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 for an assessment of the demographic situation and for 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 in 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, along with questions on deaths occurring to usual residents of the household during the two years preceding the survey. The Woman's Questionnaire collects information on the survival status of all births and the age at death of children who died. The Woman's Questionnaire also contains questions on child immunization coverage and sources; vitamin A supplementation for children; prevalence of acute respiratory infections, fever, and diarrhoea among children and the treatment of these illnesses; and mothers' knowledge of oral rehydration therapy.

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, Maharashtra

	NFHS-1 (1991–92)	NFHS-2 (1997–98)			SRS (1997)		
Age	Total	Male	Female	Total	Male	Female	Total
< 5	12.1	13.4	11.9	12.7	12.9	11.4	12.2
5–14	0.8	0.9	1.5	1.2	0.8	1.0	0.9
15–49	3.0	3.0	3.5	3.2	3.0	2.4	2.7
50–59	8.1	12.9	11.5	12.2	16.8	9.4	13.1
60+	49.1	66.6	53.5	60.0	52.6	41.2	45.8
CDR	7.7	9.2	8.9	9.1	7.9	6.7	7.3

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

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

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

Table 6.1 shows an estimated average annual CDR for Maharashtra of 9.1 deaths per 1,000 population based on NFHS-2 data (covering roughly 1997–98) compared with 7.3 from the 1997 SRS. This suggests that the completeness of reporting of deaths in NFHS-2 may be better than that in the SRS. NFHS-2 age-specific death rates are higher than the SRS rates at all ages except 50–59.

The NFHS-2 CDR estimate of 9.1 is lower than the all-India NFHS-2 rate of 9.7 and considerably higher than the corresponding NFHS-1 rate of 7.7 for Maharashtra (covering roughly 1991–92). Between NFHS-1 and NFHS-2, death rates appear to have increased at all ages, more so at ages 50 and above. Reasons for this apparent increase in death rates are not clear, but the differences in the crude death rates between the two surveys are not likely to be statistically significant.

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 Maharashtra, according to NFHS-2, death rates are higher for males than for females among children under age 5 and for the population age 50 and above. The SRS estimates the male death rate to be higher than the female death rate for all ages except 5–14.

6.2 Infant and Child Mortality

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

Neonatal mortality:	The probability of dying in the first month of life
Postneonatal mortality:	The probability of dying after the first month of life but before the first birthday
Infant mortality ($_1q_0$):	The probability of dying before the first birthday
Child mortality ($_4q_1$):	The probability of dying between the first and fifth birthdays
Under-five mortality ($_5q_0$):	The probability of dying before the fifth birthday

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

[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:

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

checks for nonsampling errors—in particular, underreporting of deaths in early childhood (which would result in an underestimate of mortality) and misreporting of the date of birth or age at death (which could distort the age pattern of under-five mortality). Both problems are likely to be more pronounced for children born further in the past than for children born recently. Underreporting of infant deaths is usually most serious for deaths that occur very early in infancy. If deaths in the early neonatal period are selectively underreported, there will be an abnormally low ratio of deaths under seven days to all neonatal deaths and an abnormally low ratio of neonatal to infant mortality. 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 Maharashtra NFHS-2, since the ratios of deaths under seven days to all neonatal deaths are consistently high (between 68 and 79 percent) for the different time periods preceding the survey (a ratio of less than 25 percent is often used as a guideline to indicate underreporting of early neonatal deaths). The ratios of infant deaths that occurred during the neonatal period (Appendix Table B.6) are also consistently high (between 68 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, which are reported to have occurred after infancy, 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 Maharashtra NFHS-2, there appears to be a preference for reporting age at death at 5, 10, 12, and 15 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 5, 9, 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, even if one-third of the deaths reported at age 12 months or one year actually occurred at less than 12 months of age, the infant mortality rate for the five years before the survey would be underestimated by less than 3 percent.

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 1996–98. The proportion of deaths to births decreases from 7 percent during 1993–95 to 5 percent during 1996–98. Some of this decrease undoubtedly reflects a real reduction in mortality during that

[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'.

period and some reflects the fact that younger children have had less exposure to the risk of mortality, but there appears to be some underenumeration of deaths to children born after 1995.

It is seldom possible to establish mortality levels with confidence for a period of more than 15 years before a survey. Even within the recent 15-year period considered here, apparent trends in mortality rates should be interpreted with caution for several reasons. First, there may be differences in the completeness of death reporting related to the length of time before the survey. Second, the accuracy of reports of age at death and of date of birth may deteriorate with time. Third, sampling variability of mortality rates tends to be high, especially for groups with relatively few births. Fourth, mortality rates are truncated as they go back in time because women currently age 50 or above who were bearing children during earlier periods were not included in the survey. This truncation affects mortality trends, in particular. For example, for the period 10–14 years before the survey, the rates do not include any births 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 Maharashtra declined from 58 deaths per 1,000 live births during 1984–88 (10–14 years before the survey) to 44 deaths per 1,000 live births during 1994–98 (0–4 years before the survey), an average rate of decline of 1.4 infant deaths per 1,000 live births per year. A comparison of the infant mortality rate for the period 0–4 years before NFHS-2 (44) with the infant mortality rate 0–4 years before NFHS-1 (51) suggests a somewhat slower decline of 1.1 infant deaths per 1,000 live births per year over the period between the two surveys.

All other measures of infant and child mortality presented in Table 6.2 have also declined during the past 15 years. All of the measures declined by 24–38 percent except for the neonatal mortality rate, which declined by only 17 percent. Despite the overall decline in the infant and child mortality rates, however, 1 in every 23 children born during the five years before NFHS-2 died within the first year of life, and 1 in every 17 children died before reaching age five. According to the NFHS-2 estimates, the infant mortality rate in Maharashtra (44) is much lower than the national IMR of 68 and the IMR is lower in Maharashtra than in any other major state except Kerala. Further reductions in infant and child mortality can be attained by focusing on antenatal and delivery care services and by intensifying various child survival programmes.

Rural mortality rates are considerably higher than urban mortality rates. For example, in the five years before the survey, the infant mortality rate is 53 percent higher in rural areas than in urban areas and the child mortality rate is 76 percent higher in rural areas than in urban areas. In Table 6.2, all mortality rates except the neonatal mortality rate in urban areas declined

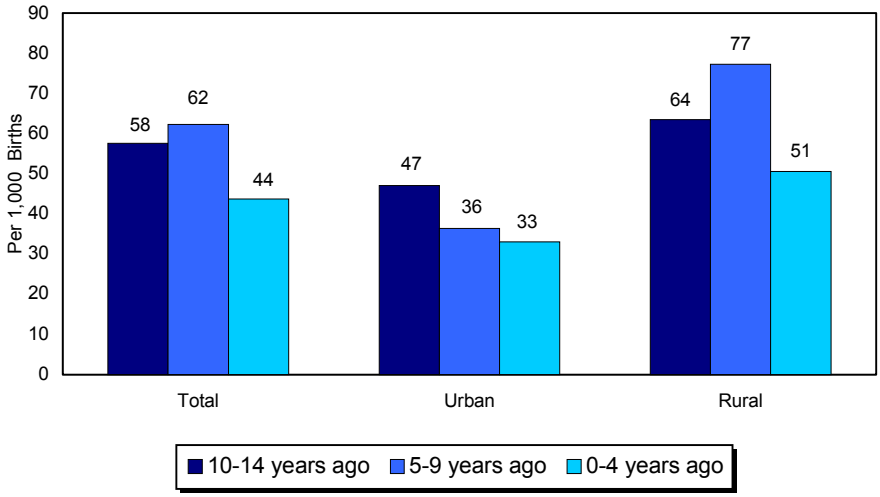
Table 6.2 Infant and child mortality

Neonatal, postneonatal, infant, child, and under-five mortality rates for five-year periods preceding the survey by residence, Maharashtra, 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	24.7	8.2	33.0	10.2	42.8
5–9	24.5	11.9	36.4	10.3	46.4
10–14	30.1	17.0	47.1	15.8	62.1
RURAL					
0–4	36.7	13.9	50.6	18.0	67.8
5–9	55.2	22.1	77.3	25.8	101.1
10–14	43.3	20.2	63.5	29.2	90.8
TOTAL					
0–4	32.0	11.7	43.7	15.0	58.1
5–9	44.0	18.4	62.3	20.2	81.3
10–14	38.6	19.0	57.6	24.0	80.2

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, Maharashtra,1999

between 1989–93 and 1994–98. Between 1984–88 and 1989–93, all mortality rates in urban Maharashtra declined, but only the child mortality rate declined in rural Maharashtra. The infant mortality rate declined by 30 percent in urban areas and by 20 percent in rural areas between 1984–88 and 1994–98, and the under-five mortality rate declined by 31 percent in urban areas and 25 percent in rural areas during this period. A comparison with corresponding figures from NFHS-1 shows a decline in all rural estimates and most urban estimates of infant and child mortality rates.

The estimated NFHS-2 infant mortality rate of 44 deaths per 1,000 live births during 1994–98 is lower than the SRS value of 51 deaths per 1,000 live births averaged for the period 1994–98. The NFHS-2 and average SRS estimates of IMR in urban areas are in close agreement (33 deaths per 1,000 live births in each case), but the NFHS-2 estimate of IMR for rural areas is much lower than the average SRS estimate over the same period (51 deaths per 1,000 live births from NFHS-2, compared with 61 deaths per 1,000 live births from the SRS). The difference between NFHS–2 and the average SRS infant mortality rates for Maharashtra as a whole is not statistically significant (the lower and upper confidence limits for the NFHS–2 estimate, shown in Appendix Table A.2, are 35 and 53, respectively). The difference between the NFHS–2 and SRS estimates of the rural infant mortality rate are also 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. During this period, children in rural areas of Maharashtra experienced a 91 percent higher probability of dying before their fifth birthday than urban children, considerably more than the 58 percent differential in the most recent five-year period shown in Table 6.2. This comparison indicates that in recent years the under-five mortality rate has declined faster in rural areas than in urban areas. All mortality indicators are much lower for Mumbai than for other areas of Maharashtra. Within Mumbai, all mortality indicators are much higher in the slum areas than in the non-slum areas. For example, the infant mortality rate in slum areas of Mumbai is 72 percent higher than the infant mortality rate in non-slum areas.

The overall infant mortality rate declines sharply with increasing education of mothers, from a high of 63 deaths per 1,000 live births for illiterate mothers to a low of 27 deaths per 1,000 live births for mothers who have at least completed high school. 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 107 percent higher and the child mortality rate is 40 percent higher for Hindu children than for Muslim children. NFHS–1 also recorded higher rates of infant and child mortality for Hindus than for Muslims in Maharashtra. However, the Hindu-Muslim differentials have widened for NFHS-2. Mortality differentials by religion presumably reflect influences other than religion alone (for example, a larger proportion of Muslims than Hindus in Maharashtra live in urban areas, where mortality rates are generally low). This is confirmed by a study based on NFHS–1 data, which noted that the difference in infant and child mortality rates between Hindu and Muslim children is reduced considerably when other demographic and socioeconomic variables are controlled statistically (Pandey et al., 1998).

