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 that was 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 and treatment of acute respiratory infections, fever, and diarrhoea among children; 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 1996. 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 Karnataka 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 from 1981 to 1991. 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) for the NFHS-2 estimates.

Table 6.1 shows an estimated average annual CDR for Karnataka of 7.9 deaths per 1,000 population based on NFHS-2 data (covering roughly 1997–98), marginally higher than the 1997 SRS rate of 7.6. This suggests that the completeness of reporting of deaths in NFHS-2 is at least as good as the SRS.

The NFHS-2 CDR estimate of 7.9 is lower than the all-India NFHS-2 rate of 9.7 and is similar to the NFHS-1 estimate of 7.5 for Karnataka (covering roughly 1991–92). Between NFHS-1 and NFHS-2, death rates declined in the youngest age group (less than five years old) and the oldest age group and increased at ages 15–59.

In most countries, male death rates are higher than female death rates at nearly all ages. South Asia generally has been 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 Karnataka, according to both NFHS-2 and the SRS, the CDR for males is higher than the CDR for females. In both surveys, death rates are higher for females than for males among children under age 5 and higher for males than for females at all other ages. In contrast, at the national level, NFHS-2 found higher female than male mortality in every age group below age 30.

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

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, Karnataka

	NFHS-1 (1991–92)	NFHS-2 (1997–98)			SRS (1997)		
Age	Total	Male	Female	Total	Male	Female	Total
< 5	13.7	11.3	13.2	12.2	15.6	17.2	16.4
5–14	1.0	1.4	0.6	1.0	1.5	1.0	1.2
15–49	2.9	4.4	2.8	3.6	3.1	2.6	2.9
50–59	9.8	14.0	11.5	12.7	15.2	10.2	12.8
60+	47.4	48.3	39.1	43.7	56.0	42.7	48.7
CDR	7.5	8.7	7.0	7.9	8.1	7.0	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

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

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

[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:

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

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 too 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 the Karnataka NFHS-2, since the ratios of deaths under seven days to all neonatal deaths are consistently high (between 66 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 neonatal deaths to infant deaths (Appendix Table B.6) are also consistently high (between 61 and 75 percent) for the different time periods preceding the survey.

Another problem inherent in most retrospective surveys is heaping of the age 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 Karnataka NFHS-2, there appears to be a preference for reporting age at death at 3, 5, 8, 12, 15, and 20 days (Table B.5 in Appendix B). 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 a substantial heaping of deaths at 6, 12, and 18 months of age. The amount of heaping on 12 months is particularly pronounced despite the strong emphasis on this problem during the training of interviewers for the NFHS-2 fieldwork.[2] Nevertheless, since there is no heaping on 12 months of age for the five years before the survey, the infant and child mortality rates for that period are not affected by heaping. For the entire 15-year period, infant mortality rates are not likely to be underestimated by more than 1 percent due to heaping.

An examination of the distribution of births and deaths since 1988 (Table B.4 in Appendix B) suggests that there may be some underreporting of deaths in the most recent five-year period. The proportion of deaths to births decreases from 8 percent in 1993–95 to 6 percent in 1996–98. Some of this decrease undoubtedly reflects a real reduction in mortality during that period and some reflects the fact that younger children have had less exposure to the risk of mortality. However, the decline in the proportion of deaths between 1993–95 and 1996–98 may be due partly to underreporting of deaths relative to births during the most recent period.

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

[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'.

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, the 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 for 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 less than 2 percent 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. Infant mortality in Karnataka declined from 70 deaths per 1,000 live births during 1984–88 (10–14 years before the survey) to 52 deaths per 1,000 live births during 1994–98 (0–4 years before the survey), an average rate of decline of nearly 2 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 (52) with the infant mortality rate 0–4 years before NFHS-1 (65) suggests a slightly faster decline of 2.1 infant deaths per 1,000 live births over the six and a half years between the two surveys.

Most other measures of infant and child mortality presented in Table 6.2 have also declined during the past 15 years. The neonatal and infant mortality rates, however, were slightly higher in the period the period 5–9 years before the survey than in the period 10–14 years before the survey. During the period covered by Table 6.2, postneonatal and child mortality rates declined by about 50 percent, but the neonatal mortality rate declined by only 13 percent. According to the NFHS-2 estimates, the infant mortality rate in Karnataka (52) is much lower than the national IMR of 68. Moreover, in recent years the infant mortality rate in Karnataka has been declining twice as fast as in India as a whole. Despite the substantial decline in infant and child mortality rates in Karnataka, however, 1 in every 19 children born during the five years before NFHS-2 died within the first year of life, and 1 in every 14 children died before reaching age five.

Rural mortality rates are considerably higher than urban mortality rates. The infant mortality rate is 41 percent higher in rural areas than in urban areas, and the child mortality rate is more than two and a half times higher in rural areas than in urban areas. The neonatal mortality rate, however, is only 22 percent higher in rural areas than in urban areas. Overall, the under-five mortality rate is 62 percent higher in rural areas than in urban areas. During the period covered in Table 6.2, mortality rates declined rapidly in both rural and urban areas of Karnataka. The infant mortality rate declined by 33 percent in urban areas and 25 percent in rural areas

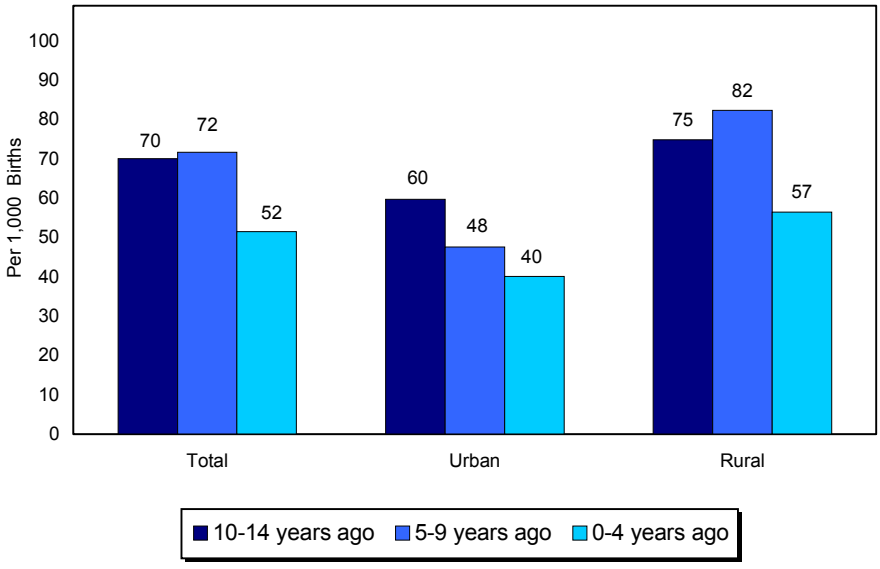
Table 6.2 Infant and child mortality

Neonatal, postneonatal, infant, child, and under-five mortality rates for five-year periods preceding the survey by residence, Karnataka, 1999

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	32.1	8.1	40.1	9.0	48.8
5–9	38.7	8.9	47.6	15.0	61.8
10–14	42.2	17.6	59.8	12.3	71.4
RURAL					
0–4	39.3	17.2	56.5	23.9	79.0
5–9	56.2	26.3	82.4	30.1	110.1
10–14	42.6	32.3	74.9	54.0	124.9
TOTAL					
0–4	37.1	14.4	51.5	19.3	69.8
5–9	50.8	21.0	71.7	25.3	95.2
10–14	42.5	27.7	70.1	40.4	107.7

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 Rates for Five-Year Periods by Residence



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

NFHS-2, Karnataka, 1999

between 1984–88 and 1994–98. The under-five mortality rate declined slightly faster in rural areas (37 percent) than in urban areas (32 percent). A comparison with corresponding figures from NFHS-1 for the five-year period before the survey shows a decline in all estimates of infant and child mortality rates in both rural and urban areas.

The estimated NFHS-2 infant mortality rate of 52 deaths per 1,000 live births during 1994–98 is slightly lower than the SRS value of 59 deaths per 1,000 live births averaged over the period 1994–98. The NFHS-2 estimate of the infant mortality rate for rural areas (57 deaths per 1,000 live births) over the same period is somewhat lower than the average SRS estimate of 66 deaths per 1,000 live births. The NFHS-2 estimate for urban areas (40 deaths per 1,000 live births) is somewhat higher than the average SRS estimate for urban areas (33 deaths per 1,000 live births). However, the differences between the NFHS-2 and SRS infant mortality rates for urban areas, rural areas, and the whole state are not statistically significant.

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. A 10-year period was selected for this table to ensure that there would be an adequate number of cases for comparative purposes. The infant mortality rate declines sharply with increasing education of mothers, from a high of 76 deaths per 1,000 live births for illiterate mothers to a low of 38 deaths per 1,000 live births for mothers who have at least completed a high school education. Other mortality indicators shown in the table vary similarly with the education of the mother.

