CHAPTER 6

MORTALITY, MORBIDITY, AND IMMUNIZATION

This chapter presents mortality rates, particularly for infants and young children, and data on the prevalence of certain diseases (morbidity). It also presents information on the prevention and treatment of diseases, especially those that are life-threatening to young children. The chapter ends with data on women's knowledge of AIDS. This type of information is relevant both to an assessment of the demographic situation and to the design of appropriate health policies and programmes. Mortality estimates are also useful for projecting the future size of the population. Detailed information on mortality and morbidity (by demographic and socioeconomic characteristics) can be used to identify population groups that are at high risk and in need of health services. This chapter primarily presents information on child health, while other chapters of this report, particularly Chapter 8, present information on maternal and reproductive health.

The Government of India has repeatedly taken steps to strengthen maternal and child health services in India, starting during the First and Second Five-Year Plans (1951–56 and 1956–61) under the Ministry of Health, and continuing with the Minimum Needs Programme initiated during the Fifth Five-Year Plan (1974–79). More recently, efforts to improve maternal and child health have been enhanced by activities of the Family Welfare Programme and by the introduction of the Child Survival and Safe Motherhood Programme (Ministry of Health and Family Welfare, 1992). The Ministry of Health and Family Welfare has also sponsored special projects under the Maternal and Child Health Programme, including the Oral Rehydration Therapy (ORT) programme, the establishment of Regional Institutes of Maternal and Child Health in states where infant mortality rates are high, the Universal Immunization Programme, and the Maternal and Child Health Supplemental Programme within the Postpartum Programme (Ministry of Health and Family Welfare, 1992). These programmes are now integrated into the Reproductive and Child Health Programme launched in 1996.

Maternal and child health services in rural areas of India are delivered mainly by government-run Primary Health Centres and sub-centres. In urban areas, such services are available mainly through government or municipal hospitals, urban health posts, hospitals and nursing homes operated by nongovernmental organizations (NGOs), and private nursing homes and maternity homes

The second National Family Health Survey (NFHS-2) includes questions on mortality and morbidity on both the Household Questionnaire and the Woman's Questionnaire. The Household Questionnaire has questions on individuals in the household suffering from asthma, tuberculosis, jaundice, and malaria, plus questions on deaths occurring to usual residents of the household during the two years preceding the survey. The Woman's Questionnaire collects information on the survival status of all births and the age at death of children who died. The Woman's Questionnaire also contains questions on child immunization coverage and sources; vitamin A supplementation for children; prevalence of acute respiratory infection, fever, and diarrhoea among children and the treatment of these illnesses; and mothers' knowledge of oral rehydration therapy.

The information on child health and health-care practices was collected from mothers for children born since 1 January 1995. If a woman had more than two live births during that period, the information was collected for only the two most recent births. The information on child health presented in this chapter pertains to children born during the three years preceding the survey.

6.1 Crude Death Rates and Age-Specific Death Rates

Table 6.1 shows crude death rates (CDR) and age-specific death rates by sex for the usual resident (*de jure*) population of Gujarat from NFHS-2 and the Sample Registration System (SRS). The table also presents crude death rates and age-specific death rates from NFHS-1 for the total population (both sexes combined). The SRS death rates are based on deaths to the usual-resident population in 1997. The NFHS-1 and NFHS-2 death rates are based on the average annual number of deaths occurring to usual residents of the household during the two-year period preceding the survey (approximately 1991–92 for NFHS-1 and 1997–98 for NFHS-2). The denominators for the NFHS-2 death rates are obtained by projecting the number of usual residents at the time of the survey backwards to the midpoint of the time period on the basis of the intercensal population growth rate in the state. The rural intercensal growth rate is applied to all rural age and sex groups and the urban intercensal growth rate is applied to all urban age and sex groups.

Questions on the number of deaths occurring to usual residents in each household during a particular time period have been included in demographic surveys in many countries and have often resulted in a substantial underreporting of deaths. The Sample Registration System (SRS), maintained by the Office of the Registrar General of India, provides a useful comparison (Office of the Registrar General, 1999a).

Table 6.1 shows an estimated annual CDR for Gujarat of 8.0 deaths per 1,000 population based on NFHS-2 data (covering roughly the period 1997–98), compared with an estimated CDR of 7.6 from the 1997 SRS. In Gujarat, the NFHS-2 age-specific death rates tend to be lower than the SRS age-specific death rates at ages below 15 but higher at ages 50 and over. If the SRS crude death rate is standardized on the NFHS-2 age distribution (from Table 2.1), however, the standardized death rate is 8.0, the same as the crude death rate of 8.0 from NFHS-2. Thus, the difference in CDRs between NFHS-2 and the SRS appears to stem mainly from differences in the population age distribution estimated from the two sources, not to differences in age-specific death rates, which largely offset each other at the younger and older ages.

The CDR is lower in NFHS-2 (8.0) than in NFHS-1 (9.1). The NFHS-1 estimate pertains approximately to the period 1991–92. Age-specific death rates are lower in NFHS-2 than in NFHS-1 for each of the broad age groups shown in the table except 50–59. Overall, the comparison suggests that mortality declined between NFHS-1 and NFHS-2, assuming that completeness of reporting of deaths did not change appreciably between the two surveys.

In most countries, male death rates are higher than female death rates at nearly all ages. South Asia has tended to be an exception in this respect, with higher death rates for females over much of the age span (Tabutin and Willems, 1995; Preston, 1989; Ghosh, 1987). In NFHS-2 in Gujarat, age-specific death rates for males exceed those for females, except at ages 5–14 and 50–59, where the rates for females exceed those of males. The SRS shows a somewhat different

Table 6.1 Age-specific death rates and crude death rates

Age-specific death rates and crude death rates (CDR) by sex from NFHS-1, NFHS-2, and the SRS, Gujarat

	NFHS-1 (1991–92)	NFHS-2 (1997–98)			SRS (1997)		
Age	Total	Male	Female	Total	Male	Female	Total
< 5	20.6	16.3	16.2	16.2	19.1	22.8	20.8
5–14	2.4	0.7	1.7	1.2	1.3	1.6	1.4
15–49	3.0	3.6	2.1	2.9	3.2	2.5	2.8
50–59	14.5	14.8	16.9	15.8	13.2	9.1	11.1
60+	49.1	51.6	39.6	45.5	47.6	39.6	42.6
CDR	9.1	8.6	7.4	8.0	7.8	7.5	7.6

Note: Age-specific death rates and crude death rates by sex from NFHS-1 and NFHS-2 are based on the annual number of deaths reported for the *de jure* population during the two years preceding the survey. The SRS rates are also *de jure*, based on deaths during 1997. Rates are specified on a per-thousand basis.
Source for SRS: Office of the Registrar General, 1999b

pattern. Male death rates exceed female death rates at ages 15 and above, whereas female death rates exceed male death rates at ages below 15.

6.2 Infant and Child Mortality

Infant and child mortality rates reflect a country's level of socioeconomic development and quality of life and are used for monitoring and evaluating population and health programmes and policies. NFHS-2 asked all ever-married women age 15–49 to provide a complete history of their births, including, for each live birth, the sex, month and year of birth, survival status, and age at the time of the survey or age at death. Age at death was recorded in days for children dying in the first month of life, in months for other children dying before their second birthday, and in years for children dying at later ages. This information was used to calculate the following direct estimates of infant and child mortality[1]:

Neonatal mortality: The probability of dying in the first month of life

Postneonatal mortality: The probability of dying after the first month of life but before the first birthday

Infant mortality ($_1q_0$): The probability of dying before the first birthday

Child mortality ($_4q_1$): The probability of dying between the first and fifth birthdays

Under-five mortality ($_5q_0$): The probability of dying before the fifth birthday

[1]A detailed description of the method for calculating the probabilities presented here is given in Rutstein (1984). The mortality estimates are not rates, but are true probabilities, calculated according to the conventional life-table approach. Deaths and exposure in any calendar period are first tabulated for the age intervals 0, 1–2, 3–5, 6–11, 12–23, 24–35, 36–47, and 48–59 months. Then age-interval-specific probabilities of survival are calculated. Finally, probabilities of mortality for larger age segments are produced by multiplying the relevant age-interval survival probabilities together and subtracting the product from one:

$$_nq_x = 1 - \prod_i (1 - q_i)$$

Assessment of Data Quality

The reliability of mortality estimates calculated from retrospective birth histories depends upon the completeness with which deaths of children are reported and the extent to which birth dates and ages at death are accurately reported and recorded. Estimated rates of infant and child mortality are subject to both sampling and nonsampling errors. While sampling errors for various mortality estimates are provided in Appendix A, this section describes the results of various checks for nonsampling errors—in particular, underreporting of deaths in early childhood (which would result in an underestimate of mortality) and misreporting of the date of birth or age at death (which could distort the age pattern of under-five mortality). Both problems are likely to be more pronounced for children born further in the past than for children born recently. Underreporting of infant deaths is usually most serious for deaths that occur very early in infancy. If deaths in the early neonatal period are selectively underreported, there will be an abnormally low ratio of deaths under seven days to all neonatal deaths and an abnormally low ratio of neonatal to infant deaths. Changes in these ratios over time can be examined to test the hypothesis that underreporting of early infant deaths is more common for births that occurred further in the past than for births that occurred more recently. Failure to report deaths will result in mortality figures that are low and if underreporting is more severe for children born further in the past than children born recently, any decline in mortality will tend to be understated.

Results from Table B.5 (Appendix B) suggest that early neonatal deaths have not been seriously underreported in NFHS-2 in Gujarat, since the ratios of deaths under seven days to all neonatal deaths are consistently high (between 73 and 78 percent) for the different time periods preceding the survey (a ratio of less than 25 percent is often used as a guideline to indicate underreporting of early neonatal deaths). The ratios of infant deaths that occurred during the neonatal period (Appendix Table B.6) are also consistently high (between 66 and 68 percent) for the different time periods preceding the survey.

Another problem inherent in most retrospective surveys is heaping of ages at death on certain digits, e.g., 6, 12, and 18 months. If the net result of age misreporting is the transference of deaths between age segments for which the rates are calculated, misreporting of the age at death will bias estimates of the age pattern of mortality. For instance, 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 year or older. Thus, heaping at 12 months can bias the mortality estimates because a certain fraction of these deaths may have actually occurred during infancy (i.e., at ages 0–11 months). In such cases, heaping would bias infant mortality ($_1q_0$) downward and child mortality ($_4q_1$) upward.

In the Gujarat NFHS-2, an examination of neonatal deaths occurring during the 15 years before the survey (Appendix Table B.5) indicates a slight preference for reporting age at death at 10, 12, 15, and 20 days. An examination of the distribution of deaths under age two years during the 15 years preceding the survey by month of death (Appendix Table B.6) indicates slight heaping of deaths at ages 7, 12, and 18 months. The amount of heaping on 12 months is minor, probably due to the strong emphasis on this problem during the training of interviewers for the NFHS–2 fieldwork[2]. This brief assessment of the internal consistency of NFHS-2 childhood mortality data for Gujarat suggests that, although there may be some heaping of age at death at

[2]Interviewers were trained to probe for the exact number of months lived by the child if the age at death was reported as 'one year'.

certain ages, the heaping is minimal, and any resulting bias in infant and child mortality rates is negligible.

It is seldom possible to establish mortality levels with confidence for a period of more than 15 years before a survey. Even within the recent 15-year period considered here, apparent trends in mortality rates should be interpreted with caution for several reasons. First, there may be differences in the completeness of death reporting related to the length of time before the survey. Second, the accuracy of reports of age at death and date of birth may deteriorate with time. Third, sampling variability of mortality rates tends to be high, especially for groups with relatively few births. Fourth, mortality rates are truncated as they go back in time because women currently age 50 or above who were bearing children during earlier periods were not included in the survey. This truncation affects mortality trends, in particular. For example, for the period 10–14 years before the survey, the rates do not include any births to women age 40–49 since these women were over age 50 at the time of the survey and were not eligible to be interviewed. Since these excluded births to older women were likely to be at a somewhat greater risk of dying than births to younger women, the mortality rates for the period may be slightly underestimated. Estimates for more recent periods are less affected by truncation bias since fewer older women are excluded. The extent of this bias depends on the proportion of births omitted. Table 4.18 (Chapter 4) shows that very few of the children born in the three years before the survey were born to women age 35 and above. Given the small proportion of births excluded, selection bias for infant and child mortality statistics as far back as 15 years before the survey should be negligible.

Levels, Trends, and Differentials in Infant and Child Mortality

Table 6.2 and Figure 6.1 present various measures of infant and child mortality by residence for the three five-year periods preceding the survey, as estimated from NFHS-2. Infant mortality in Gujarat declined from 87 deaths per 1,000 live births during 1984–88 (10–14 years before the survey) to 63 deaths per 1,000 live births during 1994–98 (0–4 years before the survey), an average rate of decline of 2.4 infant deaths per 1,000 live births per year. A comparison of the infant mortality rate for the period 0–4 years before NFHS-2 (63 per 1,000) with the infant mortality rate 0–4 years before NFHS-1 (69 per 1,000), however, indicates an average rate of decline of only 1 infant death per 1,000 live births per year.

By and large, the other measures of infant and child mortality presented in Table 6.2 have also declined during the past 15 years. As in the case of infant mortality, however, comparison with corresponding rates derived from NFHS-1 suggests that the declines may have been slower than indicated by NFHS-2 data alone.