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, Maharashtra, 1999

Background characteristic	Neonatal mortality (NN)	Postneonatal mortality[1] (PNN)	Infant mortality ($_1q_0$)	Child mortality ($_4q_1$)	Under-five mortality ($_5q_0$)
Residence					
Urban	24.6	10.0	34.7	10.3	44.6
Rural	46.3	18.2	64.5	22.1	85.2
Mumbai	15.3	9.2	24.5	4.6	29.0
Slum	18.4	9.7	28.1	6.0	33.9
Non-slum	8.2	8.1	16.3	1.7	18.0
Mother's education					
Illiterate	39.7	23.3	62.9	25.6	87.0
Literate, < middle school complete	44.6	8.6	53.1	13.9	66.3
Middle school complete	37.8	8.8	46.6	7.7	53.9
High school complete and above	21.6	5.1	26.7	2.3	29.0
Religion					
Hindu	41.3	17.0	58.3	19.2	76.4
Muslim	19.3	8.9	28.2	13.7	41.5
Buddhist/Neo-Buddhist	(43.9)	(11.3)	(55.3)	(13.7)	(68.2)
Caste/tribe					
Scheduled caste	40.2	12.5	52.6	14.2	66.1
Scheduled tribe	49.8	23.8	73.6	20.2	92.3
Other backward class	40.0	12.8	52.8	17.3	69.2
Other	34.3	14.6	48.9	17.9	65.9
Standard of living index					
Low	48.3	21.6	69.9	30.2	98.0
Medium	36.1	13.0	49.0	12.8	61.2
High	23.0	6.1	29.1	3.1	32.1
Total	38.1	15.1	53.2	17.7	69.9

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 a small number of children belonging to Jain and '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 categories 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

Children of women belonging to scheduled tribes have higher rates of infant mortality than children of women belonging to all other castes. All indicators of infant and child mortality decline substantially with increases in the household standard of living. For example, for children in households with a high standard of living the under-five mortality rate is 32 deaths per 1,000 live births; the corresponding rate for children in households with a low standard of living (98) is more than three times as high. The child mortality rate is almoar 10 times higher in households with a low standard of living than 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

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, Maharashtra, 1999

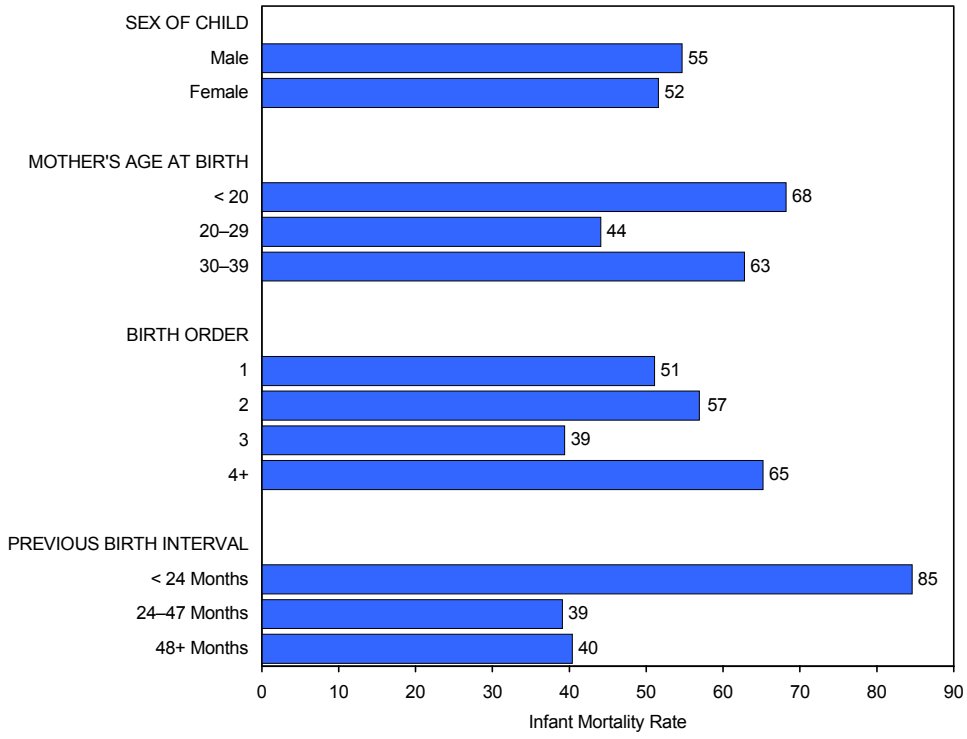
Demographic characteristic	Neonatal mortality (NN)	Postneonatal mortality[1] (PNN)	Infant mortality ($_1q_0$)	Child mortality ($_4q_1$)	Under-five mortality ($_5q_0$)
Sex of child					
Male	38.8	15.9	54.7	15.5	69.4
Female	37.4	14.3	51.6	20.0	70.6
Mother's age at birth					
< 20	51.1	17.1	68.2	21.6	88.3
20–29	31.9	12.2	44.1	15.3	58.7
30–39	(30.8)	(32.0)	(62.8)	(18.5)	(80.2)
Birth order					
1	36.8	14.2	51.1	12.7	63.1
2	45.0	11.9	56.9	19.4	75.2
3	30.8	8.6	39.4	15.0	53.9
4+	37.8	27.5	65.2	25.1	88.7
Previous birth interval					
< 24 months	68.7	15.9	84.6	27.9	110.1
24–47 months	23.2	15.9	39.1	16.3	54.8
48+ months	27.5	13.0	40.4	14.5	54.4
Medical care[2]					
One or two types of care	31.1	15.0	46.1	U	U
All three types of care	28.4	9.5	37.9	U	U
Size at birth[3]					
Large	(12.2)	(0.0)	(12.2)	U	U
Average	11.4	9.5	20.9	U	U
Small	(45.3)	(25.9)	(71.2)	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 a small number of 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 categories 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.

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 6.4 shows that there is almost no difference in the under-five mortality rates for boys and girls. But, when broken into infant and child mortality rates, there arise some differentials. While the infant mortality rate is slightly higher for boys (55 deaths per 1,000 live births) than for girls (52 deaths per 1,000), the child mortality rate is higher for girls (20 deaths per 1,000) than for boys (16 deaths per 1,000). 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).

Figure 6.2
Infant Mortality Rates by Selected Demographic Characteristics



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

NFHS-2, Maharashtra, 1999

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. Maharashtra exhibits the expected U-shaped pattern of mortality by mother's age, with higher infant mortality among children of mothers under age 20 (68 deaths per 1,000 live births) and age 30–39 (63 deaths per 1,000) than among children of mothers age 20–29 (44 deaths per 1,000). Similar patterns are observed for postneonatal mortality and child mortality rates, but not for neonatal mortality rates. The neonatal mortality rate declines with mother's age at childbirth.

Birth order also tends to have a U-shaped relationship to infant deaths, with first births and higher-order births having elevated mortality rates. In Table 6.4, birth order shows the expected U-shaped pattern only for postneonatal mortality. Unexpectedly, infant and child mortality rates are higher for second-order births than for first-order births, but as expected, births of order four or higher have the highest infant and child mortality rates. High infant and child mortality rates for higher-order births may reflect a more intense competition faced by higher birth-order children for the caregiver's time, for medical resources, and 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.

The timing of successive births has a powerful effect on the survival chances of children in Maharashtra. The infant mortality rate is twice as high for children with a previous birth interval of less than 24 months as for children with a previous interval of 24 months or more (85 deaths compared with 39–40 deaths per 1,000 live births). The previous birth interval has a similar effect on all other indicators of infant and child mortality except postneonatal mortality. 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 all three types of care have considerably lower risk of neonatal and postneonatal mortality than children of women who receive one or two types of care. A comparison with children of women who did not receive any care is not possible due to an insufficient number of cases in that category.

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 are perceived by their mothers to be smaller than average at 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 these reasons, 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 morbidity for all household members, and no effort was made to do clinical tests for any of the disease conditions.

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, Maharashtra, 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	839	140	131	1,647	3,602	3,823
15–59	2,140	389	337	1,694	3,559	8,124
60+	8,182	783	430	807	3,255	891
Sex						
Male	1,972	308	262	1,752	3,597	6,810
Female	2,397	381	305	1,467	3,499	6,029
Total	2,172	342	282	1,618	3,551	12,839
			RURAL			
Age						
< 15	803	98	98	1,640	3,702	6,005
15–59	2,684	301	251	1,450	4,817	9,454
60+	10,763	371	185	962	5,705	1,619
Sex						
Male	2,648	259	206	1,578	4,568	8,678
Female	2,934	212	176	1,360	4,448	8,400
Total	2,788	236	191	1,471	4,509	17,078
			TOTAL			
Age						
< 15	817	114	111	1,643	3,663	9,829
15–59	2,433	341	291	1,563	4,236	17,579
60+	9,847	517	272	907	4,836	2,509
Sex						
Male	2,351	281	230	1,655	4,141	15,488
Female	2,710	282	230	1,404	4,052	14,429
Total	2,524	282	230	1,534	4,098	29,917

[1]Includes medically treated tuberculosis

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 Maharashtra, 2.5 percent of the population was reported to be suffering from asthma at the time of NFHS-2. The reported level of asthma (2,524 per 100,000 population) in Maharashtra is very close to the level reported for India as a whole (2,468 per 100,000 population). The prevalence of asthma in Maharashtra is considerably higher in rural areas (2,788 per 100,000) than in urban areas (2,172 per 100,000), and is higher among females (2,710 per 100,000) than among males (2,351 per 100,000). Age differences are marked, with the prevalence of asthma increasing from 817 per 100,000 at age 0–14 to 9,847 per 100,000 at age 60 and over.

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 Maharashtra is 282 per 100,000 population, much lower than the national estimate of 544. Among all Indian states, only Karnataka, Himachal Pradesh, and Punjab have lower prevalence levels (269, 259, and 207, respectively) than Maharashtra. The prevalence of tuberculosis in NFHS-2 (2.8 per 1,000 population) is about the same level reported in NFHS-1 (2.9 per 1,000 population). The prevalence of tuberculosis is considerably higher in urban areas (342 per 100,000 population) than in rural areas of Maharashtra (236 per 100,000). The prevalence rate is about the same for males (281 per 100,000) and females (282 per 100,000). The prevalence of tuberculosis is higher for females than males in urban areas and lower for females than males in rural areas. The prevalence of tuberculosis increases rapidly with age. It is substantially higher among persons age 60 and above (517 per 100,000) than among those age 15–59 (341 per 100,000) or age 0–14 (114 per 100,000).

Medically treated tuberculosis is expected to give a more reliable measure of the prevalence of active tuberculosis than the measure based on all reported cases considered in the preceding paragraph. As expected, the prevalence of medically treated tuberculosis is considerably lower (230 per 100,000) than the prevalence based on all reported cases (282 per 100,000). The gap between all reported cases of tuberculosis and medically treated tuberculosis is highest for the oldest age group (60+). This may occur either due to differential treatment-seeking behaviour by age or due to misreporting of other ailments as tuberculosis. Differentials in the prevalence of medically treated tuberculosis by residence 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 Maharashtra, 1,534 persons per 100,000 population were reported to have suffered from jaundice during the 12 months preceding the survey, somewhat higher than the rate of 1,361 for India as a whole. People living in urban areas are more likely to have suffered from jaundice (1,618 per

100,000) than those living in rural areas (1,471 per 100,000). Males are 18 percent more likely to have suffered from jaundice than females. Jaundice is the only condition measured that does not increase steadily with age. The prevalence of jaundice in Maharashtra is highest for the age group 0–14 (1,643 per 100,000), followed by the age groups 15–59 (1,563), and 60 years and above (907).

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 Maharashtra, 4,098 persons per 100,000 population were reported to have suffered from malaria during the three months preceding the survey, somewhat higher than the national rate of 3,697 per 100,000 population. 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 not the same. However, the reported prevalence of malaria does not differ much between NFHS–1 (37.4 per 1,000 population) and NFHS–2 (41.0 per 1,000 population).

