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 awareness and prevention of AIDS. This type of information is relevant both to an assessment of the demographic situation and to the design of appropriate health policies and programmes. Mortality estimates are also useful for projecting the future size of the population. Detailed information on mortality and morbidity by demographic and socioeconomic characteristics can be used to identify population groups that are at high risk and in need of health services. This chapter primarily presents information on child health, while other chapters of this report, particularly Chapter 8, present information on maternal and reproductive health.

The Government of India has repeatedly taken steps to strengthen maternal and child health services in India, first 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, maternal and child health have been enhanced by activities of the Family Welfare Programme and by the introduction of the Child Survival and Safe Motherhood Programme (Ministry of Health and Family Welfare, 1992). The Ministry of Health and Family Welfare has also sponsored special projects under the Maternal and Child Health Programme, including the Oral Rehydration Therapy (ORT) programme, the establishment of Regional Institutes of Maternal and Child Health in states where infant mortality rates are high, the Universal Immunization Programme, and the Maternal and Child Health Supplemental Programme within the Postpartum Programme (Ministry of Health and Family Welfare, 1992). These programmes are now integrated into the Reproductive and Child Health Programme launched in 1996.

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

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

The information on child health and health-care practices was collected from mothers for children born since 1 January 1995. If a woman had more than two live births during the three years preceding the survey, 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 Orissa 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 in question on the basis of the intercensal population growth rate in the state. The intercensal growth rate is assumed to be the same for all 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 understatement of deaths. The Sample Registration System (SRS), maintained by the Office of the Registrar General of India, provides the most useful comparison. The most recent report on mortality estimates by age for Orissa is for 1997 (Office of the Registrar General, 1999a).

Table 6.1 shows an estimated average annual CDR for Orissa of 12.9 deaths per 1,000 population based on NFHS-2 data (covering roughly 1997–98), compared with 10.9 from the 1997 SRS. Contrary to expectations, the CDR estimated from NFHS-2 is higher than the corresponding SRS estimate. The NFHS-2 age-specific death rates are much higher than the SRS rates at age 60 and above and much lower at age 50–59 and below age 5.

The NFHS-2 CDR estimate of 12.9 is higher than the corresponding NFHS-1 estimate of 11.0 (covering roughly 1991–92). In the SRS, on the other hand, the CDR for Orissa declined from 12.8 in 1991 to 10.9 in 1997. In the two NFHS surveys, age-specific death rates for each of the broad age groups except below age 5 are also higher in NFHS-2 than in NFHS-1, especially at the older ages. This comparison suggests an increase in death rates among the older age groups and a decrease in death rates for children under age 5 in Orissa since 1991–92 if the completeness of reporting of deaths is the same in the two surveys. It is possible that differences in the pattern of age misreporting between the two surveys could account, at least in part, for the unexpected age pattern of mortality change between the two surveys.

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 Orissa, the male CDR is lower than the female CDR according to NFHS-2, but the two rates are virtually identical according to the SRS. The age-specific death rates in NFHS-2 are higher for males than for females at age 0–4 and 50–59 and lower for males than for females at 5–14, 15–49, and 60+.

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, Orissa

	NFHS-1 (1991–92)	NFHS-2 (1997–98)			SRS (1997)		
Age	Total	Male	Female	Total	Male	Female	Total
< 5	27.3	23.8	20.3	22.1	28.0	28.2	28.1
5–14	2.1	1.7	2.8	2.3	1.5	2.0	1.7
15–49	3.5	3.2	5.8	4.5	4.6	3.7	4.1
50–59	9.0	14.0	9.9	11.9	16.6	16.8	16.6
60+	59.1	71.8	80.6	75.9	59.9	55.0	57.0
CDR	11.0	12.3	13.5	12.9	11.0	10.7	10.9

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 SRS, on the other hand, shows very little difference in mortality between males and females at any age.

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, information on sex of child, month and year of birth, survival status at the time of the survey, and age at the time of the survey or, if dead, age at death. Age at death was recorded in days for children dying in the first month of life, in months for children dying before their second birthday, and in years for children dying at later ages. This information was used to calculate the following direct estimates of infant and child mortality[1]:

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

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

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

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

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

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

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

Assessment of Data Quality

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

Results from Table B.5 (Appendix B) suggest that early infant deaths have not been seriously underreported in the NFHS-2 in Orissa, inasmuch as the ratios of deaths under seven days to all neonatal deaths are consistently high (between 61 and 72 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 62 and 65 percent) for the different time periods preceding the survey.

Another problem inherent in most retrospective surveys is heaping of reported ages at death on certain values, e.g., 6, 12, and 18 months. If the net result of 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 or older. Thus, heaping at 12 months can bias the age-specific mortality estimates because a certain fraction of these deaths may have actually occurred during infancy (i.e., at ages 0–11 months). In such cases, heaping would bias infant mortality ($_1q_0$) downward and child mortality ($_4q_1$) upward.

In the Orissa NFHS-2, there appears to be a slight preference for reporting age at death at 3, 7, and 8 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 slight heaping of deaths at 3, 6, 12, 15, and 18 months of age. The amount of heaping on 12 months is relatively minor, probably due to the strong emphasis on this problem during the training of interviewers for the NFHS-2[2]. This brief assessment of the internal consistency of NFHS-2 childhood mortality data for Orissa suggests that, although there may be some heaping

[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'.

of ages at death at certain ages, the amount of heaping is relatively small, so that any resulting bias in infant and child mortality rates is insubstantial.

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 progressively truncated (censored) further back in time, because women currently age 50 or above who were bearing children during earlier periods were not included in the survey. This truncation affects mortality trends, in particular. For example, for the period 10–14 years before the survey, the rates do not include any births to women age 40–49, because these women were over age 50 at the time of the survey and not eligible to be interviewed. Because 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, because fewer older women are excluded. The extent of this bias depends on the proportion of births omitted. Table 4.18 (Chapter 4) shows that very few of the children born in the three years before the survey were born to women age 35 and above. Given the small proportion of births excluded, selection bias for infant and child mortality estimates 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 Orissa declined from 96 deaths per 1,000 live births during 1984–88 (10–14 years before the survey) to 81 deaths per 1,000 live births during 1994–98 (0–4 years before the survey), an average rate of decline of one and one-half 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 with the infant mortality rate 0–4 years before NFHS-1 (112 deaths per 1,000 live births) suggests a much faster decline averaging more than 5 deaths per 1,000 live births annually over the six years between the two surveys.

All other measures of infant and child mortality presented in Table 6.2 have also declined, based on comparison of estimates 10–14 years preceding NFHS-2 with estimates 0–4 years preceding NFHS-2. However, all measures except postneonatal mortality are higher 5–9 years preceding the survey than 10–14 years preceding the survey, possibly suggesting a rise in mortality before the decline. Comparing NFHS-1 to NFHS-2, all measures except child mortality (age 1–4) declined between the two surveys, and the comparison for infant mortality suggests a more rapid decline than reflected by NFHS-2 alone, as already mentioned.

Despite the overall decline in infant and child mortality, approximately 1 in every 12 children born in Orissa during the five years before NFHS-2 died within the first year of life, and more than 1 in every 10 children died before reaching age five. Clearly, child survival programmes in Orissa need to be intensified to achieve further reductions in infant and child mortality.

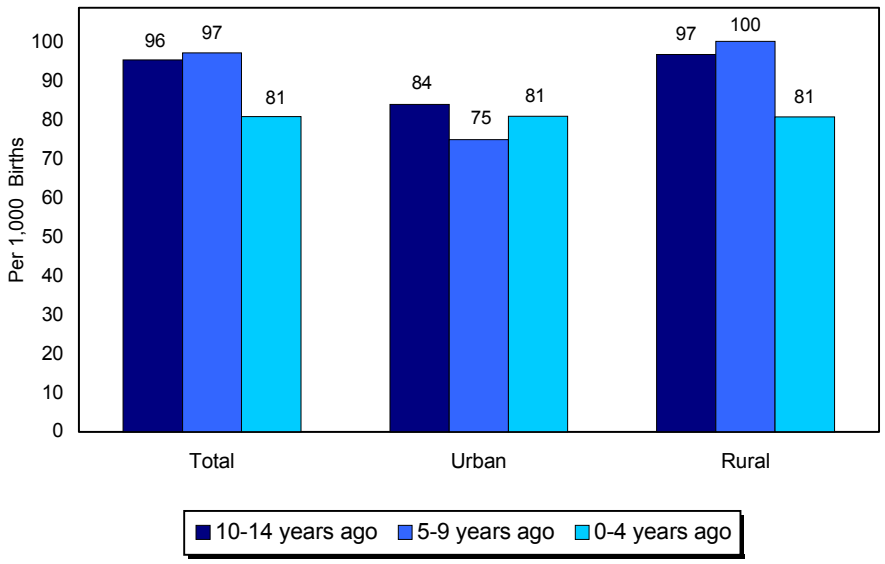
Table 6.2 Infant and child mortality

Neonatal, postneonatal, infant, child, and under-five mortality rates for five-year periods preceding the survey by residence, Orissa, 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	(49.3)	(31.9)	(81.1)	(22.7)	(102.0)
5–9	61.0	14.1	75.1	24.4	97.7
10–14	50.7	33.3	84.1	(28.9)	110.6
			RURAL		
0–4	48.6	32.4	80.9	25.9	104.8
5–9	62.4	37.9	100.3	33.2	130.1
10–14	61.4	35.5	97.0	30.7	124.7
			TOTAL		
0–4	48.6	32.3	81.0	25.5	104.4
5–9	62.2	35.2	97.4	32.2	126.5
10–14	60.3	35.3	95.5	30.5	123.1

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.
( ) 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

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



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

NFHS-2, Orissa, 1999

Urban and rural areas of Orissa differ little in infant and child mortality rates—in fact, in any of the five mortality measures of Table 6.2—during the five years preceding NFHS-2. Infant mortality in rural areas declined from 97 deaths per 1,000 live births during 1984–88 to 81 deaths per 1,000 live births during 1994–98. Neonatal mortality declined by 21 percent and postneonatal mortality declined by 9 percent over the same period. By contrast, neither neonatal nor postneonatal mortality declined much in urban areas over this period. In urban areas neonatal mortality is considerably higher and postneonatal mortality is considerably lower during the period 5–9 years preceding NFHS-2 than during the other two periods. Between 1984-88 and 1994–98 child mortality declined 21 percent in urban areas and 16 percent in rural areas.

A comparison of NFHS-2 measures with corresponding measures from NFHS-1 for the respective periods 0–4 years preceding the surveys shows a decline in all rural and urban indicators of infant and child mortality, except for urban neonatal mortality and rural child mortality.

