049 | 0.015 | 0.218 | 0.232 |
| Total | 0.210 | 0.003 | 89199 | 89199 | 0.001 | 2.163 | 0.014 | 0.204 | 0.216 |
| Not worked in past 12 months (Ever-married women age 15–49) | | | | | | | | | |
| Urban | 0.744 | 0.007 | 27862 | 23370 | 0.003 | 2.726 | 0.010 | 0.730 | 0.758 |
| Rural | 0.560 | 0.007 | 61337 | 65829 | 0.002 | 3.573 | 0.013 | 0.546 | 0.575 |
| Total | 0.608 | 0.006 | 89199 | 89199 | 0.002 | 3.607 | 0.010 | 0.597 | 0.620 |

| Variable/residence | Value (R) | Standard error (SE) | Number of cases | | Standard error assuming SRS (SER) | Design effect (DEFT) | Relative standard error (SE/R) | Confidence limits | |
| | | | Unweighted (N) | Weighted (WN) | | | | R-2SE | R+2SE |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Anaemic women (Ever-married women age 15–49) | | | | | | | | | |
| Urban | 0.457 | 0.007 | 24850 | 20872 | 0.003 | 2.067 | 0.014 | 0.444 | 0.470 |
| Rural | 0.539 | 0.005 | 54813 | 58791 | 0.002 | 2.220 | 0.009 | 0.530 | 0.549 |
| Total | 0.518 | 0.004 | 79663 | 79663 | 0.002 | 2.245 | 0.008 | 0.510 | 0.526 |
| Anaemic children (Children age 6–35 months) | | | | | | | | | |
| Urban | 0.708 | 0.010 | 5565 | 4642 | 0.006 | 1.571 | 0.014 | 0.689 | 0.727 |
| Rural | 0.753 | 0.006 | 14892 | 15374 | 0.004 | 1.633 | 0.008 | 0.742 | 0.765 |
| Total | 0.743 | 0.005 | 20457 | 20016 | 0.003 | 1.622 | 0.007 | 0.733 | 0.753 |

Table C.2  Sampling errors, India, 1998–99 (contd.)

| Variable/ residence | Value (R) | Standard error (SE) | Relative standard error (SE/R) | Confidence limits | |
|---|---|---|---|---|---|
| | | | | R-2SE | R+2SE |
| **Table C.2 Sampling errors, India, 1998–99 (contd.)** | | | | | |
| Total fertility rate (Women age 15–49) | | | | | |
| Urban | 2.272 | 0.037 | 0.016 | 2.198 | 2.346 |
| Rural | 3.075 | 0.031 | 0.010 | 3.013 | 3.136 |
| Total | 2.849 | 0.024 | 0.009 | 2.800 | 2.897 |
| Age-specific fertility rate (Women age 15–19) | | | | | |
| Urban | 0.068 | 0.003 | 0.038 | 0.063 | 0.073 |
| Rural | 0.121 | 0.002 | 0.016 | 0.117 | 0.125 |
| Total | 0.107 | 0.002 | 0.015 | 0.104 | 0.110 |
| Age-specific fertility rate (Women age 20–24) | | | | | |
| Urban | 0.179 | 0.003 | 0.018 | 0.173 | 0.185 |
| Rural | 0.222 | 0.002 | 0.011 | 0.218 | 0.227 |
| Total | 0.210 | 0.002 | 0.009 | 0.207 | 0.214 |
| Age-specific fertility rate (Women age 25–29) | | | | | |
| Urban | 0.127 | 0.003 | 0.025 | 0.121 | 0.134 |
| Rural | 0.150 | 0.003 | 0.017 | 0.145 | 0.155 |
| Total | 0.143 | 0.002 | 0.014 | 0.139 | 0.147 |
| Age-specific fertility rate (Women age 30–34) | | | | | |
| Urban | 0.057 | 0.003 | 0.047 | 0.052 | 0.063 |
| Rural | 0.075 | 0.002 | 0.029 | 0.070 | 0.079 |
| Total | 0.069 | 0.002 | 0.025 | 0.066 | 0.073 |
| Age-specific fertility rate (Women age 35–39) | | | | | |
| Urban | 0.018 | 0.002 | 0.086 | 0.015 | 0.022 |
| Rural | 0.033 | 0.002 | 0.047 | 0.030 | 0.036 |
| Total | 0.028 | 0.001 | 0.041 | 0.026 | 0.031 |
| Age-specific fertility rate (Women age 40–44) | | | | | |
| Urban | 0.003 | 0.001 | 0.211 | 0.002 | 0.005 |
| Rural | 0.011 | 0.001 | 0.083 | 0.009 | 0.012 |
| Total | 0.008 | 0.001 | 0.078 | 0.007 | 0.010 |
| Age-specific fertility rate (Women age 45–49) | | | | | |
| Urban | 0.001 | 0.000 | 0.534 | 0.000 | 0.002 |
| Rural | 0.004 | 0.001 | 0.197 | 0.002 | 0.005 |
| Total | 0.003 | 0.001 | 0.186 | 0.002 | 0.004 |