Rural residents are much more likely to suffer from malaria (4,509 per 100,000) than urban residents (3,551 per 100,000). The reported prevalence of malaria is slightly higher for males than for females in both urban and rural areas. The prevalence of malaria increases with age, from 3,663 per 100,000 in the population age 0–14 to 4,836 per 100,000 in the population age 60 years and over. The steady increase with age occurs in rural areas, but the prevalence declines slowly with age in urban areas.

6.4 Child Immunization

The vaccination of children against six serious but preventable diseases (tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis, and measles) has been a cornerstone of the child health care system in India. As part of the National Health Policy, the National Immunization Programme is being implemented on a priority basis. The Expanded Programme on Immunization (EPI) was initiated by the Government of India in 1978 with the objective of reducing morbidity, mortality, and disabilities from these six diseases by making free vaccination services easily available to all eligible children. Immunization against poliomyelitis was introduced in 1979–80, and tetanus toxoid for school children was added in 1980–81. Immunization against tuberculosis (BCG) was brought under the EPI in 1981–82. 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 Maharashtra 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 (excluding Polio 0) are considered to be fully vaccinated. Based on information obtained from a card or reported by the mother ('either source'), 78 percent of children age 12–23 months are fully vaccinated, and only 2 percent have not received any vaccinations at all. Coverage for each vaccination except Polio 0 is much higher than the percentage fully vaccinated. BCG, the first two doses of DPT, and the three doses of polio vaccine have each been received by more than 90 percent of children in Maharashtra (see Figure 6.3). 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 each dose of polio than for DPT, undoubtedly because of the Pulse Polio campaigns.

Not all children who begin with the DPT and polio vaccination series go on to complete them. In Maharashtra, the difference between the percentages of children receiving the first and third doses is 6 percentage points each for DPT and polio. Eighty-four 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, Maharashtra, 1999

Source of information	Percentage vaccinated											Number of children
			DPT			Polio						
	BCG	Polio 0	1	2	3	1	2	3	Measles	All[1]	None	
URBAN												
Vaccinated at any time before the interview												
Vaccination card	99.5	18.0	99.7	98.3	95.6	99.7	98.1	95.4	87.0	86.7	0.0	123
Mother's report	96.9	11.7	92.6	89.8	88.2	98.8	98.5	91.7	81.1	74.2	0.0	106
Either source	98.3	15.1	96.4	94.4	92.2	99.3	98.2	93.7	84.3	80.9	0.0	229
Vaccinated by 12 months of age[2]	94.9	15.1	94.5	92.7	88.4	96.2	95.6	88.5	69.7	66.0	3.3	229
RURAL												
Vaccinated at any time before the interview												
Vaccination card	93.9	3.5	100.0	95.7	94.9	100.0	95.7	94.9	91.1	85.1	0.0	166
Mother's report	88.1	4.4	88.9	85.3	81.6	92.5	89.7	83.9	78.6	69.7	5.9	196
Either source	90.8	4.0	94.0	90.0	87.7	96.0	92.4	88.9	84.3	76.8	3.2	362
Vaccinated by 12 months of age[2]	89.8	4.0	93.2	89.2	87.7	95.2	91.6	88.9	66.5	62.0	4.9	362
TOTAL												
Vaccinated at any time before the interview												
Vaccination card	96.3	9.7	99.9	96.8	95.2	99.9	96.7	95.1	89.4	85.8	0.0	289
Mother's report	91.2	7.0	90.2	86.9	83.9	94.7	92.8	86.7	79.5	71.3	3.8	302
Either source	93.7	8.3	94.9	91.7	89.4	97.2	94.7	90.8	84.3	78.4	2.0	591
Vaccinated by 12 months of age[2]	91.8	8.3	93.7	90.6	87.8	95.5	93.1	88.6	67.8	63.5	4.3	591

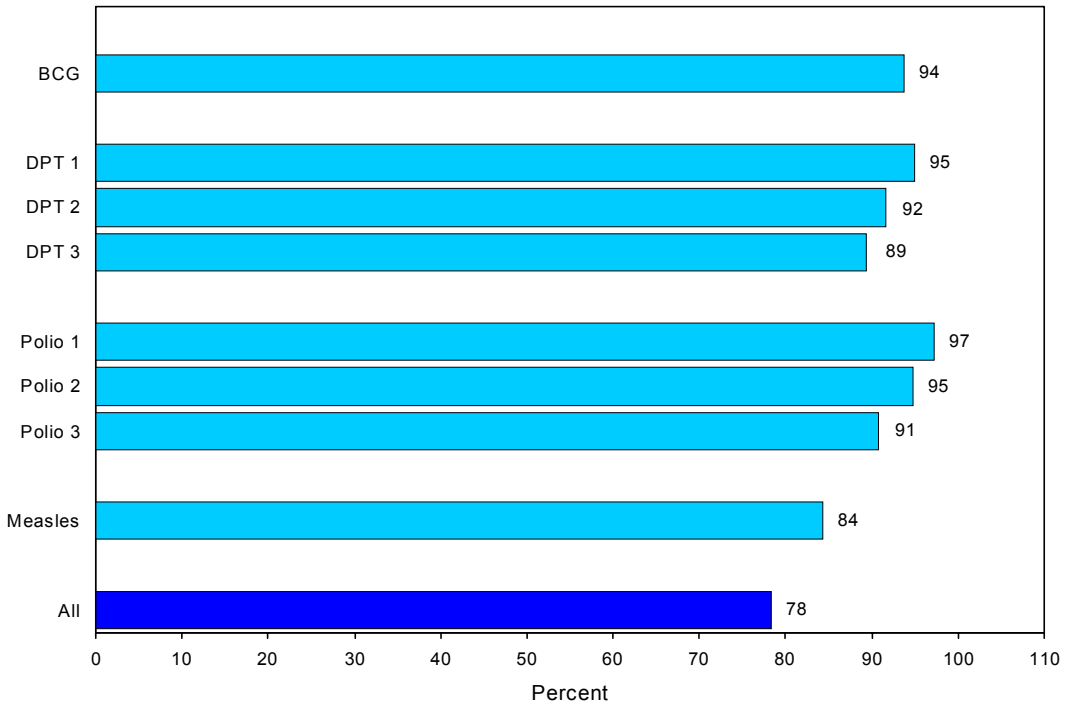
Note: Table includes only surviving children from among the two most recent births in the three years preceding the survey.
[1]BCG, measles, and three doses each of DPT and polio vaccines (excluding Polio 0)
[2]For children whose information was based on the mother's report, the proportion of vaccinations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

12–23 months have been vaccinated against measles. The lower percentage vaccinated against measles is mainly responsible for the fact that the percentage fully vaccinated is even lower.

There has been substantial improvement in full vaccination coverage in Maharashtra since the time of NFHS-1 when the proportion of children fully vaccinated was 64 percent. Many more 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 8 percent in NFHS-1 to 2 percent in NFHS-2. The coverage of all vaccinations, especially vaccination against measles, has improved considerably since NFHS-1. For Maharashtra to attain the goal of full immunization coverage in near future it has to improve the coverage of the measles vaccination and address the dropout problem for DPT and polio vaccinations.

Government statistics suggest a somewhat higher level of vaccination coverage than NFHS-2 estimates for most vaccinations, although the two sets of estimates are fairly close in the case of BCG and measles. According to government statistics for Maharashtra for 1997–98, 83 percent of children age 12–23 months are fully vaccinated and coverage is 95 percent for BCG,

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



95 percent for the third dose of DPT vaccine, 96 percent for the third dose of polio vaccine, and 85 percent for measles vaccine (Ministry of Health and Family Welfare, 1999b).

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 64 percent of all children (or 81 percent of fully vaccinated children) were fully vaccinated by age 12 months. The percentages of children who received BCG, the third dose of DPT, and the third dose of polio by age 12 months are only slightly lower than the percentages who received these vaccines at any time before the survey. For measles vaccination, however, which is supposed to be given when the child is nine months old, the gap is wider (84 percent at any time before the survey, compared with 68 percent by age 12 months). Twenty percent of children who were vaccinated against measles received the vaccination after their first birthday. These data indicate that the programme has to stress not only on the coverage but also on the timing of measles vaccination.

The analysis of vaccine-specific data indicates higher coverage for each type of vaccine except measles in urban areas than in rural areas. Measles coverage does not vary by urban-rural residence. Eighty-one percent of children age 12–23 months in urban areas had received all the recommended vaccinations by the time of the survey, compared with 77 percent in rural areas. The proportion fully vaccinated during the first year of life is also higher in urban areas (66 percent) than in rural areas (62 percent). Dropout rates for DPT and polio (the proportion of children receiving the first dose but not the third dose) are slightly lower in urban areas than in rural areas. Table 6.7 and Figure 6.4 present vaccination coverage rates (according to 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, Maharashtra, 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	95.5	9.7	95.8	94.0	90.6	96.9	94.9	91.3	85.3	80.8	2.1	51.5	276
Female	92.1	7.1	94.2	89.7	88.4	97.6	94.5	90.3	83.4	76.3	1.8	46.6	316
Birth order													
1	94.7	10.4	96.5	95.0	93.6	96.6	95.6	93.6	89.1	86.7	2.1	54.6	215
2	96.2	8.1	97.5	92.6	89.6	97.7	95.8	93.0	83.7	77.9	1.0	47.5	143
3	96.5	7.1	93.3	91.0	87.8	97.8	94.5	90.0	81.6	76.2	2.2	42.0	132
4+	84.2	5.7	90.0	84.3	82.3	97.1	91.2	82.6	78.5	64.3	2.9	47.5	101
Residence													
Urban	98.3	15.1	96.4	94.4	92.2	99.3	98.2	93.7	84.3	80.9	0.0	53.6	229
Rural	90.8	4.0	94.0	90.0	87.7	96.0	92.4	88.9	84.3	76.8	3.2	45.9	362
Mumbai	97.9	24.3	97.3	96.2	94.5	99.4	97.8	95.6	84.3	82.6	0.0	58.1	62
Slum	97.3	22.3	96.6	95.2	93.1	99.3	97.3	94.5	82.9	80.9	0.0	57.8	50
Non-slum	(100.0)	(32.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(89.4)	(89.4)	(0.0)	(59.4)	13
Mother's education													
Illiterate	87.0	5.1	87.6	82.0	78.7	92.9	87.7	80.9	74.6	65.2	5.1	42.9	229
Literate, < middle school complete	96.4	6.2	99.2	97.4	95.5	100.0	98.2	95.7	89.0	84.5	0.0	55.4	166
Middle school complete	100.0	11.7	99.5	97.1	97.1	100.0	100.0	97.6	85.8	83.9	0.0	42.8	70
High school complete and above	98.7	15.0	100.0	98.9	96.6	100.0	99.7	98.4	94.8	91.2	0.0	54.5	127

Contd…

Table 6.7 Childhood vaccinations by background characteristics (contd.)