All the infant and child mortality rates are much higher for Hindus than for Muslims. The infant mortality rate is 32 percent higher and the child mortality rate is 41 percent higher for Hindu children than for Muslim children. These findings are consistent with those of NFHS-1, which also recorded much higher rates of infant and child mortality for Hindus than Muslims in Karnataka.

Children of women belonging to scheduled castes and scheduled tribes have higher mortality rates than children whose mothers belong to other backward classes or ‘other’ castes. All indicators of infant and child mortality decline substantially with increases in the household standard of living. For example, the under-five mortality rate for children living in households with a low standard of living (118) is more than twice as high as the rate for children in households with a high standard of living (50). The child mortality rate is more than three times as high in households with a low standard of living as in households with a high standard of living.

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.

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, Karnataka, 1999

Background characteristic	Neonatal mortality (NN)	Postneonatal mortality[1] (PNN)	Infant mortality (1q0)	Child mortality ($_4q_1$)	Under-five mortality ($_5q_0$)
Residence					
Urban	35.6	8.5	44.1	12.1	55.7
Rural	48.3	22.0	70.3	27.1	95.5
Mother's education					
Illiterate	52.9	23.3	76.2	29.2	103.1
Literate, < middle school complete	31.4	10.5	41.9	17.6	58.8
Middle school complete	(40.8)	(10.9)	(51.7)	(4.3)	(55.8)
High school complete and above	29.3	8.5	37.8	5.6	43.1
Religion					
Hindu	47.5	18.1	65.5	24.0	88.0
Muslim	33.0	16.4	49.5	17.0	65.6
Caste/tribe					
Scheduled caste	46.9	23.0	69.9	37.4	104.6
Scheduled tribe	(63.2)	(21.9)	(85.0)	(38.9)	(120.6)
Other backward class	44.7	15.9	60.6	18.7	78.2
Other	39.6	16.8	56.4	14.2	69.8
Standard of living index					
Low	60.9	21.2	82.2	38.5	117.5
Medium	36.9	17.7	54.6	13.6	67.5
High	28.7	9.5	38.2	12.4	50.1
Total	44.4	17.9	62.3	22.4	83.3

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. Total includes Christian children, children from 'other' religions, and children with missing information on caste/tribe and the standard of living index. Each of these categories is based on fewer than 250 children surviving to the beginning of the age interval. Mortality rates for these children are not shown separately.
( ) 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

Table 6.4 shows that the mortality rate below age five years is considerably higher for boys than for girls. The neonatal mortality rate (which largely reflects mortality due to congenital conditions) is much higher for boys (54 deaths per 1,000 live births) than for girls (35 deaths per 1,000 live births). However, the postneonatal mortality rate and the child mortality rate ($_4q_1$) are slightly higher for girls than for boys. 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).

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 an important factor contributing to their higher neonatal mortality rate. Similarly, children born to mothers above age 30 are at a relatively high risk of experiencing congenital problems. Karnataka exhibits the expected U-shaped pattern of mortality by mother's age, with higher infant mortality rates among children of mothers under age 20 (74 deaths per

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, Karnataka, 1999

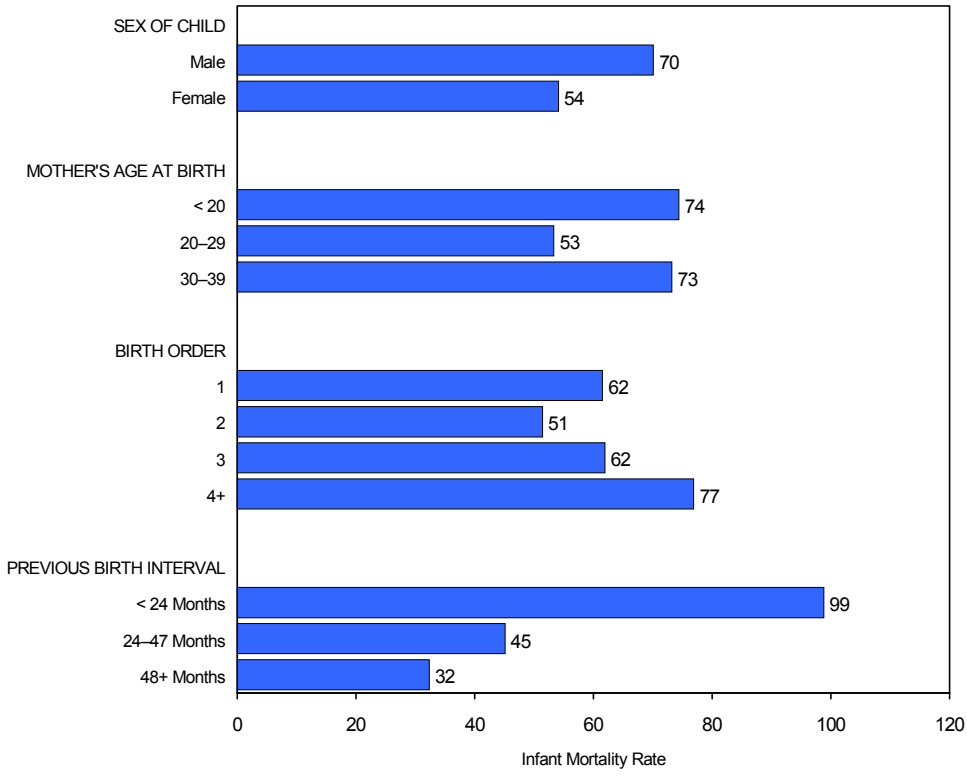
Demographic characteristic	Neonatal mortality (NN)	Postneonatal mortality[1] (PNN)	Infant mortality ($_1q_0$)	Child mortality ($_4q_1$)	Under-five mortality ($_5q_0$)
Sex of child					
Male	53.6	16.5	70.1	21.1	89.7
Female	34.8	19.3	54.1	23.8	76.6
Mother's age at birth					
< 20	55.2	19.3	74.4	22.9	95.7
20–29	36.6	16.7	53.3	20.7	72.9
30–39	(52.8)	(20.4)	(73.2)	(31.5)	(102.3)
Birth order					
1	47.9	13.7	61.5	13.4	74.1
2	34.7	16.7	51.4	14.3	65.0
3	40.7	21.2	61.9	30.9	90.9
4+	54.4	22.5	76.9	36.8	110.9
Previous birth interval					
< 24 months	68.3	30.5	98.8	40.0	134.8
24–47 months	29.0	16.1	45.1	21.3	65.4
48+ months	(25.2)	(7.1)	(32.3)	(10.1)	(42.1)
Medical care[2]					
One or two types of care	29.5	15.3	44.8	U	U
All three types of care	25.0	8.2	33.2	U	U
Birth size[3]					
Large	(32.6)	(13.5)	(46.1)	U	U
Average	22.7	11.6	34.4	U	U
Small	(39.5)	(18.5)	(58.0)	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. Total includes children whose mothers were age 40–49 at the time of birth, children whose mothers had no medical care, and children whose size at birth was very small. Each of these categories is based on fewer than 250 children surviving to the beginning of the age interval. Mortality rates for these children are not shown separately.
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.

1,000 live births) and age 30–39 (73 deaths per 1,000) than among children of mothers age 20–29 (53 deaths per 1,000). Similar patterns are observed for all of the other mortality rates.

Birth order also tends to have a U-shaped relationship to infant deaths, with first births and high-order births having elevated mortality rates. In Table 6.4, birth order shows the expected U-shaped pattern for neonatal, infant, and under-five mortality rates. This association is likely to reflect not only the effect of birth order but also the effect of the age of the mother at childbirth. The postneonatal and child mortality rates increase steadily with birth order. This increase may reflect a more intense competition faced by higher birth-order children for the caregiver's time and for medical resources, as well as for nutritious food once children are weaned. It is also likely that higher birth-order children are disproportionately from lower socioeconomic groups, in which mortality tends to be higher.

Figure 6.2
Infant Mortality Rate by Selected Demographic Characteristics



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

NFHS-2, Karnataka, 1999

The timing of successive births has a powerful effect on the survival chances of children in Karnataka. All the mortality rates decrease sharply as the length of the previous birth interval increases, and all the measures are especially high for children born less than 24 months after a previous birth. The infant mortality rate is three times as high for children with a previous birth interval of less than 24 months as for children with a previous interval of 48 months or more (99 deaths, compared with 32 deaths, per 1,000 live births). The previous birth interval has a similar effect on all other indicators of infant and child mortality shown in Table 6.4. Although the length of the previous birth interval is likely to affect mortality risks directly, a substantial 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 an 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 only one or two types of care have considerably higher neonatal, postneonatal, and infant mortality rates than those who receive all three types of care.