| Variable/ residence | Value (R) | Standard error (SE) | Relative standard error (SE/R) | Confidence limits | |
|---|---|---|---|---|---|
| | | | | R-2SE | R+2SE |
| **Neonatal mortality (5-year period preceding survey)** | | | | | |
| Urban | 31.653 | 2.007 | 0.063 | 27.639 | 35.667 |
| Rural | 46.706 | 1.301 | 0.028 | 44.104 | 49.309 |
| Total | 43.397 | 1.114 | 0.026 | 41.168 | 45.626 |
| **Infant mortality $_1q_0$ (5-year period preceding survey)** | | | | | |
| Urban | 47.026 | 2.393 | 0.051 | 42.239 | 51.812 |
| Rural | 73.344 | 1.664 | 0.023 | 70.015 | 76.673 |
| Total | 67.569 | 1.421 | 0.021 | 64.727 | 70.411 |
| **Child mortality $_4q_1$ (5-year period preceding survey)** | | | | | |
| Urban | 16.896 | 1.383 | 0.082 | 14.130 | 19.662 |
| Rural | 32.759 | 1.123 | 0.034 | 30.513 | 35.005 |
| Total | 29.256 | 0.940 | 0.032 | 27.377 | 31.136 |
| **Under-five mortality $_5q_0$ (5-year period preceding survey)** | | | | | |
| Urban | 63.127 | 2.884 | 0.046 | 57.359 | 68.895 |
| Rural | 103.701 | 2.061 | 0.020 | 99.578 | 107.824 |
| Total | 94.848 | 1.771 | 0.019 | 91.307 | 98.390 |
| **Crude death rate (Based on household questionnaire)** | | | | | |
| Urban | 7.833 | 0.271 | 0.035 | 7.291 | 8.375 |
| Rural | 10.376 | 0.278 | 0.027 | 9.820 | 10.933 |
| Total | 9.698 | 0.250 | 0.026 | 9.198 | 10.197 |
| **Crude birth rate (Based on birth history)** | | | | | |
| Urban | 20.859 | 0.336 | 0.016 | 20.187 | 21.531 |
| Rural | 26.218 | 0.230 | 0.009 | 25.758 | 26.678 |
| Total | 24.799 | 0.191 | 0.008 | 24.417 | 25.181 |
| **Maternal Mortality Ratio (100,000 live births)** | | | | | |
| Urban | 267.154 | 78.934 | 0.295 | 109.287 | 425.021 |
| Rural | 618.814 | 68.492 | 0.111 | 481.830 | 755.798 |
| Total | 540.361 | 56.193 | 0.104 | 427.975 | 652.746 |

SRS: Simple random sample

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# APPENDIX D

# DATA QUALITY TABLES

The purpose of this appendix is to provide the data user with an overview of the general quality of the NFHS-2 data. Whereas Appendix C is concerned with sampling errors and their effects on the survey results, the tables in this appendix refer to possible *nonsampling* errors: for example, rounding or heaping on certain ages or dates; omission of events occurring further in the past; deliberate distortion of information by some interviewers in an attempt to lighten their work load; noncooperation of the respondent in providing information; or refusal to have children measured for height and weight or tested for anaemia. A description of the likely magnitude of such nonsampling errors is provided in this appendix.