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, Maharashtra, 1999

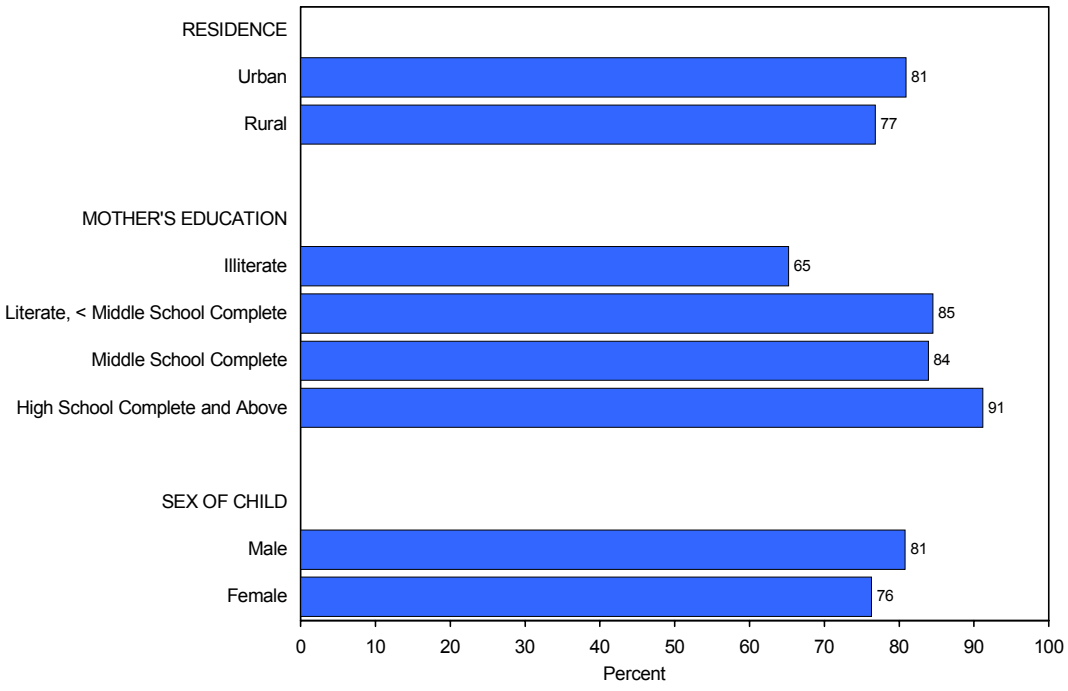
Background characteristic	Percentage vaccinated											Percentage showing vaccination card	Number of children
			DPT			Polio							
	BCG	Polio 0	1	2	3	1	2	3	Measles	All[1]	None		
Religion													
Hindu	91.9	7.7	94.6	90.8	88.8	96.7	93.9	90.1	86.5	79.7	2.6	49.3	446
Muslim	100.0	8.5	95.1	93.7	91.6	100.0	97.1	93.4	73.3	71.6	0.0	52.9	96
Buddhist/Neo-Buddhist	(95.4)	(17.4)	(95.4)	(95.4)	(91.4)	(95.4)	(95.4)	(91.4)	(79.0)	(74.5)	(0.0)	(40.9)	32
Caste/tribe													
Scheduled caste	99.2	13.1	94.2	94.2	92.2	96.4	94.2	90.5	80.2	79.8	0.0	43.5	78
Scheduled tribe	(77.0)	(5.4)	(83.3)	(76.7)	(74.6)	(87.9)	(85.7)	(76.7)	(73.2)	(62.2)	(9.6)	(39.4)	61
Other backward class	96.0	3.4	100.0	96.3	95.0	100.0	97.5	96.2	93.0	85.3	0.0	54.3	113
Other	94.6	9.4	95.4	92.2	89.5	98.2	95.4	91.5	84.2	78.5	1.7	50.5	335
Standard of living index													
Low	86.3	3.1	89.9	84.2	80.0	93.5	89.8	82.2	77.6	66.9	4.4	39.3	198
Medium	97.0	9.9	96.6	94.9	93.6	98.8	96.6	94.7	86.1	82.5	1.0	53.1	286
High	99.7	12.9	99.7	98.2	98.2	100.0	99.6	99.6	95.0	93.1	0.0	56.8	92
Total	93.7	8.3	94.9	91.7	89.4	97.2	94.7	90.8	84.3	78.4	2.0	48.9	591

Note: Table includes only surviving children from among the two most recent births in the three years preceding the survey. Total includes 5, 4, and 8 children belonging to Christian, Jain and 'other' religions, respectively, and 3 and 16 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, Maharashtra, 1999

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 49 percent of children age 12–23 months. Vaccination cards were shown for 54 percent of children in urban areas and 46 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 (81 percent) are more likely than girls (76 percent) to be fully vaccinated. Boys are also slightly more likely than girls to have received each of the individual vaccinations except the first dose of polio. Mothers showed vaccination cards for 52 percent of boys and 47 percent of girls. In NFHS-1, vaccination coverage was higher for girls than for boys and a vaccination card was shown for about an equal proportion of boys and girls. The relationship between vaccination coverage and birth order is consistently negative for all vaccinations except BCG. Eighty-seven percent of first order births are fully vaccinated, compared with 64 percent of fourth or higher order births. In Mumbai, vaccination coverage is considerably higher in non-slum areas than in slum areas, as expected.

Sixty-five percent of children of illiterate mothers are fully vaccinated, compared with 91 percent of children whose mothers have at least completed high school. Although Muslim children are more likely than Hindu children to have received each specific vaccination except measles, Hindu children are more likely than Muslim children to be fully vaccinated (80 and 72 percent, respectively). This is due to a much lower coverage of measles vaccine among Muslims than among Hindus. Children from scheduled tribes are much less likely than other children to

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, Maharashtra, 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	53.6	35.5	45.9	36.9	48.9	36.4
Percentage vaccinated by 12 months of age[1]						
BCG	94.9	90.4	89.8	91.4	91.8	91.0
Polio 0	15.1	15.9	4.0	2.2	8.3	7.7
DPT						
1	94.5	91.0	93.2	92.4	93.7	91.9
2	92.7	88.6	89.2	88.7	90.6	88.7
3	88.4	85.9	87.7	80.8	87.8	82.9
Polio						
1	96.2	93.6	95.2	94.8	95.5	94.3
2	95.6	89.0	91.6	93.7	93.1	91.7
3	88.5	85.5	88.9	85.4	88.6	85.4
Measles	69.7	67.3	66.5	74.7	67.8	71.6
All vaccinations[2]	66.0	67.3	62.0	67.7	63.5	68.7
No vaccinations	3.3	6.6	4.9	3.0	4.3	4.4
Number of children	229	220	362	329	591	549

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)

have received each vaccination. Sixty-two percent of scheduled-tribe children are fully vaccinated, compared with 79–85 percent of other children. The standard of living of the household has a strong positive relationship with vaccination coverage. Sixty-seven percent of children from households with a low standard of living are fully vaccinated, compared with 93 percent of children from households with a high standard of living.

Table 6.8 shows the percentage of children age 12–23 months and 24–35 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 table shows that there has been some improvement in vaccination coverage over a short period of time. 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.

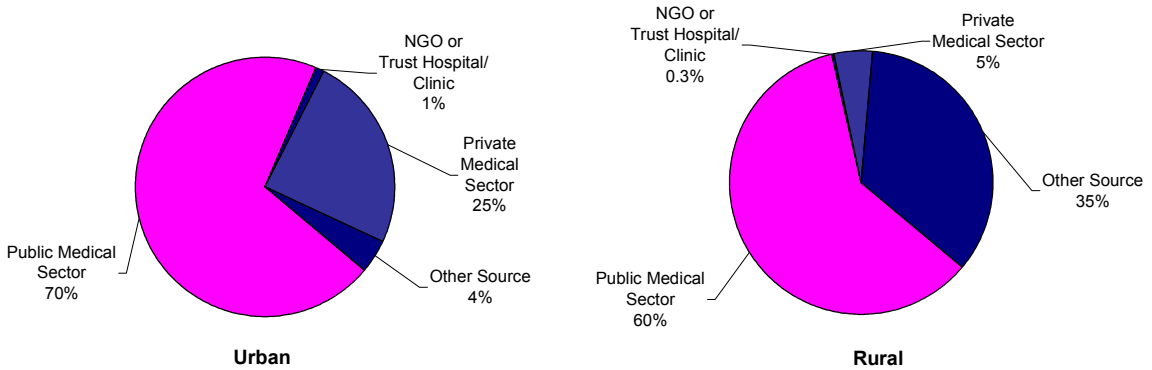
The proportion of children whose vaccination status was determined from a vaccination card declines substantially with the age of children. This may reflect an upward trend in the use

of vaccination cards as well as an upward trend in overall vaccination coverage. On the other hand, vaccination cards may have been lost or discarded, especially for older children who have received all their vaccinations. Surprisingly, the proportion of children fully vaccinated by age 12 months has declined over time, from 69 percent for children age 24–35 months to 64 percent for children age 12–23 months. This trend is mainly due to the conditions in rural areas, where the percentage of fully vaccinated children (by 12 months) has declined from 68 to 62. Again, the observed pattern is mainly due to a decline in measles vaccination coverage by age 12 months in rural areas, from 75 percent for children age 24–35 months to 67 percent for children age 12–23 months.

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 Maharashtra. Sixty-four percent of all children who have received vaccinations received most of them from a public sector source and only 13 percent received them from a private sector medical source (the corresponding percentages for India as a whole are 82 percent from the public sector and 13 percent from the private medical sector). Twenty-three percent of the children have received most of their vaccinations from 'other' sources. When the categories under 'other' were examined, it was found that most of them belonged to the 'public sector'. The percentage of vaccinated children receiving vaccinations from the private medical sector is more than five times as high in urban areas (25 percent), where private-sector services tend to be concentrated, as in rural areas (5 percent). Even in urban areas, however, 70 percent of children received their vaccinations from the public sector. In Mumbai, a much larger proportion of children from non-slum areas received their vaccinations from the private medical sector (44 percent) than children from slum areas (20 percent).

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. Muslim children are more likely than Hindu children to receive vaccinations from the private medical sector, perhaps because Muslims are disproportionately

Figure 6.5
Source of Childhood Vaccinations by Residence



Note: Percents may add to more than 100.0 due to rounding

NFHS-2, Maharashtra, 1999

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, Maharashtra, 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	61.5	0.5	15.3	22.7	100.0	513
12–23 months	66.9	0.6	10.5	21.9	100.0	580
24–35 months	64.2	0.7	12.1	23.1	100.0	539
Sex of child						
Male	65.6	0.5	12.3	21.6	100.0	859
Female	62.8	0.7	12.8	23.6	100.0	772
Birth order						
1	62.1	0.1	18.3	19.5	100.0	535
2	64.3	0.7	13.6	21.4	100.0	448
3	65.0	0.8	7.0	27.2	100.0	359
4+	67.5	1.1	7.2	24.2	100.0	289
Residence						
Urban	70.3	1.0	24.5	4.2	100.0	651
Rural	60.3	0.3	4.6	34.7	100.0	980
Mumbai	71.8	0.7	26.3	1.2	100.0	198
Slum	78.1	0.9	19.6	1.4	100.0	145
Non-slum	55.0	0.0	44.3	0.7	100.0	54
Mother's education						
Illiterate	62.5	0.5	4.8	32.2	100.0	637
Literate, < middle school complete	66.5	0.7	8.8	23.9	100.0	425
Middle school complete	66.7	0.8	14.0	18.6	100.0	234
High school complete and above	63.2	0.4	31.1	5.3	100.0	335
Religion						
Hindu	62.0	0.4	10.9	26.7	100.0	1,248
Muslim	73.6	0.1	19.5	6.8	100.0	234
Christian	(66.9)	(17.2)	(15.8)	(0.0)	100.0	23
Buddhist/Neo-Buddhist	70.1	0.0	13.1	16.8	100.0	100
Caste/tribe						
Scheduled caste	67.4	0.0	14.1	18.6	100.0	220
Scheduled tribe	65.5	0.9	5.4	28.3	100.0	173
Other backward class	68.3	0.9	8.4	22.4	100.0	333
Other	61.7	0.6	15.3	22.4	100.0	896
Standard of living index						
Low	60.3	0.3	3.7	35.7	100.0	522
Medium	69.3	0.8	10.7	19.2	100.0	782
High	59.1	0.5	32.3	8.1	100.0	277
Total	64.3	0.6	12.6	22.5	100.0	1,631

Note: Table includes only surviving children from among the two most recent births in the three years preceding the survey. Total includes 12 and 13 children belonging to Jain and 'other' religions, respectively, and 11 and 50 children with missing information on caste/tribe and the standard of living index, respectively, who are not shown separately.
NGO: Nongovernmental organization
( ) Based on 25–49 unweighted cases

concentrated in urban areas. Children from scheduled tribes and other backward classes are less likely than other children to receive vaccinations from the private medical sector.