The estimated NFHS-2 infant mortality rate of 81 deaths per 1,000 live births during 1994–98 is somewhat higher than the SRS value of 72 deaths per 1,000 live births for 1995-97. Likewise, the NFHS-2 estimate of the infant mortality rate for rural areas during 1994–98 (81 deaths per 1,000 live births) is somewhat higher than the SRS estimate for 1995-97 (78 deaths per 1,000 live births). However, the NFHS-2 estimate for urban areas (81 deaths per 1,000 live births) is considerably higher than the average SRS estimate for urban areas (46 deaths per 1,000 live births), and the difference is statistically significant (the lower and upper 95 percent confidence limits for the NFHS-2 estimate are 48 and 114, respectively (Appendix Table A.2)).

Socioeconomic Differentials in Infant and Child Mortality

The probability of dying in early childhood is higher in some population groups than in others. Table 6.3 presents differentials in infant and child mortality rates for the 10-year period preceding the survey by selected background characteristics. The infant mortality rate is one-sixth higher in rural areas than in urban areas, and the child mortality rate is one-fourth higher in rural areas than in urban areas. Children in rural areas of Orissa experience an 18 percent higher probability of dying before their fifth birthday than do urban children. A comparison of the urban and rural measures of Table 6.3 with those of Table 6.2 for 0–4 years preceding the survey suggests that, whereas mortality in rural areas declined during the 10 years preceding NFHS-2 by all five measures, only neonatal mortality declined comparably in urban areas. But that has been counteracted by an increase in postneonatal mortality, so that infant mortality increased in urban areas during the 10 years preceding the survey. Of course, Table 6.2 shows this even more directly.

Infant mortality declines very sharply with increasing education of mothers, as expected, ranging from a high of 104 deaths per 1,000 live births for illiterate mothers to a low of 22 deaths per 1,000 live births for mothers who have at least completed high school. In fact, all mortality indicators shown in the table decline sharply as mother's education increases.

Children of women belonging to scheduled tribes and other backward classes have higher rates of infant mortality than children of women belonging to scheduled castes or children of women not in any backward class. The higher infant mortality for children of women belonging to other backward classes is due to their considerably higher neonatal mortality compared with that of other children. Child mortality, however, is highest among children born to scheduled-

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, Orissa, 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	55.6	22.3	77.9	23.6	99.7
Rural	55.7	35.2	90.9	29.4	117.7
Mother's education					
Illiterate	62.4	41.7	104.1	37.1	137.3
Literate, < middle school complete	55.4	23.2	78.6	17.8	95.0
Middle school complete	(34.4)	(14.8)	(49.2)	(10.1)	(58.8)
High school complete and above	(10.2)	(11.5)	(21.7)	(0.0)	(21.7)
Caste/tribe					
Scheduled caste	48.9	35.0	83.9	42.4	122.7
Scheduled tribe	56.1	42.6	98.7	44.0	138.4
Other backward class	71.0	24.7	95.6	20.1	113.8
Other	43.1	36.0	79.1	15.0	92.9
Standard of living index					
Low	59.0	42.2	101.1	40.9	137.9
Medium	59.5	24.0	83.5	14.4	96.7
High	18.9	13.9	32.8	1.4	34.1
Total	55.7	33.8	89.5	28.8	115.7

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

caste and scheduled-tribe women. As expected, all indicators of infant and child mortality decline substantially with increase in household standard of living, except that there is no difference in neonatal mortality between children in households with a low standard of living and children in households with a medium standard of living. Infant mortality is more than three times higher for children in households with a low standard of living than for children 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 both the child and the mother. Table 6.4 and Figure 6.2 present various indicators of infant and child mortality for the 10 years preceding the survey by sex of the child, mother's age at childbirth, birth order, length of the previous birth interval, and medical care received by the mother during pregnancy, delivery and the early postpartum period.

Table 6.4 shows that the infant mortality rate during the 10-year period before the survey is higher for boys (95 deaths per 1,000 live births) than for girls (84 deaths per 1,000 live births). This is the result of considerably higher neonatal mortality for boys (65 deaths per 1,000 live births) than for girls (46 deaths per 1,000 live births) which more than counteracts the higher postneonatal mortality for girls (38 deaths per 1,000 live births) than for boys (30 deaths per 1,000 live births). Higher male mortality during the first month of life is expected because neonatal mortality (which reflects largely congenital conditions) tends to be higher for boys than girls in most populations. Also, child mortality is slightly higher for boys (30 deaths per 1,000

Table 6.4 Infant and child mortality by demographic characteristics

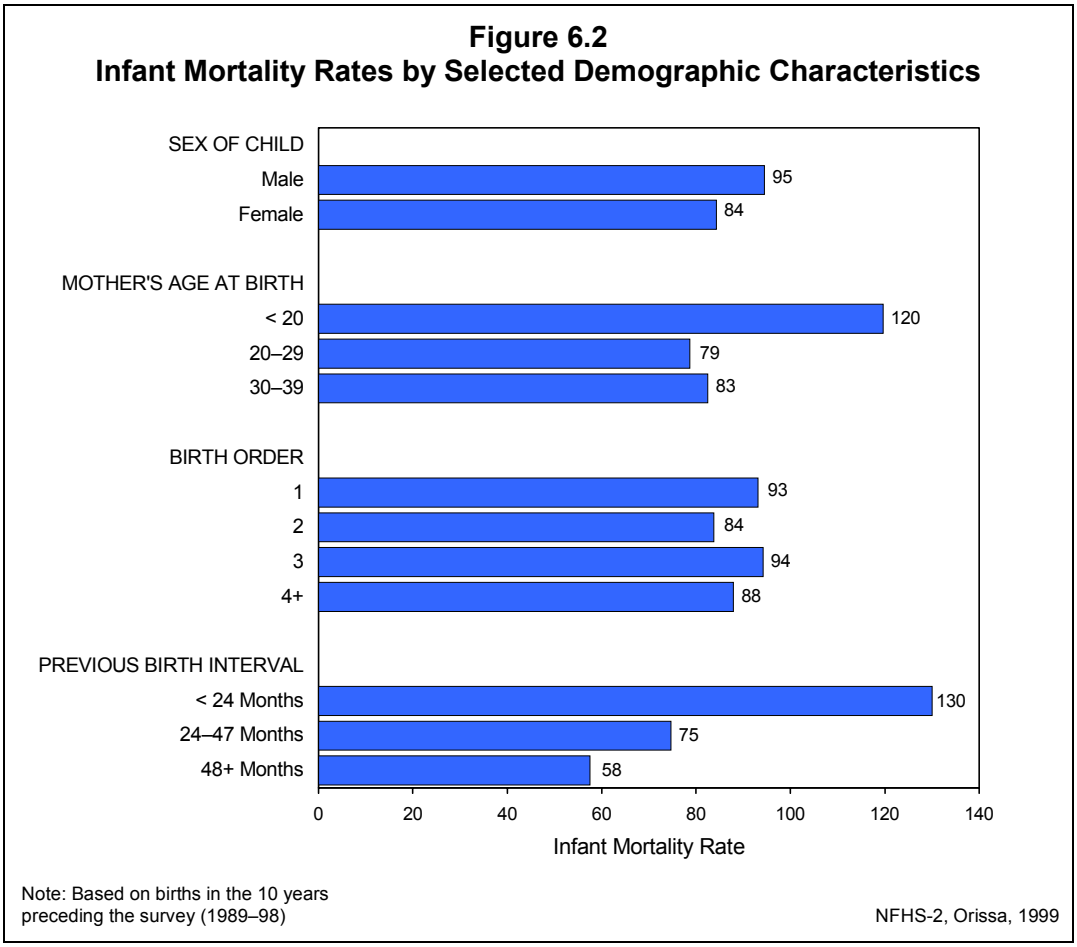
Neonatal, postneonatal, infant, child, and under-five mortality rates for the 10-year period preceding the survey by selected demographic characteristics, Orissa, 1999

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	64.6	29.9	94.5	29.6	121.3
Female	46.4	37.8	84.3	27.9	109.9
Mother's age at birth					
< 20	80.1	39.5	119.6	33.1	148.7
20–29	46.3	32.4	78.7	27.5	104.0
30–39	52.1	30.5	82.5	27.6	107.8
Birth order					
1	62.3	30.7	93.1	17.4	108.8
2	46.9	36.9	83.8	30.3	111.5
3	65.1	29.1	94.2	35.8	126.6
4+	50.2	37.7	87.9	34.9	119.8
Previous birth interval					
< 24 months	88.3	41.8	130.0	48.5	172.2
24–47 months	41.2	33.4	74.7	33.3	105.4
48+ months	31.0	26.5	57.5	8.0	65.0
Size at birth[2]					
Large	(27.8)	(23.0)	(50.8)	U	U
Average	37.2	31.3	68.5	U	U
Small	(64.5)	(34.9)	(99.4)	U	U

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

live births) than for girls (28 deaths per 1,000 live births). Thus, Orissa may not be experiencing the reversal of sex differentials in mortality with increasing age that has been observed in other studies in South Asia, and that is thought to reflect the relative medical and nutritional neglect of the girl child (Das Gupta, 1987; Basu, 1989). The male-female differences in Orissa, particularly in postneonatal and child mortality rates, may not be significant, however, given the large sampling errors associated with the various estimates of infant and child mortality (Appendix Table A.2).

For both social and biological reasons, infant mortality and child mortality often exhibit a U-shaped pattern with respect to mother's age at childbirth, with children of both very young and very old mothers experiencing higher mortality rates than children whose mothers are in the prime reproductive ages. Children born to young mothers are more likely to be of low birth weight, which is probably an important factor contributing to their higher neonatal mortality rate. Similarly, children born to mothers above age 30 are at relatively high risk of experiencing congenital problems. Orissa weakly exhibits the expected U-shaped pattern (more resembling a backward J-shaped pattern) of mortality by mother's age, with higher infant mortality among children of mothers under age 20 (120 deaths per 1,000 live births) and age 30–39 (83 deaths per 1,000) than among children of mothers age 20–29 (79 deaths per 1,000). This results from a U-shaped pattern (again more resembling a backward J-shape) for neonatal mortality because, in



contrast, postneonatal mortality decreases slightly with increasing mother's age at childbirth. An L-shaped relationship is observed in the case of child mortality. Mortality among children age 1–4 years tends to decrease initially, then remain almost constant, as mother's age at childbirth increases.

Birth order also commonly has a U-shaped relationship to infant deaths, with first births and higher-order births having elevated mortality rates. This association is likely to reflect the effect of not just birth order but also the effect of mother's age at childbirth. In Table 6.4, however, the rates by birth order do not show the expected U-shaped pattern for neonatal, postneonatal, and infant mortality rates. A considerably lower neonatal mortality rate for children of birth order four or more than for children of birth order three results in the same relationship for infant mortality, despite the opposite relationship for postneonatal mortality. Child mortality tends to increase with birth order, except that children of birth order three have slightly higher child mortality than children of birth order four or more. Under-five mortality has a similar relationship, but with greater excess mortality for children of birth order three, reflecting the same excess for neonatal mortality. The general increase in child mortality with birth order 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, where mortality tends to be higher.