Despite the overall decline in infant and child mortality, 1 in every 16 children born during the five years before NFHS-2 died within the first year of life, and 1 in every 12 children died before reaching age five. Clearly, child survival programmes in Gujarat need to be intensified in order to achieve further reductions in infant and child mortality.

Table 6.2 also shows urban-rural differentials. Rural mortality rates for children are considerably higher than urban mortality rates. In the recent period 0–4 years before the survey, postneonatal mortality is more than twice as high in rural areas as in urban areas, neonatal

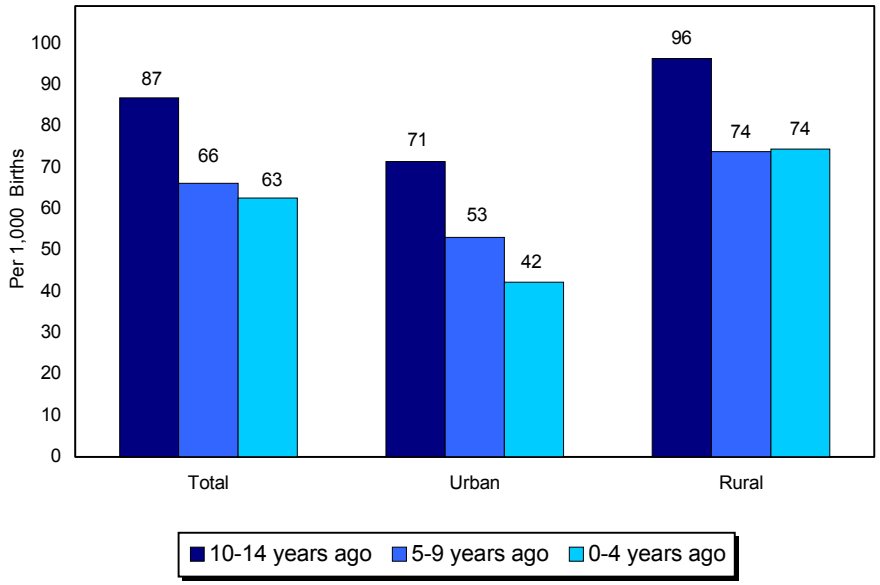
Table 6.2 Infant and child mortality

Neonatal, postneonatal, infant, child, and under-five mortality rates for five-year periods preceding the survey by residence, Gujarat, 1998–99

Years preceding the survey	Neonatal mortality (NN)	Postneonatal mortality[1] (PNN)	Infant mortality ($_1q_0$)	Child mortality ($_4q_1$)	Under-five mortality ($_5q_0$)
URBAN					
0–4	28.6	13.6	42.2	27.2	68.3
5–9	38.2	14.9	53.1	16.5	68.7
10–14	45.5	26.0	71.4	21.0	90.9
RURAL					
0–4	46.0	28.5	74.4	21.9	94.7
5–9	47.7	26.1	73.8	42.1	112.8
10–14	65.9	30.4	96.3	43.3	135.4
TOTAL					
0–4	39.6	23.0	62.6	24.0	85.1
5–9	44.2	21.9	66.1	32.3	96.2
10–14	58.1	28.7	86.8	34.6	118.5

Note: The first five-year period preceding the survey does not include the month in which the interview took place. Rates are specified on a per-thousand basis. See text for definition of rates.
[1]Computed as the difference between the infant and neonatal mortality rates

Figure 6.1
Infant Mortality Rate for Five-Year Periods by Residence



Note: Rates are for five-year periods preceding the survey

NFHS-2, Gujarat, 1998–99

mortality is 1.6 times as high, infant mortality is 1.8 times as high, and under-five mortality is 1.4 times as high. Surprisingly, child mortality (between ages 1 and 5) is slightly higher in urban than in rural areas during the period 0–4 years before the survey. Indeed, child mortality actually appears to have increased in urban areas and is highest during the last five-year period. In rural

areas, all mortality rates shown in the table declined steadily, except that postneonatal and infant mortality increased slightly during the last two 5-year periods.

The estimated NFHS-2 infant mortality rate of 63 deaths per 1,000 live births during 1994–98 is identical to the SRS value of 63 deaths per 1,000 live births averaged for the period 1994–98. The NFHS-2 estimate of the infant mortality rate for rural areas over the same period (74 deaths per 1,000 live births) is, however, slightly higher than the SRS estimate (69 deaths per 1,000 live births), and the NFHS-2 estimate for urban areas (42 per 1,000) is slightly lower than SRS estimate (47 per 1,000). But none of these differences in infant mortality between NFHS–2 and the SRS is statistically significant, as is evident from the confidence intervals given in Appendix Table A.2.

Socioeconomic Differentials in Infant and Child Mortality

The probability of dying in early childhood is higher in some population groups than in others. Table 6.3 presents differentials in infant and child mortality rates for the 10-year period preceding the survey by selected background characteristics. Under-five mortality is 52 percent higher in rural areas than in urban areas, which is considerably more than the 39 percent differential in the most recent five-year period shown in Table 6.2. This comparison confirms the finding in Table 6.2 that the under-five mortality rate has been falling more rapidly in rural areas than in urban areas.

The infant mortality rate declines sharply with increasing education of mothers, as expected, ranging from a high of 77 deaths per 1,000 live births for illiterate mothers to a low of 35 deaths per 1,000 live births for mothers who have at least completed high school. The other mortality measures also show large differences by education in the same direction. In the case of postneonatal mortality, the rate for children of illiterate mothers is almost seven times higher than the rate for children of mothers who have at least completed high school.

All the infant and child mortality rates are much higher for Hindus than for Muslims. The infant mortality rate is about two times higher and the postneonatal mortality rate is about 3.5 times higher for Hindu children than for Muslim children. Although the sample size for Muslim children is relatively small, these findings are consistent with those of NFHS–1, which also recorded much higher rates of infant and child mortality for Hindus than for Muslims in Gujarat. The lower rates for Muslims may occur partly because a larger proportion of Muslims than of Hindus in Gujarat live in urban areas, where mortality rates are lower. This is confirmed by a study based on NFHS-1 data, which noted that the difference in infant and child mortality rates between Hindu and Muslim children is reduced considerably when other demographic and socioeconomic variables, including urban-rural residence, are statistically controlled (Pandey et al., 1998).

Children of women belonging to scheduled castes and other backward classes have higher rates of infant mortality than children of women belonging to scheduled tribes or ‘other’ women. Children of women who do not belong to a scheduled caste, scheduled tribe, or other backward class have by far the lowest rates of infant and child mortality. As expected, all indicators of infant and child mortality decline substantially with increases in the household standard of living. For example, children in households with a high standard of living have an infant mortality rate of 38 per 1,000, compared with 83 per 1,000 for children in households with

Table 6.3 Infant and child mortality by background characteristics

Neonatal, postneonatal, infant, child, and under-five mortality rates for the 10-year period preceding the survey by selected background characteristics, Gujarat, 1998–99

Background characteristic	Neonatal mortality (NN)	Postneonatal mortality[1] (PNN)	Infant mortality ($_1q_0$)	Child mortality ($_4q_1$)	Under-five mortality ($_5q_0$)
Residence					
Urban	33.5	14.3	47.8	21.8	68.5
Rural	46.9	27.2	74.1	32.1	103.8
Mother's education					
Illiterate	48.5	28.8	77.2	42.6	116.6
Literate, < middle school complete	38.4	21.4	59.9	9.4	68.7
Middle school complete	(27.1)	(14.3)	(41.4)	(9.3)	(50.3)
High school complete and above	30.5	4.4	34.9	3.5	38.3
Religion					
Hindu	43.9	24.4	68.3	29.9	96.2
Muslim	(26.9)	(7.2)	(34.0)	(16.7)	(50.2)
Caste/tribe					
Scheduled caste	49.1	31.1	80.1	46.6	123.0
Scheduled tribe	31.1	29.2	60.3	36.5	94.6
Other backward class	51.7	22.5	74.2	23.6	96.0
Other	39.2	14.5	53.7	17.5	70.3
Standard of living index					
Low	45.4	37.9	83.3	58.9	137.3
Medium	44.2	21.4	65.6	19.7	84.0
High	32.8	5.0	37.8	10.8	48.2
Total	41.9	22.5	64.4	28.2	90.7

Note: The 10-year period preceding the survey does not include the month in which the interview took place. Rates are specified on a per-thousand basis. See text for definition of rates.
( ) Based on 250–499 children surviving to the beginning of the age interval
[1]Computed as the difference between the infant and neonatal mortality rates

a low standard of living. Corresponding rates for under-five mortality are 48 per 1,000 for children in households with a high standard of living and 137 per 1,000 for children in households with a low standard of living. The postneonatal mortality rate is more than seven times higher and the child mortality rate is more than five times higher in households with a low standard of living than in households with a high standard of living. The neonatal mortality rate is only 1.4 times higher, reflecting the greater role that congenital defects, the prevalence of which varies little by socioeconomic status, play in neonatal mortality.

Demographic Differentials in Infant and Child Mortality

This section examines differentials in early childhood mortality by demographic characteristics of the child and the mother. Table 6.4 and Figure 6.2 present various indicators of infant and child mortality for the 10 years preceding the survey by sex of the child, mother's age at childbirth, birth order, length of the previous birth interval, medical care received by the mother during pregnancy, delivery and the early postpartum period, and the size of the child at the time of birth.

Under-five mortality is slightly higher for boys than for girls. When under-five mortality is broken down into its components, however, it is seen that male excess mortality occurs almost

Table 6.4 Infant and child mortality by demographic characteristics

Neonatal, postneonatal, infant, child, and under-five mortality rates for the 10-year period preceding the survey by selected demographic characteristics, Gujarat, 1998–99

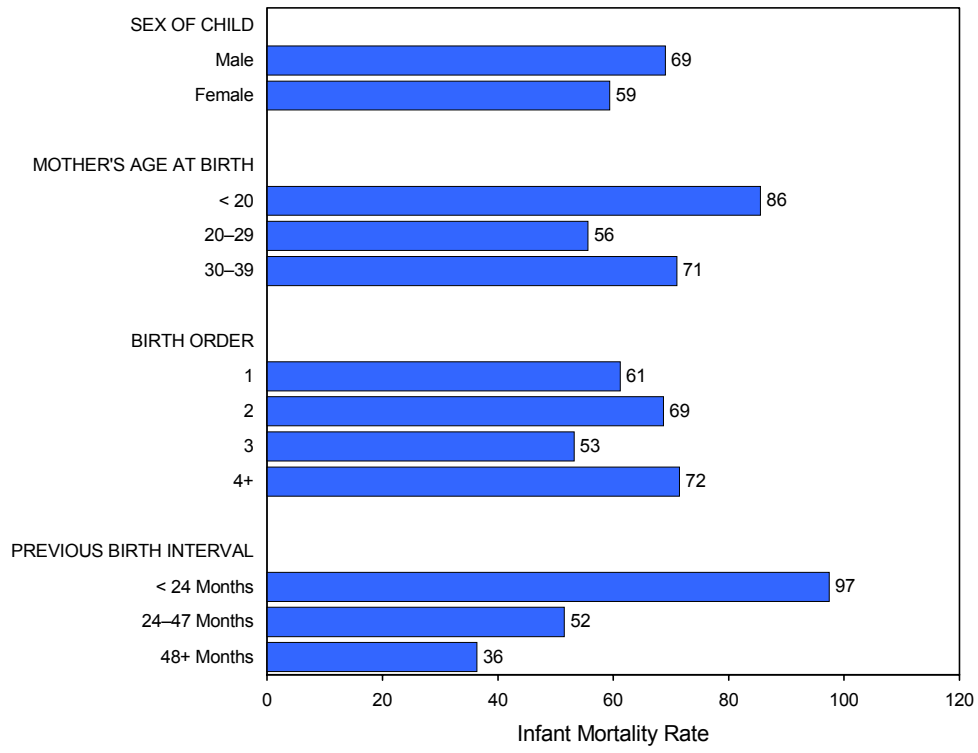
Demographic characteristic	Neonatal mortality (NN)	Postneonatal mortality[1] (PNN)	Infant mortality ($_1q_0$)	Child mortality ($_4q_1$)	Under-five mortality ($_5q_0$)
Sex of child					
Male	46.6	22.5	69.0	25.1	92.4
Female	37.0	22.4	59.4	31.4	89.0
Mother's age at birth					
< 20	62.2	23.3	85.5	29.5	112.5
20–29	37.0	18.6	55.6	27.0	81.1
30–39	(29.0)	(42.0)	(71.0)	(33.0)	(101.7)
Birth order					
1	45.0	16.3	61.2	17.3	77.4
2	49.6	19.1	68.7	25.3	92.3
3	37.1	16.1	53.2	32.4	83.9
4+	33.4	38.1	71.5	40.0	108.6
Previous birth interval					
< 24 months	62.0	35.5	97.4	44.1	137.2
24–47 months	30.6	20.9	51.5	29.5	79.5
48+ months	(20.2)	(16.1)	(36.4)	(15.5)	(51.3)
Medical care[2]					
One or two types of care	41.9	21.6	63.4	U	U
All three types of care	(21.9)	(18.4)	(40.3)	U	U
Birth size[3]					
Average	29.4	18.1	47.5	U	U
Small	(51.5)	(37.2)	(88.8)	U	U

Note: The 10-year period preceding the survey does not include the month in which the interview took place. Rates are specified on a per-thousand basis. See text for definition of rates.
U: Not available
( ) Based on 250–499 children surviving to the beginning of the age interval
[1]Computed as the difference between the infant and neonatal mortality rates
[2]Medical care includes (i) antenatal care received from a health worker, (ii) delivery assistance given by a doctor, nurse, trained midwife, or other health professional, and (iii) postnatal care received in a health facility or at home within two months of delivery; rates are for the three-year period preceding the survey.
[3]Birth size as reported by mother; rates are for the three-year period preceding the survey.

entirely in the first month of life, where a large fraction of mortality stems from congenital defects, to which males are more prone than females. The sex differential is negligible for postneonatal mortality, and it is reversed for child mortality at ages 1–4, where female mortality exceeds male mortality. This reversal of sex differentials in mortality with increasing age has been observed in other studies in South Asia and is thought to reflect the relative medical and nutritional neglect of the girl child (Das Gupta, 1987; Basu, 1989). The male-female differences in neonatal and postneonatal mortality rates in Gujarat are probably not statistically significant, however, given the large sampling errors associated with the different estimates of infant and child mortality (Appendix Table A.2).