The distribution of the *de facto* household population by single years of age and sex is presented in Table D.1. In many (but not all) cases, the respondent was the head of the household. It is well documented that ages are poorly reported in most parts of India. Ages are of little relevance to much of the rural population in particular, and no amount of probing will ensure that ages are properly recorded. In interviewer training for NFHS-2, a great deal of emphasis was placed on obtaining as accurate information as possible on ages and dates of events. Nevertheless, it is clear that age reporting in NFHS-2 shares the same problems inherent in all Indian censuses and surveys. Heaping on ages ending in 0, 2, 5, and 8 is considerable and is particularly severe in the older age groups. However, the NFHS-2 age data are evidently of considerably better quality than age data from other sources. This can be seen, for example, by comparing the degree of age heaping in NFHS-2 with that in the 1991 Census. Age reporting appears to be better in NFHS-2 than in the 1991 Census, particularly at the young adult ages. Another measure of the quality of the NFHS-2 age data is the percentage of persons whose ages were recorded as not known or missing. In the country as a whole, information on age was missing for only 70 persons out of 486,011 persons listed on the household schedules.

Table D.2 examines the possibility that some eligible women (that is, ever-married women age 15–49) were not properly identified in NFHS-2. In some surveys, interviewers may try to reduce their workload by pushing women out of the eligible age range or recording ever-married women as never married so that they will not have to be interviewed. If such practices were being followed to a noticeable extent, Table D.2 would normally show (1) a shortage of ever-married women in the 45–49 age group and an excess in the 50–54 age group or (2) an unusually low proportion of ever-married women by age. Neither of these patterns is evident in the NFHS-2 data. It can, therefore, be concluded that there was no concerted effort to misidentify eligible women in NFHS-2.

One traditional measure of the quality of data is the extent to which information is missing on key variables. Although completeness of responses does not necessarily indicate that the results are accurate, the existence of missing information for a large number of cases would suggest that data collection was not carried out with sufficient care. In NFHS-2 for India as a whole, the extent of missing information is very low for age at death, age at first marriage, woman's education, and prevalence of diarrhoea in the two weeks preceding the survey (Table D.3). Month of birth only was missing for less than 4 percent of children; however, the year is reported in almost every case in which the month is missing. Data on height and weight of

| Table D.1 Household age distribution |
| --- |

Single-year age distribution of *de facto* household population by sex (weighted), India, 1998–99