The length of time between successive births has a powerful effect on the survival chances of children in Orissa. Infant and child mortality rates decrease sharply as the length of the previous birth interval increases, and both measures are especially high for children born less than 24 months after a previous birth. Infant mortality is more than twice as high for children with a previous birth interval of less than 24 months as for children with a previous interval of 48 months or more (130 deaths compared with 58 deaths per 1,000 live births), and child mortality is more than six times as high (49 deaths compared with 8 deaths per 1,000 live births). Previous birth interval has a similar effect on all other indicators of infant and child mortality as shown in Table 6.4. Although the length of the previous birth interval is likely to affect mortality risks directly, a substantial portion of the association between birth intervals and mortality risks may reflect the effect of factors that are correlated with birth intervals. For example, shorter birth intervals are likely to occur in large families, and large families tend to come from lower socioeconomic groups and are more likely than other families to live in rural areas where medical facilities and other survival-enhancing resources are less readily available. Nevertheless, multivariate analyses of birth-interval effects and child survival commonly find an association between short birth intervals (less than 24 months) and increased mortality even after controlling for other demographic and socioeconomic characteristics (Retherford et al., 1989).

As Table 6.4 indicates, neonatal, postneonatal, and infant mortality all decrease with increasing size of the child at birth. However, these results are based on a sample of children in which relatively few were other than average size at birth.

6.3 Morbidity

There is limited experience in collecting morbidity data from population-based demographic sample surveys. NFHS-1 collected data on five major morbidity conditions—partial and complete blindness, tuberculosis, leprosy, physical impairment of limbs, and malaria—among all members of the sampled households. The results were found to be generally plausible and useful. For this reason, it was decided to include similar 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 an additional question on medical treatment of tuberculosis was included to get a better measure of the prevalence of tuberculosis. The household head or other knowledgeable adult in the household reported for all household members, and no effort was made to test for any of the disease conditions clinically.

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

Table 6.5 Morbidity

Number of persons per 100,000 usual household residents suffering from asthma, tuberculosis, jaundice, or malaria by age, sex, and residence, Orissa, 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	3,191	131	131	2,127	5,361	866
15–59	2,411	974	766	691	4,297	1,602
60+	7,170	2,678	2,083	590	3,250	187
Sex						
Male	3,163	730	730	1,488	4,320	1,382
Female	2,823	915	567	787	4,842	1,273
Total	3,000	819	652	1,152	4,571	2,655
RURAL						
Age						
< 15	2,963	222	191	1,556	8,369	6,968
15–59	2,755	939	812	1,191	7,419	12,179
60+	7,611	2,315	1,928	711	7,824	2,023
Sex						
Male	3,376	918	763	1,572	8,151	10,783
Female	3,195	749	663	947	7,375	10,387
Total	3,288	835	714	1,265	7,770	21,170
TOTAL						
Age						
< 15	2,988	212	184	1,619	8,036	7,834
15–59	2,715	943	806	1,133	7,056	13,781
60+	7,573	2,345	1,941	701	7,438	2,209
Sex						
Male	3,352	896	759	1,562	7,716	12,164
Female	3,155	767	652	930	7,098	11,660
Total	3,255	833	707	1,253	7,414	23,824

[1]Includes medically treated tuberculosis

Asthma

Asthma is a chronic respiratory disease characterized by sudden attacks of laboured breathing, chest constriction, and coughing. There has been a rapid increase in asthma cases in recent years in many parts of the world. In Orissa, more than 3 percent of the population was reported to be suffering from asthma at the time of the survey. The prevalence of asthma is slightly higher in rural areas (3,288 per 100,000 population) than in urban areas (3,000 per 100,000 population), and slightly higher among males (3,352 per 100,000) than among females (3,155 per 100,000). Age differences are marked, with the prevalence of asthma increasing from 2,988 per 100,000 at age 0–14 and 2,715 per 100,000 at age 15–59 to 7,573 per 100,000 at age 60 and over.

Tuberculosis

Tuberculosis, which is resurgent worldwide, is an infectious disease that affects the lungs and other body tissues. Tuberculosis of the lungs, the most commonly occurring form, is characterized by coughing up mucus and sputum, fever, weight loss, and chest pain. The overall prevalence of tuberculosis in Orissa is 833 per 100,000 population. This is considerably higher than the prevalence of 560 per 100,000 recorded in NFHS-1. The prevalence of tuberculosis is slightly lower in urban areas (819 per 100,000) than in rural areas (835 per 100,000). The prevalence rate is higher for males (896 per 100,000) than for females (767 per 100,000). Probable causes for higher prevalence of tuberculosis among males than females are that men are more likely than women to come in contact with people who suffer from active tuberculosis and that men in Orissa smoke more than women. The prevalence of tuberculosis increases rapidly with age. It is much higher among persons age 60 and above (2,345 per 100,000) than among those age 15–59 (943 per 100,000) or age 0–14 (212 per 100,000).

Medically treated tuberculosis is expected to give a more reliable measure of the prevalence of active tuberculosis than a measure based on all reported cases considered in the preceding paragraph. As expected, the prevalence of medically treated tuberculosis is lower (707 per 100,000) than the prevalence based on all reported cases (833 per 100,000). The prevalence of medically treated tuberculosis reported in NFHS-2 is somewhat higher than the prevalence of all reported cases in NFHS-1, indicating that tuberculosis may be increasing in Orissa. Differentials in the prevalence of medically treated tuberculosis by residence, age, and sex are similar to differentials in the prevalence of all reported cases.

Jaundice

Jaundice is characterized by yellowish discolouration of the eyes and skin, fever, liver enlargement, and abdominal pain. NFHS-2 asked household respondents if any member of the household had suffered from jaundice at any time during the 12 months preceding the survey. In Orissa, 1,253 persons per 100,000 population were reported to have suffered from jaundice during the past 12 months. People living in rural areas were slightly more likely to have suffered from jaundice (1,265 per 100,000) than those living in urban areas (1,152 per 100,000). Males were 68 percent more likely to have suffered from jaundice than females. The prevalence of jaundice was highest at age 0–14 (1,619 per 100,000) followed by 15–59 (1,133 per 100,000) and 60+ (701 per 100,000). Age and sex differentials in the prevalence of jaundice are similar in urban and rural areas, except that a considerably higher proportion of cases occur below age 15, and a considerably lower proportion at age 15–59, in urban than rural areas.

Malaria

Malaria is characterized by recurrent high fever with shivering. NFHS-2 asked household respondents whether any member of their household had suffered from malaria at any time during the three months preceding the survey. In Orissa, 7,414 persons per 100,000 population were reported to have suffered from malaria during the three months before the survey. Since the prevalence of malaria is known to vary considerably by season, the NFHS-2 estimates should not be interpreted as representative of the level throughout the year. It is also misleading to compare this estimate with the lower NFHS-1 estimate because the months of the year comprising the reference period for the malaria estimates from the two surveys are different.

Rural residents are 70 percent more likely to suffer from malaria (7,770 per 100,000) than urban residents (4,571 per 100,000). The reported prevalence of malaria is higher for males than for females in rural areas, but higher for females than for males in urban areas. The prevalence of malaria during the past three months decreases with age in urban areas. However, the prevalence of malaria is U-shaped with respect to age in rural areas and in the state as a whole (rural and urban areas combined), with the prevalence highest at age 0–14 and next highest at age 60 and above.

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 (Gupta and Murli, 1989). The Expanded Programme on Immunization (EPI) was initiated by the Government of India in 1978 with the objective of reducing morbidity, mortality, and disabilities from these six diseases by making free vaccination services easily available to all eligible children. Immunization against poliomyelitis was introduced in 1979–80, and tetanus toxoid for school children was added in 1980–81. Immunization against tuberculosis (BCG) was brought under the EPI in 1981–82. The latest addition to the Programme was vaccination against measles in 1985–86 (Ministry of Health and Family Welfare, 1991).

The Universal Immunization Programme (UIP) was introduced in 1985–86 with the following objectives: to cover at least 85 percent of all infants against the six vaccine-preventable diseases by 1990 and to achieve self-sufficiency in vaccine production and the manufacture of cold-chain equipment (Ministry of Health and Family Welfare, 1991). This scheme has been introduced in every district of the country, and the target now is to achieve 100 percent immunization coverage. Pulse Polio Immunization Campaigns began in December 1995 as part of a major 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). Vaccinations received by infants and children are usually recorded on a vaccination card that is issued for the child.