Another important determinant of the survival chances of children is the baby's weight at the time of birth. Many studies have found that low birth weight babies (under 2,500 grams) have a substantially increased risk of mortality. Because most babies in India are not weighed at the time of birth, in addition to birth weight, mothers were asked whether babies born during the three years preceding the survey were large, average, small, or very small at birth. The last panel in Table 6.4 shows neonatal, postneonatal, and infant mortality rates by birth size. Children who were perceived by their mothers to be small at the time of birth experience much higher mortality risks than children perceived to be of average size or larger.

6.3 Morbidity

There is only 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, and 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. Respondents may underreport diseases carrying a stigma, such as tuberculosis, due to intentional concealment. Underestimation may also occur because the household 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 a 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 asthma or tuberculosis, or common flu as malaria.

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. In Karnataka, 2 percent of the population was reported to be suffering from asthma at the time of NFHS-2. The reported level of asthma (1,733 per 100,000 population) in Karnataka is lower than the level reported for India as a whole (2,468 per 100,000 population). The prevalence of asthma in Karnataka is considerably higher in rural areas (1,888 per 100,000 population) than in urban areas (1,442 per 100,000 population). Age differences are marked, with the prevalence of asthma increasing from 464 per 100,000 at age 0–14 to 8,078 per 100,000 at age 60 and over.

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, Karnataka, 1999

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	612	87	87	668	310	2,264
15–59	1,225	201	181	282	281	4,972
60+	6,399	833	660	0	167	596
Sex						
Male	1,503	275	224	453	300	3,997
Female	1,377	155	155	289	260	3,835
Total	1,442	216	190	372	280	7,832
			RURAL			
Age						
< 15	397	79	79	439	563	5,000
15–59	1,690	367	296	322	894	8,410
60+	8,840	682	456	459	767	1,313
Sex						
Male	1,940	325	271	393	978	7,375
Female	1,837	270	203	355	561	7,347
Total	1,888	297	237	374	770	14,723
			TOTAL			
Age						
< 15	464	82	82	511	484	7,264
15–59	1,517	305	253	307	666	13,382
60+	8,078	729	520	316	580	1,908
Sex						
Male	1,786	307	254	414	740	11,372
Female	1,679	231	186	332	458	11,182
Total	1,733	269	221	373	600	22,554

[1]Includes medically treated tuberculosis

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. According to NFHS-2, the overall prevalence of tuberculosis in Karnataka is 269 per 100,000 population, about half the national estimate of 544 and lower than the estimate in any other state except Punjab and Himachal Pradesh. The prevalence of tuberculosis in Karnataka is far lower than the level reported in NFHS-1 (about 1,400 per 100,000). The prevalence of tuberculosis increases rapidly with age. It is substantially higher among persons age 60 and above (729 per 100,000) than among those age 15–59 (305 per 100,000) or age 0–14 (82 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 (221 per 100,000) is lower than the prevalence based on all reported cases (269 per 100,000), but the difference is small. Over 80 percent of persons who suffer from tuberculosis have had medical treatment for the condition. 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 Karnataka, 373 persons per 100,000 population were reported to have suffered from jaundice during the 12 months preceding the survey, much lower than the rate of 1,361 for India as a whole and lower than any other state in India. The reported level of jaundice is the same in urban and rural areas. Males are 25 percent more likely to have suffered from jaundice than females. Jaundice is the only condition measured that does not increase with age. The prevalence of jaundice is highest for the children age less than 15 (511 per 100,000), followed by persons age 60 and above (316 per 100,000) and age 15–59 (307 per 100,000).

Malaria

Malaria is characterized by recurrent high fever with shivering. NFHS-2 asked household respondents whether any member of their household suffered from malaria any time during the three months preceding the survey. In Karnataka, 600 persons per 100,000 population were reported to have suffered from malaria during the three months preceding the survey, much lower than the national rate of 3,697 per 100,000 population, but higher than the rates for the adjoining states of Kerala and Tamil Nadu. 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 not possible 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 almost three times as likely to suffer from malaria (770 per 100,000) as are urban residents (280 per 100,000). The reported prevalence of malaria is higher for males than for females in both urban and rural areas. The prevalence of malaria increases with age, from 484 per 100,000 in the population age 0–14 to 666 per 100,000 in the population age 15–59 and then falls to 580 per 100,000 in the population age 60 and over.

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 vaccine for school children was added in 1980–81. Immunization against tuberculosis

(BCG) was brought under the EPI in 1981–82. In 1985–86, immunization against measles was added to the programme (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 Karnataka whether they had a vaccination card for each child born since January 1996. 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 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 gives the percentages 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 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, the proportion of vaccinations given during the first year of life to children whose information is based on the mother's report is assumed to be the same as the proportion of vaccinations given during the first year of life to 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 vaccine (excluding Polio 0) are considered to be fully vaccinated. Based on information obtained from a card or reported by the mother ('either source'), 60 percent of children age

[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.

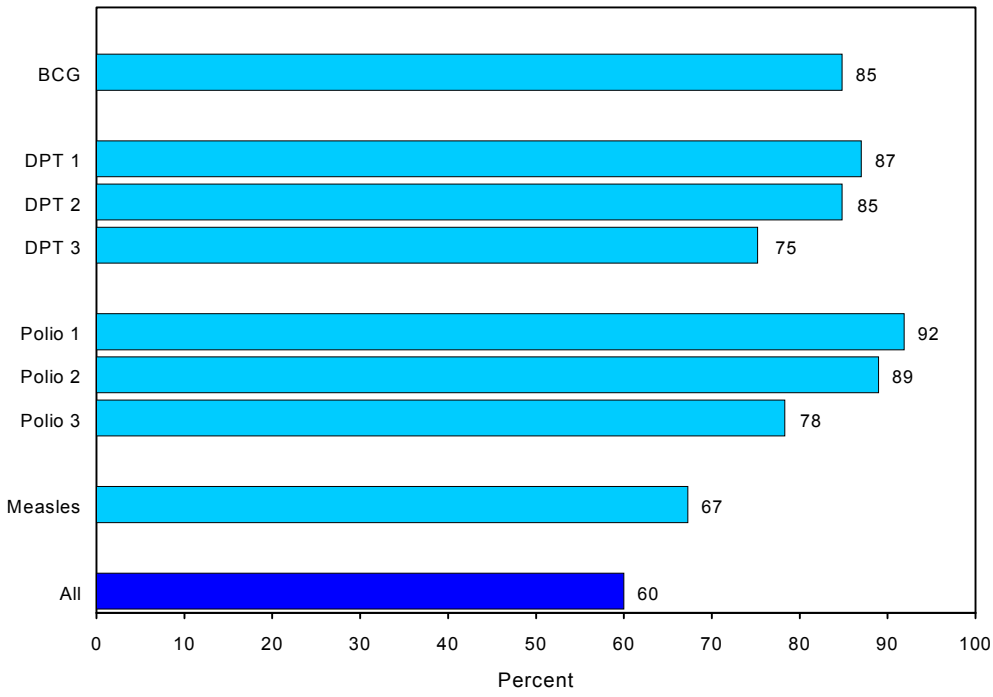
Table 6.6 Childhood vaccinations by source of information

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, Karnataka, 1999

	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	92.3	46.5	98.5	96.9	89.6	98.5	96.9	89.6	80.4	68.3	0.0	67
Mother's report	81.9	30.0	83.5	81.9	65.2	88.4	85.1	71.8	57.1	48.7	11.6	60
Either source	87.4	38.7	91.4	89.8	78.1	93.7	91.4	81.2	69.4	59.0	5.5	128
Vaccinated by 12 months of age[2]	87.4	38.7	91.4	89.8	76.7	93.7	91.4	79.8	64.9	57.4	5.5	128
RURAL												
Vaccinated at any time before the interview												
Vaccination card	96.3	32.4	100.0	96.2	87.0	100.0	96.2	87.0	75.9	72.1	0.0	108
Mother's report	76.5	14.8	76.6	74.9	66.7	86.0	83.4	71.4	61.0	53.7	13.5	190
Either source	83.7	21.2	85.1	82.7	74.0	91.1	88.0	77.0	66.4	60.4	8.6	298
Vaccinated by 12 months of age[2]	83.7	21.2	85.1	81.9	73.2	91.1	87.2	76.1	56.0	52.0	9.4	298
TOTAL												
Vaccinated at any time before the interview												
Vaccination card	94.8	37.8	99.4	96.5	88.0	99.4	96.5	88.0	77.6	70.7	0.0	175
Mother's report	77.8	18.4	78.2	76.6	66.3	86.6	83.8	71.5	60.0	52.5	13.0	250
Either source	84.8	26.4	87.0	84.8	75.2	91.9	89.0	78.3	67.3	60.0	7.7	426
Vaccinated by 12 months of age[2]	84.8	26.4	87.0	84.3	74.2	91.9	88.5	77.2	59.2	54.1	8.2	426

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.