For both social and biological reasons, infant mortality rates and child mortality rates often exhibit a U-shaped pattern with respect to the mother's age at childbirth, with children of the youngest and oldest mothers experiencing higher mortality rates than children whose mothers are in their prime reproductive ages. Children born to young mothers are more likely to be of low birth weight, which is probably an important factor contributing to their higher neonatal mortality rate.

Figure 6.2
Infant Mortality Rates by Selected Demographic Characteristics



Note: Based on births in the 10 years preceding the survey (1989–98)

NFHS-2, Gujarat, 1998–99

Similarly, children born to mothers above age 30 are at a relatively high risk of experiencing congenital problems. Gujarat exhibits the expected U-shaped pattern of mortality by mother's age, with higher infant mortality among children of mothers under age 20 (86 deaths per 1,000 live births) and age 30–39 (71 deaths per 1,000) than among children of mothers age 20–29 (56 deaths per 1,000). A similar pattern is observed for postneonatal mortality rates and child mortality rates. The U-shaped relationship is not observed, however, in the case of neonatal mortality. Mortality rates among children age below one month of age decline monotonically with mother's age at childbirth.

The relationship between birth order and infant and child mortality is somewhat irregular. For all of the mortality measures shown in Table 6.4, children of birth order 2 have slightly higher mortality than children of birth order 1. Children of birth order 3 have lower mortality than children of birth order 2, except for child mortality at ages 1–4, where the relationship is reversed. Children of birth order 4 or higher have higher mortality than children of birth order 3, except for neonatal mortality, where the relationship is reversed.

The length of the previous birth interval has a powerful effect on the survival chances of children in Gujarat. Children with a shorter previous birth interval have much higher mortality than children with a longer previous birth interval. For example, under-five mortality is 137 per 1,000 for children with a previous birth interval of less than 24 months, 80 per 1,000 for children with a previous birth interval of 24–47 months, and 51 per 1,000 for children with a previous birth interval that is 48 months or longer. The effect of previous birth interval is also large for the

other mortality measures shown. Although the length of the previous birth interval is likely to affect mortality risks directly, a portion of the association between birth intervals and mortality risks may reflect the effect of factors that are correlated with birth intervals. For example, shorter birth intervals are likely to occur in large families, and large families tend to come from lower socioeconomic groups and are more likely than other families to live in rural areas where medical facilities and other survival-enhancing resources are less readily available. Nevertheless, multivariate analyses of birth-interval effects and child survival commonly find a strong association between short birth intervals (less than 24 months) and increased mortality even after controlling for other demographic and socioeconomic characteristics (Retherford et al., 1989).

Antenatal, delivery, and postnatal care are usually associated with lower infant mortality. Table 6.4 shows that children of women who receive all three types of care have considerably lower risks of neonatal and postneonatal mortality than those with only one or two types of care. It is not possible to compare the mortality rates for children of mothers who receive none of the three types of pregnancy-related care because of the small number of cases in that category. Table 6.4 also shows that mortality risks are about two times higher for children who were small at birth than for children who were of average size at birth.

6.3 Morbidity

There is limited experience in collecting morbidity data from population-based demographic sample surveys. NFHS-1 collected data on five major morbidity conditions—partial and complete blindness, tuberculosis, leprosy, physical impairment of the limbs, and malaria—among all persons in the sample households. The results were found to be generally plausible and useful. For this reason, it was decided to include similar morbidity questions in NFHS-2. In NFHS-2, questions on blindness, leprosy, and physical impairment of the limbs were replaced by questions on asthma and jaundice. The questions on tuberculosis and malaria were retained, and a question on medical treatment of tuberculosis was added to get a better measure of the prevalence of tuberculosis. The household head or other knowledgeable adult in the household reported on morbidity for all household members. No effort was made to do clinical tests for any of the disease conditions.

Table 6.5 shows the prevalence of asthma, tuberculosis, jaundice, and malaria in the household population by age, sex, and place of residence. There are several reasons why the results of NFHS-2 may understate the prevalence of these conditions. Diseases carrying a stigma, such as tuberculosis, may be underreported due to intentional concealment by respondents. Underestimation may also occur because the respondents are unaware that they or other members of the household have the condition. It is also possible that the respondents know that a household member suffers from a given condition but fail to report it because they do not recognize the term used by the enumerator to describe the condition. On the other hand, a factor contributing to possible overestimation of prevalence without clinical verification is that some other disease can be mistaken by the respondent as one of the listed diseases; for example, chronic bronchitis may be reported as tuberculosis or common flu as malaria.

Table 6.5 Morbidity

Number of persons per 100,000 usual household residents suffering from asthma, tuberculosis, jaundice, or malaria by age, sex, and residence, Gujarat, 1998–99

Age and sex	Number of persons per 100,000 suffering from: Asthma	Tuberculosis[1]	Medically treated tuberculosis	Jaundice during the past 12 months	Malaria during the past 3 months	Number of usual residents
URBAN						
Age						
< 15	366	82	82	1,720	3,229	2,431
15–59	1,256	343	305	956	3,411	5,200
60+	5,827	531	356	354	3,714	561
Sex						
Male	1,184	281	257	1,311	3,409	4,252
Female	1,434	277	226	958	3,344	3,940
Total	1,304	279	242	1,141	3,378	8,193
RURAL						
Age						
< 15	427	50	50	1,082	4,065	4,008
15–59	2,428	774	639	1,091	5,326	6,759
60+	11,245	1,073	640	1,082	9,115	941
Sex						
Male	2,518	755	603	1,216	4,554	5,993
Female	2,382	335	264	952	5,875	5,715
Total	2,451	550	438	1,087	5,199	11,708
TOTAL						
Age						
< 15	404	62	62	1,323	3,749	6,439
15–59	1,918	587	494	1,032	4,494	11,960
60+	9,221	871	534	810	7,098	1,502
Sex						
Male	1,964	558	459	1,255	4,079	10,245
Female	1,995	311	249	955	4,842	9,655
Total	1,979	438	357	1,109	4,449	19,900

[1]Includes medically treated tuberculosis

Asthma

Asthma is a chronic respiratory disease characterized by sudden attacks of laboured breathing, chest constriction, and coughing. There has been a rapid increase in asthma cases in recent years in many parts of the world. According to NFHS-2, about 2 percent of the population of Gujarat suffer from asthma. The prevalence of asthma is considerably higher in rural areas (2,451 per 100,000 population) than in urban areas (1,304 per 100,000 population). Age differences are marked, with the prevalence of asthma increasing from 404 per 100,000 at age 0–14 to 9,221 per 100,000 at age 60 and over. Most of the urban-rural difference in prevalence is accounted for by urban-rural differences at age 15–59 and 60+, where rural prevalence is approximately twice as high as urban prevalence. By sex, prevalence is virtually the same for females (1,995 per 100,000) and males (1,964 per 100,000) in the state as a whole. But this is not true in urban and

rural areas separately. In urban areas, males have a somewhat lower prevalence of asthma than females, whereas in rural areas, males have a somewhat higher prevalence of asthma than females.

Tuberculosis

Tuberculosis, which is also resurgent worldwide, is an infectious disease that affects the lungs and other body tissues. Tuberculosis of the lungs, the most commonly known form, is characterized by coughing up mucus and sputum, fever, weight loss, and chest pain. The overall prevalence of tuberculosis in Gujarat is 438 per 100,000 population. This is considerably higher than the prevalence recorded in NFHS-1 (310 per 100,000). The prevalence of tuberculosis is almost twice as high in rural areas (550 per 100,000) as in urban areas (279 per 100,000). The prevalence rate is much higher for males (558 per 100,000) than for females (311 per 100,000). The sex differential in the prevalence of tuberculosis is much larger in rural areas than in urban areas. Probable reasons for the much higher prevalence of tuberculosis among males than females are that men are more likely than women to come in contact with people who suffer from active tuberculosis, and that men in Gujarat smoke more than women. In Gujarat, as seen earlier, the proportion who smoke is 26 percent for men and 1 percent for women (Table 2.12). The prevalence of tuberculosis increases rapidly with age. It is substantially higher among persons age 60 and above (871 per 100,000) than among those age 15–59 (587 per 100,000) or those age 0–14 (62 per 100,000).

Medically treated tuberculosis is expected to give a more reliable measure of the prevalence of active tuberculosis than the measure based on all reported cases considered in the preceding paragraph. As expected, the prevalence of medically treated tuberculosis is considerably lower (357 per 100,000) than the prevalence based on all reported cases (438 per 100,000). The prevalence of medically treated tuberculosis reported in NFHS-2 is somewhat higher than the prevalence of all reported cases in NFHS-1 (310 per 100,000), indicating that tuberculosis may be increasing in Gujarat. Differentials in the prevalence of medically treated tuberculosis by residence, age, and sex are similar to differentials in the prevalence of all reported cases.

Jaundice

Jaundice is characterized by yellowish discolouration of the eyes and skin, fever, liver enlargement, and abdominal pain. NFHS-2 asked household respondents if any member of the household had suffered from jaundice at any time during the 12 months preceding the survey. In Gujarat, 1,109 persons per 100,000 population were reported to have suffered from jaundice during the 12 months preceding the survey. People living in urban areas are slightly more likely to have suffered from jaundice (1,141 per 100,000) than those living in rural areas (1,087 per 100,000). Males are 1.3 times more likely to have suffered from jaundice than females. Jaundice is the only condition measured that decreases with age. The prevalence of jaundice is the highest at age 0–14 (1,323 per 100,000) followed by age 15–59 (1,032 per 100,000) and age 60+ (810 per 100,000). Sex differentials in the prevalence of jaundice are similar in urban and rural areas. For reasons that are not at all clear, the prevalence of jaundice declines sharply with age in urban areas but hardly varies by age in rural areas.

Malaria

Malaria is characterized by recurrent high fever with shivering. NFHS-2 asked household respondents whether any member of their household had suffered from malaria any time during the three months preceding the survey. In Gujarat, 4,449 persons per 100,000 population are reported to have suffered from malaria during the three months preceding the survey. Since the prevalence of malaria is known to vary considerably by season, the NFHS-2 estimates should not be interpreted as representative of the level throughout the year. It is also misleading to compare this estimate with the NFHS-1 estimate, because the months of the year comprising the reference period for the malaria estimates from the two surveys are different.

Rural residents are one and a half times as likely to suffer from malaria (5,199 per 100,000) as are urban residents (3,378 per 100,000). The reported prevalence of malaria is somewhat higher for females than for males in rural areas but slightly lower for females than for males in urban areas. The prevalence of malaria during the past three months increases with age, from 3,749 per 100,000 at age 0–14 to 7,098 per 100,000 at age 60+. The prevalence of malaria increases more sharply with age in rural areas than in urban areas.

6.4 Child Immunization

The vaccination of children against six serious but preventable diseases (tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis, and measles) has been a cornerstone of the child health care system in India. As part of the National Health Policy, the National Immunization Programme is being implemented on a priority basis. The Expanded Programme on Immunization (EPI) was initiated by the Government of India in 1978 with the objective of reducing morbidity, mortality, and disabilities from these six diseases by making free vaccination services easily available to all eligible children. Immunization against poliomyelitis was introduced in 1979–80, and tetanus toxoid for school children was added in 1980–81. Immunization against tuberculosis (BCG) was brought under the EPI in 1981–82. The latest addition to the Programme was vaccination against measles in 1985–86 (Ministry of Health and Family Welfare, 1991).

The Universal Immunization Programme (UIP) was introduced in 1985–86 with the following objectives: to cover at least 85 percent of all infants against the six vaccine-preventable diseases by 1990 and to achieve self-sufficiency in vaccine production and the manufacture of cold-chain equipment (Ministry of Health and Family Welfare, 1991). This scheme has been introduced in every district of the country, and the target now is to achieve 100 percent immunization coverage. Pulse Polio Immunization Campaigns began in December 1995 as part of a major national effort to eliminate polio. The standard immunization schedule developed for the child immunization programme specifies the age at which each vaccine is to be administered, the number of doses to be given, and the route of vaccination (intramuscular, oral, or subcutaneous). Routine vaccinations received by infants and children are usually recorded on a vaccination card that is issued for the child.