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

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, Orissa, 1999

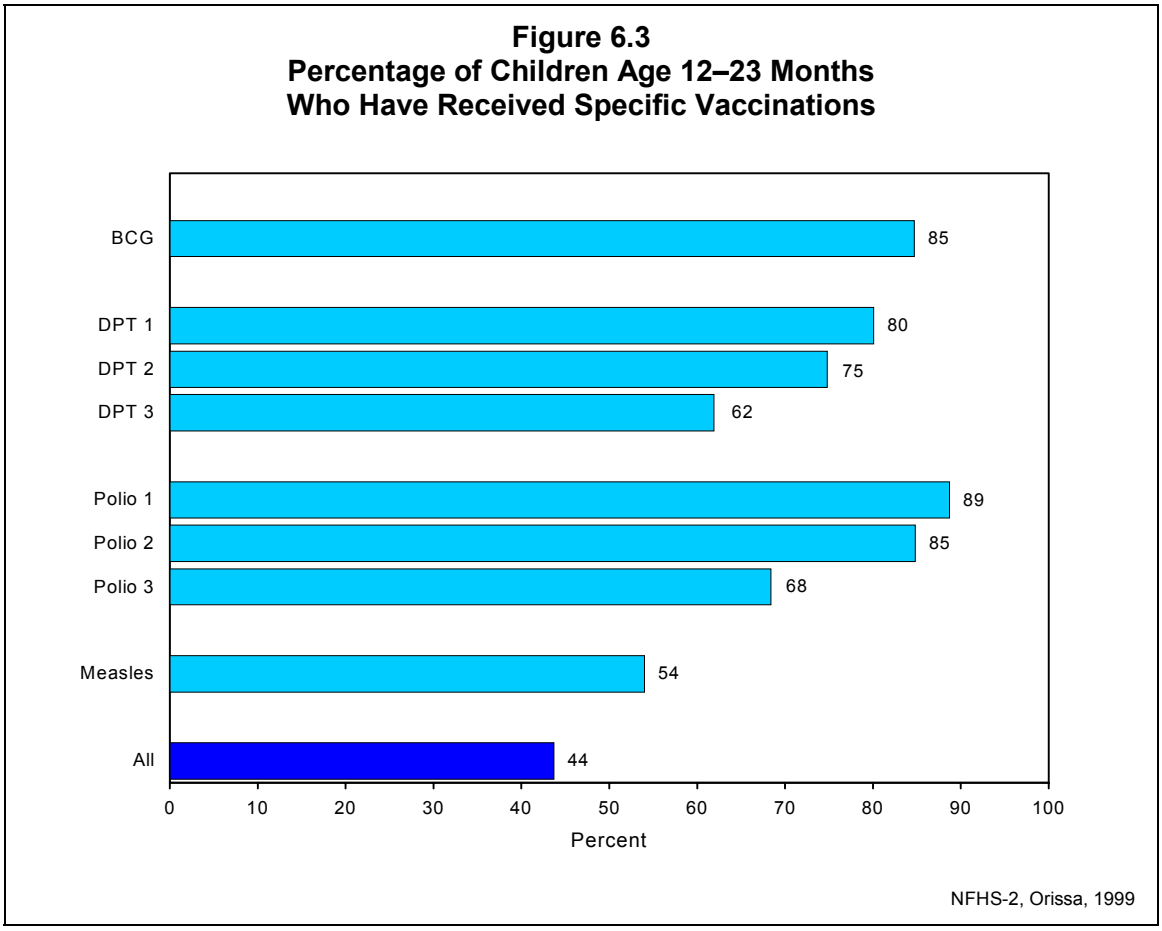
	Percentage vaccinated											
			DPT			Polio						Number of children
Source of information	BCG	Polio 0	1	2	3	1	2	3	Measles	All[1]	None	
URBAN												
Vaccinated at any time before the interview												
Vaccination card	(98.0)	(48.4)	(96.0)	(90.0)	(79.5)	(96.0)	(92.0)	(79.5)	(79.3)	(75.3)	(0.0)	27
Mother's report	(59.2)	(5.5)	(56.5)	(51.0)	(40.3)	(70.1)	(64.6)	(45.6)	(42.7)	(32.0)	(29.9)	21
Either source	81.1	29.7	78.8	73.0	62.4	84.7	80.1	64.8	63.4	56.4	13.0	48
Vaccinated by 12 months of age[2]	79.3	29.7	75.4	69.3	58.9	81.1	76.1	61.1	56.0	49.3	16.6	48
RURAL												
Vaccinated at any time before the interview												
Vaccination card	95.3	20.2	98.8	91.7	84.0	98.2	91.7	84.0	60.6	57.0	0.0	186
Mother's report	76.7	6.7	65.1	61.2	43.7	81.7	80.1	56.4	46.6	30.1	16.4	227
Either source	85.1	12.8	80.3	75.0	61.8	89.1	85.4	68.8	52.9	42.2	9.0	413
Vaccinated by 12 months of age[2]	83.5	12.8	78.8	73.9	59.1	87.5	84.2	65.7	39.3	31.4	10.6	413
TOTAL												
Vaccinated at any time before the interview												
Vaccination card	95.6	23.8	98.5	91.5	83.4	97.9	91.8	83.4	63.0	59.3	0.0	213
Mother's report	75.3	6.6	64.4	60.3	43.4	80.7	78.8	55.5	46.3	30.3	17.5	248
Either source	84.7	14.6	80.1	74.8	61.9	88.7	84.8	68.4	54.0	43.7	9.4	461
Vaccinated by 12 months of age[2]	83.0	14.6	78.4	73.4	59.0	86.7	83.3	65.2	41.3	33.3	11.3	461

Note: Table includes only surviving children from among the two most recent births in the three years preceding the survey.
( ) Based on 25–49 unweighted cases
[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 vaccination given by 12 months of age is assumed to be the same as for children with a written record of vaccination.

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 proportions of urban and rural children age 12–23 months who received specific vaccinations at any time before the interview and before 12 months of age, according to whether a vaccination card was shown to the interviewer or the mother was the source of all vaccination information. The 12–23-month age group was chosen for analysis because international and Government of India guidelines specify that children should be fully

[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 vaccines 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 was assumed to really be Polio 1, Polio 1 was assumed to be Polio 2, etc. For comparative purposes, this same adjustment was made to the NFHS-1 vaccination estimates.



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 among 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 among children with an exact date of vaccination on the card.

In NFHS-2, children who 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'), 44 percent of children age 12–23 months are fully vaccinated, and 9 percent have not received any vaccinations. Coverage for BCG, DPT, and polio (except Polio 0) vaccinations is much higher than the percentage fully vaccinated. BCG, the first dose of DPT, and the first and second doses of polio have each been received by at least 80 percent of children (see Figure 6.3). Sixty-two percent of children have received three doses of DPT, and 68 percent have received three doses of polio vaccine. Although DPT and polio vaccinations are given at the same time as part of the routine immunization programme, the coverage rates are somewhat higher for polio than DPT, undoubtedly because of the Pulse Polio campaigns. Not all children who begin with the DPT and polio vaccination series go on to complete them, however. The difference between the percentages of children receiving the first and third doses is 18 percentage points for DPT and 21 percentage points for polio. Fifty-four percent of children 12–23 months have been vaccinated against measles.

There has been considerable improvement in vaccination coverage in Orissa since the time of NFHS-1 when the proportion of children fully vaccinated was 36 percent and the proportion who had received no vaccinations was 28 percent. The coverage of each specific vaccination has also improved considerably since NFHS-1, suggesting that government programmes are making a difference. Nonetheless, these data suggest that the goal of universal immunization coverage for children is far from being met.

Government of India statistics suggest a much higher level of vaccination coverage than estimated by NFHS-2. According to Government statistics for Orissa for 1997–98, 81 percent of children age 12–23 months are fully vaccinated, and coverage is 94 percent for BCG, 92 percent for the third dose of DPT, 93 percent for the third dose of polio vaccine, and 92 percent for measles (Ministry of Health and Family Welfare, 1999).

According to the immunization schedule, all primary vaccinations, including measles, should be completed by the time a child is 12 months old. Table 6.6 shows that one-third of all children (or three-fourths of all fully vaccinated children) were fully vaccinated by age 12 months. The percentages of children who received BCG, each dose of DPT, and each dose of polio by age 12 months is only slightly lower than the percentage who received these vaccines at any time before the survey. The gap is wider for the measles vaccination, however (54 percent at any time before the survey compared with 41 percent by age 12 months), even though it is supposed to be given when the child is nine months old. Twenty-four percent of children who were vaccinated against measles received the vaccination after their first birthday.

The analysis of vaccine-specific data indicates higher coverage for each type of vaccine in rural areas than in urban areas, except for Polio 0, the third dose of DPT, and measles. However, 56 percent of children age 12–23 months in urban areas were fully immunized at some time before the survey, compared with 42 percent in rural areas. The proportion fully vaccinated during the first year of life is also higher in urban areas (49 percent) than in rural areas (31 percent).

Table 6.7 and Figure 6.4 present vaccination coverage rates (according to the vaccination card or the mother) for children age 12–23 months by selected background characteristics. The table also shows the percentage of children with vaccination cards that were shown to the interviewer. Mothers could show vaccination cards for 46 percent of the children age 12–23 months compared with 42 percent in NFHS-1. Vaccination cards were shown for 57 percent of children in urban areas and 45 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).

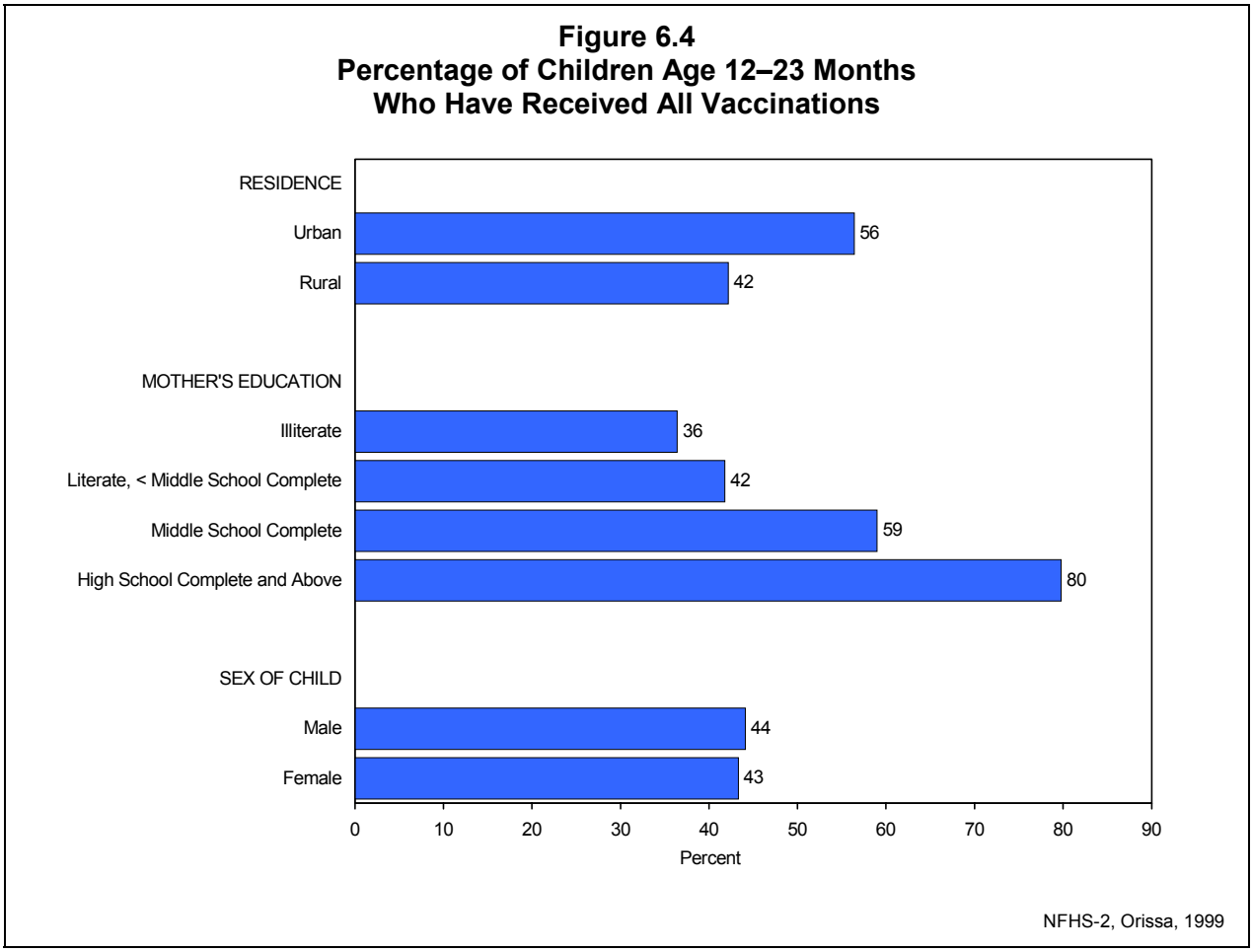
The male-female differential in full vaccination coverage is negligible. Female children are more likely than male children to have received Polio 0 and the measles vaccination, but males are more likely than females to have received the other individual vaccinations. Mothers showed vaccination cards for 48 percent of male children and 44 percent of female children. In NFHS-1, vaccination coverage was somewhat higher for male than female children, and a vaccination card was shown for a higher proportion of male than female children. The negligible difference in the vaccination coverage by sex in NFHS-2 suggests that discrimination against female children in Orissa with regard to immunization has diminished.