6.5 Vitamin A Supplementation

Vitamin A deficiency is one of the most common nutritional deficiency disorders in the world, affecting more than 250 million children worldwide (Bloem et al., 1997). The National Programme on Prevention of Blindness targets children under age five years and administers oral doses of vitamin A every six months starting at age nine months. NFHS-2 asked mothers of children born during the three years before the survey whether their children ever received a dose of vitamin A. Those who said that their child had received at least one dose of vitamin A were asked how long ago the last dose of vitamin A was given. Table 6.10 shows the percentage of children age 12–35 months who received at least one dose of vitamin A and who received a dose of vitamin A within the past six months by selected background characteristics. In the state as a whole, 65 percent of children age 12–35 months received at least one dose of vitamin A, and 37 percent received a dose within the past six months. This indicates that a substantial number of children in Maharashtra have received vitamin A supplementation and more than one-third of the children receive vitamin A supplementation regularly.

Children living in rural areas, children living in non-slum areas of Mumbai, children of lower birth order, children of mothers from other backward classes, children of literate mothers, and children living in households with a medium or high standard of living are considerably more likely than other children to receive vitamin A supplementation. 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. Poorer performance in urban areas than in rural areas is not surprising given that the vitamin A supplementation programme is weak in much of urban Maharashtra, with the exception of a few municipal councils.

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 recall of when the disease episode occurred. The two-week recall period is thought to be most suitable for ensuring that there will be an adequate number of cases to analyze and that recall errors will not be too serious. Table 6.11 shows the percentage of children with cough accompanied by fast breathing (symptoms of acute respiratory infection), fever, and diarrhoea during the two weeks preceding the survey and the percentage with acute respiratory infection who were taken to a health facility or provider, by selected background characteristics.

Acute Respiratory Infection

Acute respiratory infection, 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 14 percent of children under age three in Maharashtra suffered from acute respiratory infection (cough accompanied by short, rapid

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, Maharashtra, 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	62.8	46.4	591
24–35 months	66.7	26.0	549
Sex of child			
Male	65.4	37.1	594
Female	63.9	36.0	546
Birth order			
1	68.7	40.0	381
2	64.0	37.0	310
3	62.9	32.6	246
4+	60.3	34.3	202
Residence			
Urban	60.0	32.7	449
Rural	67.7	39.1	691
Mumbai	59.7	32.1	135
Slum	56.0	32.6	97
Non-slum	69.1	30.9	38
Mother's education			
Illiterate	54.6	31.4	450
Literate, < middle school complete	71.6	38.7	304
Middle school complete	71.7	35.0	159
High school complete and above	70.5	45.1	226
Religion			
Hindu	65.7	37.5	869
Muslim	54.3	32.6	168
Buddhist/Neo-Buddhist	69.9	29.7	67
Caste/tribe			
Scheduled caste	66.4	32.2	155
Scheduled tribe	45.1	26.0	121
Other backward class	77.5	43.5	224
Other	63.5	37.2	632
Standard of living index			
Low	56.7	33.1	380
Medium	68.5	37.3	541
High	68.4	39.8	189
Total	64.7	36.6	1,140

Note: Table includes only surviving children from among the two most recent births in the three years preceding the survey. Total includes 16, 8, and 12 children belonging to Christian, Jain, and 'other' religions, respectively, and 8 and 30 children with missing information on caste/tribe and the standard of living index, respectively, who are not shown separately.

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

Percentage of children under age 3 who were ill with a cough accompanied by fast breathing (symptoms of acute respiratory infection—ARI), fever, or diarrhoea during the two weeks preceding the survey and percentage with ARI who were taken to a health facility or provider, by selected background characteristics, Maharashtra, 1999

Background characteristic	Percentage of children suffering in past two weeks from:				Number of children	Percentage with ARI taken to a health facility or provider	Number of children with ARI
	Cough accompanied by fast breathing (ARI)	Fever	Diarrhoea				
			Any diarrhoea[1]	Diarrhoea with blood			
Age of child							
1–5 months	8.7	27.5	27.4	1.1	246	*	21
6–11 months	19.9	44.6	30.1	1.4	318	81.4	63
12–23 months	14.4	39.9	27.4	2.1	591	86.9	85
24–35 months	11.0	34.9	19.5	1.7	549	86.0	60
Sex of child							
Male	14.8	38.0	24.7	1.6	897	81.7	133
Female	12.1	36.7	26.1	1.8	807	88.5	98
Birth order							
1	13.2	40.4	25.6	1.3	557	92.5	74
2	12.3	33.2	21.2	0.7	472	82.2	58
3	14.7	39.3	27.3	1.5	370	(76.4)	54
4+	14.7	36.0	28.9	4.1	305	(84.4)	45
Residence							
Urban	10.3	38.7	29.1	1.8	673	95.7	69
Rural	15.6	36.5	22.9	1.6	1,030	79.8	161
Mumbai	9.2	33.9	21.0	0.7	199	98.1	18
Slum	10.7	35.6	21.7	0.5	145	(97.8)	16
Non-slum	5.1	29.2	19.2	1.2	54	*	3
Mother's education							
Illiterate	16.4	36.7	26.4	2.2	686	74.9	113
Literate, < middle school complete	12.5	41.8	29.6	1.8	440	91.6	55
Middle school complete	13.3	35.0	24.3	1.7	241	(95.7)	32
High school complete and above	9.1	34.6	18.4	0.4	337	(95.7)	31
Religion							
Hindu	13.8	35.7	23.4	1.5	1,306	80.4	180
Muslim	9.9	43.3	35.7	3.0	244	(98.6)	24
Christian	(5.1)	(48.8)	(31.8)	(5.1)	27	*	1
Buddhist/Neo-Buddhist	17.9	44.7	23.1	0.3	102	*	18
Caste/tribe							
Scheduled caste	12.9	40.5	27.6	2.5	226	(85.9)	29
Scheduled tribe	21.8	44.5	24.7	2.7	201	(77.0)	44
Other backward class	14.2	33.0	21.3	1.7	334	(88.2)	47
Other	11.7	37.0	26.4	1.3	932	85.5	109
Standard of living index							
Low	18.5	35.7	26.8	1.7	568	77.2	105
Medium	11.9	41.1	25.8	1.8	800	89.5	95
High	7.8	30.7	21.6	1.1	283	*	22

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 and percentage with ARI who were taken to a health facility or provider, by selected background characteristics, Maharashtra, 1999

Background characteristic	Percentage of children suffering in past two weeks from:				Number of children	Percentage with ARI taken to a health facility or provider	Number of children with ARI
	Cough accompanied by fast breathing (ARI)	Fever	Diarrhoea				
			Any diarrhoea[1]	Diarrhoea with blood			
Source of drinking water							
Piped water	12.3	37.9	26.8	1.5	1,095	90.4	135
Hand pump	15.4	39.6	21.1	1.7	237	(80.9)	36
Well water	16.1	33.9	24.4	2.5	333	(73.5)	53
Purification of water[2]							
Straining by cloth	13.4	39.2	26.0	1.9	628	82.7	84
Water filter	10.6	30.1	20.9	1.9	143	*	15
Boiling	8.2	26.9	16.1	0.3	125	*	10
Nothing	14.0	39.2	26.4	1.5	838	83.2	117
Other	(22.6)	(30.6)	(32.9)	(6.4)	42	*	10
Total	13.5	37.4	25.4	1.7	1,704	84.6	231

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 a small number of children belonging to Jain and 'other' religions, children from households having surface water and 'other' source of drinking water or using alum or electronic water purifier to purify water, and children with missing information on caste/tribe and the standard of living index, who are not shown separately.
( ) Based on 25–49 unweighted cases
*Percentage not shown; based on fewer than 25 unweighted cases
[1]Includes diarrhoea with blood
[2]Number of children and number of children with ARI add to more than the respective totals because multiple methods of purification of water could be recorded.

breathing) at some time during the two-week period before the survey. Table 6.11 shows that ARI was somewhat more common among boys than girls and among children living in rural areas than urban areas. Within Mumbai, ARI was twice as prevalent in slum areas as in non-slum areas. ARI was also more prevalent among children 6–11 months of age, children of illiterate mothers, Buddhist/Neo-Buddhist children, scheduled-tribe children, and children from households with a low standard of living.

Table 6.11 also shows the percentage of children suffering from ARI symptoms in the two weeks before the survey who received advice or treatment from a health facility or provider. Eighty-five percent of children received advice or treatment from a health facility or health provider when ill with ARI. As expected, this percentage is relatively low for children in rural areas, children whose mothers are illiterate, scheduled-tribe children, and children from low standard of living households. Muslim children are more likely than Hindu children to receive medical advice or treatment when they have ARI, and, contrary to expectation, girls are somewhat more likely than boys to receive medical advice or treatment for ARI. Overall, the differentials in treatment seeking for ARI are not large by most characteristics shown in the table.

Fever

Fever is the most common of the three conditions examined in Table 6.11, with 37 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 (28 percent) than among older children (35–45 percent). Fever is less prevalent among children from non-slum areas of Mumbai, children from high standard of living households, and children from households that use boiled water or use a filter for water purification. Overall, the prevalence of fever is high across all groups of children shown in Table 6.11, indicating the widespread nature of fever affecting children irrespective of their characteristics.

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 25 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. The prevalence of diarrhoea reported in NFHS-2 also cannot be compared with that reported in NFHS-1 because the months of the year comprising the reference period for the diarrhoea estimates from the two surveys are not the same.

Among children age 1–35 months, those age 24–35 months are least susceptible to diarrhoea and those age 6–11 months are most susceptible. The prevalence of diarrhoea is relatively low among children of second birth order, children in Mumbai (especially in non-slum areas of Mumbai), children whose mothers completed at least high school, children belonging to other backward classes, and children living in households with a high standard of living. The prevalence of diarrhoea is particularly high among Muslim children. Surprisingly, the prevalence of diarrhoea is relatively high among children living in households that use piped water for drinking, but as expected, it is relatively low among children living in households that purify water by boiling or by using a water filter.

Two percent of all children age 1–35 months (7 percent of children who suffered from diarrhoea in the two weeks preceding the survey) had diarrhoea with blood, a symptom of dysentery. The prevalence of diarrhoea with blood falls with the level of education of the mother. Children of birth order four or higher, Muslim and Christian children, scheduled-tribe and scheduled-caste children, and children living in households using well water for drinking have an elevated risk of having diarrhoea with blood.

Table 6.12 shows that 65 percent of mothers with births during the three years preceding the survey know about ORS packets, up sharply from 47 percent among women who gave birth during the three years before NFHS-1, and slightly higher than the national average of 62 percent. Knowledge of ORS packets is somewhat lower among mothers age 15–19 years and among mothers age 35–49 years than among mothers in the middle age groups. Interestingly, the knowledge is somewhat higher among rural mothers than urban mothers. A higher knowledge of ORS packets in rural areas of Maharashtra than in urban areas has also been reported in other studies (Godbole and Talwalkar, 1999). Knowledge is much lower in Mumbai, especially in slum areas of Mumbai. As expected, knowledge of ORS packets is positively associated with mother's level of education. Knowledge is lower among Hindu mothers (64 percent) than among Muslim mothers (70 percent) or Christian mothers (85 percent). Knowledge of ORS packets is much lower among mothers who are not regularly exposed to any mass media (56 percent) than among mothers who are exposed to some media (70–76 percent). Mothers belonging to other backward classes are more likely to know about ORS packets (71 percent) than mothers from any other caste or tribe group (63–66 percent).