NFHS-2 asked mothers in Gujarat whether they had a vaccination card for each child born since January 1995. If a card was available, the interviewer was required to copy carefully the dates when the child received vaccinations against each disease. For vaccinations not recorded on the card, the mother's report that the vaccination was or was not given was accepted. If the mother could not show a vaccination card, she was asked whether the child had received any vaccinations. If any vaccination had been received, the mother was asked whether the child

Table 6.6 Childhood vaccinations by source of information

Percentage of children age 12–23 months who received specific vaccinations at any time before the interview and before 12 months of age by source of information on vaccination history and residence, Gujarat, 1998–99

	Percentage vaccinated											
			DPT			Polio						Number of
Source of information	BCG	Polio 0	1	2	3	1	2	3	Measles	All[1]	None	children
URBAN												
Vaccinated at any time before the interview												
Vaccination card	96.7	14.9	95.0	89.8	86.5	95.0	88.2	86.5	78.2	74.9	0.0	59
Mother's report	77.6	0.0	77.6	72.3	61.8	86.8	82.9	69.8	59.1	49.9	13.2	75
Either source	86.0	6.6	85.3	80.1	72.7	90.4	85.3	77.2	67.5	60.9	7.4	134
Vaccinated by 12 months of age[2]	82.8	6.6	80.6	75.2	67.8	85.4	80.1	72.0	51.2	44.3	10.5	134
RURAL												
Vaccinated at any time before the interview												
Vaccination card	96.8	15.0	95.1	88.6	82.1	93.4	88.5	82.0	75.7	69.1	0.0	62
Mother's report	79.6	1.1	77.4	67.6	51.8	88.9	78.6	57.8	56.6	41.8	8.3	184
Either source	83.9	4.6	81.9	72.9	59.4	90.1	81.1	63.8	61.4	48.7	6.2	245
Vaccinated by 12 months of age[2]	80.7	4.6	78.9	69.8	55.0	86.7	75.9	59.1	49.1	40.3	10.9	245
TOTAL												
Vaccinated at any time before the interview												
Vaccination card	96.8	15.0	95.0	89.2	84.3	94.2	88.3	84.2	76.9	72.0	0.0	121
Mother's report	79.0	0.8	77.5	69.0	54.7	88.3	79.8	61.3	57.3	44.2	9.7	259
Either source	84.7	5.3	83.1	75.4	64.1	90.2	82.5	68.6	63.6	53.0	6.6	380
Vaccinated by 12 months of age[2]	81.4	5.3	79.3	71.5	59.6	86.0	77.4	63.7	49.4	40.9	10.6	380

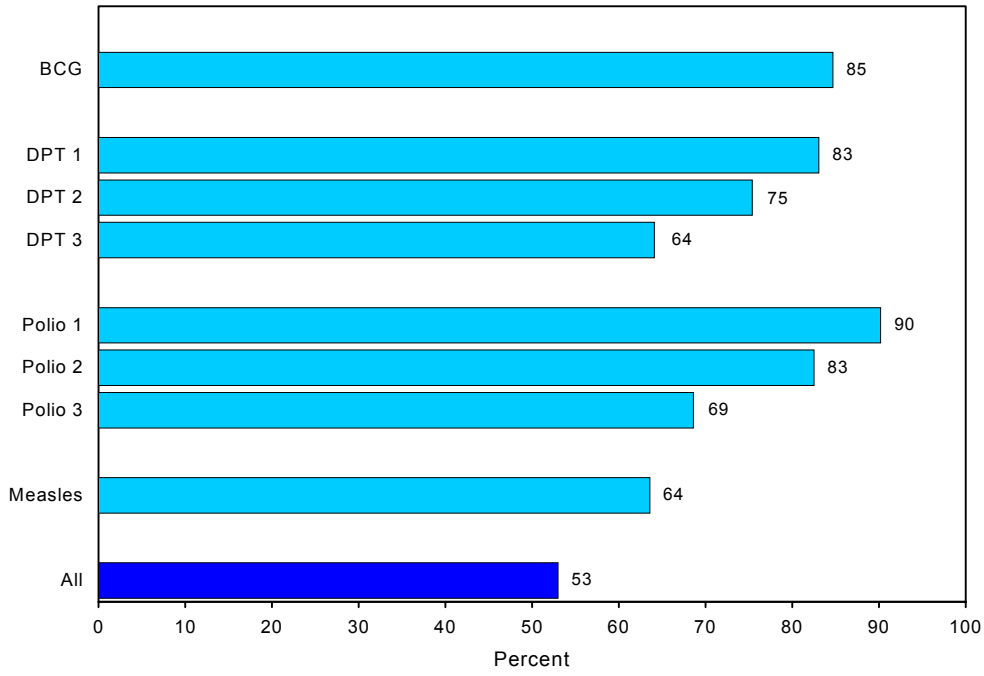
Note: Table includes only surviving children from among the two most recent births in the three years preceding the survey.
[1]BCG, measles, and three doses each of DPT and polio vaccines (excluding Polio 0)
[2]For children whose information was based on the mother's report, the proportion of vaccinations given by 12 months of age is assumed to be the same as for children with a written record of vaccinations.

had received a vaccination against tuberculosis (BCG); diphtheria, whooping cough (pertussis), and tetanus (DPT); poliomyelitis (polio); and measles. For DPT and polio, information was obtained on the number of doses of the vaccine given to the child. Mothers were not asked the dates of vaccinations. To distinguish Polio 0 (polio vaccine given at the time of birth) from Polio 1 (polio vaccine given about six weeks after birth), mothers were also asked whether the first polio vaccine was given just after birth or later[3].

Table 6.6 shows the proportions of urban and rural children age 12–23 months who received specific vaccinations at any time before the interview and before 12 months of age, according to whether a vaccination card was shown to the interviewer or the mother was the

[3]Because mothers sometimes report that the first dose was given just after birth even if it was given several weeks later, an adjustment was made to the estimates of the number of polio vaccinations given, based on reports of the number of DPT vaccinations. This adjustment is based on the fact that when children receive a DPT vaccination, they are almost always given a polio vaccination at the same time. Thus, if the number of polio vaccinations was reported to be less than the number of DPT vaccinations and the first polio vaccination was reported to be given just after birth, then Polio 0 is assumed to really be Polio 1, Polio 1 is assumed to be Polio 2, etc. For comparative purposes, this same adjustment was made to the NFHS-1 vaccination estimates.

Figure 6.3
Percentage of Children Age 12–23 Months Who Have Received Specific Vaccinations



NFHS-2, Gujarat, 1998–99

source of all vaccination information. The 12–23-month age group was chosen for analysis because both international and Government of India guidelines specify that children should be fully immunized by the time they complete their first year of life. Because the date of vaccination was not asked of the mother if she could not show a vaccination card, for children whose information is based on the mother's report, the proportion of vaccinations given during the first year of life is assumed to be the same as the proportion of vaccinations given during the first year of life among children with an exact date of vaccination on the card.

In NFHS-2, children who have received BCG, measles, and three doses each of DPT and polio (excluding Polio 0) are considered to be fully vaccinated. Based on information obtained from a card or reported by the mother ('either source'), 53 percent of children age 12–23 months are fully vaccinated, and 7 percent have not received any vaccinations. Coverage for BCG, DPT, and polio (except Polio 0) vaccinations is much higher than the percentage fully vaccinated. BCG, the first dose of DPT, and the first and second doses of polio vaccine have each been received by at least 83 percent of children (see Figure 6.3). Sixty-four percent of children have received three doses of DPT, and 69 percent have received three doses of polio vaccine. Although DPT and polio vaccinations are given at the same time as part of the routine immunization programme, the coverage rates are slightly higher for polio than DPT, undoubtedly because of the Pulse Polio campaigns. Not all children who begin with the DPT and polio vaccination series go on to complete them, however. The difference between the percentages of children receiving the first and third doses is 19 percentage points for DPT and 22 percentage points for polio. Sixty-four percent of children 12–23 months have been vaccinated against measles.

There has been some improvement in vaccination coverage in Gujarat since the time of NFHS-1 when the proportion of children fully vaccinated was 50 percent and the proportion who had received no vaccinations was 19 percent. The coverage of each specific vaccination has also improved since NFHS-1. Despite the improvement, the data indicate that greater efforts are required to meet the goal of universal immunization coverage for children in Gujarat. Concerted efforts are also required to convert the partial immunization coverage for DPT and Polio into full immunization coverage by reducing the dropout rate between the first and third doses of each of these vaccines.

Government statistics suggest a much higher level of vaccination coverage than NFHS-2 estimates. According to government statistics for Gujarat for 1997–98, 71 percent of children age 12–23 months are fully vaccinated, with coverage at 82 percent for BCG, 83 percent for the third dose of DPT, 82 percent for the third dose of polio vaccine, and 73 percent for measles (Ministry of Health and Family Welfare, 1999).

According to the immunization schedule, all primary vaccinations, including measles, should be completed by the time a child is 12 months old. Table 6.6 shows that 41 percent of all children (77 percent of fully vaccinated children) were fully vaccinated by age 12 months. The percentages of children who received BCG, each dose of DPT, and each dose of polio by age 12 months are only slightly lower than the percentages who received these vaccines at any time before the survey. For measles vaccination, however, which is supposed to be given when the child is nine months old, the gap is wider (64 percent at any time before the survey compared with 49 percent by age 12 months). Twenty-two percent of children who were vaccinated against measles received the vaccination after their first birthday.

The analysis of vaccine-specific data indicates higher coverage for each type of vaccine in urban areas than in rural areas. Sixty-one percent of children age 12–23 months in urban areas were fully vaccinated at some time before the survey, compared with 49 percent in rural areas. The proportion fully vaccinated during the first year of life is also higher in urban areas (44 percent) than in rural areas (40 percent). In addition, dropout rates for DPT and polio are lower in urban areas than in rural areas.

Table 6.7 and Figure 6.4 present vaccination coverage rates (according to the vaccination card or the mother) for children age 12–23 months by selected background characteristics. The table also shows the percentage of children with vaccination cards that were shown to the interviewer. Mothers could show vaccination cards for 32 percent of children age 12–23 months. Vaccination cards were shown for 44 percent of children in urban areas and 25 percent in rural areas. As expected, vaccination coverage is much higher for children for whom a vaccination card was shown than for other children (Table 6.6).

Female children are just as likely as male children to be fully vaccinated. However, except for Polio 0, female children are slightly less likely than male children to have received each of the individual vaccinations. Mothers showed vaccination cards for 34 percent of male children and 30 percent of female children. In NFHS-1, in contrast, vaccination coverage was somewhat higher for male children than female children, and a vaccination card was shown for a higher proportion of female children than male children.

Table 6.7 Childhood vaccinations by background characteristics

Percentage of children age 12–23 months who received specific vaccinations at any time before the interview (according to the vaccination card or the mother) and percentage with a vaccination card that was shown to the interviewer by selected background characteristics, Gujarat, 1998–99