| | Male | | Female | | | Male | | Female | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Age | Number | Percent | Number | Percent | Age | Number | Percent | Number | Percent |
| < 1 | 5,960 | 2.4 | 5,416 | 2.3 | 38 | 2,867 | 1.2 | 2,908 | 1.2 |
| 1 | 5,471 | 2.2 | 5,112 | 2.1 | 39 | 1,207 | 0.5 | 1,535 | 0.6 |
| 2 | 5,602 | 2.3 | 5,323 | 2.2 | 40 | 7,330 | 3.0 | 4,942 | 2.1 |
| 3 | 5,454 | 2.2 | 5,297 | 2.2 | 41 | 938 | 0.4 | 1,317 | 0.6 |
| 4 | 6,276 | 2.5 | 5,792 | 2.4 | 42 | 2,348 | 0.9 | 2,293 | 1.0 |
| 5 | 7,067 | 2.8 | 6,187 | 2.6 | 43 | 938 | 0.4 | 1,326 | 0.6 |
| 6 | 6,615 | 2.7 | 6,152 | 2.6 | 44 | 1,006 | 0.4 | 1,199 | 0.5 |
| 7 | 6,048 | 2.4 | 5,682 | 2.4 | 45 | 6,003 | 2.4 | 4,247 | 1.8 |
| 8 | 7,177 | 2.9 | 6,558 | 2.8 | 46 | 1,204 | 0.5 | 1,465 | 0.6 |
| 9 | 5,228 | 2.1 | 4,851 | 2.0 | 47 | 993 | 0.4 | 1,284 | 0.5 |
| 10 | 7,616 | 3.1 | 6,839 | 2.9 | 48 | 1,859 | 0.7 | 1,903 | 0.8 |
| 11 | 4,724 | 1.9 | 4,352 | 1.8 | 49 | 913 | 0.4 | 862 | 0.4 |
| 12 | 7,475 | 3.0 | 6,632 | 2.8 | 50 | 4,823 | 1.9 | 2,048 | 0.9 |
| 13 | 4,950 | 2.0 | 4,964 | 2.1 | 51 | 751 | 0.3 | 1,030 | 0.4 |
| 14 | 5,594 | 2.3 | 5,096 | 2.1 | 52 | 1,444 | 0.6 | 1,902 | 0.8 |
| 15 | 5,783 | 2.3 | 5,255 | 2.2 | 53 | 638 | 0.3 | 1,144 | 0.5 |
| 16 | 5,514 | 2.2 | 5,387 | 2.3 | 54 | 654 | 0.3 | 1,047 | 0.4 |
| 17 | 4,240 | 1.7 | 4,082 | 1.7 | 55 | 3,361 | 1.4 | 3,940 | 1.7 |
| 18 | 6,706 | 2.7 | 6,346 | 2.7 | 56 | 893 | 0.4 | 1,153 | 0.5 |
| 19 | 3,370 | 1.4 | 3,691 | 1.6 | 57 | 518 | 0.2 | 702 | 0.3 |
| 20 | 5,966 | 2.4 | 6,868 | 2.9 | 58 | 1,192 | 0.5 | 1,300 | 0.5 |
| 21 | 3,088 | 1.2 | 3,195 | 1.3 | 59 | 519 | 0.2 | 507 | 0.2 |
| 22 | 5,201 | 2.1 | 5,260 | 2.2 | 60 | 4,884 | 2.0 | 4,733 | 2.0 |
| 23 | 3,219 | 1.3 | 3,542 | 1.5 | 61 | 446 | 0.2 | 460 | 0.2 |
| 24 | 3,298 | 1.3 | 3,627 | 1.5 | 62 | 978 | 0.4 | 1,044 | 0.4 |
| 25 | 6,678 | 2.7 | 7,047 | 3.0 | 63 | 453 | 0.2 | 465 | 0.2 |
| 26 | 3,590 | 1.4 | 3,771 | 1.6 | 64 | 403 | 0.2 | 412 | 0.2 |
| 27 | 2,799 | 1.1 | 3,008 | 1.3 | 65 | 3,252 | 1.3 | 3,246 | 1.4 |
| 28 | 4,296 | 1.7 | 4,630 | 1.9 | 66 | 433 | 0.2 | 402 | 0.2 |
| 29 | 1,828 | 0.7 | 2,295 | 1.0 | 67 | 361 | 0.1 | 293 | 0.1 |
| 30 | 7,879 | 3.2 | 7,187 | 3.0 | 68 | 600 | 0.2 | 545 | 0.2 |
| 31 | 1,419 | 0.6 | 1,869 | 0.8 | 69 | 303 | 0.1 | 220 | 0.1 |
| 32 | 3,821 | 1.5 | 3,613 | 1.5 | 70+ | 8,054 | 3.2 | 6,581 | 2.8 |
| 33 | 1,573 | 0.6 | 1,944 | 0.8 | Don't | | | | |
| 34 | 1,730 | 0.7 | 2,088 | 0.9 | know/ | | | | |
| 35 | 8,490 | 3.4 | 6,410 | 2.7 | missing | 33 | 0.0 | 37 | 0.0 |
| 36 | 2,252 | 0.9 | 2,468 | 1.0 | | | | | |
| 37 | 1,418 | 0.6 | 1,664 | 0.7 | Total | 248,014 | 100.0 | 237,997 | 100.0 |

Note: The *de facto* population includes residents and nonresidents who stayed in the household the night before the interview.

children and woman's haemoglobin level are available for more than 85 percent of the members of the respective reference groups. Missing information is highest (21 percent) for children's haemoglobin level. The response rates are acceptable for the height and weight and child's haemoglobin level since in any survey many children cannot be measured because they are not at home or they are ill at the time of the survey. In some cases when the child was at home, either the child refused to be measured or the mother refused to allow the child to be measured because of cultural beliefs. Before undertaking haemoglobin measurements, a separate 'informed consent' statement was read to the respondent explaining that participation in the haemoglobin testing was completely voluntary. At this point, some women declined to take part in the anaemia testing and/or to have their children participate.