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 Maharashtra, only 18 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, 42 percent report that children should be given less to drink. This suggests that mothers in Maharashtra 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, Hindu mothers, scheduled-tribe mothers, and mothers not regularly exposed to any mass media.

To assess whether mothers are aware of one or more signs associated with diarrhoea which suggest the need for medical treatment, mothers were also asked: 'When a child is sick with diarrhoea, what signs of illness would tell you that he or she should be taken to a health facility or health worker?' All answers given by the respondent were recorded. The 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 41 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 teenage mothers than older mothers and, the percentage is lower among rural mothers than urban mothers. The percentage is also relatively low among illiterate mothers, among mothers belonging to scheduled tribes and other backward classes, and among mothers who are not regularly exposed to any mass media. However, 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

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, Maharashtra, 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	56.5	51.4	32.8	13.1	2.7	100.0	32.8	261
20–24	66.0	40.5	38.7	14.8	6.0	100.0	40.9	672
25–29	67.4	43.3	32.4	21.2	3.1	100.0	44.5	447
30–34	71.6	33.9	30.9	29.2	5.9	100.0	47.1	121
35–49	60.3	32.1	41.6	20.4	5.9	100.0	45.3	44
Residence								
Urban	61.4	36.0	34.1	26.5	3.5	100.0	47.6	601
Rural	67.4	46.4	36.2	12.0	5.3	100.0	37.1	945
Mumbai	56.5	22.9	40.5	33.8	2.8	100.0	53.0	181
Slum	54.6	25.1	41.6	30.2	3.1	100.0	52.6	131
Non-slum	61.4	17.1	37.6	43.2	2.0	100.0	54.1	50
Education								
Illiterate	60.1	47.9	36.0	10.4	5.7	100.0	37.3	627
Literate, < middle school complete	63.6	41.7	36.1	20.0	2.2	100.0	41.7	389
Middle school complete	71.1	46.1	31.7	18.3	3.9	100.0	46.5	221
High school complete and above	72.7	29.5	35.9	28.8	5.9	100.0	44.4	310
Religion								
Hindu	64.0	44.4	34.9	15.7	5.0	100.0	40.2	1,196
Muslim	69.6	37.2	39.3	21.8	1.7	100.0	40.2	211
Christian	(84.8)	(27.8)	(53.6)	(18.6)	(0.0)	100.0	(55.8)	20
Buddhist/Neo-Buddhist	67.4	36.8	25.8	31.7	5.8	100.0	48.6	92
Caste/tribe								
Scheduled caste	65.6	36.6	34.9	22.7	5.8	100.0	52.6	204
Scheduled tribe	62.7	41.5	35.2	15.0	8.2	100.0	35.5	191
Other backward class	71.2	45.9	31.6	18.1	4.5	100.0	33.1	304
Other	63.1	42.6	37.0	16.9	3.6	100.0	42.7	838
Exposure to media								
Exposed to any media	69.3	40.9	34.5	21.1	3.5	100.0	44.1	1,073
Watches television weekly	70.4	39.8	35.6	21.1	3.5	100.0	44.7	902
Listens to radio weekly	72.2	34.5	39.5	22.4	3.5	100.0	47.8	514
Visits cinema/theatre monthly	75.5	40.7	32.2	22.8	4.3	100.0	45.8	147
Reads newspaper/magazine weekly	71.9	35.7	35.1	25.8	3.5	100.0	45.8	491
Not regularly exposed to any media	55.5	45.6	37.5	9.8	7.1	100.0	34.5	473
Total	65.1	42.4	35.4	17.6	4.6	100.0	41.2	1,546

Note: Total includes 13 women each belonging to Jain and 'other' religions and 9 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

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, Maharashtra, 1999

Background characteristic	Taken to a health facility or provider	Oral rehydration					Other treatment					No treat-ment	Number of children with diarrhoea
		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		
Age of child													
1–11 months	77.3	25.4	7.9	5.0	10.6	59.0	63.9	11.6	6.1	2.5	0.0	18.3	163
12–23 months	78.7	41.9	18.3	3.1	15.7	37.6	64.6	17.5	10.9	1.6	0.0	14.7	162
24–35 months	74.8	31.8	8.2	5.6	18.4	48.8	64.3	13.5	11.1	1.3	1.6	18.5	107
Sex of child													
Male	78.3	28.8	13.2	5.3	12.9	50.7	66.9	12.9	9.3	1.2	0.8	14.0	221
Female	76.0	37.8	10.5	3.4	16.1	46.1	61.5	15.7	8.9	2.6	0.0	20.2	211
Residence													
Urban	85.0	30.5	16.5	5.3	18.5	45.4	73.6	14.0	13.5	2.0	0.0	12.0	196
Rural	70.8	35.4	8.1	3.7	11.0	51.0	56.6	14.5	5.5	1.8	0.7	21.2	236
Mumbai	86.4	23.6	11.3	8.9	23.8	48.7	83.8	12.0	3.3	0.0	0.0	8.8	42
Slum	85.3	24.6	12.8	11.9	19.6	47.2	82.8	16.0	4.4	0.0	0.0	9.5	31
Non-slum	(89.8)	(20.5)	(6.6)	(0.0)	(36.6)	(53.2)	(86.7)	(0.0)	(0.0)	(0.0)	(0.0)	(6.5)	10
Mother's education													
Illiterate	69.7	37.4	12.9	4.7	11.6	46.4	58.7	13.7	5.5	2.3	0.9	19.8	181
Literate, < middle school complete	76.6	28.5	10.6	2.4	14.1	51.9	61.9	14.3	11.7	1.0	0.0	22.0	130
Middle school complete	88.4	38.6	17.3	2.2	20.2	46.6	73.2	23.5	8.1	4.6	0.0	4.0	59
High school complete and above	89.6	25.6	6.5	9.9	18.0	49.0	76.8	7.2	15.2	0.0	0.0	10.6	62

Contd…

Table 6.13 Treatment of diarrhoea (contd.)

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, Maharashtra, 1999

Background characteristic	Taken to a health facility or provider	Oral rehydration					Other treatment					No treatment	Number of children with diarrhoea
		Oral rehydration salt (ORS) packets	Gruel	Homemade sugar-salt-water solution	Increased fluids	ORT not given	Pill or syrup	Injection	Intravenous (IV/drip/ bottle)	Home remedy/ Herbal medicine	Other		
Religion													
Hindu	74.6	34.1	12.0	4.4	14.6	48.4	62.2	14.9	6.2	2.3	0.5	17.2	306
Muslim	79.9	34.5	12.1	5.0	13.4	45.2	78.0	7.2	9.6	1.5	0.0	14.5	87
Caste/tribe													
Scheduled caste	89.2	38.7	10.6	2.1	26.8	37.2	66.3	20.8	13.1	2.2	0.0	11.2	62
Scheduled tribe	(75.7)	(50.8)	(13.3)	(8.6)	(6.5)	(37.8)	(64.6)	(8.1)	(5.6)	(2.8)	(0.0)	(17.7)	50
Other backward class	77.2	36.2	14.7	2.4	8.1	51.1	57.1	11.3	17.2	0.0	0.0	15.9	71
Other	75.3	27.7	11.2	4.8	14.3	52.7	66.5	14.9	6.6	1.6	0.7	18.3	246
Standard of living index													
Low	71.0	40.0	11.0	1.8	11.5	45.9	51.7	17.2	5.3	0.0	1.1	24.2	152
Medium	77.0	30.5	14.2	6.0	15.3	48.4	70.0	13.7	10.0	4.0	0.0	13.8	207
High	88.8	24.7	5.8	6.2	14.5	55.7	73.6	7.3	17.4	0.0	0.0	13.2	61
Total	77.2	33.2	11.9	4.4	14.4	48.5	64.3	14.3	9.1	1.9	0.4	17.0	432

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 8, 23, 3, and 4 children belonging to Christian, Buddhist/Neo-Buddhist, Jain, and 'other' religions, respectively, and 3 and 12 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

other types of treatment, by selected background characteristics. Seventy-seven percent of children in Maharashtra who suffered from diarrhoea during the two weeks preceding the survey were taken to a health facility or provider for medical advice or treatment, much higher than the national level of 63 percent and up substantially from 61 percent in NFHS-1. Seventeen percent of children with diarrhoea did not receive any treatment at all. Boys with diarrhoea were slightly more likely than girls to be taken to a health facility or provider, but the difference is quite small. The likelihood of seeking treatment is particularly high for urban children (especially for non-slum children in Mumbai), children of educated mothers, scheduled-caste children, and children living in households with a high standard of living.

Only about one-third (33 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 slightly higher than the national level of 27 percent and up from 20 percent in NFHS-1, indicating a considerable improvement in the use of ORS packets in Maharashtra for the treatment of childhood diarrhoea. Only 14 percent of children in Maharashtra received increased fluids when sick with diarrhoea, and only 12 percent received gruel. Almost half of children with diarrhoea (49 percent) did not receive any of the various types of oral rehydration therapy (ORT).

The youngest children (age 1–11 months) and children from households with high standard of living are less likely than other children to receive oral rehydration therapy. The use of oral rehydration is most common for children age 12–23 months and for scheduled-caste and scheduled-tribe children.

The use of antibiotics and other antidiarrhoeal drugs is not generally recommended for the treatment of childhood diarrhoea. Yet 64 percent of the children who had diarrhoea in the two weeks before NFHS-2 were treated with pills or syrup, and 14 percent received an injection. Nine percent were treated with intravenous fluids, which is often combined with antibiotics and other antidiarrhoeal drugs in the form of injection. These figures indicate poor knowledge about 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 among urban children (particularly children in Mumbai), children of more educated mothers, and children from households with a high standard of living.

Table 6.14 shows the percent distribution of children who were treated with ORS for diarrhoea in the two weeks before NFHS-2 by the source of the ORS packets. For 40 percent of children who were treated with ORS, the packets were obtained from public-sector medical sources, for 44 percent the packets were obtained from private-sector medical sources, and for 16 percent the packets were obtained from other sources (especially from shops). Among the public-sector medical sources, government or municipal hospitals are mentioned most often, followed by community health centres (CHCs), rural hospitals, or Primary Health Centres (PHCs). Among the private-sector medical sources, ORS packets were usually obtained from a pharmacy, followed by private hospitals or clinics and private doctors. The pharmacy or drugstore category accounts for 16 percent of all cases. If this category is added to the 'shop' category, the proportion purchasing ORS packets from shops, pharmacies, or drugstores becomes 24 percent.

Table 6.14 Source of ORS packets

Among children under age 3 who were treated with a solution made from oral rehydration salt (ORS) packets for diarrhoea in the two weeks preceding the survey, percent distribution of children by source of ORS packets, Maharashtra, 1999

Source	Percent
Public medical sector	40.3
Government/municipal hospital	17.8
CHC/rural hospital/PHC	16.4
Sub-centre	1.9
Government paramedic	2.1
Other public medical sector	2.0
Private medical sector	43.6
Private hospital/clinic	15.7
Private doctor	9.2
Private paramedic	1.3
Vaidya/*hakim*/homeopath	1.0
Pharmacy/drugstore	16.4
Other source	16.2
Shop	7.4
Other relative/friend	1.0
Other	7.8
Total percent	100.0
Number of children treated with ORS	143

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

6.7 HIV/AIDS

Acquired Immune Deficiency Syndrome (AIDS) is an illness caused by the HIV virus, which weakens the immune system and leads to death through secondary infections such as tuberculosis or pneumonia. The virus is generally transmitted through sexual contact, through the placenta of HIV-infected women to their unborn children, or through contact with contaminated needles (injections) or blood. 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. Sixty-one percent of women in Maharashtra have heard of AIDS, much higher than the national level of 40 percent. AIDS awareness in Maharashtra has increased substantially during the six years between NFHS-1 and NFHS-2, from 19 percent to 61 percent.