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, Orissa, 1999

	Percentage vaccinated												
			DPT			Polio						Percentage showing vaccination card	Number of children
Background characteristic	BCG	Polio 0	1	2	3	1	2	3	Measles	All[1]	None		
Sex of child													
Male	86.0	13.3	81.3	77.1	64.2	89.8	85.6	70.2	52.4	44.1	8.3	48.1	260
Female	83.0	16.2	78.6	71.8	58.9	87.1	83.8	66.1	56.1	43.3	11.0	43.8	201
Birth order													
1	90.6	22.7	84.0	79.1	69.8	94.3	92.5	79.5	59.6	52.1	4.0	52.5	124
2	86.4	10.8	86.5	78.3	63.4	89.4	81.7	68.2	59.2	46.1	8.9	54.0	130
3	88.7	11.3	80.5	75.4	55.2	90.6	88.7	63.5	48.7	36.7	7.5	34.4	88
4+	73.6	12.5	69.1	65.9	57.0	80.6	77.3	60.8	46.3	37.6	17.1	39.9	120
Residence													
Urban	81.1	29.7	78.8	73.0	62.4	84.7	80.1	64.8	63.4	56.4	13.0	56.5	48
Rural	85.1	12.8	80.3	75.0	61.8	89.1	85.4	68.8	52.9	42.2	9.0	45.0	413
Mother's education													
Illiterate	81.1	11.3	75.3	68.8	54.5	84.4	80.1	61.2	45.1	36.4	13.0	41.9	272
Literate, < middle school complete	85.8	14.9	81.6	75.9	62.7	92.7	87.5	71.7	55.0	41.8	5.7	46.6	106
Middle school complete	(94.6)	(28.0)	(93.2)	(90.5)	(81.0)	(97.3)	(95.9)	(81.0)	(74.0)	(59.0)	(2.7)	(51.7)	40
High school complete and above	95.1	21.7	94.9	94.9	88.7	97.5	97.5	93.8	88.6	79.8	2.5	67.1	44
Caste/tribe													
Scheduled caste	88.3	11.2	83.8	75.8	62.4	90.4	85.2	70.0	53.2	44.5	8.6	44.7	109
Scheduled tribe	71.7	10.5	58.7	55.4	41.5	74.6	72.5	49.5	36.8	26.4	18.2	29.7	84
Other backward class	87.2	15.0	86.2	79.1	66.3	90.9	86.2	70.0	59.9	48.5	8.1	49.5	163
Other	87.4	20.7	84.1	82.5	70.9	94.7	92.1	79.5	59.3	49.3	5.3	56.1	105
Standard of living index													
Low	79.4	10.9	73.4	66.5	52.5	84.7	79.7	59.8	42.2	33.5	12.8	40.6	265
Medium	91.5	18.7	88.7	84.4	72.2	93.7	91.2	78.3	66.1	53.3	5.6	53.2	154
High	(91.6)	(24.2)	(92.9)	(92.9)	(87.4)	(97.3)	(95.9)	(90.3)	(87.4)	(76.1)	(2.7)	(57.9)	39
Total	84.7	14.6	80.1	74.8	61.9	88.7	84.8	68.4	54.0	43.7	9.4	46.2	461

Note: Table includes only surviving children from among the two most recent births in the three years preceding the survey. Total includes 3 children with missing information on the standard of living index, 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)



The relationship between vaccination coverage and birth order is more or less negative for all vaccinations. A large majority of first-order births occur to younger women who are more likely than older women to utilize maternal health care services. As with use of maternal health care services, there is a strong positive relationship between mother's education and children's vaccination coverage. Only 36 percent of children of illiterate mothers are fully vaccinated, compared with 80 percent of children with mothers who have at least completed high school. Scheduled-tribe children are less likely to be fully vaccinated than are scheduled-caste, other backward caste, or children of mothers not in any backward class. Household standard of living has a strong positive relationship with vaccination coverage. Thirty-four percent of children in households with a low standard of living are fully vaccinated compared with 76 percent of children in households with a high standard of living.

Table 6.8 shows, for children age 12–35 months, the percentage 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 child and place of residence. The table suggests a slight decline in vaccination coverage, particularly for certain individual vaccinations in urban areas and full vaccination in rural areas, 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 who have not received any vaccination by age 12 months.

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, Orissa, 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	56.5	52.2	45.0	32.5	46.2	34.6
Percentage vaccinated by 12 months of age[1]						
BCG	79.3	81.8	83.5	82.6	83.0	82.4
Polio 0	29.7	21.6	12.8	13.1	14.6	13.6
DPT						
1	75.4	81.4	78.8	77.3	78.4	77.8
2	69.3	78.8	73.9	73.7	73.4	74.4
3	58.9	62.9	59.1	58.3	59.0	58.6
Polio						
1	81.1	85.0	87.5	85.8	86.7	85.8
2	76.1	83.6	84.2	83.7	83.3	83.9
3	61.1	70.4	65.7	68.2	65.2	68.3
Measles	56.0	58.5	39.3	48.8	41.3	50.2
All vaccinations[2]	49.3	49.9	31.4	37.6	33.3	39.3
No vaccinations	16.6	15.6	10.6	12.6	11.3	12.9
Number of children	48	48	413	412	461	460

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)

The proportion of children whose vaccination status was determined from a vaccination card declines with child's age. This may reflect an upward trend in the use of vaccination cards, despite no indication of 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. The proportion of children fully vaccinated by age 12 months increases with age from 33 percent for children age 12–23 months to 39 percent for children age 24–35 months. The increase in full vaccination coverage with age in rural areas is similar, from 31 percent for children age 12–23 months to 38 percent for children age 24–35 months. The measles vaccine is primarily responsible for the increase in full vaccination with age, because coverage by every other individual vaccination varies little by age in rural areas. By contrast, in urban areas coverage for every individual vaccination except Polio 0 increases with child's age, but full immunization varies little by age.

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.

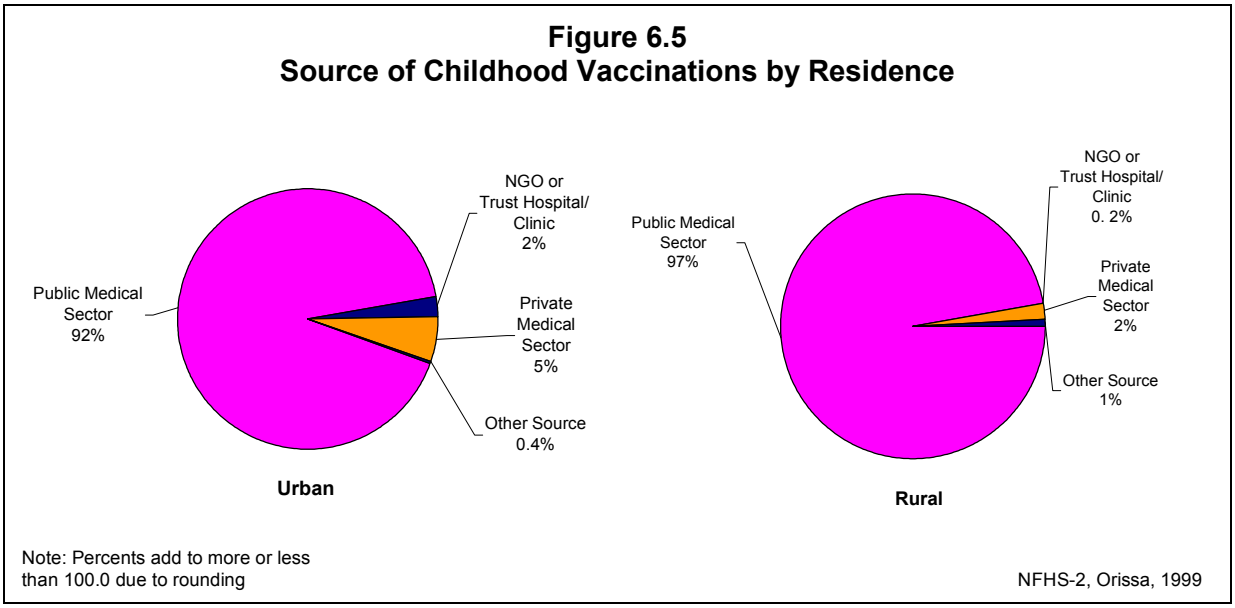
Table 6.9 Source of childhood vaccinations

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

Background characteristic	Source: Public medical sector	Source: NGO or trust hospital/ clinic	Source: Private medical sector	Source: Other	Total percent	Number of children
Age of child						
< 12 months	97.2	0.8	1.9	0.2	100.0	354
12–23 months	97.9	0.0	1.8	0.3	100.0	418
24–35 months	94.5	0.6	3.1	1.8	100.0	426
Sex of child						
Male	97.4	0.1	2.0	0.5	100.0	640
Female	95.4	0.8	2.7	1.1	100.0	559
Birth order						
1	95.3	0.3	3.2	1.2	100.0	366
2	96.2	0.3	2.4	1.1	100.0	352
3	99.2	0.0	0.8	0.0	100.0	208
4+	96.4	1.1	2.2	0.4	100.0	273
Residence						
Urban	91.8	2.4	5.4	0.4	100.0	125
Rural	97.0	0.2	1.9	0.8	100.0	1,074
Mother's education						
Illiterate	97.3	0.2	1.5	1.0	100.0	654
Literate, < middle school complete	96.2	0.9	2.0	0.9	100.0	309
Middle school complete	95.3	1.0	3.7	0.0	100.0	121
High school complete and above	93.7	0.0	6.3	0.0	100.0	115
Religion						
Hindu	96.5	0.4	2.3	0.8	100.0	1,156
Muslim	(97.5)	(0.0)	(2.5)	(0.0)	100.0	24
Caste/tribe						
Scheduled caste	97.3	0.0	1.3	1.5	100.0	266
Scheduled tribe	96.4	0.5	2.2	0.9	100.0	245
Other backward class	96.2	0.9	2.1	0.8	100.0	389
Other	96.3	0.2	3.5	0.0	100.0	298
Standard of living index						
Low	96.5	0.0	2.2	1.3	100.0	651
Medium	97.0	1.1	1.7	0.3	100.0	423
High	94.6	0.0	5.4	0.0	100.0	115
Total	96.5	0.4	2.3	0.8	100.0	1,199

Note: Table includes only surviving children from among the two most recent births in the three years preceding the survey. Total includes 19 Christian children and 9 children with missing information on the standard of living index, who are not shown separately.
NGO: Nongovernmental organization
( ) Based on 25–49 unweighted cases

The public sector is the primary provider of childhood vaccinations. Most of the children who have received any vaccinations received most of them from a public-sector source, and only 2 percent received them from a private-sector source. The percentage of children receiving vaccinations from the private sector is slightly lower in rural areas (2 percent) than in urban areas (5 percent), where private-sector services tend to be concentrated. Even in urban areas, however, 92 percent of children received their vaccinations from the public sector. Children of more



educated mothers and children in households with a high standard of living are slightly more likely to receive vaccinations from the private sector. Muslim children are almost equally likely to receive vaccinations from the private sector as Hindu children. Children from scheduled tribes, scheduled castes, and other backward classes are slightly less likely than children of mothers not in any backward class to receive vaccinations from the private sector. However, the percentages and differences in percentages of children receiving vaccinations from the private sector are very small in all of these cases.