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



NFHS-2, Karnataka, 1999

12–23 months in Karnataka are fully vaccinated, and only 8 percent have not received any vaccinations at all. Coverage for each vaccination except Polio 0 is considerably higher than the percentage fully vaccinated. BCG, the first and second dose of DPT, and the first and second doses of polio vaccine have each been received by at least 85 percent of children (see Figure 6.3). Seventy-five percent of children have received three doses of DPT and 78 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 for DPT, undoubtedly because of the Pulse Polio campaigns.

Not all children who begin the DPT and polio vaccination series go on to complete them. The difference between the percentages of children receiving the first and third doses is 12 percentage points for DPT and 14 percentage points for polio. Moreover, only 67 percent of children 12–23 months have been vaccinated against measles.

There has been an improvement in full vaccination coverage in Karnataka since the time of NFHS-1 when the proportion of children fully vaccinated was 52 percent, and many children were brought into the programme in the six years between the surveys. The proportion of children who did not receive any vaccinations declined substantially, from 15 percent in NFHS-1 to 8 percent in NFHS-2. The coverage of every vaccination has also improved since NFHS-1. The largest increase was in the Polio 0 vaccination, which increased from 6 percent in NFHS-1 to 26 percent in NFHS-2. These data indicate that despite the progress that has been made in immunization coverage for children in Karnataka, 40 percent of children still do not receive all

the recommended vaccinations and a substantial proportion of children who receive some early vaccinations drop out of the programme before receiving all of the vaccinations.

Statistics from the Government of India and from NFHS-2 both estimate that 60 percent of children in Karnataka have received all recommended vaccinations, although the two sets of estimates are somewhat different for individual vaccines. According to government statistics for Karnataka for 1997–98, coverage is 90 percent for BCG, 87 percent for the third dose of DPT vaccine, 87 percent for the third dose of polio vaccine, and 72 percent for measles vaccine (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 54 percent of all children (or 90 percent of fully vaccinated children) were fully vaccinated by age 12 months. The percentages of children who received every vaccine except measles within the first year of life are the same or only slightly lower than the percentages who received these vaccines at any time before the survey. For measles vaccination, which is supposed to be given when the child is nine months old, there is a small gap (67 percent at any time before the survey, compared with 59 percent by age 12 months). Twelve 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. However, the percent of children age 12–23 months who received all the recommended vaccinations by the time of the survey is almost the same in urban and rural areas (59 percent and 60 percent, respectively). The proportion fully vaccinated during the first year of life, however, is higher in urban areas (57 percent) than in rural areas (52 percent). Dropout rates for DPT and polio (the proportion of children receiving the first dose but not the third dose) are similar (13–15 percent) in urban and 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 showed vaccination cards for only 41 percent of children age 12–23 months. Vaccination cards were shown for 53 percent of children in urban areas and 36 percent in rural areas. As expected, vaccination coverage is much higher for children for whom a vaccination card was shown than for other children (see Table 6.6).

Boys (63 percent) are more likely than girls (57 percent) to be fully vaccinated, although girls are slightly more likely than boys to have received the first two doses of DPT and polio vaccines. Immunization coverage is higher for first-order and the second-order births than for third and higher-order births.

Only 47 percent of children of illiterate mothers are fully vaccinated, compared with 77 percent of children whose mothers have at least completed high school. A higher than average percentage of children of illiterate mothers (12 percent) have not received any vaccinations. Hindu children are much more likely than Muslim children to have received each of the

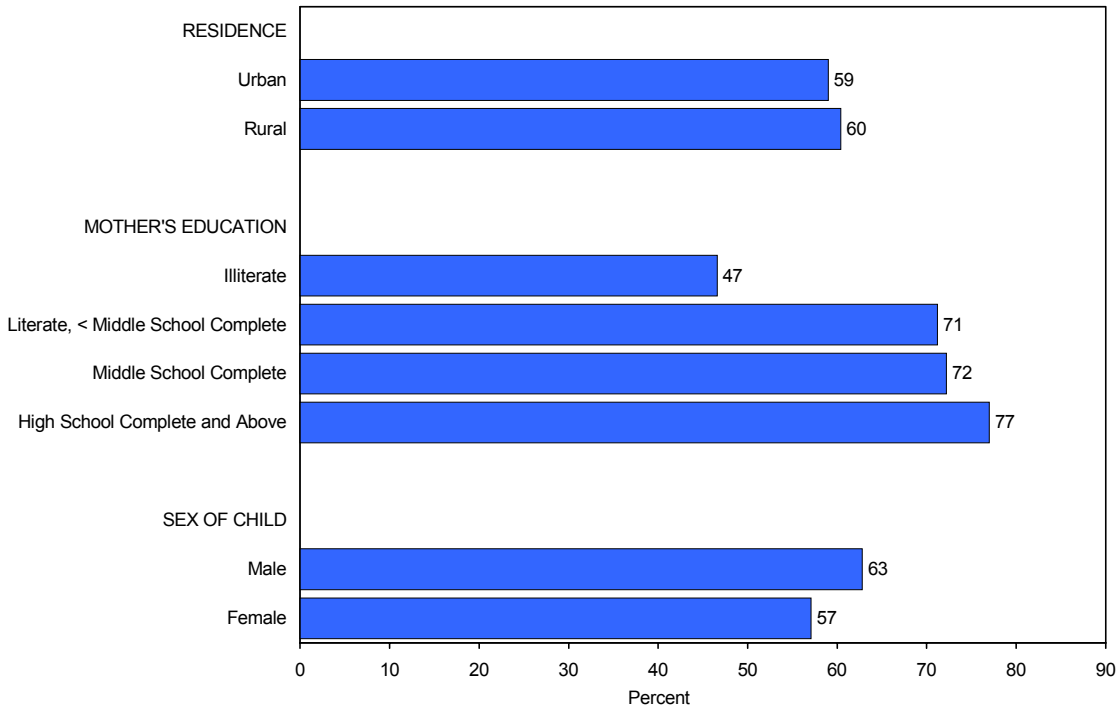
Table 6.7 Childhood vaccinations by background characteristics

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, Karnataka, 1999

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	84.8	28.4	85.3	82.9	76.1	91.3	88.5	79.3	69.3	62.8	8.3	39.8	217
Female	84.8	24.3	88.7	86.8	74.4	92.5	89.6	77.2	65.2	57.1	7.0	42.7	209
Birth order													
1	87.1	38.2	89.8	87.8	82.7	92.9	89.8	81.5	74.4	66.6	7.1	49.6	155
2	88.6	26.0	91.5	90.0	79.3	95.8	95.1	83.6	72.8	65.6	4.2	44.9	139
3	80.1	11.9	84.1	80.1	66.2	88.2	82.1	68.1	58.1	44.2	11.8	34.2	50
4+	77.0	13.7	75.7	73.3	59.8	85.4	81.7	69.4	50.0	47.7	12.1	23.3	82
Residence													
Urban	87.4	38.7	91.4	89.8	78.1	93.7	91.4	81.2	69.4	59.0	5.5	52.8	128
Rural	83.7	21.2	85.1	82.7	74.0	91.1	88.0	77.0	66.4	60.4	8.6	36.2	298
Mother's education													
Illiterate	74.9	14.2	78.1	75.8	64.0	86.8	82.7	67.1	54.9	46.6	12.3	27.6	218
Literate, < middle school complete	97.4	35.5	97.4	96.1	84.2	98.7	97.4	90.7	76.3	71.2	1.3	44.7	76
Middle school complete	(91.7)	(30.3)	(94.4)	(91.6)	(86.0)	(94.4)	(91.6)	(86.0)	(77.7)	(72.2)	(5.6)	(56.4)	36
High school complete and above	94.8	45.6	96.0	93.7	89.6	97.0	95.9	90.8	84.4	77.0	3.0	63.5	96
Religion													
Hindu	86.6	26.7	89.0	86.3	77.9	94.2	90.7	80.2	69.5	62.0	5.5	41.3	342
Muslim	74.0	19.4	75.4	75.4	60.1	79.5	79.5	65.7	53.1	46.1	19.1	38.3	73
Caste/tribe													
Scheduled caste	81.8	14.3	83.2	80.4	69.2	93.0	88.9	74.8	62.1	55.2	7.0	22.6	71
Scheduled tribe	(65.5)	(7.0)	(72.2)	(65.4)	(58.6)	(86.3)	(75.8)	(54.9)	(41.9)	(31.5)	(13.7)	(27.7)	29
Other backward class	90.0	31.1	92.8	90.1	82.9	95.4	92.7	84.9	75.8	65.8	3.9	51.0	152
Other	85.3	31.5	86.4	85.9	74.6	90.0	88.9	79.3	67.9	63.2	9.4	43.3	168
Standard of living index													
Low	75.8	14.8	78.7	76.5	66.2	87.5	83.1	70.6	54.4	50.1	11.7	25.1	135
Medium	86.0	27.2	88.4	86.4	75.3	91.6	89.3	77.1	68.2	59.8	7.9	44.6	213
High	97.3	45.7	98.7	96.0	92.0	100.0	98.7	94.9	88.0	78.5	0.0	61.5	76
Total	84.8	26.4	87.0	84.8	75.2	91.9	89.0	78.3	67.3	60.0	7.7	41.2	426

Note: Table includes only surviving children from among the two most recent births in the three years preceding the survey. Total includes 8 Christian children, 3 children from 'other' religions, and 6 and 2 children with missing information on caste/tribe and the standard of living index, respectively, 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, Karnataka, 1999

recommended vaccinations, a pattern that is also evident at the national level. A much higher percentage of Muslim children (19 percent) than Hindu children (6 percent) had not received any vaccinations by the time of the survey. Vaccination coverage is lowest for the small number of children from scheduled tribes, and is also relatively low for children from scheduled castes. The standard of living of the household has a strong positive relationship with vaccination coverage. Only 50 percent of children from households with a low standard of living are fully vaccinated, compared with 79 percent of children from households with a high standard of living. Twelve percent of children from households with a low standard of living have not received any vaccinations.