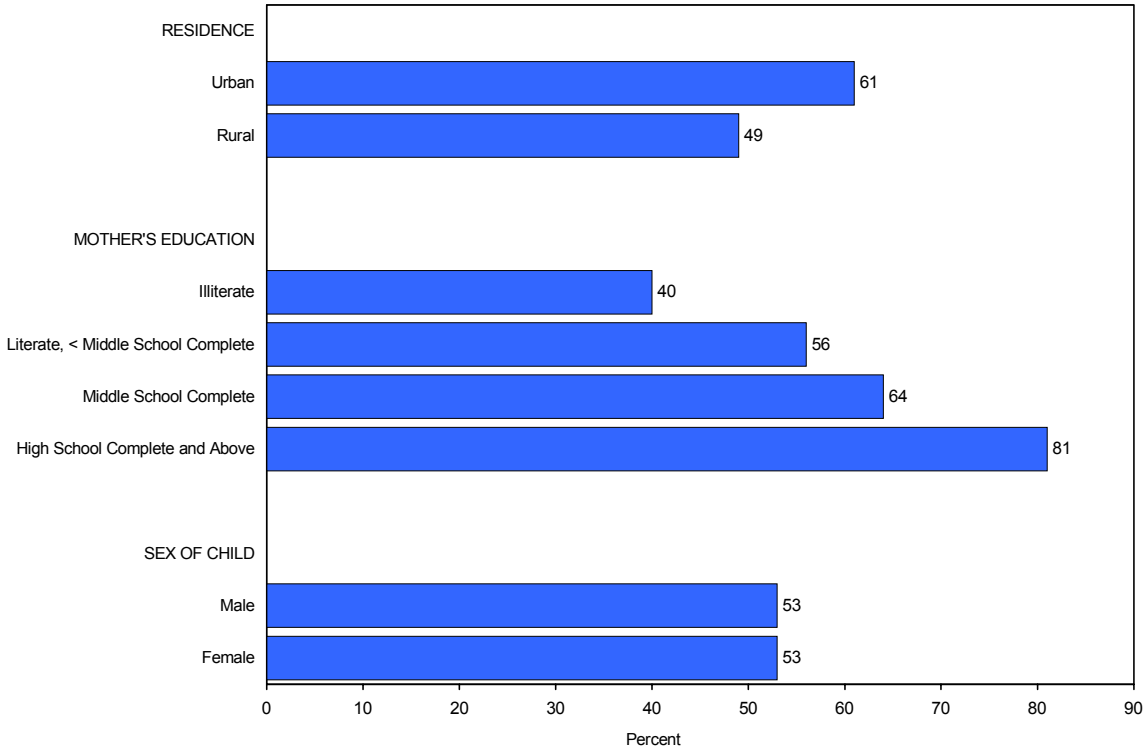
Background characteristic	Percentage vaccinated											Percentage showing vaccination card	Number of children
			DPT			Polio							
	BCG	Polio 0	1	2	3	1	2	3	Measles	All[1]	None		
Sex of child													
Male	85.6	4.7	86.1	78.9	65.0	91.2	85.1	70.6	63.9	53.1	6.7	33.5	195
Female	83.7	5.9	79.9	71.7	63.1	89.1	79.9	66.4	63.2	52.9	6.5	30.0	185
Birth order													
1	89.2	7.2	89.2	81.2	68.8	92.8	85.6	76.7	73.2	59.9	4.5	40.1	112
2	84.4	3.9	82.4	76.6	66.7	93.2	83.4	67.8	59.9	53.1	5.9	30.2	102
3	85.2	2.7	82.6	73.3	61.2	88.0	75.9	61.2	62.4	49.1	9.4	26.5	75
4+	78.9	6.7	76.6	68.8	57.7	85.5	83.3	65.5	56.7	47.7	7.8	27.7	90
Residence													
Urban	86.0	6.6	85.3	80.1	72.7	90.4	85.3	77.2	67.5	60.9	7.4	44.0	134
Rural	83.9	4.6	81.9	72.9	59.4	90.1	81.1	63.8	61.4	48.7	6.2	25.1	245
Mother's education													
Illiterate	75.1	3.0	71.6	62.2	50.8	84.0	74.1	56.7	50.7	40.3	12.5	19.3	202
Literate, < middle school complete	94.3	5.6	94.4	84.8	69.5	94.4	88.9	76.4	72.4	55.7	0.0	37.6	72
Middle school complete	(96.8)	(6.6)	(93.5)	(83.6)	(70.8)	(96.8)	(86.9)	(70.8)	(71.0)	(64.3)	(0.0)	(45.4)	31
High school complete and above	96.0	10.8	98.6	98.6	93.3	100.0	97.3	91.9	87.8	81.1	0.0	55.1	74
Religion													
Hindu	83.8	5.3	82.5	74.9	64.0	89.6	81.7	67.8	63.7	53.1	7.1	32.0	340
Muslim	(91.4)	(2.8)	(85.7)	(80.1)	(63.1)	(94.2)	(88.6)	(74.3)	(60.1)	(48.6)	(3.0)	(26.0)	35
Caste/tribe													
Scheduled caste	87.4	1.9	82.1	74.7	65.6	89.3	85.6	71.1	62.0	52.8	8.9	25.4	55
Scheduled tribe	81.0	2.5	78.4	67.1	50.7	87.2	78.4	58.2	49.2	40.6	8.9	18.9	79
Other backward class	81.1	3.2	79.1	72.9	59.3	87.4	80.1	63.5	61.6	50.1	8.5	32.0	97
Other	87.9	9.4	88.5	81.8	73.8	93.9	85.2	76.4	73.0	61.6	3.4	40.9	149
Standard of living index													
Low	68.7	3.8	65.8	56.4	46.1	77.2	69.7	52.7	44.3	36.7	17.1	17.6	107
Medium	88.7	3.5	87.1	78.6	62.1	94.4	85.4	67.1	63.8	50.1	3.9	30.2	176
High	94.9	10.3	94.8	90.6	87.5	96.8	91.6	88.5	84.4	76.2	0.0	50.3	97
Total	84.7	5.3	83.1	75.4	64.1	90.2	82.5	68.6	63.6	53.0	6.6	31.8	380

Note: Table includes only surviving children from among the two most recent births in the three years preceding the survey. Total includes 5 children whose mothers belong to other religions and 1 child with missing information on mother's education, who are not shown separately.

( ) Based on 25–49 unweighted cases

[1]BCG, measles, and three doses each of DPT and polio vaccines (excluding Polio 0)

Figure 6.4
Percentage of Children Age 12–23 Months Who Have Received All Vaccinations



NFHS-2, Gujarat, 1998–99

The relationship between vaccination coverage and birth order is mostly negative, probably because a large majority of first-order births occur to younger women who are more likely than older women to utilize maternal and child health care services. There is a strong positive relationship between mother's education and children's vaccination coverage. Only 40 percent of children of illiterate mothers are fully vaccinated, compared with 81 percent of children of mothers who have at least completed high school. Muslim children are slightly less likely to be fully vaccinated than are Hindu children, but this result is based on a small number of cases of Muslims. By caste/tribe, children of scheduled-tribe mothers are least likely to be fully vaccinated, and children of mothers not belonging to any scheduled caste, scheduled tribe, or other backward class are most likely to be vaccinated. Household standard of living has a strong positive relationship with vaccination coverage. Thirty-seven percent of children from households with a low standard of living are fully vaccinated, compared with 76 percent of children from households with a high standard of living.

Table 6.8 shows the percentage of children age 12–35 months with a vaccination card that was shown to the interviewer and the percentage who received various vaccinations during the first year of life by current age of the child and place of residence. The proportion vaccinated during the first year of life is estimated separately for children in each age group. The row

Table 6.8 Childhood vaccinations received by 12 months of age

Percentage of children age 12–23 months and 24–35 months with a vaccination card that was shown to the interviewer and percentage who received specific vaccinations by 12 months of age, according to residence and child's current age, Gujarat, 1998–99

	Urban		Rural		Total	
Vaccination status	12–23 months	24–35 months	12–23 months	24–35 months	12–23 months	24–35 months
Vaccination card shown to interviewer	44.0	28.4	25.1	17.1	31.8	21.2
Percentage vaccinated by 12 months of age[1]						
BCG	82.8	84.8	80.7	76.8	81.4	79.6
Polio 0	6.6	4.8	4.6	3.7	5.3	4.0
DPT						
1	80.6	84.3	78.9	76.3	79.3	79.2
2	75.2	82.7	69.8	72.2	71.5	75.9
3	67.8	79.9	55.0	64.2	59.6	69.9
Polio						
1	85.4	88.4	86.7	85.8	86.0	86.7
2	80.1	84.5	75.9	82.6	77.4	83.3
3	72.0	77.4	59.1	70.6	63.7	72.8
Measles	51.2	57.8	49.1	53.9	49.4	54.6
All vaccinations[2]	44.3	56.2	40.3	50.8	40.9	51.4
No vaccinations	10.5	10.1	10.9	10.6	10.6	10.7
Number of children	134	153	245	271	380	424

Note: Table includes only surviving children from among the two most recent births in the three years preceding the survey.
[1]Information was obtained either from the vaccination card or from the mother if there was no written record. For children whose information was based on the mother's report, the proportion of vaccinations given by 12 months of age is assumed to be the same as for children with a written record of vaccinations.
[2]BCG, measles, and three doses each of DPT and polio vaccines (excluding Polio 0)

labelled 'no vaccinations' indicates the percentage of children who have not received any vaccination by 12 months of age.

The proportion of children whose vaccination status was determined from a vaccination card declines substantially with the age of the children. This may occur partly because vaccination cards tend eventually to get lost or discarded, especially for older children who have received all their vaccinations.

The proportion of children fully vaccinated by age 12 months increases from 41 percent for children age 12–23 months to 51 percent for children age 24–35 months. An increase in coverage with increasing child's age is observed for most vaccines in both urban and rural areas. In rural areas, a decline in coverage with increasing children's age is observed only for BCG, Polio 0, the first dose of DPT, and the first dose of polio.

Table 6.9 and Figure 6.5 give the percent distribution of children under age three years who have received any vaccinations by the source of most of the vaccinations, according to

Table 6.9 Source of childhood vaccinations

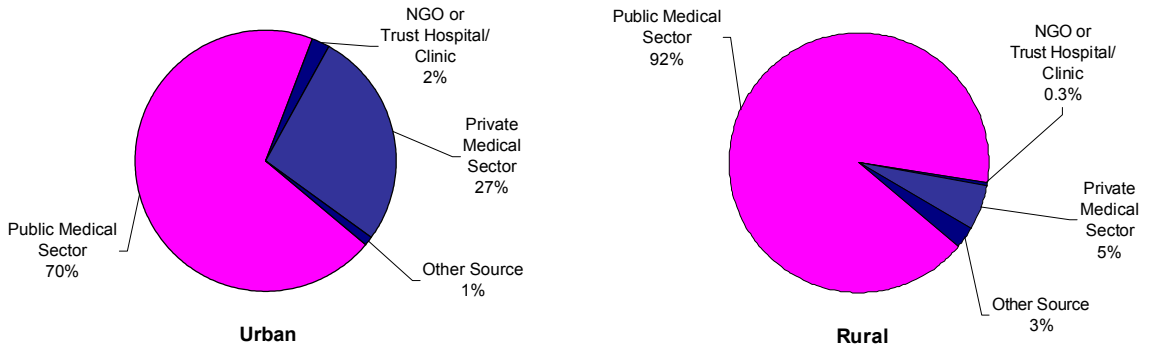
Percent distribution of children under age 3 who have received any vaccinations by source of most of the vaccinations, according to selected background characteristics, Gujarat, 1998–99

Background characteristic	Source				Total percent	Number of children
	Public medical sector	NGO or trust hospital/ clinic	Private medical sector	Other		
Age of child						
< 12 months	82.1	0.9	15.4	1.6	100.0	318
12–23 months	82.5	1.4	13.1	2.9	100.0	341
24–35 months	84.7	0.8	12.7	1.8	100.0	388
Sex of child						
Male	81.8	1.1	15.6	1.5	100.0	537
Female	84.6	1.0	11.6	2.8	100.0	511
Birth order						
1	75.6	1.5	22.0	0.9	100.0	334
2	81.4	0.3	16.9	1.4	100.0	299
3	88.8	1.5	5.6	4.1	100.0	198
4+	92.2	0.9	3.7	3.2	100.0	217
Residence						
Urban	69.8	2.2	27.0	1.0	100.0	401
Rural	91.5	0.3	5.4	2.8	100.0	647
Mother's education						
Illiterate	92.9	1.0	3.6	2.6	100.0	502
Literate, < middle school complete	89.5	0.9	6.6	3.1	100.0	229
Middle school complete	78.4	1.0	18.6	2.1	100.0	98
High school complete and above	56.4	1.3	42.2	0.0	100.0	218
Religion						
Hindu	83.0	0.7	13.8	2.4	100.0	920
Muslim	89.9	2.7	7.4	0.0	100.0	108
Caste/tribe						
Scheduled caste	88.7	1.2	7.0	3.1	100.0	161
Scheduled tribe	93.3	0.9	4.3	1.4	100.0	211
Other backward class	86.3	0.8	11.0	2.0	100.0	254
Other	74.2	1.2	22.5	2.2	100.0	422
Standard of living index						
Low	94.0	0.4	0.8	4.8	100.0	252
Medium	91.0	1.1	6.3	1.5	100.0	518
High	58.6	1.4	39.2	0.8	100.0	276
Total	83.2	1.0	13.7	2.1	100.0	1,048

Note: Table includes only surviving children from among the two most recent births in the three years preceding the survey. Total includes 20 children whose mothers belong to other religions and 1 and 1 children with missing information on mother's education and the standard of living index, respectively, who are not shown separately.
NGO: Nongovernmental organization

selected background characteristics. The public sector is the primary provider of childhood vaccinations in Gujarat. Eighty-three percent of all children who have received any vaccinations received most of them from a public sector source and only 14 percent received them from a private sector medical source. The percentage of vaccinated children receiving vaccinations from the private medical sector is considerably lower in rural areas (5 percent) than in urban areas (27 percent), where private sector services tend to be concentrated. Even in urban areas, however, 70

Figure 6.5
Source of Childhood Vaccinations by Residence



Note: Rural percentages add to more than 100.0 due to rounding

NFHS-2, Gujarat, 1998–99

percent of children received most of their vaccinations from the public sector. A higher proportion of male children (16 percent) than of female children (12 percent) received most of their vaccinations from the private medical sector. Private-sector medical services for childhood vaccination are used much more for first and second-order births than for third or higher-order births. (However, this apparent effect of birth order may be due mainly to the fact children of higher birth order belong disproportionately to families of lower socioeconomic status who are less likely to use private-sector services.) Children of more educated mothers and those belonging to households with a high standard of living are much more likely than other children to receive vaccinations from the private sector. Hindu children are much more likely to receive vaccinations from the private sector than Muslim children. Children from scheduled tribes, scheduled castes, and other backward classes are much less likely than other children to receive vaccinations from the private sector.

6.5 Vitamin A Supplementation

Vitamin A deficiency is one of the most common nutritional deficiency disorders in the world, affecting more than 250 million children worldwide (Bloem et al., 1997). The National Programme on Prevention of Blindness targets children under age five years and administers oral doses of vitamin A every six months starting at age nine months. NFHS-2 asked mothers of children born during the three years before the survey whether their children ever received a dose of vitamin A. Those who said that their child had received at least one dose of vitamin A were asked how long ago the last dose of vitamin A was given. Table 6.10 shows the percentage of children age 12–35 months who received at least one dose of vitamin A and the percentage who received a dose of vitamin A within the past six months by selected background characteristics. In the state as a whole, slightly more than half of children age 12–35 months (52 percent) received at least one dose of vitamin A, but only 26 percent received a dose within the past six months. This indicates that almost half of children in Gujarat have not received vitamin A supplementation at all, and only about one-quarter of children receive vitamin A supplementation regularly.