6.5 Vitamin A Supplementation

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

Table 6.10 also shows that children living in urban areas are somewhat more likely to receive Vitamin A supplementation than children living in rural areas. The proportion of children receiving vitamin A supplementation differs little by sex of child or by religion, but increases markedly as mother's education or household standard of living increases. The percentage receiving Vitamin A supplementation is particularly low among scheduled-tribe children. Children of birth order 4 or above are much less likely than children of birth orders 1 or 2 to have received any Vitamin A supplementation. In most cases, children from categories that are less

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, Orissa, 1999

Background characteristic	Percentage who received Vitamin A: At least one dose	Percentage who received Vitamin A: At least one dose within past six months	Number of children
Age of child			
12–23 months	41.0	32.2	461
24–35 months	43.0	20.6	460
Sex of child			
Male	40.8	26.1	493
Female	43.3	26.8	428
Birth order			
1	46.3	27.2	259
2	49.6	33.1	272
3	36.7	21.1	163
4+	31.8	21.5	227
Residence			
Urban	47.8	32.5	96
Rural	41.3	25.7	825
Mother's education			
Illiterate	33.2	20.1	522
Literate, < middle school complete	44.9	30.1	228
Middle school complete	54.7	32.6	88
High school complete and above	75.9	49.9	83
Religion			
Hindu	41.8	26.2	884
Muslim	(42.8)	(22.6)	20
Caste/tribe			
Scheduled caste	42.1	26.5	203
Scheduled tribe	30.5	17.7	187
Other backward class	45.8	30.3	297
Other	46.3	28.5	234
Standard of living index			
Low	34.4	21.6	520
Medium	47.3	29.5	313
High	70.9	45.6	82
Total	42.0	26.4	921

Note: Table includes only surviving children from among the two most recent births in the three years preceding the survey. Total includes 18 Christian children and 6 children with missing information on the standard of living index, who are not shown separately.
( ) Based on 25–49 unweighted cases

likely to have received at least one dose of Vitamin A supplementation are also less likely to have received a dose in the past six months.

6.6 Child Morbidity and Treatment

This section discusses the prevalence and treatment of acute respiratory infection (ARI), fever, and diarrhoea. Mothers of children born during the three years preceding the survey were asked

if their children suffered from cough, fever, or diarrhoea during the past two weeks, and if so, the type of treatment given. The accuracy of 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 23 percent of children under age three in Orissa suffered from acute respiratory infection (cough accompanied by short, rapid breathing) at some time during the two-week period before the survey. A comparison with NFHS-1 ARI data is not meaningful because the two surveys took place at different times of the year and rates of ARI are affected by the time of the year when the measurements are taken.

Table 6.11 shows that there was not much variation in the prevalence of ARI by most of the background characteristics included in the table. ARI was somewhat more common among boys than girls. Children of mothers who have at least completed high school had a considerably lower occurrence of ARI than other children, and children from households with a high standard of living had a somewhat lower occurrence. The prevalence of ARI was lower among Hindu children (22 percent) than among Muslim (29 percent) or Christian (36 percent) children, but the percentages for Muslim and Christian children are based on small samples. Scheduled-tribe and other-backward-class children had lower prevalence of ARI (19 and 20 percent, respectively) than scheduled-caste children (27 percent) or children of mothers not in any backward class (24 percent). Children living in households with piped water had a somewhat lower incidence of ARI than children living in households with surface or ground water. The relatively small variation in the prevalence of ARI by most socioeconomic characteristics indicates that respiratory infections affect children of all strata irrespective of their socioeconomic background.

Table 6.11 also shows the percentage of children suffering from ARI symptoms in the two weeks before the survey who were taken to a health facility or provider. Fifty-seven percent of children received some advice or treatment from a health facility or health provider when ill with ARI. This percentage varies most by caste/tribe, with only 40 percent of scheduled-tribe children having been taken to a health facility or provider, compared with 52 percent of scheduled-caste children, 61 percent of other-backward-class children, and 71 percent of children of mothers not in any backward class. Older children age 24–35 months and female children are somewhat less likely to be taken to a health facility. The percentage who were taken to a health facility or provider does not vary much by most other background characteristics, although small samples for certain key categories (e.g., children of mothers who have at least completed high school or who are from households with a high standard of living) preclude some important comparisons.

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, Orissa, 1999

Background characteristic	Percentage of children suffering in past two weeks from:					Percentage with ARI taken to a health facility or provider	Number of children with ARI
	Cough accompanied by fast breathing (ARI)	Fever	Diarrhoea		Number of children		
			Any diarrhoea[1]	Diarrhoea with blood			
Age of child							
1–5 months	21.7	24.5	20.8	0.0	189	(47.3)	41
6–11 months	28.7	42.1	34.9	5.3	262	66.5	75
12–23 months	24.7	40.9	34.0	5.9	461	59.2	114
24–35 months	17.0	32.4	21.5	4.5	460	50.0	78
Sex of child							
Male	24.5	37.2	26.5	4.7	727	61.7	178
Female	20.2	34.7	30.0	4.2	644	50.7	130
Birth order							
1	25.5	36.5	27.4	3.5	393	63.6	100
2	21.9	32.0	28.2	5.6	394	49.8	86
3	20.2	35.9	27.9	3.9	247	56.5	50
4+	21.4	40.2	29.1	4.7	337	57.1	72
Residence							
Urban	23.3	31.7	29.2	3.6	142	53.5	33
Rural	22.4	36.5	28.0	4.6	1,229	57.5	275
Mother's education							
Illiterate	22.6	37.5	29.4	5.3	792	52.5	179
Literate, < middle school complete	26.5	34.2	30.5	3.9	338	62.5	90
Middle school complete	21.0	36.6	21.5	5.4	124	(57.4)	26
High school complete and above	11.8	30.8	19.8	0.0	118	*	14
Religion							
Hindu	22.1	35.6	27.9	4.2	1,319	57.1	291
Muslim	(28.7)	(45.1)	(44.8)	(6.1)	28	*	8
Christian	(35.7)	(46.0)	(24.8)	(15.6)	25	*	9
Caste/tribe							
Scheduled caste	27.3	41.7	34.1	7.4	315	52.2	86
Scheduled tribe	19.3	32.1	22.3	4.0	304	40.0	59
Other backward class	20.1	32.8	25.5	2.5	425	61.0	85
Other	23.9	38.4	31.3	4.7	327	70.9	78
Standard of living index							
Low	22.7	38.7	30.4	5.4	771	56.0	175
Medium	23.6	33.9	25.8	4.1	472	53.6	111
High	16.1	25.7	23.3	0.5	119	*	19
Source of drinking water							
Piped water	15.8	32.3	29.5	0.0	104	*	16
Hand pump	24.0	36.8	27.2	5.8	753	55.5	180
Well water	20.9	33.8	28.9	3.4	399	62.3	83
Surface water	24.3	42.2	30.5	3.9	115	(44.7)	28
Purification of water[2]							
Straining by cloth	25.2	38.0	32.9	5.6	152	(66.7)	38
Water filter	24.4	40.3	16.0	0.0	64	*	16
Boiling	25.9	36.2	23.2	3.5	95	(65.5)	25
Nothing	22.1	36.0	28.0	4.6	1,101	54.5	243
Total	22.5	36.0	28.1	4.5	1,372	57.1	308

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 in households using alum to purify water, electronic water purifiers, or 'other' methods to purify water, and children with missing information on 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.

Fever

Fever was the most common of the three conditions examined, with 36 percent of children suffering from fever during the two weeks before the survey. The prevalence of fever is somewhat lower among children under age six months (25 percent) and age 24–35 months (32 percent) than among children age 6–23 months (41 to 42 percent). Scheduled-caste children suffer somewhat more from fever than other children, and incidence of fever decreases with increase in standard of living. Fever is slightly more prevalent among male children than female children, and more prevalent in rural areas than in urban areas. There is relatively little variation in the prevalence of fever by other background characteristics. As with acute respiratory infection, fever tends to strike young children irrespective of their demographic and socioeconomic background.

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 born during the past three years 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 and treatment of diarrhoea, and about their knowledge and use of ORS.

Table 6.11 shows that 28 percent of children under age three suffered from diarrhoea in the two-week period before the interview. There are seasonal variations in the incidence of diarrhoea, however, so that the percentages shown in Table 6.11 cannot be assumed to reflect the situation throughout the year.

Among children age 1–35 months, those age 6–23 months are most susceptible to diarrhoea. Girls (30 percent) are slightly more likely to have diarrhoea than boys (27 percent). Among all background characteristics, the prevalence of diarrhoea is lowest for children whose water is purified by water filter. It is higher for children whose mothers have not completed middle school than for children whose mothers have. It decreases somewhat with increasing standard of living, and it is higher for scheduled-caste children than for children of other caste/tribe categories. There is little variation in the incidence of diarrhoea by other background characteristics.

Sixteen percent of children who suffered from diarrhoea in Orissa suffered from bloody diarrhoea with blood, a symptom of dysentery. Children under age six months had no incidence of diarrhoea with blood, compared with 5 to 6 percent among older children. Children living in rural areas, children belonging to scheduled castes, children in households with a low or medium standard of living, and children in households without piped water for drinking or without a water filter for purification all have a somewhat elevated risk of diarrhoea with blood.