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 labelled 'No vaccinations' indicates the percentage of children that 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 children. While the percentage of vaccination cards shown is higher for children age 12–23 months (41 percent) than for children age 24–35 months (32 percent), the percentage of children fully vaccinated by age 12 months is lower for children

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, Karnataka, 1999

	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	52.8	34.0	36.2	31.0	41.2	31.9
Percentage vaccinated by 12 months of age[1]						
BCG	87.4	86.8	83.7	81.1	84.8	82.9
Polio 0	38.7	35.4	21.2	17.5	26.4	23.2
DPT						
1	91.4	86.0	85.1	80.8	87.0	82.5
2	89.8	83.5	81.9	78.9	84.3	80.4
3	76.7	81.9	73.2	70.5	74.2	74.2
Polio						
1	93.7	90.1	91.1	89.2	91.9	89.5
2	91.4	86.0	87.2	88.0	88.5	87.4
3	79.8	81.1	76.1	79.0	77.2	79.8
Measles	64.9	72.6	56.0	62.0	59.2	65.5
All vaccinations[2]	57.4	69.3	52.0	55.9	54.1	60.2
No vaccinations	5.5	9.1	9.4	10.4	8.2	10.0
Number of children	128	120	298	256	426	376

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)

age 12–23 months (54 percent) than for children age 24–35 months (60 percent). On the other hand, the proportion not receiving any vaccinations is slightly lower for children age 12–23 months (8 percent) than for children age 24–35 months (10 percent). A similar pattern is observed in urban and rural areas.

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 selected background characteristics. The public sector is the primary provider of childhood vaccinations in Karnataka. Eighty-four percent of all children who have received vaccinations received most of them from a public sector source and only 14 percent received them from a private sector medical source (about the same percentages as for all India). The percentage of vaccinated children receiving vaccinations from the private medical sector is four times as high in urban areas (28 percent), where private-sector services tend to be concentrated, as in rural areas (7 percent). Even in urban areas, however, 71 percent of children received their vaccinations from the public sector.

Table 6.9 Source of childhood vaccinations

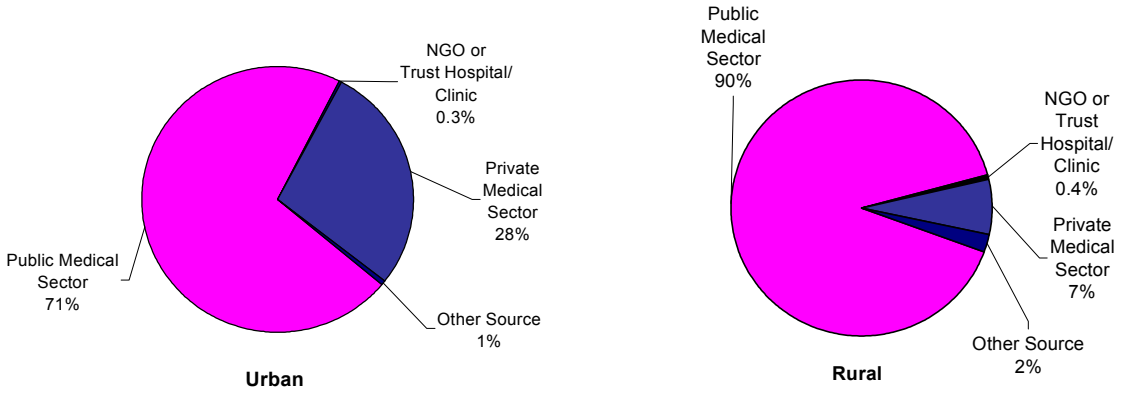
Percent distribution of children under age 3 who have received any vaccinations by source of most of the vaccinations, according to selected background characteristics, Karnataka, 1999

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	83.3	0.6	13.2	2.8	100.0	347
12–23 months	84.1	0.0	15.4	0.5	100.0	393
24–35 months	85.0	0.6	12.7	1.7	100.0	341
Sex of child						
Male	85.2	0.2	13.5	1.1	100.0	552
Female	83.0	0.6	14.2	2.2	100.0	530
Birth order						
1	79.0	0.5	19.2	1.3	100.0	396
2	81.4	0.6	16.0	2.0	100.0	345
3	92.5	0.0	5.6	1.8	100.0	161
4+	93.2	0.0	5.1	1.6	100.0	180
Residence						
Urban	71.4	0.3	27.7	0.6	100.0	353
Rural	90.3	0.4	7.1	2.2	100.0	729
Mother's education						
Illiterate	92.9	0.0	4.7	2.5	100.0	519
Literate, < middle school complete	86.1	0.6	12.3	1.0	100.0	190
Middle school complete	89.1	2.0	7.9	1.0	100.0	101
High school complete and above	64.2	0.4	34.7	0.7	100.0	271
Religion						
Hindu	84.7	0.5	13.5	1.4	100.0	882
Muslim	84.6	0.0	12.0	3.4	100.0	171
Caste/tribe						
Scheduled caste	92.6	0.5	6.4	0.5	100.0	204
Scheduled tribe	93.9	0.0	6.1	0.0	100.0	64
Other backward class	82.2	0.5	16.0	1.3	100.0	395
Other	80.0	0.2	16.9	2.9	100.0	410
Standard of living index						
Low	94.7	0.3	2.9	2.0	100.0	339
Medium	87.8	0.6	10.3	1.3	100.0	535
High	57.1	0.0	41.0	2.0	100.0	204
Total	84.1	0.4	13.8	1.6	100.0	1,082

Note: Table includes only surviving children from among the two most recent births in the three years preceding the survey. Total includes 21 Christian children, 7 children from 'other' religions, and 8 and 3 children with missing information on caste/tribe and the standard of living index, respectively, who are not shown separately.
NGO: Nongovernmental organization

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 medical sector. Religious differentials in the source of vaccinations are small. Children from scheduled castes and scheduled tribes are less likely than other children to receive vaccinations from the private medical sector.

Figure 6.5
Source of Childhood Vaccinations by Residence



Note: Percents do not add to 100.0 due to rounding

NFHS-2, Karnataka,1999

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 who received a dose of vitamin A within the past six months by selected background characteristics. In the state as a whole, only 48 percent of children age 12–35 months received at least one dose of vitamin A, and only 23 percent received a dose within the past six months. This indicates that a majority of children in Karnataka have not received vitamin A supplementation at all and even fewer children receive vitamin A supplementation regularly.

Children living in urban areas, children whose mothers have completed at least a high school education, Hindu children, first births, and children living in households with a high standard of living are more likely than other children to receive vitamin A supplementation. Boys and girls are equally likely to receive vitamin A supplementation in Karnataka. Children from groups that are less likely to have received at least one dose of vitamin A supplementation are also less likely to have received a dose in the past six months.

6.6 Child Morbidity and Treatment

This section discusses the prevalence and treatment of acute respiratory infection (ARI), fever, and diarrhoea. Mothers of children less than three years old 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

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, Karnataka, 1999

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	45.1	29.1	426
24–35 months	52.2	15.6	376
Sex of child			
Male	48.3	23.7	408
Female	48.6	21.7	394
Birth order			
1	54.9	24.2	281
2	49.4	21.3	253
3	42.0	20.0	118
4+	39.7	24.6	151
Residence			
Urban	50.7	23.3	248
Rural	47.4	22.5	554
Mother's education			
Illiterate	40.4	21.7	416
Literate, < middle school complete	52.6	20.3	143
Middle school complete	57.5	24.9	68
High school complete and above	60.5	26.5	175
Religion			
Hindu	51.4	25.3	647
Muslim	33.0	12.9	132
Caste/tribe			
Scheduled caste	45.8	24.8	152
Scheduled tribe	38.1	26.8	53
Other backward class	52.9	22.4	282
Other	48.0	21.4	307
Standard of living index			
Low	39.6	18.5	257
Medium	49.5	23.9	400
High	60.9	27.0	142
Total	48.4	22.8	802

Note: Table includes only surviving children from among the two most recent births in the three years preceding the survey. Total includes 18 Christian children, 5 children from 'other' religions, and 8 and 3 children with missing information on caste/tribe and the standard of living index, respectively, who are not shown separately.