Table D.2  Age distribution of eligible and interviewed women

Percent distribution of the *de facto* household population of women age 10–54 and of interviewed women age 15–49 and percentage of eligible women who were interviewed (weighted), India, 1998–99

| Age | All women | Ever-married women | Interviewed women | | Percent interviewed |
|-----|-----------|--------------------|-------------------|--|---------------------|
| | | | Number | Percent | |
| 10–14 | 27,885 | 187 | NA | NA | NA |
| 15–19 | 24,762 | 7,436 | 7,044 | 7.6 | 94.7 |
| 20–24 | 22,491 | 17,564 | 16,762 | 18.2 | 95.4 |
| 25–29 | 20,752 | 19,582 | 18,834 | 20.4 | 96.2 |
| 30–34 | 16,700 | 16,353 | 15,763 | 17.1 | 96.4 |
| 35–39 | 14,986 | 14,792 | 14,240 | 15.4 | 96.3 |
| 40–44 | 11,078 | 10,955 | 10,508 | 11.4 | 95.9 |
| 45–49 | 9,762 | 9,683 | 9,167 | 9.9 | 94.7 |
| 50–54 | 7,171 | 7,127 | NA | NA | NA |
| | | | | | |
| 15–49 | 120,531 | 96,364 | 92,318 | 100.0 | 95.8 |

Note: The *de facto* population includes all residents and nonresidents who stayed in the household the night before the interview. For all columns, the age distribution is taken from ages reported on the Household Questionnaire. The total number of interviewed women in this table differs from the total number in earlier tables because this table uses household weights rather than women's weights for the calculations.
NA: Not applicable

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Table D.3  Completeness of reporting

Percentage of observations with missing information for selected demographic and health questions (weighted), India, 1998–99

| Subject | Reference group | Percentage missing information | Number of cases |
|---------|-----------------|-------------------------------|-----------------|
| **Birth date** | Births in past 15 years | | |
| Month only | | 3.76 | 173,724 |
| Month and year | | 0.12 | 173,724 |
| | | | |
| Age at death | Deaths to births in past 15 years | 0.87 | 18,457 |
| | | | |
| Age at first marriage | Ever-married women age 15–49 | 0.30 | 89,199 |
| | | | |
| Woman's education | Ever-married women age 15–49 | 0.04 | 89,199 |
| | | | |
| **Anthropometry** | Living children age 0–35 months | | |
| Height | | 13.05 | 30,372 |
| Weight | | 13.12 | 30,372 |
| Height or weight | | 13.58 | 30,372 |
| | | | |
| Woman's haemoglobin level | Ever-married women age 15–49 | 11.65 | 89,199 |
| | | | |
| Child's haemoglobin level | Living children age 6–35 months | 20.92 | 24,846 |
| | | | |
| Diarrhoea in past 2 weeks | Living children age 1–35 months | 0.27 | 29,864 |

Another measure of data quality is the completeness and accuracy of information on births. Table D.4 examines the distribution of births by calendar year to identify any unusual patterns which may indicate that births have been omitted or that the ages of children have been displaced. Overall, 96 percent of living children listed in the birth history had complete birth dates recorded, as did 88 percent of children who had died. The completeness of data on birth dates for living children is good overall and is excellent in recent years. The completeness for nonsurviving children is less satisfactory, but again better in the past few years. The annual data on the number of births can be examined to see if there is an abnormally large decline in the number of births after January of the third calendar year before the survey. The cutoff point for the health questions and measurements made on young children was 1 January 1995 for surveys that began in 1998 and 1 January 1996 for surveys that began in 1999. It is typical for the annual number of births to fluctuate somewhat, so small annual fluctuations are to be expected. However, a drop in the annual number of births between the years just before the cutoff point and the years just after the cutoff point (particularly for nonsurviving children) suggests that there has been some omission of recent births or displacement of birth dates that could result in an underestimate of fertility rates for recent years.