Table 6.10 shows that male children are slightly more likely to receive Vitamin A supplementation than female children. Children of literate mothers are much more likely to

Table 6.10 Vitamin A supplementation for children

Percentage of children age 12–35 months who received at least one dose of vitamin A and who received at least one dose of vitamin A within the six months preceding the survey by selected background characteristics, Gujarat, 1998–99

Background characteristic	Percentage who received Vitamin A		Number of children
	At least one dose	At least one dose within past six months	
Age of child			
12–23 months	48.3	30.4	380
24–35 months	55.1	22.5	424
Sex of child			
Male	54.2	27.3	414
Female	49.5	25.2	390
Birth order			
1	51.4	22.3	247
2	49.5	22.8	225
3	56.8	34.0	151
4+	51.6	29.4	182
Residence			
Urban	51.3	18.9	287
Rural	52.3	30.4	516
Mother's education			
Illiterate	45.0	26.4	419
Literate, < middle school complete	62.5	32.9	159
Middle school complete	55.8	17.6	68
High school complete and above	58.3	23.1	155
Religion			
Hindu	51.3	26.6	712
Muslim	55.9	25.4	79
Caste/tribe			
Scheduled caste	45.9	22.1	127
Scheduled tribe	45.8	24.7	163
Other backward class	53.9	29.1	194
Other	56.3	26.9	320
Standard of living index			
Low	43.4	26.9	220
Medium	53.6	25.8	385
High	58.1	26.4	198
Total	51.9	26.3	803

Note: Table includes only surviving children from among the two most recent births in the three years preceding the survey. Total includes 13 children whose mothers belong to other religions and 1 child with missing information on mother's education, who are not shown separately.

receive vitamin A supplementation than children of illiterate mothers. Vitamin A supplementation is equally common in urban and rural areas. The percentage receiving vitamin A supplementation is lower among scheduled-caste and scheduled-tribe children than among other children. There is no consistent relation between Vitamin A supplementation and birth order. Children of Muslim mothers are slightly more likely to receive Vitamin A supplementation than children of Hindu mothers. Children in households with a high standard of

living are much more likely to receive Vitamin A supplementation than children in households with a low standard of living.

6.6 Child Morbidity and Treatment

This section discusses the prevalence and treatment of acute respiratory tract infection (ARI), fever, and diarrhoea. Mothers of children born during the three years preceding the survey were asked if their children suffered from cough, fever, or diarrhoea during the two weeks preceding the survey, and if so, the type of treatment given. Accuracy of all these measures is affected by the reliability of the mother's recall of when the disease episode occurred. The two-week recall period is thought to be most suitable for ensuring that there will be an adequate number of cases to analyze and that recall errors will not be too serious. Table 6.11 shows the percentage of children with cough accompanied by fast breathing (symptoms of acute respiratory infection), fever, and diarrhoea during the two weeks preceding the survey and the percentage with acute respiratory infection who were taken to a health facility or provider, by selected background characteristics.

Acute Respiratory Infection

Acute respiratory infection (ARI), primarily pneumonia, is a major cause of illness among infants and children and the leading cause of childhood mortality throughout the world (Murray and Lopez, 1996). Early diagnosis and treatment with antibiotics can prevent a large proportion of ARI/pneumonia deaths. NFHS-2 found that 11 percent of children under age three in Gujarat suffered from acute respiratory infection (cough accompanied by short, rapid breathing) at some time during the two-week period before the survey. A comparison with NFHS-1 ARI data is not meaningful because the two surveys took place at different times of the year, and because rates of ARI are affected by the time of the year when the measurements are taken.

Table 6.11 shows that there was little variation in the prevalence of ARI by most of the background characteristics included in the table. ARI was most common among scheduled-tribe children and children whose mothers completed middle school, but did not complete high school. The prevalence of ARI is almost the same for boys and girls and almost the same for urban and rural areas. There is a slight tendency for prevalence of ARI to decline with increasing birth order and with increasing education of the mother. The prevalence of ARI is slightly lower for Muslim children than for Hindu children. Surprisingly, household standard of living has virtually no influence on the prevalence of ARI. For reasons that are unclear, children living in households with piped water or water from a hand pump have a higher prevalence of ARI than children living in households with well water. Children living in households that strain water with a cloth have a slightly lower prevalence of ARI than other children. The small variation in the prevalence of ARI by most characteristics indicates that respiratory infections affect children of all strata irrespective of their socioeconomic background.

Table 6.11 also shows the percentage of children suffering from ARI symptoms in the two weeks before the survey who were taken to a health facility or provider. Seventy-one percent of children received advice or treatment from a health facility or health provider when ill with ARI. The percentage is somewhat lower for children whose mothers are illiterate or belong to a

Table 6.11 Prevalence of acute respiratory infection, fever, and diarrhoea

Percentage of children under age 3 who were ill with a cough accompanied by fast breathing (symptoms of acute respiratory infection—ARI), fever, or diarrhoea during the two weeks preceding the survey and percentage with ARI who were taken to a health facility or provider, by selected background characteristics, Gujarat, 1998–99

Background characteristic	Percentage of children suffering in past two weeks from:				Number of children	Percentage with ARI taken to a health facility or provider	Number of children with ARI
	Cough accompanied by fast breathing (ARI)	Fever	Diarrhoea				
			Any diarrhoea[1]	Diarrhoea with blood			
Age of child							
1–5 months	11.4	14.2	20.2	1.4	218	(68.1)	25
6–11 months	13.8	24.2	29.1	1.4	211	(72.2)	29
12–23 months	10.8	21.6	21.2	1.3	380	(65.7)	41
24–35 months	9.7	21.5	13.5	1.2	424	(78.0)	41
Sex of child							
Male	10.7	21.3	19.8	1.0	628	74.6	67
Female	11.4	20.1	19.7	1.6	605	68.0	69
Birth order							
1	13.4	20.4	18.2	1.0	387	74.8	52
2	11.4	21.7	19.2	1.4	341	(66.6)	39
3	6.9	20.0	22.0	0.8	247	*	17
4+	10.9	20.6	20.7	2.0	257	(67.7)	28
Residence							
Urban	10.4	17.8	17.0	0.6	455	(79.1)	47
Rural	11.4	22.4	21.4	1.7	778	67.1	89
Mother's education							
Illiterate	11.3	21.6	21.7	1.9	622	64.3	70
Literate, < middle school complete	10.8	20.8	21.6	0.4	261	(78.6)	28
Middle school complete	15.3	21.7	17.2	0.9	111	*	17
High school complete and above	8.8	18.1	13.9	0.8	238	*	21
Religion							
Hindu	11.4	20.5	20.4	1.4	1,092	70.9	124
Muslim	9.1	22.3	15.0	0.0	121	*	11
Caste/tribe							
Scheduled caste	10.5	19.6	25.3	1.0	198	*	21
Scheduled tribe	15.0	23.1	20.5	1.6	260	(61.4)	39
Other backward class	9.2	20.0	18.2	1.0	296	(77.9)	27
Other	10.2	20.3	18.0	1.4	478	(73.3)	49
Standard of living index							
Low	10.9	22.6	22.1	2.2	324	(66.1)	35
Medium	11.5	20.8	21.5	1.0	611	69.9	70
High	10.0	18.2	13.6	1.0	296	(79.7)	30
Source of drinking water							
Piped water	11.4	20.5	18.2	1.4	794	72.5	91
Hand pump	13.1	22.0	26.1	1.9	217	(78.6)	28
Well water	7.9	19.0	17.9	0.7	154	*	12
Surface water	(3.6)	(31.8)	(10.7)	(0.0)	28	*	1
Other	(9.8)	(17.0)	(29.1)	(0.0)	41	*	4
Purification of water[2]							
Straining by cloth	10.8	20.5	19.3	1.3	1,023	71.7	110
Boiling	13.8	27.6	15.7	3.5	57	*	8
Nothing	12.4	23.7	23.8	1.7	177	*	22
Total	11.0	20.7	19.7	1.3	1,233	71.2	136

Note: Table includes only surviving children age 1–35 months from among the two most recent births in the three years preceding the survey. Total includes children whose mothers belong to other religions, households using alum, water filters, electronic water purifiers, or other methods to purify water, and children with missing information on mother's education and the standard of living index, who are not shown separately.
( ) Based on 25–49 unweighted cases
*Percentage not shown; based on fewer than 25 unweighted cases
[1]Includes diarrhoea with blood
[2]Number of children and number of children with ARI add to more than the respective totals because multiple methods of purification of water could be recorded.

scheduled tribe or who live in households with a low standard of living. Male children, urban children, and children of birth order 1 are somewhat more likely to have been taken to a health facility or provider for advice or treatment than other children.

Fever

Fever was the most common of the three conditions examined, with 21 percent of children suffering from fever during the two weeks preceding the survey. The prevalence of fever is lower among children age 1–5 months (14 percent) than among older children (22 percent or higher). Fever is somewhat more likely to strike children who live in rural areas, who are older than 6 months, whose mothers have less than a high school education, or who live in households with a low standard of living.

Diarrhoea

Diarrhoea is the second most important killer of children under age five worldwide, following acute respiratory infection. Deaths from acute diarrhoea are most often caused by dehydration due to loss of water and electrolytes. Nearly all dehydration-related deaths can be prevented by prompt administration of rehydration solutions. Because deaths from diarrhoea are a significant proportion of all child deaths, the Government of India has launched the Oral Rehydration Therapy Programme as one of its priority activities for child survival. One major goal of this programme is to increase awareness among mothers and communities about the causes and treatment of diarrhoea. Oral rehydration salt (ORS) packets are made widely available and mothers are taught how to use them. NFHS-2 asked mothers of children less than three years old a series of questions about episodes of diarrhoea suffered by their children in the two weeks before the survey, including questions on feeding practices during diarrhoea, the treatment of diarrhoea, and their knowledge and use of ORS.

Table 6.11 shows that 20 percent of children under age three suffered from diarrhoea in the two-week period before the survey. There are seasonal variations in the prevalence of diarrhoea, however, so that the percentages shown in Table 6.11 cannot be assumed to reflect the situation throughout the year.

Among children age 1–35 months, those age 6–11 months are most susceptible to diarrhoea. Boys and girls have an equal risk of diarrhoea (20 percent) in Gujarat. Children of higher birth order have slightly higher risk of diarrhoea. The prevalence of diarrhoea is somewhat higher for rural children than urban children. It is higher for children of mothers who have not completed middle school (whether illiterate or literate) than for children of mothers who have completed at least middle school. Prevalence of diarrhoea is higher for Hindu children than for Muslim children, and higher for children of mothers belonging to scheduled castes or scheduled tribes than for other children. It is considerably higher for children in households that rely on a hand pump for drinking water. Prevalence of diarrhoea among children is lower in households that purify water by boiling than in households that strain water with a cloth or do nothing to purify water.

About 1 percent of the children suffered from diarrhoea with blood, a symptom of dysentery. Among the various demographic and socioeconomic subgroups shown in Table 6.11, the proportion of children who suffered from diarrhoea with blood varies from 0 to 2 percent, except for the unexpected finding that children in households that boil water for drinking have

Table 6.12 Knowledge of diarrhoea care

Among mothers with births during the three years preceding the survey, percentage who know about oral rehydration salt (ORS) packets, percent distribution by quantity to be given to drink during diarrhoea, and percentage who know two or more signs of diarrhoea that indicate the need for medical treatment by selected background characteristics, Gujarat, 1998–99

Background characteristic	Percentage who know about ORS packets	Reported quantity to be given to drink					Percentage who know two or more signs for medical treatment of diarrhoea[1]	Number of mothers
		Less	Same	More	Don't know/ missing	Total percent		
Age								
15–19	50.9	53.6	30.7	13.9	1.7	100.0	21.2	115
20–24	61.0	38.7	35.0	24.8	1.5	100.0	31.5	478
25–29	63.4	31.9	32.5	35.6	0.0	100.0	31.7	343
30–34	70.5	38.3	28.0	33.8	0.0	100.0	26.2	129
35–49	55.9	36.9	43.5	17.8	1.8	100.0	20.0	55
Residence								
Urban	68.5	28.3	29.3	41.2	1.2	100.0	29.9	416
Rural	57.4	43.8	35.8	19.7	0.7	100.0	28.9	703
Education								
Illiterate	51.6	46.0	34.5	18.6	0.9	100.0	28.0	564
Literate, < middle school complete	64.0	39.6	37.9	22.5	0.0	100.0	25.9	232
Middle school complete	68.5	31.7	29.7	36.7	2.0	100.0	30.6	98
High school complete and above	81.3	19.2	27.3	52.2	1.4	100.0	35.2	224
Religion								
Hindu	60.2	39.5	32.9	26.6	1.0	100.0	30.4	996
Muslim	72.8	28.2	39.2	32.6	0.0	100.0	18.7	107
Caste/tribe								
Scheduled caste	58.9	46.9	30.3	21.1	1.6	100.0	31.1	180
Scheduled tribe	58.4	49.1	35.6	14.9	0.4	100.0	28.1	229
Other backward class	59.5	37.5	37.0	25.1	0.4	100.0	29.4	274
Other	65.5	28.8	31.3	38.7	1.2	100.0	29.2	435
Exposure to media								
Exposed to any media	69.5	32.1	31.1	35.7	1.0	100.0	30.0	677
Watches television weekly	72.3	29.3	31.3	38.2	1.2	100.0	30.2	562
Listens to radio weekly	70.2	34.3	33.4	31.3	1.0	100.0	27.8	296
Visits cinema/theatre monthly	78.4	25.3	35.4	39.3	0.0	100.0	29.1	78
Reads newspaper/magazine weekly	78.3	24.2	27.7	47.0	1.1	100.0	31.5	285
Not regularly exposed to any media	49.4	47.0	36.9	15.4	0.7	100.0	28.3	442
Total	61.5	38.0	33.4	27.7	0.9	100.0	29.3	1,119

Note: Total includes 17 women belonging to other religions and 1 woman with missing information on education, who are not shown separately.
[1]Percentage who know two or more signs of illness that indicate that a child should be taken to a health facility or health worker

a prevalence of 4 percent. Children of birth order four or higher, children living in rural areas, children whose mothers are illiterate, and children living in households with a low standard of living all have a slightly elevated risk of having diarrhoea with blood.