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, by selected background characteristics.

Acute Respiratory Infection

Acute respiratory infection, 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 8 percent of children under age three in Karnataka suffered from acute respiratory infection (cough accompanied by short, rapid breathing) at some time during the two-week period before the survey. Table 6.11 shows that ARI was slightly more common among children age 6–11 months, fourth and higher order births, and children whose mothers have a low level of education than among other children. Seventy-seven percent of children suffering from ARI symptoms in the two weeks before the survey were taken to a health facility or provider (data not shown).

Fever

Fever is the most common of the three conditions examined in Table 6.11, with 26 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 (17 percent) than among older children (24–34 percent). Fever is more prevalent in urban areas than in rural areas. Fever is more common for boys than for girls and for children whose mothers completed less than middle school. Fever is relatively high for Muslim children, scheduled-caste children and children belonging to 'other' castes, and children from households with a low or medium 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 14 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.

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, by selected background characteristics, Karnataka, 1999

Background characteristic	Percentage of children suffering in past two weeks from:				Number of children
	Cough accompanied by fast breathing (ARI)	Fever	Diarrhoea		
			Any diarrhoea[1]	Diarrhoea with blood	
Age of child					
1–5 months	9.1	16.7	12.5	0.0	186
6–11 months	10.9	34.3	18.1	0.9	219
12–23 months	8.3	27.4	15.4	0.7	426
24–35 months	5.2	24.1	10.4	1.0	376
Sex of child					
Male	8.5	28.0	13.5	0.5	620
Female	7.3	23.8	14.3	1.0	587
Birth order					
1	7.0	24.2	13.8	0.9	429
2	6.0	20.2	12.2	0.3	377
3	9.3	31.5	15.7	1.1	179
4+	11.6	34.6	15.6	0.9	222
Residence					
Urban	9.6	28.8	12.4	0.0	377
Rural	7.1	24.7	14.6	1.1	830
Mother's education					
Illiterate	8.6	24.5	13.9	1.1	622
Literate, < middle school complete	11.3	36.6	14.0	0.5	202
Middle school complete	1.9	17.8	16.9	0.0	106
High school complete and above	6.1	24.6	12.6	0.3	277
Religion					
Hindu	7.7	24.4	14.0	0.9	974
Muslim	9.3	32.7	14.9	0.0	203
Caste/tribe					
Scheduled caste	8.9	27.1	15.5	0.8	233
Scheduled tribe	9.1	21.0	10.5	0.0	77
Other backward class	7.1	23.6	15.7	1.4	422
Other	7.8	28.4	12.2	0.2	460
Standard of living index					
Low	8.3	26.4	14.7	1.2	404
Medium	8.3	26.3	15.0	0.4	589
High	6.2	23.1	9.5	0.9	211

Contd…

Table 6.11 Prevalence of acute respiratory infection, fever, and diarrhoea (contd.)

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, by selected background characteristics, Karnataka, 1999

Background characteristic	Percentage of children suffering in past two weeks from:				Number of children
	Cough accompanied by fast breathing (ARI)	Fever	Diarrhoea		
			Any diarrhoea[1]	Diarrhoea with blood	
Source of drinking water					
Piped water	6.8	26.7	14.5	0.6	807
Hand pump	10.5	21.2	13.3	0.8	252
Well water	9.9	30.3	9.9	1.5	133
Purification of water[2]					
Straining by cloth	12.2	30.4	17.0	0.0	206
Water filter	4.3	24.9	16.1	1.0	94
Boiling	5.2	24.4	14.6	1.0	96
Nothing	7.4	25.2	13.1	0.9	834
Total	7.9	25.9	13.9	0.7	1,207

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 23 and 7 children belonging to Christian and 'other' religions, respectively, 13, 2, 4, 2, and 1 children in households using surface water or an 'other' source of drinking water, using alum, electronic water purifier, or other method to purify water, and 15 and 4 children with missing information on caste/tribe and the standard of living index, respectively, who are not shown separately.

[1]Includes diarrhoea with blood

[2]Number of children adds to more than the total because multiple methods of purification of water were recorded.

Children age 6–11 months are more susceptible to diarrhoea than children in other age groups. The prevalence of diarrhoea is relatively low in urban areas, among children whose mothers have completed at least high school, for first and second births, and among children living in households with a high standard of living. Differentials by sex and religion are small. Contrary to expectations, the prevalence of diarrhoea is relatively low among children living in households that use well water for drinking and among children living in households that do nothing to purify their drinking water. Less than 1 percent of all children age 1–35 months (5 percent of children who suffered from diarrhoea in the two weeks preceding the survey) had diarrhoea with blood, a symptom of dysentery.

Table 6.12 shows that 79 percent of mothers with births during the three years preceding the survey know about ORS packets, up sharply from 49 percent among women who gave birth during the three years before NFHS-1, and higher than the national average of 62 percent. Knowledge of ORS packets is somewhat lower among mothers age 15–19 than among mothers in older age groups. As expected, knowledge is considerably higher among urban mothers than rural mothers, and among more educated mothers. Knowledge of ORS is slightly higher among Hindu mothers (80 percent) than Muslim mothers (75 percent). Knowledge of ORS packets is much lower among mothers who are not regularly exposed to any mass media than among mothers who are exposed to some media. Mothers belonging to scheduled castes and tribes are less likely to know about ORS (69–73 percent) than mothers from any other caste group (81–82 percent).

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, Karnataka, 1999

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	68.1	25.3	37.7	30.3	6.7	100.0	28.1	223
20–24	80.9	26.3	32.5	35.6	5.5	100.0	26.3	492
25–29	83.3	19.4	28.4	48.5	3.8	100.0	31.4	293
30–34	81.3	19.0	24.9	53.1	3.0	100.0	31.1	100
35–49	(76.0)	(30.3)	(30.4)	(39.3)	(0.0)	100.0	(36.2)	33
Residence								
Urban	87.1	21.2	28.9	46.0	3.8	100.0	37.9	355
Rural	75.2	25.0	33.0	36.6	5.4	100.0	24.5	787
Education								
Illiterate	67.0	29.1	36.7	27.8	6.4	100.0	24.2	592
Literate, < middle school complete	87.2	18.5	32.5	44.5	4.5	100.0	27.7	182
Middle school complete	91.4	19.2	29.0	48.7	3.2	100.0	41.0	95
High school complete and above	94.8	17.5	21.4	58.5	2.6	100.0	34.5	273
Religion								
Hindu	79.5	23.6	30.8	40.7	5.0	100.0	29.4	930
Muslim	74.9	25.5	38.6	30.9	5.0	100.0	23.5	184
Caste/tribe								
Scheduled caste	73.3	26.4	31.8	35.8	6.0	100.0	29.9	221
Scheduled tribe	68.9	28.8	41.1	28.8	1.4	100.0	24.8	70
Other backward class	81.2	23.2	30.0	41.9	4.9	100.0	29.4	405
Other	81.7	21.7	32.7	40.4	5.1	100.0	27.4	431
Exposure to media								
Exposed to any media	84.6	23.0	30.2	43.0	3.7	100.0	31.3	864
Watches television weekly	87.8	22.2	27.4	46.7	3.7	100.0	30.8	612
Listens to radio weekly	87.4	23.4	29.6	43.4	3.7	100.0	31.2	657
Visits cinema/theatre monthly	84.9	21.1	29.4	45.5	4.0	100.0	32.0	252
Reads newspaper/magazine weekly	93.1	18.0	24.1	54.3	3.6	100.0	35.9	342
Not regularly exposed to any media	61.3	26.3	36.4	28.7	8.6	100.0	20.3	278
Total	78.9	23.8	31.7	39.5	4.9	100.0	28.6	1,142

Note: Total includes 21 and 7 women belonging to Christian and 'other' religions, respectively, and 15 women with missing information on caste/tribe, who are not shown separately.
( ) Based on 25–49 unweighted cases
[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

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 has 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 Karnataka, only 40 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, 24 percent report that children should be given less to drink. This suggests that mothers in Karnataka need much more education in the proper management of diarrhoea. The proportion reporting correctly that children with diarrhoea should be given more to drink is particularly low among teenage mothers, rural mothers, illiterate mothers, Muslim mothers, mothers belonging to a scheduled tribe, and mothers not regularly exposed to any mass media.