Many surveys that include both demographic information and health information for children below a specified age have been subject to a substantial amount of age displacement. In particular, there is often a tendency for interviewers to 'age' children out of the eligible period for asking health questions. This problem was well known before NFHS-2 began; therefore, interviewer training stressed this issue to try to reduce the extent of biases due to age displacement. Apparently, the training was not entirely successful in avoiding this type of problem, however. The 14 percent decline in the number of births between 1994 and 1995 (and the much larger percent decline between those two years in the number of children who died by the time of the survey) must be partly due to the omission of births in 1995 and/or the displacement of births from 1995 to earlier years. This type of error is likely to result in some degree of underestimation in recent fertility and infant mortality rates.

Table D.5 presents information on the reporting of age at death in days. Results from the table suggest that early infant deaths have not been seriously underreported in NFHS-2, because the ratios of deaths under seven days to all neonatal deaths are quite high (a ratio of less than 25 percent is often used as a guideline to indicate underreporting of early neonatal deaths). The ratios decline slightly over time, from 74 in the period 0–4 years preceding the survey to 70 in the period 10-14 years preceding the survey. Although there was no severe underreporting of early neonatal deaths in NFHS-2, there was some misreporting of age at death due to a preference for reporting the age at death at 3, 5, 8, 10, 12, 15, 18, 20, 25, and 30 days (Table D.5).

Table D.6 shows the percentage of infant deaths that occurred during the neonatal period. These percentages are also quite high and nearly constant over time, suggesting that there is no major omission of neonatal deaths.

Table D.4  Births by calendar year

Number of births, percent with complete birth date, sex ratio at birth, and calendar year ratio for children still alive at the time of the survey (L), children who died by the time of the survey (D), and total children (T), by calendar year (weighted), India, 1998–99

| Calendar year | Number of births | | | Percent with complete birth date[1] | | | Sex ratio at birth[2] | | | Calendar year ratio[3] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L | D | T | L | D | T | L | D | T | L | D | T |
| 1999 | 1,741 | 60 | 1,801 | 100.0 | 99.2 | 100.0 | 905 | 520 | 889 | NA | NA | NA |
| 1998 | 10,647 | 665 | 11,312 | 99.7 | 98.1 | 99.6 | 898 | 961 | 901 | NC | NC | NC |
| 1997 | 9,913 | 696 | 10,609 | 99.2 | 97.3 | 99.0 | 958 | 879 | 952 | NC | NC | NC |
| 1996 | 9,732 | 809 | 10,541 | 98.9 | 95.6 | 98.7 | 945 | 1,044 | 953 | 97.9 | 102.6 | 98.2 |
| 1995 | 9,977 | 880 | 10,857 | 98.2 | 93.5 | 97.8 | 938 | 1,018 | 944 | 95.5 | 78.3 | 93.8 |
| 1994 | 11,169 | 1,440 | 12,609 | 97.5 | 93.4 | 97.0 | 922 | 1,118 | 942 | 103.0 | 130.0 | 105.6 |
| 1993 | 11,699 | 1,335 | 13,035 | 97.4 | 92.0 | 96.9 | 901 | 951 | 906 | 103.4 | 92.2 | 102.1 |
| 1992 | 11,471 | 1,458 | 12,929 | 96.9 | 92.8 | 96.5 | 930 | 994 | 937 | 103.6 | 112.8 | 104.6 |
| 1991 | 10,436 | 1,249 | 11,685 | 96.3 | 90.0 | 95.7 | 922 | 996 | 930 | 90.4 | 85.6 | 89.8 |
| 1990 | 11,625 | 1,461 | 13,086 | 96.3 | 90.3 | 95.6 | 935 | 1,032 | 945 | 116.0 | 112.1 | 115.6 |
| 1989 | 9,600 | 1,357 | 10,957 | 95.8 | 89.5 | 95.0 | 926 | 938 | 928 | 83.2 | 92.5 | 84.2 |
| 1988 | 11,465 | 1,475 | 12,940 | 95.6 | 89.5 | 94.9 | 900 | 1,049 | 916 | 124.6 | 107.9 | 122.4 |
| 1993–97 | 52,490 | 5,161 | 57,651 | 98.2 | 93.9 | 97.8 | 931 | 1,011 | 938 | NA | NA | NA |
| 1988–92 | 54,596 | 7,001 | 61,597 | 96.2 | 90.4 | 95.6 | 923 | 1,003 | 931 | NA | NA | NA |
| 1983–87 | 45,988 | 7,146 | 53,134 | 94.8 | 87.6 | 93.8 | 925 | 965 | 930 | NA | NA | NA |
| 1978–82 | 35,973 | 6,644 | 42,616 | 93.9 | 86.4 | 92.7 | 903 | 972 | 914 | NA | NA | NA |
| 1977 or earlier | 30,280 | 8,492 | 38,772 | 91.8 | 82.0 | 89.6 | 876 | 877 | 876 | NA | NA | NA |
| All | 231,715 | 35,168 | 266,883 | 95.6 | 87.7 | 94.6 | 914 | 957 | 920 | NA | NA | NA |