Table 6.12 Knowledge of diarrhoea care

Among mothers with births during the three years preceding the survey, percentage who know about oral rehaydration 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, Orissa, 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	61.6	18.3	20.3	57.8	3.6	100.0	35.9	138
20–24	72.7	10.0	26.4	60.3	3.3	100.0	41.0	495
25–29	78.8	10.8	23.3	64.3	1.6	100.0	51.2	452
30–34	72.1	5.9	25.3	64.4	4.4	100.0	43.4	215
35–49	61.1	6.7	24.2	61.6	7.5	100.0	44.1	74
Residence								
Urban	78.8	8.2	11.6	77.8	2.4	100.0	50.3	139
Rural	72.2	10.5	25.9	60.3	3.2	100.0	43.7	1,235
Education								
Illiterate	63.6	14.0	29.4	52.1	4.5	100.0	40.7	803
Literate, < middle school complete	84.7	5.7	22.0	70.7	1.6	100.0	43.8	332
Middle school complete	82.5	5.3	12.5	80.5	1.7	100.0	52.6	126
High school complete and above	93.2	2.9	9.8	87.3	0.0	100.0	62.7	113
Religion								
Hindu	72.8	10.5	24.6	61.6	3.2	100.0	44.3	1,321
Muslim	(71.9)	(4.6)	(32.2)	(63.2)	(0.0)	100.0	(44.1)	26
Christian	(74.8)	(4.5)	(8.6)	(82.9)	(4.1)	100.0	(47.6)	27
Caste/tribe								
Scheduled caste	76.5	13.7	22.4	62.1	1.8	100.0	41.5	309
Scheduled tribe	53.7	11.7	36.7	45.6	5.9	100.0	36.4	305
Other backward class	76.8	12.4	22.0	62.1	3.5	100.0	47.1	432
Other	82.1	3.0	18.2	77.2	1.5	100.0	50.9	329
Exposure to media								
Exposed to any media	83.5	5.7	18.9	73.9	1.5	100.0	53.5	567
Watches television weekly	85.9	5.8	15.2	77.7	1.3	100.0	54.8	328
Listens to radio weekly	84.1	5.3	18.2	75.5	1.0	100.0	56.1	435
Visits cinema/theatre monthly	85.5	1.0	7.8	90.3	0.9	100.0	57.8	58
Reads newspaper/magazine weekly	88.0	5.4	15.2	78.6	0.8	100.0	59.9	136
Not regularly exposed to any media	65.4	13.5	28.4	53.8	4.3	100.0	38.0	807
Total	72.9	10.3	24.5	62.1	3.2	100.0	44.4	1,374

( ) 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 6.12 shows that 73 percent of mothers with births during the three years preceding NFHS-2 know about ORS packets, up from 43 percent among women who gave birth during the three years before NFHS-1. This comparison suggests that awareness of ORS has increased substantially during the six years between the two surveys. Knowledge of ORS packets is somewhat lower among mothers age 15–19 and mothers age 35 years or older than among mothers in intermediate age groups. As expected, knowledge is somewhat higher among urban mothers than rural mothers, and substantially higher among more educated mothers, especially literate mothers as compared with illiterate mothers. Knowledge of ORS does not vary by

religion. Knowledge of ORS packets is much lower among mothers who are not regularly exposed to any mass media than among mothers who are exposed to some media. Mothers belonging to scheduled tribes are less likely to know about ORS than mothers with any other background characteristics.

In order to assess mothers' knowledge of children's need for extra fluids during episodes of diarrhoea, all mothers of children born in the past three years were asked: 'When a child is sick with diarrhoea, should he/she be given less to drink than usual, about the same, or more than usual?' Table 6.12 shows the response of mothers to this question by selected background characteristics. In Orissa, 62 percent of mothers report that children should be given more to drink than usual during an episode of diarrhoea, compared with 10 percent who report that children should be given less and 25 percent who report that children should be given the same amount. This suggests that many mothers in Orissa still need education in the proper treatment of diarrhoea. The proportion reporting correctly that children with diarrhoea should be given more to drink is particularly low among rural mothers, less educated mothers, mothers belonging to scheduled tribes, and mothers not regularly exposed to any mass media. Mothers age 15–24 and 35 years or older are slightly less likely to answer correctly than mothers age 25–34.

To assess whether mothers are aware of one or more signs associated with diarrhoea that suggest the need for medical treatment, mothers were also asked: 'When a child is sick with diarrhoea, what signs of illness would tell you that he or she should be taken to a health facility or health worker?' All answers given by the respondent were recorded. The signs warranting medical treatment include repeated watery stools, repeated vomiting, blood in stools, fever, marked thirst, not eating or not drinking well, getting sicker or very sick, and not getting better. Table 6.12 shows that 44 percent of mothers were able to name two or more signs of diarrhoea that indicate that a child with diarrhoea should be given medical treatment. As expected, the percentage is lower among rural than urban mothers, lower among less-educated than more-educated mothers, and much lower among mothers not regularly exposed to any media than mothers exposed to some media. It is also lower among mothers belonging to scheduled tribes than mothers in other caste/tribe categories. Knowledge of two or more signs of diarrhoea that suggest the need for medical treatment is universally low across demographic and socioeconomic groups. This suggests a need for further educating mothers with regard to children's diarrhoea so that they are better able to recognize the signs of diarrhoea for which a health provider should be consulted.

Table 6.13 shows the percentage of children under age three with diarrhoea during the two weeks preceding the survey who were taken to a health facility or provider, the percentage who received various types of oral rehydration therapy (ORT), and the percentage who received other types of treatment, by selected background characteristics. Among children in Orissa who suffered from diarrhoea during the two weeks preceding NFHS-2, 47 percent were taken to a health facility or provider. This is the same percentage as reported in NFHS-1. Thirty-five percent of children with diarrhoea did not receive any treatment at all. Medical advice or treatment was more likely to be sought for boys than for girls, for urban children than for rural children, for children of more-educated mothers than for children of less-educated mothers, and for children in households with a high standard of living than children in households with a low or medium standard of living. The likelihood of seeking treatment is much lower for scheduled-tribe children than for children with any other background characteristics, once again emphasizing the great disadvantages associated with being a scheduled-tribe child in Orissa.

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, Orissa, 1999

		Oral rehydration					Other treatment						
Background characteristic	Taken to a health facility or provider	Oral rehydration salt (ORS) packets	Gruel	Homemade sugar-salt-water solution	Increased fluids	ORT not given	Pill or syrup	Injection	Intrave-nous (IV/drip/ bottle)	Home remedy/ Herbal medicine	Other	No treat-ment	Number of children with diarrhoea
Age of child													
1–11 months	43.8	29.1	11.5	3.8	36.9	40.4	25.7	2.2	0.8	5.8	0.0	44.3	131
12–23 months	49.4	37.1	15.6	11.4	39.0	31.1	22.1	5.7	0.0	7.0	0.0	27.5	157
24–35 months	46.8	39.8	16.2	12.4	53.0	25.5	24.3	6.8	0.0	6.6	0.6	32.7	99
Sex of child													
Male	50.6	35.3	14.4	10.7	42.3	35.1	23.5	2.9	0.6	4.6	0.0	33.8	193
Female	43.1	34.8	14.3	7.5	41.5	30.6	24.2	6.6	0.0	8.5	0.3	35.2	193
Residence													
Urban	51.1	34.6	13.7	15.3	33.0	32.8	26.1	4.1	0.0	0.0	1.4	27.1	42
Rural	46.4	35.1	14.4	8.4	43.0	32.8	23.6	4.8	0.3	7.3	0.0	35.4	344
Mother's education													
Illiterate	42.3	32.3	12.2	6.5	37.8	39.1	23.1	6.7	0.5	6.6	0.0	38.5	233
Literate, < middle school complete	50.5	34.9	18.7	12.5	44.3	28.2	22.1	1.1	0.0	7.3	0.0	35.9	103
Middle school complete	(61.0)	(48.6)	(22.8)	(8.1)	(39.4)	(20.5)	(31.3)	(6.2)	(0.0)	(8.1)	(0.0)	(12.3)	27
High school complete and above	(59.8)	(47.8)	(7.3)	(21.4)	(74.2)	(4.6)	(31.0)	(0.0)	(0.0)	(0.0)	(2.5)	(14.1)	23
Caste/tribe													
Scheduled caste	48.1	35.7	8.8	5.2	37.6	38.0	22.9	4.2	1.0	6.1	0.0	37.4	107
Scheduled tribe	21.2	27.9	12.3	0.8	34.1	46.1	15.6	1.6	0.0	8.2	0.0	47.6	68
Other backward class	55.1	35.2	20.4	10.4	43.0	29.6	31.4	8.1	0.0	7.1	0.0	30.2	109
Other	53.8	39.1	15.1	17.3	50.3	22.0	22.2	3.9	0.0	5.3	0.6	27.4	102
Standard of living index													
Low	45.7	34.1	10.7	8.0	35.9	36.4	22.8	5.3	0.5	4.7	0.0	39.9	234
Medium	44.5	34.5	19.9	10.8	48.2	29.1	25.8	5.0	0.0	9.9	0.0	28.5	122
High	(70.3)	(48.5)	(17.9)	(12.1)	(64.5)	(17.5)	(22.0)	(0.0)	(0.0)	(7.8)	(2.1)	(17.7)	28
Total	46.9	35.1	14.4	9.1	41.9	32.8	23.9	4.8	0.3	6.5	0.2	34.5	386

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 2 children with missing information on the standard of living index, who are not shown separately.
( ) Based on 25–49 unweighted cases

Thirty-five percent of the children age 1–35 months who suffered from diarrhoea during the two weeks preceding the survey were treated with ORS packets. Although this is up from 17 percent in NFHS-1, indicating considerable improvement in the use of ORS packets in Orissa for the treatment of childhood diarrhoea, there is still much room for improvement.

The proportion of children who did not receive any of the various types of oral rehydration therapy (ORT) when sick with diarrhoea decreased from 59 percent in NFHS-1 to 33 percent in NFHS-2. In NFHS-2, 42 percent of children with diarrhoea received increased fluids, and 14 percent received gruel.

The use of antibiotics and other antidiarrhoeal drugs is not generally recommended for the treatment of childhood diarrhoea. Yet 24 percent of the children who had diarrhoea in the two weeks before NFHS-2 were treated with pills or syrup, and 5 percent received an injection. These figures indicate the need for increased knowledge about the proper treatment of diarrhoea, not only among mothers but also among health-care providers. More generally, all of these results underscore the need for informational programmes for mothers and supplemental training for health-care providers that emphasize the importance of ORT, increased fluid intake, and continued feeding, and discourage the use of drugs to treat childhood diarrhoea.

The youngest children (age 1–11 months), male children, and children belonging to scheduled castes and scheduled tribes are less likely than other children to receive any of the various types of oral rehydration therapy. Children are more likely to receive oral rehydration therapy with an increase in their mother's level of education or their household's standard of living. The use of unnecessary drugs or injections varies little except by mother's education (higher for children whose mothers have completed middle school) and by caste/tribe status (highest for other-backward-class children and lowest for scheduled-tribe children).

Table 6.14 shows the percent distribution of children who were treated with ORS for diarrhoea in the two weeks before NFHS-2 by source of the ORS packets. Only 135 children were treated with ORS packets in the Orissa sample, so the results in this table should be interpreted with caution. For 58 percent of children who were treated with ORS, the packets were obtained from public-sector sources, for 12 percent the packets were obtained from private-sector sources, for 1 percent the packets were obtained from nongovernmental organizations or trusts, and for the remaining 30 percent the packets were obtained from other sources, primarily shops. Among the public-sector sources, community health centres (CHC), rural hospitals, or Primary Health Centres (PHC) are most often mentioned, followed by government or municipal hospitals, sub-centres, and government dispensaries, although 1 in 10 mention some other public medical sector source. Among the private-sector sources, nearly all ORS packets were obtained from a private hospital or clinic, private doctor, or pharmacy or drugstore. The pharmacy or drugstore category, listed under private-sector sources, accounts for almost 2 percent of all cases. If this category is added to the 'other source' category, the proportion purchasing ORS packets from shops, pharmacies, or drugstores becomes 31 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, Orissa, 1999

Source	Percent
Public medical sector	58.0
Government/municipal hospital	14.9
Government dispensary	2.1
CHC/rural hospital/PHC	22.8
Sub-centre	8.3
Other public medical sector	9.9
NGO or trust	0.8
NGO worker	0.8
Private medical sector	11.5
Private hospital/clinic	7.0
Private doctor	1.6
Private mobile clinic	0.8
Private paramedic	0.4
Pharmacy/drugstore	1.6
Other source	29.6
Shop	24.7
Husband	3.3
Other	1.7
Total percent	100.0
Number of children treated with ORS	135

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 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 Orissa have never heard of an illness called AIDS. NFHS-1 did not include AIDS-awareness questions for Orissa, so it is not possible to assess any trend in AIDS awareness between NFHS-1 and NFHS-2.