To assess whether mothers are aware of one or more signs associated with diarrhoea that 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 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 that indicate that a child with diarrhoea should be given medical treatment. The percentage is lower among younger mothers, rural mothers, illiterate mothers, Muslim mothers, scheduled-tribe mothers, and mothers who are not regularly exposed to mass media, although the differences are generally small. In fact, knowledge of two or more signs of diarrhoea that suggest the need for medical treatment is universally low across all demographic and socioeconomic groups. 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. Sixty-eight percent of children in Karnataka who suffered from diarrhoea during the two weeks preceding the survey were taken to a health facility or provider for medical advice or treatment (higher than the national level of 63 percent). Twenty percent of children with diarrhoea did not receive any treatment at all. Boys with diarrhoea were much more likely than girls to be taken to a health facility or provider. The likelihood of seeking treatment at a health facility or from a health provider is particularly high for children who live in urban areas.

Only 34 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 27 percent in NFHS-1, indicating a slight improvement in the use of ORS packets in Karnataka for the treatment of childhood diarrhoea, and it is higher than the national level of 27 percent. Only 30 percent of children in Karnataka received increased fluids when sick with diarrhoea, and 22 percent received gruel. More than two-fifths of children with diarrhoea (42 percent) did not receive any of the various types of oral rehydration therapy (ORT).

The youngest children (age 1–11 months), boys, children living in rural areas, children of illiterate mothers or mothers with little education, children of Hindu mothers, and children from other backward classes are less likely than other children to receive oral rehydration therapy.

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, Karnataka, 1999

		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	63.8	20.4	13.1	3.3	20.7	56.9	38.3	20.7	1.6	3.2	0.0	25.2	63
12–23 months	74.2	45.6	27.0	4.4	36.1	33.5	54.4	24.0	1.6	3.2	0.0	18.5	66
24–35 months	(64.0)	(37.9)	(28.6)	(2.6)	(33.3)	(31.0)	(43.1)	(17.6)	(0.0)	(5.5)	(2.4)	(13.1)	39
Sex of child													
Male	73.8	34.5	24.0	2.3	26.2	46.4	48.7	20.1	2.5	1.3	1.1	18.0	84
Female	62.0	34.2	20.3	4.8	33.2	37.1	42.7	22.5	0.0	6.2	0.0	21.5	84
Residence													
Urban	(82.6)	(39.0)	(20.1)	(8.4)	(34.4)	(37.1)	(43.9)	(19.4)	(2.3)	(4.4)	(0.0)	(17.2)	47
Rural	62.2	32.5	23.0	1.7	27.9	43.5	46.4	22.0	0.8	3.5	0.8	20.7	121
Mother's education													
Illiterate	62.1	29.5	16.3	1.3	19.5	48.4	35.4	18.4	1.1	3.6	1.1	31.2	87
Literate, < middle school complete	(71.0)	(28.7)	(25.1)	(7.1)	(35.7)	(49.7)	(53.0)	(31.6)	(0.0)	(3.9)	(0.0)	(7.6)	28
High school complete and above	(74.3)	(45.3)	(37.0)	(2.8)	(42.3)	(26.2)	(51.3)	(22.4)	(3.1)	(2.9)	(0.0)	(8.5)	35
Religion													
Hindu	67.9	31.9	21.9	3.7	28.4	43.2	47.9	21.0	0.8	2.3	0.7	22.1	136
Muslim	(70.4)	(46.5)	(24.2)	(3.2)	(32.9)	(36.4)	(33.6)	(23.1)	(3.3)	(10.3)	(0.0)	(9.9)	30
Caste/tribe													
Scheduled caste	(74.7)	(35.7)	(22.1)	(2.7)	(27.8)	(33.8)	(46.9)	(16.1)	(3.0)	(0.0)	(0.0)	(25.5)	36
Other backward class	70.4	28.2	24.0	4.7	28.4	46.3	53.7	28.3	0.0	3.1	1.4	16.2	66
Other[1]	64.3	42.8	20.1	3.5	33.7	37.2	39.2	19.6	1.8	5.5	0.0	16.2	56
Standard of living index													
Low	64.9	29.8	20.3	1.6	21.9	43.2	45.0	19.9	0.0	3.4	1.6	26.8	59
Medium	68.2	36.1	20.6	3.5	33.9	43.2	43.0	21.5	2.3	3.6	0.0	19.5	89
Total	67.9	34.3	22.2	3.6	29.7	41.7	45.7	21.3	1.2	3.7	0.6	19.8	168

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 18 children whose mother's education is 'middle school complete', 1 child of a mother belonging to an other religion, 8 scheduled-tribe children, 20 children from households with a high standard of living index, and 1 child with missing information on caste/tribe, who are not shown separately.

( ) Based on 25–49 unweighted cases

[1]Not belonging to a scheduled caste, a scheduled tribe, or an other backward class

The use of antibiotics and other antidiarrhoeal drugs is not generally recommended for the treatment of childhood diarrhoea. Yet 46 percent of the children who had diarrhoea in the two weeks before NFHS-2 were treated with pills or syrup, and 21 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. The 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 literate mothers.

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. For 36 percent of children who were treated with ORS, the packets were obtained from public-sector medical sources, for 50 percent the packets were obtained from private-sector medical sources, and for 14 percent the packets were obtained from other sources (primarily shops). The NGO sector is totally absent in Karnataka as a source of ORS packets. Among the public-sector medical sources, community health centres (CHC), rural hospitals, or Primary Health Centres (PHC) are mentioned most often, followed by government or municipal hospitals. Among the private-sector medical sources, ORS packets were usually obtained from a private hospital or clinic. The pharmacy or drugstore category accounts for 3 percent of all cases. If this category is added to

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, Karnataka, 1999

Source	Percent
Public medical sector	36.2
Government/municipal hospital	8.7
UHC/UHP/UFWC	3.3
CHC/rural hospital/PHC	19.1
Sub-centre	1.7
Government paramedic	1.7
Other public medical sector	1.6
Private medical sector	49.9
Private hospital/clinic	34.5
Private doctor	6.9
Private paramedic	1.7
Pharmacy/drugstore	3.4
Other private medical sector	3.4
Other source	14.0
Shop	12.2
Husband	1.7
Total percent	100.0
Number of children treated with ORS	58

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.
UHC: Urban health centre; UHP: Urban health post; UFWC: Urban family welfare centre; CHC: Community health centre; PHC: Primary Health Centre

the 'shop' category, the proportion purchasing ORS packets from shops, pharmacies, or drugstores becomes 16 percent.

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 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.

Knowledge of AIDS

Table 6.15 shows the percentage of women who have heard about AIDS by background characteristics. Fifty-eight percent of women in Karnataka have heard of AIDS, much higher than the national level of 40 percent. NFHS-1 did not include AIDS-awareness questions for Karnataka so it is not possible to assess the trend in AIDS awareness in the state between NFHS-1 and NFHS-2.

Knowledge of AIDS varies relatively little by women's age, but there are substantial differentials for all other background characteristics. Almost four-fifths of women in urban areas (79 percent) have heard of AIDS, compared with only 47 percent of women in rural areas. The difference in the knowledge of AIDS by women's educational level is dramatic. Knowledge of AIDS increases from only 35 percent for illiterate women to 98 percent for women who have completed at least a high school education. There is also a strong positive relationship between knowledge of AIDS and household standard of living. Christian are much more likely to know about AIDS (94 percent) than either Muslims (48 percent) or Hindus (58 percent). Knowledge of AIDS is very low among women from scheduled tribes and scheduled castes (only 35–45 percent). The effect of media exposure on knowledge of AIDS is very powerful. Only 20 percent of women who are not regularly exposed to radio, television, cinema, theatre, or print media say that they have heard about AIDS, whereas 92 percent of women who read a newspaper or magazine weekly know about AIDS.

Source of Knowledge About AIDS

As part of its 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

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, Karnataka, 1999

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	54.0	1,205	70.0	82.7	12.3	24.0	11.6	3.2	0.2	31.8	0.8	2.5	650
25–34	61.3	1,584	69.5	81.0	11.6	28.6	11.9	6.4	0.5	31.9	0.9	3.8	972
35–49	57.9	1,585	65.7	78.8	12.1	27.2	9.3	3.3	0.4	36.2	1.0	3.8	918
Residence													
Urban	78.5	1,523	63.4	92.0	14.4	38.2	14.2	3.9	0.7	27.1	1.2	3.2	1,195
Rural	47.2	2,851	72.7	70.5	9.8	16.9	7.9	4.9	0.1	39.1	0.7	3.6	1,345
Education													
Illiterate	35.2	2,414	61.6	63.4	6.8	0.7	4.4	3.4	0.0	43.0	0.1	2.9	851
Literate, < middle school complete	72.1	818	67.7	80.3	10.1	17.8	8.8	3.8	0.2	35.1	0.3	3.8	590
Middle school complete	92.4	289	73.0	89.2	10.1	28.2	12.8	2.9	0.0	30.3	0.0	1.5	267
High school complete and above	97.5	853	74.0	95.8	19.2	59.7	18.5	6.4	1.1	23.5	2.4	4.4	832
Religion													
Hindu	58.3	3,741	70.3	80.2	12.4	26.7	10.9	4.3	0.5	33.5	1.0	3.5	2,179
Muslim	47.9	492	50.4	82.9	6.9	16.7	7.6	4.2	0.0	33.0	0.5	1.8	236
Christian	94.3	105	62.2	85.1	16.6	50.1	13.2	7.1	0.0	34.4	1.0	6.2	99
Other	(71.9)	35	(80.5)	(83.9)	(8.3)	(48.8)	(31.9)	(3.7)	(0.0)	(27.7)	(0.0)	(0.0)	25
Caste/tribe													
Scheduled caste	45.1	704	61.2	75.7	13.3	16.8	9.4	8.0	1.0	35.7	1.3	5.0	318
Scheduled tribe	35.0	252	65.6	63.8	6.8	14.7	4.5	5.6	0.0	45.3	0.0	7.0	88
Other backward class	60.4	1,809	70.5	79.3	12.8	25.3	11.3	3.5	0.5	34.3	0.8	3.3	1,093
Other	65.4	1,559	68.5	85.7	11.2	33.3	11.7	4.3	0.1	30.3	1.0	2.8	1,019

Contd…

Table 6.15 Source of knowledge about AIDS (contd.)