Knowledge of AIDS does not vary much by women's age, but there are substantial differentials for all other background characteristics. Four-fifths of women in urban areas (81 percent) have heard of AIDS, compared with only 47 percent of women in rural areas. Eighty-five percent of women in Mumbai have heard about the disease, and within Mumbai the knowledge is much higher in non-slum areas (94 percent) than in slum areas (79 percent). 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 the household standard of living. By religion, the extent of knowledge of AIDS ranges from 58 percent among Hindus to 83 percent among Christians and 95 percent among Jains. By caste/tribe, the knowledge is much lower among women from scheduled tribes (35 percent) than among women from any other caste or tribe (60–68 percent). The effect of media exposure on knowledge of AIDS is very powerful. Only 24 percent of women who are not regularly exposed to radio, television, cinema, theatre, or print media say that they have heard about AIDS, whereas at least 90 percent of women who go to the cinema/theatre monthly or read a newspaper/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 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 Maharashtra. Seventy-seven percent of women who know about AIDS received information from that source. Other important sources of information about AIDS are friends and relatives (33 percent), newspapers and magazines (23 percent), and radio (22 percent). Only 7 percent report that they received information about AIDS from a health worker.

Television is the most important source of information about AIDS in all of the groups shown in Table 6.15 except for women not regularly exposed to any media and women from low standard of living households. On the other hand, friends and relatives are an important source of AIDS information for illiterate women, scheduled-tribe women, women who live in households with a low standard of living, and women who are not regularly exposed to any media. Newspapers and magazines are an important source of AIDS information for non-slum women in Mumbai, women with high school or more education, Jain women, women from households with a high standard of living, women who go to cinema or theatre monthly, and women who read newspapers or magazines weekly.

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, Maharashtra, 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	59.6	1,453	23.4	75.5	1.2	19.8	18.5	5.5	0.0	33.4	2.4	13.5	866
25–34	62.7	2,048	21.4	77.5	3.0	23.9	16.7	7.0	0.1	31.7	1.3	13.3	1,284
35–49	60.5	1,890	22.3	76.9	3.4	24.2	15.0	6.6	0.3	33.5	0.9	14.1	1,143
Residence													
Urban	80.5	2,229	23.1	88.6	3.7	29.4	19.8	5.0	0.3	28.8	1.5	9.8	1,794
Rural	47.4	3,162	21.2	62.7	1.4	15.2	12.8	8.3	0.0	37.5	1.5	18.1	1,499
Mumbai	85.0	682	28.5	92.3	4.2	32.9	23.7	2.4	0.5	25.1	1.2	5.0	580
Slum	78.7	397	27.5	90.0	2.3	21.0	20.6	2.4	0.4	29.0	0.9	5.3	313
Non-slum	93.9	285	29.6	95.1	6.3	46.8	27.2	2.3	0.5	20.5	1.6	4.8	267
Education													
Illiterate	35.1	2,405	11.2	52.0	0.2	0.2	2.9	6.3	0.2	46.1	0.5	18.4	843
Literate, < middle school complete	70.5	1,448	19.5	76.3	1.2	11.1	15.0	4.5	0.1	35.7	0.5	13.5	1,021
Middle school complete	85.4	582	27.9	84.9	3.2	31.2	23.3	7.5	0.1	26.4	2.1	10.4	497
High school complete and above	97.5	956	32.2	95.4	6.2	52.1	27.2	8.3	0.3	20.9	3.2	11.1	932
Religion													
Hindu	58.4	4,318	23.7	73.9	2.7	23.6	16.3	6.8	0.2	34.1	1.6	14.8	2,523
Muslim	69.0	531	16.2	88.5	2.0	13.9	12.9	4.3	0.1	28.5	1.6	7.3	366
Christian	83.3	71	16.2	96.6	1.2	35.1	21.2	6.6	0.5	31.9	1.1	10.4	59
Buddhist/Neo-Buddhist	71.3	368	19.8	82.3	3.3	20.4	20.8	7.1	0.0	31.1	1.0	10.6	263
Jain	94.9	68	19.8	83.8	2.7	46.0	30.7	2.3	0.0	16.9	0.0	17.7	64
Other	(51.3)	36	*	*	*	*	*	*	*	*	*	*	18
Caste/tribe													
Scheduled caste	67.8	728	20.4	78.1	2.3	19.4	16.1	5.9	0.1	33.0	1.4	14.5	494
Scheduled tribe	35.4	552	26.9	60.2	0.2	19.1	11.3	11.7	0.7	45.8	3.7	14.8	195
Other backward class	60.4	1,162	21.1	77.3	2.3	25.4	19.5	7.5	0.0	35.3	2.2	13.6	702
Other	64.9	2,923	22.7	78.0	3.1	23.4	16.3	5.8	0.2	30.5	1.0	13.2	1,898

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, Maharashtra, 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	32.1	1,639	15.2	43.6	0.5	5.3	7.8	6.6	0.0	46.6	1.2	19.6	526
Medium	66.1	2,409	21.1	76.5	1.6	15.9	15.1	7.0	0.2	34.4	1.1	13.8	1,592
High	90.6	1,176	27.1	92.7	5.2	41.5	22.8	6.1	0.2	24.8	2.4	11.0	1,065
Exposure to mass media													
Exposed to any media	76.6	3,796	24.5	83.7	3.0	25.6	17.5	6.4	0.2	29.0	1.6	12.3	2,907
Listens to radio weekly	80.3	1,947	40.3	82.9	3.9	29.5	17.8	6.7	0.2	28.7	1.9	13.8	1,562
Watches television weekly	80.3	3,332	23.6	88.2	3.2	26.4	18.1	6.3	0.2	27.9	1.8	11.4	2,674
Goes to cinema/theatre monthly	90.7	447	32.9	93.1	8.5	45.4	25.1	7.9	0.3	28.5	3.6	8.6	405
Reads newspaper/magazine weekly	90.2	1,736	31.1	92.3	5.2	43.9	24.0	6.8	0.2	24.1	2.3	10.9	1,565
Not regularly exposed to any media	24.2	1,595	5.0	24.6	0.1	3.3	10.3	7.4	0.1	61.0	0.5	23.5	386
Total	61.1	5,391	22.2	76.8	2.7	23.0	16.6	6.5	0.2	32.8	1.5	13.6	3,293

Note: Total includes a small number of women with missing information on caste/tribe and the standard of living index, who are not shown separately.
( ) Based on 25–49 unweighted cases
*Percentage not shown; based on fewer than 25 unweighted cases

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, 33 percent do not know any way to avoid infection, the same as for India as a whole. The percentage is much higher among rural women (43 percent) than among urban women (26 percent). Within Mumbai, slum women are less likely to know of any way to avoid infection than non-slum women. The proportion knowing no way to avoid infection decreases sharply with education and household living standard. Fifty-nine percent of illiterate women know of no way to avoid AIDS, compared with only 10 percent of women with high school or more education. This proportion is 59 percent for women from low standard of living households and 17 percent for women from high standard of living households. The proportion is considerably higher for scheduled-tribe women (43 percent) than for other women (32–34 percent). Only 33 percent of women who are not regularly exposed to radio, television, cinema, theatre, or print media say that they know of a way to avoid AIDS, whereas 83–84 percent of women who go to the cinema/theatre monthly or read a newspaper/magazine weekly know of at least one way of avoiding AIDS.

Among women who report that something can be done to prevent AIDS, the most commonly mentioned ways of avoiding AIDS are having only one sex partner (38 percent) and avoiding sex with commercial sex workers (33 percent). Substantial proportions of respondents also mention avoiding injections or using clean needles (27 percent) and using condoms (20 percent). Eleven percent of women mention avoiding blood transfusions, but only 2 percent each mention abstaining from sex or avoiding sex with homosexuals and less than 1 percent mention avoiding intravenous drug use. The percentage reporting each specific way of avoiding AIDS is much lower among rural than among urban women and women not regularly exposed to mass media than other women. The level of education and the household standard of living are strongly positively associated with women mentioning almost every way of avoiding AIDS. Women in Mumbai are much more likely than in other parts of the state to mention avoiding sex with commercial sex workers and avoiding injections or using clean needles as ways to prevent AIDS. Within Mumbai, non-slum women are much more likely than slum women to mention using condoms, having only one sex partner, avoiding blood transfusions, and avoiding injections or using clean needles, but slum and non-slum women are about equally likely to mention avoiding sex with commercial sex workers as a way of avoiding AIDS. The use of condoms is mentioned most often by non-slum women in Mumbai, women with high school or more education, women from households with a high standard of living, and women who are regularly exposed to cinema/theatre or print media. On the other hand, illiterate women, women from low standard of living households, and women not regularly exposed to any mass media are least likely to mention using condoms as a way of avoiding AIDS.

The lack of knowledge of AIDS, its modes of transmission, and ways to avoid infection among women in Maharashtra is a major challenge to efforts to avoid the spread of AIDS. Thirty-nine percent of ever-married women in their childbearing years have never heard of AIDS, and almost one-third of those who have heard of AIDS do not know even one way to

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, Maharashtra, 1999

Background characteristic	Percentage who believe AIDS can be avoided by:									Knows no way to avoid AIDS	Number of women
	Abstaining from sex	Using condoms	Having only one sex partner	Avoiding sex with commercial sex workers	Avoiding sex with homo-sexuals	Avoiding blood transfusions	Avoiding injections/ using clean needles	Avoiding IV drug use	Other ways		
Age											
15–24	1.3	22.6	36.4	32.3	1.7	7.9	23.6	0.4	6.0	36.0	866
25–34	2.9	21.8	38.1	37.3	1.6	11.3	29.2	0.9	6.6	30.4	1,284
35–49	2.2	16.3	37.9	29.5	2.0	12.8	27.9	0.9	7.8	34.5	1,143
Residence											
Urban	3.3	23.9	41.4	37.9	2.7	14.3	33.9	1.1	8.7	25.6	1,794
Rural	0.9	15.5	33.1	27.8	0.7	6.9	19.3	0.4	4.7	42.5	1,499
Mumbai	2.1	26.1	38.7	50.1	1.3	15.6	44.2	0.7	11.3	20.3	580
Slum	1.9	17.1	33.9	49.5	1.6	10.7	40.0	0.8	11.5	25.6	313
Non-slum	2.5	36.7	44.3	50.9	0.9	21.3	49.2	0.5	11.0	14.1	267
Education											
Illiterate	0.8	4.6	24.4	20.8	0.6	1.5	7.7	0.2	4.0	58.7	843
Literate, < middle school complete	2.0	11.3	34.3	31.3	1.2	7.5	20.3	0.3	6.8	39.4	1,021
Middle school complete	1.8	24.6	45.8	38.7	2.0	11.6	33.9	1.6	6.6	21.2	497
High school complete and above	4.0	41.3	48.8	43.8	3.3	22.9	49.1	1.4	9.6	10.2	932
Religion											
Hindu	2.1	20.2	37.8	31.4	1.5	10.3	25.5	0.7	6.5	34.5	2,523
Muslim	2.5	14.8	37.6	42.3	1.2	10.7	30.6	0.9	7.8	30.3	366
Christian	1.8	19.3	26.0	51.3	6.2	18.2	43.1	2.2	6.8	28.1	59
Buddhist/Neo-Buddhist	2.0	22.8	36.5	37.7	3.5	13.5	33.1	1.5	8.8	30.7	263
Jain	7.1	32.9	46.5	29.4	3.1	17.6	39.2	0.0	8.4	18.4	64
Caste/tribe											
Scheduled caste	2.2	18.1	38.8	32.7	2.8	11.2	27.9	0.8	6.4	33.0	494
Scheduled tribe	1.5	20.9	28.7	26.7	2.1	8.8	21.7	0.7	8.8	42.7	195
Other backward class	1.5	21.2	36.9	29.1	2.1	11.2	26.2	0.9	5.8	34.1	702
Other	2.6	20.1	38.5	35.7	1.3	11.0	28.0	0.7	7.2	32.2	1,898