NA: Not applicable
NC: Not calculated because full-year data were not collected for 1998 and 1999 (the survey began during 1998)
[1] Both year and month of birth given
[2] $(B_f/B_m) \times 1000$, where $B_f$ and $B_m$ are the numbers of female and male births, respectively
[3] $[2B_x/(B_{x-1}+B_{x+1})] \times 100$, where $B_x$ is the number of births in calendar year x

Table D.5  Reporting of age at death in days

Distribution of reported deaths under 1 month of age by age at death in days
and the percentage of neonatal deaths reported to occur at age 0–6 days,
for births occurring during five-year periods preceding the survey
(weighted), India, 1998–99

| Age at death (days) | Years preceding survey | | | |
| | 0–4 | 5–9 | 10–14 | 0–14 |
| --- | --- | --- | --- | --- |
| < 1 | 625 | 827 | 675 | 2,127 |
| 1 | 401 | 539 | 502 | 1,442 |
| 2 | 169 | 242 | 255 | 666 |
| 3 | 243 | 285 | 243 | 772 |
| 4 | 95 | 120 | 144 | 359 |
| 5 | 115 | 151 | 159 | 424 |
| 6 | 110 | 127 | 145 | 382 |
| 7 | 85 | 118 | 140 | 343 |
| 8 | 98 | 152 | 144 | 393 |
| 9 | 33 | 66 | 56 | 154 |
| 10 | 51 | 80 | 88 | 219 |
| 11 | 36 | 33 | 33 | 102 |
| 12 | 38 | 51 | 58 | 148 |
| 13 | 13 | 33 | 32 | 78 |
| 14 | 16 | 14 | 16 | 46 |
| 15 | 110 | 145 | 147 | 401 |
| 16 | 4 | 8 | 22 | 35 |
| 17 | 9 | 11 | 12 | 31 |
| 18 | 18 | 19 | 14 | 51 |
| 19 | 5 | 7 | 11 | 23 |
| 20 | 33 | 47 | 43 | 124 |
| 21 | 13 | 28 | 21 | 62 |
| 22 | 11 | 15 | 20 | 46 |
| 23 | 2 | 0 | 4 | 6 |
| 24 | 6 | 11 | 9 | 26 |
| 25 | 13 | 10 | 17 | 40 |
| 26 | 2 | 2 | 1 | 5 |
| 27 | 2 | 2 | 5 | 9 |
| 28 | 4 | 4 | 10 | 18 |
| 29 | 3 | 1 | 7 | 11 |
| 30 | 14 | 7 | 13 | 33 |
| Missing | 3 | 5 | 3 | 12 |
| 0–30 | 2,376 | 3,155 | 3,045 | 8,576 |
| Percent early neonatal[1] | 74.0 | 72.6 | 69.7 | 72.0 |

[1]Deaths during the first 6 days divided by deaths during the first 30 days

One problem that is inherent in most retrospective surveys is heaping of the age at death on certain digits, e.g., 6, 12, and 18 months. Misreporting of age at death will bias estimates of the age pattern of mortality if the net result of misreporting is the transference of deaths between age segments for which the rates are calculated. For example, an overestimate of child mortality relative to infant mortality may result if children dying during the first year of life are reported as having died at age one or older. Thus, heaping at 12 months can bias the mortality estimates because a certain fraction of these deaths, which are reported to have occurred after infancy (that is, at ages 12–23 months), may have actually occurred during infancy (that is, at ages 0–11 months). In this case, heaping would bias the infant mortality rate downward and the child mortality rate upward.