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, Karnataka, 1999

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	
Standard of living index													
Low	30.9	1,314	66.6	55.8	8.3	7.8	7.2	4.6	0.0	45.7	1.0	5.7	407
Medium	61.3	2,141	67.1	78.8	10.1	18.1	8.8	3.7	0.1	34.8	0.5	2.8	1,312
High	90.0	904	71.1	96.0	17.0	50.5	16.2	5.5	1.1	24.9	1.5	3.4	814
Exposure to mass media													
Exposed to any media	68.3	3,439	70.4	84.5	12.7	28.8	11.2	4.3	0.4	30.9	0.9	3.4	2,350
Listens to radio weekly	70.2	2,663	78.4	83.6	12.8	29.5	11.4	4.2	0.5	30.5	0.9	3.7	1,869
Watches television weekly	76.5	2,555	68.7	92.1	13.9	31.7	11.5	4.1	0.5	28.6	1.0	2.7	1,953
Goes to cinema/theatre monthly	70.9	860	72.6	86.8	20.9	34.7	15.1	5.6	0.8	33.9	0.7	3.8	610
Reads newspaper/magazine weekly	91.6	1,222	74.2	93.2	17.0	51.8	17.0	5.2	0.8	24.6	1.8	4.1	1,119
Not regularly exposed to any media	20.3	935	42.4	33.2	3.7	3.2	7.5	5.8	0.0	65.1	0.5	3.7	190
Total	58.1	4,374	68.3	80.6	12.0	26.9	10.9	4.4	0.4	33.4	0.9	3.4	2,540

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

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 Karnataka. Eighty-one percent of women who know about AIDS received information from that source. Other important sources of information about AIDS are radio (68 percent), friends or relatives (33 percent), and newspapers or magazines (27 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 most of the groups shown in Table 6.15 and a substantial percentage of women in all groups received information about AIDS from the radio. Friends and relatives are a particularly important source of AIDS information for women who live in households with a low standard of living, illiterate women, scheduled-tribe women, 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 can do anything to avoid becoming infected. Those who reported that something can be done were asked what a person can 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, 36 percent do not know any way to avoid infection, compared with 33 percent for India as a whole. The percentage is higher among rural women than among urban women and among women not regularly exposed to mass media. The percentage is also considerably higher among Muslim women (46 percent) than among Hindu women (36 percent) or Christian women (16 percent). Scheduled-caste women and scheduled-tribe women are more likely than other women not to know any way to avoid AIDS. Lack of knowledge of ways to avoid becoming infected with AIDS decreases sharply with increasing education and household standard of living.

Among women who report that something can be done to prevent AIDS, the most commonly mentioned ways of avoiding AIDS are avoiding injections/using clean needles (39 percent), avoiding sex with commercial sex workers (38 percent), avoiding blood transfusions (30 percent), and having only one sex partner (25 percent). Fourteen percent of women mention avoiding sex with homosexuals as a way of avoiding AIDS, followed by using condoms (9 percent). The percentage reporting every specific way of avoiding AIDS is lower among rural than among urban women and among women not regularly exposed to mass media than other women. The level of education and the household standard of living are positively associated with women mentioning every way of avoiding AIDS. The use of condoms as a way of avoiding AIDS is mentioned most often by women who have at least completed high school, women from households with a high standard of living, Christian women, and women who are regularly exposed to the cinema and print media.

The lack of knowledge of AIDS, its modes of transmission, and ways to avoid infection among women in Karnataka is a major challenge to efforts to avoid the spread of AIDS. A large percentage of 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

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, Karnataka, 1999

Background characteristic	Percentage who believe AIDS can be avoided by:										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	Knows no way to avoid AIDS	
Age											
15–24	1.4	7.7	23.4	36.9	13.7	28.8	36.4	0.6	5.7	38.6	650
25–34	3.7	10.2	28.8	41.9	14.1	32.1	41.1	1.4	8.5	31.7	972
35–49	3.3	7.5	23.0	33.4	13.7	29.1	37.8	1.2	7.9	38.7	918
Residence											
Urban	4.1	12.6	29.7	43.5	14.4	36.7	45.5	1.5	7.9	28.8	1,195
Rural	2.0	5.1	21.4	32.3	13.3	24.4	32.7	0.7	7.2	42.4	1,345
Education											
Illiterate	0.9	1.0	12.9	22.0	9.3	14.2	20.1	0.2	4.5	58.1	851
Literate, < middle school complete	1.5	4.7	21.6	36.1	11.2	21.6	30.8	0.2	7.5	40.3	590
Middle school complete	2.2	10.1	32.2	45.9	14.0	33.8	42.4	0.0	6.0	26.8	267
High school complete and above	6.3	18.6	38.5	51.8	20.2	51.5	62.3	3.1	11.2	13.4	832
Religion											
Hindu	2.9	8.1	25.1	37.5	13.8	30.2	39.7	1.2	7.4	35.9	2,179
Muslim	2.6	9.1	20.3	29.9	11.0	21.2	22.2	0.0	6.4	46.2	236
Christian	6.2	20.5	41.5	56.4	18.7	47.7	54.7	2.1	12.2	16.3	99
Other	(0.0)	(4.0)	(28.2)	(40.3)	(19.9)	(40.6)	(48.9)	(0.0)	(16.4)	(27.3)	25
Caste/tribe											
Scheduled caste	1.3	6.3	18.9	34.0	12.1	21.2	28.8	1.0	6.0	45.9	318
Scheduled tribe	4.5	3.5	20.4	25.0	11.5	20.6	29.7	0.0	5.8	47.5	88
Other backward class	3.0	6.9	26.9	37.4	13.4	31.7	39.1	1.5	8.0	36.4	1,093
Other	3.4	11.8	26.2	40.2	15.3	32.9	42.5	0.9	7.6	31.1	1,019

Contd…

Table 6.16 Knowledge about avoidance of AIDS (contd.)

Among ever-married women who have heard about AIDS, percentage who believe AIDS can be avoided in specific ways by selected background characteristics, Karnataka, 1999

Background characteristic	Percentage who believe AIDS can be avoided by:										
	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	Knows no way to avoid AIDS	Number of women
Standard of living index											
Low	0.7	3.2	13.0	21.5	8.1	13.2	21.2	0.2	6.0	60.3	407
Medium	1.7	4.8	23.3	36.4	13.2	24.9	33.8	0.6	6.6	38.5	1,312
High	6.0	17.2	34.8	47.7	17.7	47.2	55.6	2.4	9.7	19.6	814
Exposure to mass media											
Exposed to any media	3.1	9.2	26.5	39.4	14.4	31.9	41.0	1.2	7.6	33.4	2,350
Listens to radio weekly	2.8	9.3	27.9	42.2	16.2	34.9	43.3	1.4	7.5	30.2	1,869
Watches television weekly	3.5	10.1	27.9	41.4	15.4	34.9	44.1	1.4	7.5	30.4	1,953
Goes to cinema/theatre monthly	3.8	12.2	33.6	47.4	14.6	35.9	45.2	1.0	8.1	29.7	610
Reads newspaper/magazine weekly	5.1	16.6	36.8	49.2	18.4	44.3	56.3	2.3	10.3	17.6	1,119
Not regularly exposed to any media	1.1	1.6	10.5	15.0	6.3	8.9	10.6	0.0	6.4	69.0	190
Total	3.0	8.6	25.3	37.6	13.8	30.2	38.7	1.1	7.5	36.0	2,540

Note: Total includes 22 and 8 women with missing information on caste/tribe and the standard of living index, respectively, who are not shown separately.
( ) Based on 25–49 unweighted cases

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 Karnataka.