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, Maharashtra, 1999

Background characteristic	Percentage who believe AIDS can be avoided by:									Knows no way to avoid AIDS	Number of women
	Abstaining from sex	Using condoms	Having only one sex partner	Avoiding sex with commercial sex workers	Avoiding sex with homo-sexuals	Avoiding blood transfusions	Avoiding injections/ using clean needles	Avoiding IV drug use	Other ways		
Standard of living index											
Low	0.1	6.0	24.1	20.8	0.5	2.1	6.6	0.0	3.6	58.9	526
Medium	2.4	16.4	34.8	32.5	1.3	7.7	23.7	0.3	5.8	36.8	1,592
High	2.8	32.4	47.9	40.3	3.2	19.8	43.2	1.9	10.1	16.5	1,065
Exposure to mass media											
Exposed to any media	2.5	22.3	39.9	35.9	2.0	12.2	30.4	0.8	7.5	28.8	2,907
Listens to radio weekly	2.1	25.2	41.8	36.1	2.5	14.5	34.2	1.0	8.4	26.4	1,562
Watches television weekly	2.5	23.2	40.5	36.7	2.1	13.0	31.7	0.9	7.7	27.3	2,674
Goes to cinema/theatre monthly	3.1	40.8	44.3	36.0	5.8	18.3	38.1	2.1	9.9	16.8	405
Reads newspaper/magazine weekly	3.3	32.6	47.3	41.0	3.3	18.2	42.1	1.4	8.7	16.0	1,565
Not regularly exposed to any media	0.6	3.6	20.5	13.4	0.1	1.3	3.6	0.3	2.0	67.1	386
Total	2.2	20.1	37.6	33.3	1.8	10.9	27.3	0.8	6.9	33.3	3,293

Note: Total includes 18 women belonging to other religions and 4 and 10 women with missing information on caste/tribe and the standard of living index, respectively, who are not shown separately.

avoid infection. It is clear that AIDS prevention organizations need to strengthen the educational components of their programmes, in addition to trying to reduce high-risk behaviour, since even basic information about AIDS is seriously deficient among women in Maharashtra.

6.8 Lead Levels Among Children

Lead is a toxicant that affects virtually every system in the body (Centers for Disease Control and Prevention, 1991). It is particularly harmful to the developing brain and the central nervous system of young children. High levels of lead in the blood (≥80.0 micrograms/decilitre) can cause severe brain damage or death. Even relatively low blood lead levels (as low as 10.0 µg/dL) decrease intelligence and the ability to learn. Lead poisoning also contributes to anaemia, decreases growth, and causes hearing impairment.

Childhood lead poisoning is thought to be widespread in India. Although few studies have been conducted, previous research indicates that more than half of young children in India may have blood lead levels ≥10.0 µg/dL (George Foundation, 1999; Patel et al., 2001; Kaul, 1999). Blood lead levels above 10.0 µg/dL indicate a potentially serious medical condition. Recognizing the threat that widespread lead exposure poses for the nation's physical and economic health, the Government of India has made a commitment to phase out the use of leaded petrol throughout the country. The use of unleaded and low-leaded petrol was made mandatory throughout India on 1 April 2000. Ahead of this scheduled move by the central government, the sale of leaded petrol was banned in Mumbai from 1 October 1999. As a result, Mumbai became the second metropolis in India, after Delhi, that took steps to control the harmful effects of the use of unleaded petrol.

Many other lead exposure sources besides petrol are also common in India, including uncontrolled industrial emissions, cottage industries (e.g., battery recycling, papier mache-making, and jewellery-making), traditional medicines that include heavy metals, cosmetics used by women and children, lead-based paints, and home flour mills with leaded grinding wheels (Tandon, 1999; Shah et al., 1991; Dunbadin et al., 1992; Gogte et al., 1991; Kachru et al., 1989; Wahid et al., 1997; Patel et al., 2001).

In Delhi and Mumbai, NFHS-2 included an additional blood test for lead in the blood, administered to children under three years of age. The test was done in the field, using approximately 2–3 drops of capillary blood (50 µl) taken just after a single drop of blood was taken for the anaemia test, using the same finger prick or heel prick. Before any blood was taken, an expanded informed consent statement was read to the child's mother requesting her consent for the child to receive both the anaemia test and the lead test. If she agreed to the lead test, the child's hands were first washed thoroughly with soap and water before the blood was taken. The blood for the lead test was mixed with a treatment reagent. In this test, the blood and reagent mixture is then transferred to a sensor using a pipette and the sensor is introduced into a LeadCare analyzer. In three minutes, the test results are displayed digitally by the analyzer. The mothers were given the results of the test in the field right after the test was completed and the results were explained to them in simple terms. Arrangements were made to provide free medical treatment for any child with a lead level of at least 45 µg/dL, but that level of lead poisoning was not detected in any child in Mumbai.

To ensure that the LeadCare analyzer performed well under Indian conditions, a validation study of the LeadCare analyzer was carried out by the All India Institute of Medical Sciences, New Delhi, and the Industrial Toxicology Research Centre, Lucknow before NFHS-2 lead testing was undertaken. Blood samples were collected from 79 subjects and each sample was analyzed under controlled conditions in the laboratory first using the established technique of Graphite Furnace Atomic Absorption Spectrophotometry (GFAAS) and then using the LeadCare instrument. The validation study concluded that the LeadCare Analyzer can be utilized for estimation of lead levels in the field in India (All India Institute of Medical Sciences, 1999).

NFHS-2 is the first survey to provide information on blood lead levels that is representative of the population of young children living in Mumbai and Delhi. The estimates of lead levels in the blood of children under three years of age are shown in Table 6.17.

Overall, 50 percent of the children under age 3 in Mumbai have elevated lead levels in the blood (≥10.0 µg/dL), including 8 percent who have lead levels of 20.0–44.9 µg/dL.[4] The proportion of children with elevated lead levels (≥10.0 µg/dL) varies by background characteristics. Older children (12–35 months) are much more likely than younger children (age less than 12 months) to have elevated lead levels in their blood. This may reflect the cumulative effects of exposure to lead over time, as well as the fact that younger children are less likely to be exposed to lead outside of the home. Currently breastfeeding children are also less likely to have elevated lead levels (45 percent) than children who were breastfed only in the past (59 percent), perhaps at least in part because currently breastfeeding children are likely to be younger. The finding that blood lead levels are higher among children of fourth or higher birth orders than among children of lower birth orders may reflect the fact that children of fourth or higher birth orders come disproportionately from poorer families that tend to live in more polluted environments. In keeping with this, the proportion of children with elevated lead levels in the blood is considerably higher among children from households with a medium standard of living (53 percent) than among children from households with a high standard of living (41 percent). Similarly, the proportion of children with elevated lead levels is slightly higher among households in slum areas of Mumbai (51 percent) than among households in non-slum areas of Mumbai (48 percent). The lead levels also vary among children coming from different household conditions in terms of the type of kitchenware and cooking fuel used. Use of aluminium kitchenware and use of kerosene as the main type of cooking fuel are both associated with higher proportions of children with elevated lead levels in the blood (58 percent and 54 percent, respectively) than are found in children from households using stainless steel kitchenware and liquid petroleum gas as the main cooking fuel (49 percent and 45 percent, respectively).

The proportion of children with elevated lead levels in the blood is lowest among children who are not anemic (37 percent) and it increases with the severity of anaemia, from 50 percent among mildly anaemic children to 59 percent among moderately anaemic children. About half of the children born to illiterate mothers or to mothers with less than a middle school education are found to have elevated lead levels in the blood. The proportion of children with high lead levels in the blood is lower (44 percent) among children of mothers who have completed at least a high school education. There are no differentials by the sex of the child. Muslim children and children not belonging to scheduled castes, scheduled tribes, or other

[4]By way of comparison, a slightly lower percentage of children in Delhi have lead levels of 10.0 µg/dL or higher (45 percent), but a slightly higher percentage (10 percent) have a level of 20 µg/dL or higher, including 0.2 percent having a level of 45 µg/dL or higher.

Table 6.17 Lead levels among children

Percent distribution of children under three years of age by lead level in the blood, according to background characteristics, Mumbai, Maharashtra, 1999

Background characteristic	Percent of children with specific levels of lead in their blood			Total percent	Number of children
	Less than 10.0 µg/dL	10.0–19.9 µg/dL	20.0–44.9 µg/dL		
Age of child					
< 12 months	70.1	25.5	4.3	100.0	48
12–23 months	39.1	52.8	8.0	100.0	51
24–35 months	43.1	46.7	10.1	100.0	58
Sex of child					
Male	50.5	41.2	8.3	100.0	82
Female	49.6	43.4	7.0	100.0	75
Birth order					
1	48.5	41.1	10.4	100.0	57
2–3	53.0	42.5	4.5	100.0	78
4–5	39.7	48.5	11.9	100.0	17
Mumbai					
Slum	49.3	42.9	7.7	100.0	119
Non-slum	52.2	40.2	7.5	100.0	39
Mother's education					
Illiterate	49.3	39.5	11.2	100.0	43
Literate, < middle school complete	50.3	44.6	5.1	100.0	40
Middle school complete	41.1	50.4	8.5	100.0	28
High school complete and above	55.9	37.9	6.2	100.0	47
Religion					
Hindu	50.1	42.0	7.9	100.0	92
Muslim	53.7	37.9	8.4	100.0	50
Caste/tribe					
Scheduled caste	44.9	47.8	7.3	100.0	18
Other backward class	46.9	46.2	6.9	100.0	22
Other[1]	51.0	41.4	7.6	100.0	114
Standard of living index					
Medium	46.7	45.7	7.6	100.0	95
High	59.2	35.8	4.9	100.0	44
Child's anaemia status					
Not anaemic	63.5	33.2	3.2	100.0	43
Mildly anaemic	50.2	44.7	5.0	100.0	42
Moderately anaemic	41.3	46.5	12.2	100.0	68
Main type of cooking utensils					
Aluminium	42.0	50.4	7.6	100.0	23
Stainless steel	51.4	40.9	7.7	100.0	135
Main type of cooking fuel					
Kerosene	46.1	47.0	6.9	100.0	89
Liquid petroleum gas	55.0	36.1	8.8	100.0	67
Breastfeeding status					
Currently breastfeeding	54.8	37.7	7.5	100.0	96
Breastfed only in the past	41.4	50.8	7.8	100.0	59
Total	50.0	42.3	7.7	100.0	158

Note: Total includes 6 children of birth order 6 or above, 5 Christian children, 8 Buddhist/Neo-Buddhist children, 1 Jain child, 1 child belonging to an 'other' religion, 5 scheduled-tribe children, 5 children from households with a low standard of living index, 4 children who are severely anaemic, 1 child belonging to a household using charcoal as the main type of cooking fuel, 2 children who have never been breastfed, and 14 children with missing information on the standard of living index, who are not shown separately.

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

backward classes are somewhat less likely than other children to have elevated blood levels. Despite these differentials, the high prevalence of elevated lead levels in almost all subgroups of young children clearly indicates that lead in the environment, especially in the poorer areas of Mumbai, is a serious public health problem requiring government attention.