Examination of the distribution of deaths under age two years during the 15 years before the survey by month of death (Table D.6) indicates there is some heaping of deaths at 6, 12, and

Table D.6  Reporting of age at death in months

Distribution of reported deaths under two years of age by age at death in months and the percentage of infant deaths reported to occur at age under one month, for births occurring during five-year periods preceding the survey (weighted), India, 1998–99

| Age at death (months) | Years preceding survey | | | |
|---|---|---|---|---|
| | 0–4 | 5–9 | 10–14 | 0–14 |
| < 1 | 2,379 | 3,160 | 3,048 | 8,588 |
| 1 | 237 | 343 | 375 | 956 |
| 2 | 161 | 223 | 244 | 627 |
| 3 | 148 | 181 | 213 | 542 |
| 4 | 95 | 112 | 99 | 306 |
| 5 | 68 | 109 | 114 | 290 |
| 6 | 140 | 195 | 183 | 518 |
| 7 | 81 | 102 | 106 | 290 |
| 8 | 89 | 87 | 91 | 268 |
| 9 | 66 | 99 | 130 | 294 |
| 10 | 57 | 66 | 90 | 213 |
| 11 | 45 | 73 | 74 | 191 |
| 12 | 181 | 288 | 333 | 802 |
| 13 | 28 | 41 | 44 | 114 |
| 14 | 20 | 37 | 45 | 103 |
| 15 | 26 | 39 | 35 | 101 |
| 16 | 11 | 18 | 15 | 44 |
| 17 | 7 | 8 | 10 | 25 |
| 18 | 51 | 144 | 127 | 322 |
| 19 | 2 | 5 | 3 | 11 |
| 20 | 10 | 7 | 6 | 24 |
| 21 | 5 | 4 | 6 | 15 |
| 22 | 3 | 4 | 8 | 15 |
| 23 | 7 | 9 | 8 | 24 |
| Missing | 4 | 3 | 0 | 7 |
| 1 year | 54 | 95 | 145 | 294 |
| 0–11 | 3,566 | 4,750 | 4,767 | 13,082 |
| Percent neonatal[1] | 66.7 | 66.5 | 64.0 | 65.6 |

[1]Deaths during the first month divided by deaths during the first year

18 months of age. The heaping at 12 months is substantial despite the strong emphasis on this problem during the training of interviewers for the NFHS-2 fieldwork. Nevertheless, even if one-third of the deaths reported at age 12 months or age one year actually occurred at less than 12 months of age, the infant mortality rate for the five years before the survey would be underestimated by about 2 percent. Therefore, the degree of heaping on 12 months and one year might lead to a slight underestimate of the postneonatal and infant mortality rates and a somewhat more substantial overestimate of the child mortality rate.

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# APPENDIX F

## SURVEY INSTRUMENTS

The three standard core questionnaires (Household Questionnaire, Woman's Questionnaire, and Village Questionnaire) that were used in all states are presented in this appendix. However, there were a few questions that were included only in the questionnaires in Maharashtra, Delhi, and Tamil Nadu. The specific questions were:

For Maharashtra, on the coversheet of Household Questionnaire, two additional identifiers were added for use in Mumbai only: whether the area is a slum area and whether the household is a slum household (not shown on the questionnaire presented here).

Questions 907A, 907B, 913A, and 913B were included in the Woman's Questionnaire for use only in Mumbai and Delhi to test the level of lead in the blood of children born since January 1996 to eligible women. A form showing the results of the lead testing was also added. In addition, the informed consent statement in question 901 was modified in these states to include information on lead testing.

For Maharashtra, Delhi, and Tamil Nadu, question 914 was included in the Woman's Questionnaire to determine whether the respondent would agree to be interviewed again in the future for a follow-up study.

For all the Phase I states (in which fieldwork began in 1998), the reference date for household questions on deaths (questions 51 to 62) was 1996. The reference year was changed to 1997 for Phase II states (in which fieldwork began in 1999). Similarly, the reference date for question 224, section 4A, section 4B (through question 485), question 620, section 8, and section 9 was 1995 for Phase I states and 1996 for Phase II states.