Table 6.12 shows that 62 percent of mothers with births during the three years preceding the survey know about ORS packets, up sharply from 40 percent among women who gave birth during the three years before NFHS-1. Knowledge of ORS packets is somewhat lower among

mothers age 15–19 and among mothers age 35–49 years than among mothers in the middle age groups. As expected, knowledge is higher among urban mothers than rural mothers and among more-educated mothers than less-educated mothers. Knowledge of ORS is greater among Muslim mothers than Hindu mothers. Knowledge of ORS packets is much lower among mothers who are not regularly exposed to any mass media (49 percent) than among mothers who are exposed to some media (70 percent). Mothers belonging to scheduled castes, scheduled tribes, or other backward classes are less likely to know about ORS than other mothers.

In order to assess mothers' knowledge of children's need for extra fluids during episodes of diarrhoea, all mothers of children born in the three years preceding the survey were asked: 'When a child is sick with diarrhoea, should he/she be given less to drink than usual, about the same amount, or more than usual?' Table 6.12 shows the responses of mothers to this question by selected background characteristics. In Gujarat, only 28 percent of mothers report that children should be given more to drink than usual during an episode of diarrhoea and, contrary to the standard recommendation, 38 percent report that children should be given less to drink. This suggests that mothers in Gujarat need much more education on the proper management of diarrhoea. The proportion reporting correctly that children with diarrhoea should be given more to drink is particularly low among teenage and older mothers, rural mothers, less-educated mothers, mothers belonging to a scheduled tribe, and mothers not regularly exposed to any mass media. The proportion reporting correctly is somewhat lower among Hindu mothers than among Muslim mothers.

To assess whether mothers are aware of one or more signs associated with diarrhoea which suggest the need for medical treatment, mothers were also asked: 'When a child is sick with diarrhoea, what signs of illness would tell you that he or she should be taken to a health facility or health worker?' All answers given by the respondent were recorded. The danger signs warranting medical treatment include repeated watery stools, repeated vomiting, blood in the stools, fever, marked thirst, not eating or drinking well, getting sicker or very sick, and not getting better. Table 6.12 shows that only 29 percent of mothers were able to name two or more signs of diarrhoea that indicate that a child with diarrhoea should be given medical treatment. Mothers age 15–19 and 35 years or older are less likely to know two or more signs for medical treatment of diarrhoea than mothers age 20–34. Knowledge of danger signs is about the same for urban mothers and rural mothers but greater among more-educated mothers. Hindu mothers are more likely to know about danger signs than Muslim mothers. Surprisingly, the extent of exposure to mass media makes little difference in mothers' knowledge of danger signs. Overall, knowledge of two or more signs of diarrhoea that suggest the need for medical treatment is universally low across the demographic and socioeconomic groups shown in the table. The highest proportion having knowledge of two or more danger signs is 35 percent among women with at least a high school education. This lack of knowledge suggests a need for further educating mothers about children's diarrhoea so that they are better able to recognize the signs of diarrhoea for which a health provider should be consulted.

Table 6.13 shows the percentage of children under age three with diarrhoea during the two weeks preceding the survey who were taken to a health facility or provider, the percentage who received various types of oral rehydration therapy (ORT), and the percentage who received other types of treatment, by selected background characteristics. Among children in Gujarat who suffered from diarrhoea during the two weeks preceding NFHS-2, medical advice or treatment

Table 6.13 Treatment of diarrhoea

Among children under age 3 who had diarrhoea in the past two weeks, percentage taken to a health facility or provider, percentage who received various types of oral rehydration therapy (ORT), and percentage who received other treatments by selected background characteristics, Gujarat, 1998–99

		Oral rehydration					Other treatment						
Background characteristic	Taken to a health facility or provider	Oral rehydration salt (ORS) packets	Gruel	Homemade sugar-salt-water solution	Increased fluids	ORT not given	Pill or syrup	Injection	Intrave-nous (IV/drip/ bottle)	Home remedy/ herbal medicine	Other	No treat-ment	Number of children with diarrhoea
Age of child													
1–11 months	62.7	22.0	2.8	5.8	11.4	65.6	57.1	1.9	0.9	6.8	1.9	30.4	106
12–23 months	63.4	30.0	3.8	0.0	20.0	58.7	58.6	5.0	1.3	1.3	2.5	33.8	81
24–35 months	63.4	40.2	10.4	5.3	24.5	42.2	59.7	3.5	3.5	3.5	1.7	23.0	57
Sex of child													
Male	65.6	28.4	6.5	3.2	19.5	57.8	58.5	4.1	1.6	4.1	4.0	28.5	124
Female	60.5	29.5	3.3	4.3	15.2	57.8	57.9	2.5	1.7	4.3	0.0	31.1	119
Residence													
Urban	75.8	36.2	3.8	7.8	24.4	45.9	62.8	2.6	2.6	1.3	3.9	20.4	77
Rural	57.2	25.5	5.4	1.9	14.1	63.4	56.1	3.6	1.2	5.5	1.2	34.2	166
Mother's education													
Illiterate	58.2	27.6	4.5	0.7	15.7	61.2	58.2	4.5	1.5	2.3	3.0	33.6	135
Literate, < middle school complete	67.7	26.8	1.8	5.4	14.4	57.0	58.7	0.0	0.0	9.0	0.0	23.3	57
High school complete and above	(78.6)	(36.6)	(12.1)	(15.3)	(27.2)	(42.4)	(63.7)	(3.0)	(0.0)	(5.9)	(0.0)	(18.1)	33
Caste/tribe													
Scheduled caste	63.7	33.9	8.0	0.0	8.1	62.0	59.9	6.0	2.0	6.2	1.9	27.9	50
Scheduled tribe	71.8	36.2	7.7	5.7	20.8	46.8	52.9	3.8	3.7	1.9	1.8	32.0	53
Other backward class	50.9	24.5	0.0	5.7	18.8	62.4	54.5	1.9	1.9	2.0	5.6	34.2	54
Other	65.0	24.3	4.5	3.5	19.7	59.4	62.8	2.3	0.0	5.8	0.0	26.7	86
Standard of living index													
Low	55.0	25.4	5.6	1.4	11.2	64.8	45.1	4.2	0.0	4.4	2.8	40.8	72
Medium	65.6	32.1	4.6	5.4	18.4	54.1	64.1	3.8	2.3	3.1	0.7	25.2	131
High	(69.6)	(24.9)	(5.0)	(2.6)	(25.1)	(57.8)	(62.3)	(0.0)	(2.6)	(7.4)	(5.0)	(25.1)	40
Total	63.1	28.9	4.9	3.7	17.4	57.8	58.2	3.3	1.6	4.2	2.0	29.8	243

Note: Table includes only surviving children age 1–35 months from among the two most recent births in the three years preceding the survey. Total includes 19 children whose mother's education is 'middle school complete', who are not shown separately.
( ) Based on 25–49 unweighted cases

was sought for 63 percent. Thirty percent of children with diarrhoea did not receive any treatment at all. Medical advice or treatment was slightly more likely to be sought for boys than for girls, and much more likely to be sought for urban children than for rural children. Treatment was also more likely to be sought for children of literate mothers than for children of illiterate mothers. The likelihood of seeking treatment was especially low for children in households with a low standard of living.

Twenty-nine percent of the children age 1–35 months who suffered from diarrhoea during the two weeks preceding the survey were treated with a solution made from ORS packets. This is up from 13 percent in NFHS-1, indicating considerable improvement in the use of ORS packets in Gujarat for the treatment of childhood diarrhoea.

The proportion of children who received at least one of the various types of oral rehydration therapy (ORT) when sick with diarrhoea was 42 percent in NFHS-2. Yet only 17 percent received increased fluids when sick with diarrhoea, and only 5 percent received gruel.

The youngest children (age 1–23 months), children living in rural areas, children of illiterate mothers, children belonging to a scheduled caste or 'other backward class', and children in households with a low standard of living are less likely than other children to receive any of the various types of oral rehydration therapy. The use of antibiotics and other antidiarrhoeal drugs is not generally recommended for the treatment of childhood diarrhoea. Yet 58 percent of the children who had diarrhoea in the two weeks before NFHS-2 were treated with pills or syrup, and 3 percent received an injection. These figures indicate poor knowledge about the proper treatment of diarrhoea not only among mothers but also among health-care providers. These results underscore the need for informational programmes for mothers and supplemental training for health-care providers that emphasizes the importance of ORT, increased fluid intake, and continued feeding and discourages the use of drugs to treat childhood diarrhoea. The use of unnecessary antidiarrhoeal drugs is widespread across all socioeconomic groups, and is particularly common for children of urban women, more educated women, women who do not belong to a scheduled caste, scheduled tribe or other backward class, and children living in households with a medium or high standard of living.

Table 6.14 shows the percent distribution of children who were treated with ORS for diarrhoea in the two weeks before NFHS-2 by the source of the ORS packets. Only 70 children were treated with ORS packets in the Gujarat sample, so the results in this table should be interpreted with caution. For 49 percent of children who were treated with ORS, the packets were obtained from public-sector sources, for 30 percent the packets were obtained from private-sector medical sources, and for 20 percent the packets were obtained from other sources (primarily shops). NGO or trust hospitals/clinics were the source of ORS packets for 1 percent of children who received ORS. Among the public-sector sources, community health centres (CHC), rural hospitals, or Primary Health Centres (PHC) are mentioned most often, followed by sub-centres, government or municipal hospitals, government paramedics, and other public medical sector sources. Among the private-sector medical sources, ORS packets were usually obtained from a private doctor. The pharmacy or drugstore category, listed under private-sector sources, accounts for 7 percent of all cases. If this category is added to the 'shop' category, the proportion purchasing ORS packets from shops, pharmacies, or drugstores becomes 20 percent.

Table 6.14 Source of ORS packets

Among children under age 3 who were treated with a solution made from oral rehydration salt (ORS) packets for diarrhoea in the two weeks preceding the survey, percent distribution of children by source of ORS packets, Gujarat, 1998–99

Source	Percent
Public medical sector	48.6
Government/municipal hospital	7.1
Government dispensary	1.4
CHC/rural hospital/PHC	23.0
Sub-centre	8.4
Government paramedic	5.8
Other public medical sector	2.9
NGO or trust	1.4
NGO or trust hospital/clinic	1.4
Private medical sector	30.1
Private hospital/clinic	8.7
Private doctor	14.4
Pharmacy/drugstore	7.0
Other private medical sector	19.9
Other source	20.0
Shop	12.8
Other relative/friend	1.4
Other	5.8
Total percent	100.0
Number of children treated with ORS	70

Note: Table includes only surviving children age 1–35 months from among the two most recent births in the three years preceding the survey. Table excludes children with missing information on source of ORS packets.
CHC: Community health centre; PHC: Primary Health Centre; NGO: Nongovernmental organization

6.7 HIV/AIDS

Acquired Immune Deficiency Syndrome (AIDS) is an illness caused by the HIV virus, which weakens the immune system and leads to death through secondary infections such as tuberculosis or pneumonia. The virus is generally transmitted through sexual contact, through contact with contaminated needles (injections) or blood, or from an HIV-infected mother to her child during pregnancy, during delivery, or through breastfeeding. HIV and AIDS prevalence in India have been on the rise for more than a decade and have reached alarming proportions in recent years. The Government of India established a National AIDS Control Organization (NACO) under the Ministry of Health and Family Welfare in 1989 to deal with the epidemic. Since then there have been various efforts to prevent HIV transmission, such as public health education through the media and the activities of many nongovernmental organizations (NGOs).

NFHS-2 included a set of questions on knowledge of AIDS and AIDS prevention. Ever-married women age 15–49 were first asked if they had ever heard of an illness called AIDS. Respondents who had heard of AIDS were asked further questions about their sources of information on AIDS, whether they believe that AIDS is preventable, and if so, what precautions, if any, a person can take to avoid infection.

Table 6.15 Source of knowledge about AIDS

Percentage of ever-married women who have heard about AIDS and among women who have heard about AIDS, percentage who received information from specific sources by selected background characteristics, Gujarat, 1998–99

Background characteristic	Percentage who have heard about AIDS	Number of women	Among those who have heard about AIDS, percentage who received information from:										Number of women who have heard about AIDS
			Radio	Television	Cinema	Newspaper/ magazine	Poster/ hoarding	Health worker	Adult education programme	Friend/ relative	School/ teacher	Other source	
Age													
15–24	27.7	964	18.3	88.7	5.6	43.6	39.2	4.2	0.0	10.8	3.4	4.9	267
25–34	32.3	1,351	14.4	86.7	5.7	44.6	39.9	4.4	0.7	9.5	1.0	3.6	437
35–49	28.8	1,530	14.1	83.4	4.5	49.8	34.4	2.9	0.0	14.8	0.9	7.4	441
Residence													
Urban	49.9	1,633	12.6	89.7	5.5	51.4	38.8	1.8	0.2	11.2	1.1	4.9	816
Rural	14.9	2,212	21.7	76.4	4.3	34.1	34.7	8.6	0.3	13.5	2.5	6.5	329
Education													
Illiterate	5.0	1,934	13.4	72.1	2.1	3.1	7.2	4.2	0.0	18.5	2.2	9.2	97
Literate, < middle school complete	26.5	801	10.9	75.5	2.4	20.2	32.0	3.8	0.0	14.6	0.5	4.2	212
Middle school complete	50.3	335	11.3	84.0	4.7	41.9	40.8	2.4	0.0	10.0	0.6	2.4	168
High school complete and above	86.2	774	17.8	91.6	6.7	62.2	43.0	4.1	0.4	10.5	1.9	6.0	667
Religion													
Hindu	28.6	3,448	15.6	85.3	5.0	46.6	38.2	4.2	0.3	12.2	1.5	5.5	986
Muslim	31.4	314	14.3	88.0	4.1	37.5	40.5	1.0	0.0	9.1	0.0	3.0	99
Other	72.4	82	9.8	91.7	10.0	57.3	22.9	1.6	0.0	9.9	3.3	6.7	60
Caste/tribe													
Scheduled caste	18.1	568	15.5	85.4	2.9	34.0	28.9	4.9	1.0	10.7	2.0	3.0	103
Scheduled tribe	8.9	763	14.6	69.1	1.5	29.4	41.2	5.9	0.0	10.2	0.0	5.9	68
Other backward class	26.7	917	15.2	84.1	3.7	41.7	39.5	7.8	0.4	11.7	1.3	4.4	245
Other	45.6	1,596	15.2	88.1	6.4	51.4	37.9	2.1	0.1	12.3	1.7	6.0	728
Standard of living index													
Low	3.0	832	(16.0)	(59.7)	(3.9)	(11.8)	(12.1)	(8.1)	(0.0)	(20.1)	(4.2)	(7.9)	25
Medium	20.1	1,818	17.8	77.6	3.8	30.1	33.0	6.6	0.3	12.5	2.0	6.0	366
High	63.2	1,191	13.9	90.8	5.9	55.5	40.7	2.3	0.3	11.3	1.2	5.0	753
Exposure to mass media													
Exposed to any media	43.2	2,545	15.5	87.0	5.3	47.8	38.2	3.7	0.3	11.6	1.4	5.2	1,100
Listens to radio weekly	42.1	1,173	26.8	86.3	7.0	49.2	35.9	5.1	0.6	11.2	1.6	6.4	494
Watches television weekly	48.3	2,148	14.7	89.8	5.5	47.9	38.1	3.4	0.3	11.0	1.4	4.9	1,037
Goes to cinema/theatre monthly	61.5	289	22.1	88.3	11.6	53.6	31.6	2.8	1.1	14.9	1.1	9.4	178
Reads newspaper/magazine weekly	68.9	1,142	17.3	89.2	6.0	60.4	42.2	3.3	0.4	10.9	1.1	5.5	787
Not regularly exposed to any media	3.5	1,300	(8.8)	(57.6)	(2.2)	(13.3)	(22.2)	(4.5)	(0.0)	(17.8)	(4.6)	(8.9)	45
Total	29.8	3,845	15.2	85.9	5.2	46.4	37.6	3.8	0.3	11.9	1.5	5.4	1,145

Note: Total includes a small number of women with missing information on mother's education, caste/tribe, and the standard of living index, who are not shown separately.
( ) Based on 25–49 unweighted cases

Knowledge of AIDS

Table 6.15 shows the percentage of women who have heard about AIDS by background characteristics. Seventy percent of women in Gujarat have never heard of AIDS. NFHS-1 also included AIDS awareness questions for Gujarat, so it is possible to assess the trend in AIDS awareness between NFHS-1 and NFHS-2. In NFHS-1, 89 percent of the women in Gujarat had never heard of AIDS. Thus, between NFHS-1 and NFHS-2 in Gujarat, the proportion of women who have heard about AIDS has increased by 19 percentage points.

Knowledge of AIDS varies little by woman's age, but there are substantial differentials for all other background characteristics. Urban residence, education, and standard of living have a strong positive association with AIDS knowledge. Fifty percent of urban women in Gujarat have heard about AIDS, compared with only 15 percent of rural women. Knowledge of AIDS increases from 5 percent among illiterate women to 86 percent among women who have at least completed high school. Similarly, knowledge of AIDS increases from 3 percent among women in households with a low standard of living to 63 percent among women in households with a high standard of living.

Hindu or Muslim women are much less likely to know about AIDS (29–31 percent) than other women (72 percent). Only 9 percent of scheduled-tribe women have heard about AIDS, compared with 18 percent of scheduled-caste women, 27 percent of women belonging to other backward classes, and 46 percent of other women. Exposure to mass media increases women's knowledge about AIDS substantially. Sixty-nine percent of women who read a newspaper or magazine at least once a week know about AIDS, compared with only 4 percent of women who are not regularly exposed to any mass media (newspapers, magazines, radio, television, cinema, or theatre).

Source of Knowledge About AIDS

As part of the AIDS prevention programme, the Government of India has been using mass media, especially electronic media, extensively to create awareness among the general public about AIDS and its prevention. NFHS-2 asked women who had heard of AIDS about their sources of AIDS information. Table 6.15 shows the percentage of ever-married women who have heard about AIDS from specific sources. Television is by far the most important source of information about AIDS among ever-married women in Gujarat. Eighty-six percent of women who know about AIDS received information from television, followed by newspaper/magazine (46 percent), poster/hoarding (38 percent), radio (15 percent), and friend/relative (12 percent). Only 4 percent report that they received information about AIDS from a health worker.

Television is the most important source of information about AIDS in all of the groups shown in Table 6.15 and a substantial percentage of women in all groups except illiterate women received information about AIDS from newspapers or magazines and posters or hoardings. Friends and relatives are an important source of AIDS information for illiterate women and for women who live in households with a low standard of living and women who are not regularly exposed to any media.

Knowledge of Ways to Avoid AIDS

Respondents who have heard of AIDS were asked if a person could do anything to avoid becoming infected. Those who reported that something can be done were asked what a person could do to avoid AIDS. Table 6.16 shows the percentage of ever-married women who know of no way to avoid AIDS and the percentages who report that AIDS can be avoided in specific ways, by selected background characteristics.

Among women who have heard about AIDS, 35 percent do not know any way to avoid infection. As expected, this percentage is much higher among rural women than among urban women and higher among women not regularly exposed to mass media than among women who are regularly exposed. The percentage who do not know any way to avoid becoming infected with AIDS decreases sharply with increasing levels of education and household standard of living. This percentage is also higher among Muslim women (42 percent) than among Hindu women (35 percent) or women belonging to other religions (26 percent). Scheduled-tribe women, followed by scheduled-caste women, are less likely to know any way to avoid AIDS than other women.

Among women who have heard about AIDS, 'avoiding sex with commercial sex workers' (35 percent) and 'having only one sex partner' (33 percent) are the most commonly mentioned ways of avoiding AIDS. 'Avoiding injection/using clean needles' and 'avoiding blood transfusions' are also mentioned as ways to avoid AIDS by substantial proportions of women (26 percent and 19 percent, respectively). Only 27 percent of women mention using a condom during intercourse as a way of avoiding AIDS. Two percent mention abstaining from sex, 3 percent mention avoiding sex with homosexuals, and 1 percent mention avoiding intravenous drug use. The percentage reporting each means of avoiding AIDS is, by and large, lower among rural than among urban women and among women not regularly exposed to mass media than among other women. Level of education and household standard of living are strongly and positively associated with the frequency of mentioning almost all of these ways of avoiding AIDS. The use of condoms as a way of avoiding AIDS is mentioned most often by younger women, urban women, women who have at least completed middle school, women from households with a high standard of living, women exposed to mass media, women of 'other religion', and women who not belong to any scheduled caste/tribe or other backward class. Clearly much more needs to be done in educating women about AIDS.

The lack of knowledge of AIDS, its modes of transmission, and ways to avoid infection among women in Gujarat is a major challenge to efforts to avoid the spread of AIDS. Most ever-married women in their childbearing years have never heard of AIDS, and more than one-third of those who have heard of AIDS do not know even one way to avoid infection. It is clear that AIDS prevention organizations need to strengthen the educational components of their programmes, in addition to trying to reduce high-risk behaviour, since even basic information about AIDS is seriously deficient among women in Gujarat.

Table 6.16 Knowledge about avoidance of AIDS

Among ever-married women who have heard about AIDS, percentage who believe AIDS can be avoided in specific ways by selected background characteristics, Gujarat, 1998–99

Background characteristic	Percentage who believe AIDS can be avoided by:									Knows no way to avoid AIDS	Number of women
	Abstaining from sex	Using condoms	Having only one sex partner	Avoiding sex with commercial sex workers	Avoiding sex with homo-sexuals	Avoiding blood transfusions	Avoiding injections/ using clean needles	Avoiding IV drug use	Other ways		
Age											
15–24	1.1	28.4	30.5	35.3	2.6	16.0	20.4	1.1	4.1	38.2	267
25–34	1.6	30.3	34.4	35.7	1.6	19.7	26.3	0.0	6.1	33.8	437
35–49	2.4	23.5	33.2	33.1	3.6	19.4	28.2	1.4	7.0	35.3	441
Residence											
Urban	1.7	31.5	36.4	39.3	3.1	20.2	28.8	0.9	5.4	30.2	816
Rural	2.1	16.7	24.6	23.0	1.2	15.0	17.7	0.6	7.4	48.3	329
Education											
Illiterate	1.0	7.1	16.3	15.4	1.0	8.1	8.3	1.0	4.2	66.1	97
Literate, < middle school complete	0.5	11.7	19.6	24.8	0.9	5.6	7.5	0.0	3.7	56.0	212
Middle school complete	1.7	17.2	29.7	35.9	0.6	12.9	20.7	0.6	2.4	40.9	168
High school complete and above	2.4	37.6	40.6	40.1	3.8	25.9	35.1	1.1	7.9	23.0	667
Religion											
Hindu	1.8	27.9	32.7	33.8	2.7	20.0	26.0	0.9	6.5	35.3	986
Muslim	2.1	13.4	28.3	41.4	1.0	7.1	17.2	0.0	3.0	42.4	99
Other	1.6	39.2	45.9	36.1	3.3	16.4	32.7	0.0	3.3	26.2	60
Caste/tribe											
Scheduled caste	2.9	17.4	27.1	28.9	1.9	13.4	18.4	1.0	5.8	47.9	103
Scheduled tribe	2.8	14.8	19.1	26.5	1.5	14.5	11.7	0.0	4.4	52.9	68
Other backward class	1.2	22.7	34.5	31.6	2.0	10.1	21.6	0.4	6.1	37.6	245
Other	1.8	31.3	34.8	37.2	3.0	22.8	29.3	1.0	6.1	31.2	728
Standard of living index											
Low	(0.0)	(4.0)	(11.7)	(11.7)	(0.0)	(0.0)	(8.1)	(0.0)	(8.2)	(68.2)	25
Medium	2.2	16.3	28.0	27.1	1.1	8.9	16.0	0.5	3.6	48.1	366
High	1.7	33.3	36.2	39.0	3.4	24.1	30.9	0.9	7.1	28.2	753
Exposure to mass media											
Exposed to any media	1.9	28.2	33.6	35.2	2.7	19.2	26.3	0.8	6.1	34.4	1,100
Listens to radio weekly	2.4	28.3	34.1	33.3	2.0	20.6	28.0	1.0	6.3	32.4	494
Watches television weekly	2.0	29.0	34.4	36.3	2.8	19.9	27.2	0.9	6.1	32.6	1,037
Goes to cinema/theatre monthly	2.2	38.2	37.0	33.7	5.0	29.2	39.2	1.1	6.6	25.4	178
Reads newspaper/magazine weekly	2.4	33.3	37.2	37.1	3.2	22.6	32.4	1.0	7.1	28.4	787
Not regularly exposed to any media	(0.0)	(4.5)	(19.9)	(19.9)	(0.0)	(6.6)	(8.9)	(0.0)	(2.4)	(60.1)	45
Total	1.8	27.2	33.0	34.6	2.6	18.7	25.6	0.8	6.0	35.4	1,145

Note: Total includes 1 woman with missing information on caste/tribe, who is not shown separately.
( ) Based on 25–49 unweighted cases