Knowledge of AIDS varies little by woman's age. Urban residence, education, and standard of living have a strong positive association with AIDS knowledge. Sixty-eight percent of urban women in Orissa have heard about AIDS, compared with only 36 percent of rural women. Knowledge of AIDS increases from 17 percent among illiterate women to 94 percent among women who have at least completed high school. Similarly, knowledge of AIDS increases from 20 percent among women in households with a low standard of living to 90 percent among women in households with a high standard of living. Hindu women are much less likely to know about AIDS (39 percent) than Muslim women (59 percent) but more likely to know about AIDS than Christian women (29 percent). Greater knowledge of AIDS among Muslims than Hindus may in part be due to the greater concentration of Muslims in urban areas. Only 11 percent of scheduled-tribe women have heard about AIDS, compared with 33 percent of scheduled-caste women, 38 percent of women belonging to other backward classes, and 64 percent of 'other' women. Exposure to mass media increases women's knowledge about AIDS substantially. Ninety-two percent of women who read a newspaper or magazine at least once a week know about AIDS, compared with 15 percent of women who are not regularly exposed to any mass media (newspapers, magazines, radio, television, cinema, or theatre).

Source of Knowledge About AIDS

As part of the AIDS prevention programme, the Government of India has been using mass media, especially electronic media, extensively to create awareness among the general public about AIDS and its prevention. NFHS-2 asked women who had heard of AIDS about their sources of AIDS information. Table 6.15 also gives the percentages of ever-married women who have heard about AIDS from specific sources. Television is the most important source of information about AIDS among ever-married women in Orissa. Seventy-four percent of women report television as a source of their information about AIDS, followed by radio (62 percent), and friends or relatives (40 percent). Only 2 percent report that they received information about AIDS from a health worker.

Television is the most important source of information about AIDS in both rural and urban areas, followed by radio. 'Friends or relatives' is the third most important source in rural areas, whereas 'newspapers or magazines' is the third most important source by a slight margin over 'friends or relatives' in urban areas. Rural women are more likely than urban women to have learned about AIDS from the radio or from friends or relatives. On the other hand, urban women are more likely to have learned about AIDS from television, cinema, or a newspaper or magazine. More-educated women are more likely than less-educated women to have learned about AIDS from the radio, television, newspaper or magazine, cinema, or a poster or hoarding but less likely to have learned from a friend or relative. Hindu women are slightly more likely than Muslim women to have learned about AIDS from the radio or a newspaper or magazine, but somewhat less likely to have learned about AIDS from a friend or relative. As standard of living

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, Orissa, 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	36.3	1,112	64.0	69.6	5.1	17.0	7.1	1.5	0.7	43.1	0.8	1.7	404
25–34	41.4	1,751	62.2	74.9	5.7	17.4	7.1	2.2	0.4	40.1	0.5	3.0	724
35–49	38.3	1,562	59.9	77.2	4.4	15.6	6.8	2.5	0.4	38.4	1.3	3.6	599
Residence													
Urban	67.7	488	47.8	91.1	9.8	29.5	8.1	3.6	1.0	27.9	0.7	3.8	331
Rural	35.5	3,937	65.1	70.5	3.9	13.6	6.8	1.8	0.3	43.1	0.9	2.7	1,396
Education													
Illiterate	17.3	2,633	52.9	55.6	1.6	1.3	4.9	1.1	0.2	46.3	0.6	3.3	455
Literate, < middle school complete	60.5	1,153	62.7	75.1	2.1	9.3	6.2	1.4	0.2	39.3	0.3	2.2	698
Middle school complete	85.0	305	69.0	79.8	7.0	24.3	7.1	2.6	0.0	39.2	0.9	1.1	259
High school complete and above	94.4	334	66.8	95.7	15.2	48.8	11.9	5.0	1.8	34.4	2.3	5.5	315
Religion													
Hindu	38.8	4,279	62.0	74.5	5.0	16.6	6.8	2.0	0.5	40.0	0.8	2.8	1,661
Muslim	58.8	75	56.8	75.6	1.3	13.4	8.9	5.0	0.0	48.1	0.0	2.6	44
Christian	28.5	68	(65.9)	(59.9)	(14.2)	(31.3)	(20.1)	(8.6)	(0.0)	(40.0)	(8.6)	(17.1)	19
Caste/tribe													
Scheduled caste	33.1	938	61.3	60.2	1.8	7.7	5.0	3.2	0.2	48.5	1.1	4.5	311
Scheduled tribe	11.0	868	47.0	57.7	2.3	10.9	3.5	4.0	0.0	35.8	1.8	4.8	96
Other backward class	38.4	1,371	57.5	73.4	3.9	13.6	7.3	1.5	0.4	41.9	0.7	1.5	527
Other	63.7	1,246	66.7	82.7	7.5	22.9	8.0	2.0	0.6	36.4	0.8	3.0	794
Standard of living index													
Low	20.1	2,376	57.8	50.0	1.6	3.5	6.5	2.2	0.2	50.3	0.6	4.6	478
Medium	52.4	1,559	63.6	76.7	3.7	12.7	5.5	0.9	0.3	39.2	0.5	1.8	818
High	89.5	474	62.9	97.1	11.6	39.2	10.8	4.6	1.0	30.7	1.7	2.9	425
Exposure to mass media													
Exposed to any media	69.6	1,958	66.8	82.9	6.2	20.6	8.1	2.1	0.5	35.1	1.0	2.7	1,363
Listens to radio weekly	67.4	1,463	80.9	79.3	6.3	19.8	8.9	1.7	0.3	36.0	1.3	2.3	985
Watches television weekly	82.4	1,228	61.7	95.4	7.2	23.7	8.3	2.3	0.7	32.1	1.1	2.6	1,012
Goes to cinema/theatre monthly	87.7	205	70.5	92.9	14.3	32.7	14.6	3.1	1.2	28.8	1.2	2.5	179
Reads newspaper/magazine weekly	91.6	475	71.2	90.7	12.4	46.7	11.7	3.8	1.0	28.8	1.4	3.3	435
Not regularly exposed to any media	14.8	2,467	43.3	42.7	0.9	2.1	3.0	2.4	0.3	59.5	0.3	3.8	364
Total	39.0	4,425	61.8	74.4	5.1	16.7	7.0	2.2	0.4	40.2	0.8	2.9	1,727

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

increases, women are more likely to have learned about AIDS from television, less likely to have learned from a friend or relative, and equally likely to have learned from the radio. Women who are not regularly exposed to mass media are much more likely to have learned about AIDS from a friend or relative than from any other source, as might be expected.

Knowledge of Ways to Avoid AIDS

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

Among women who have heard about AIDS, 16 percent do not know any way to avoid infection. As expected, this percentage is higher among rural women than among urban women and among women not regularly exposed to mass media than among women who are regularly exposed. The percentage who do not know any way to avoid becoming infected with AIDS increases slightly with age and decreases sharply with increasing levels of education and household standard of living. This percentage is higher among Hindu women (16 percent) than among Muslim women (5 percent) or Christian women (11 percent). Scheduled-tribe women are less likely to know any way to avoid AIDS than women in other caste/tribe/class groups.

Among women who report that something can be done to prevent AIDS, 'avoiding injections or using clean needles' (62 percent) and 'having only one sex partner' (40 percent) are the most commonly mentioned ways of avoiding AIDS. 'Avoiding sex with commercial sex workers' and 'avoiding blood transfusion' are also mentioned as ways to avoid AIDS by substantial proportions of women (35 percent and 27 percent, respectively). Only 15 percent of women mention using a condom during intercourse as a way of avoiding AIDS. Seventeen percent mention abstaining from sex, 5 percent mention avoiding intravenous drug use, and 3 percent mention avoiding sex with homosexuals. The percentage reporting each of these means of avoiding AIDS is lower among rural than among urban women, except for the percentage who mention avoiding sex with commercial sex workers, and is lower among women not regularly exposed to mass media than among women who are regularly exposed. The level of education and the household standard of living are strongly and positively associated with women mentioning each of these ways of avoiding AIDS. Among all background characteristics, the use of condoms as a way of avoiding AIDS is mentioned most often by women who have at least completed high school, followed by women from households with a high standard of living, women who go to the cinema or theatre at least once a month, and women who read a newspaper or magazine weekly.

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, Orissa, 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	17.7	17.0	42.3	33.5	4.5	25.7	62.9	4.6	28.6	11.9	404
25–34	18.3	15.4	40.2	36.1	2.2	27.3	61.8	3.9	24.2	16.0	724
35–49	14.6	11.6	36.7	33.4	2.3	27.8	61.2	6.3	24.0	17.8	599
Residence											
Urban	21.1	20.9	40.2	33.9	3.2	32.7	68.8	5.6	22.7	13.6	331
Rural	15.9	13.0	39.3	34.7	2.7	25.7	60.2	4.7	25.7	16.1	1,396
Education											
Illiterate	10.0	5.4	30.8	28.6	0.9	19.7	48.3	4.5	14.3	26.8	455
Literate, < middle school complete	17.4	12.1	37.0	31.2	2.5	24.9	61.1	4.3	27.5	16.5	698
Middle school complete	19.3	18.3	42.8	39.3	3.8	28.6	73.2	4.1	28.9	9.8	259
High school complete and above	23.6	29.8	54.7	46.5	5.3	41.2	73.7	7.5	32.7	2.5	315
Religion											
Hindu	16.8	14.7	39.3	33.9	2.8	27.1	61.6	4.9	24.9	16.0	1,661
Muslim	14.2	7.5	40.0	45.5	1.3	31.7	69.7	3.9	30.1	5.2	44
Christian	(28.6)	(5.6)	(51.6)	(57.1)	(5.6)	(17.0)	(68.7)	(8.6)	(37.2)	(11.4)	19
Caste/tribe											
Scheduled caste	12.4	9.4	37.8	25.4	2.1	27.8	54.0	5.5	20.4	20.0	311
Scheduled tribe	12.1	16.6	30.7	22.2	1.1	11.5	35.7	0.0	13.6	31.5	96
Other backward class	12.1	8.5	39.6	34.3	2.3	28.0	60.7	5.2	22.7	16.6	527
Other	22.4	20.2	41.1	39.7	3.5	28.1	68.9	5.0	30.1	11.5	794
Standard of living index											
Low	11.6	7.9	32.5	31.8	1.4	21.5	53.3	3.8	18.6	20.2	478
Medium	15.7	13.3	39.6	31.3	2.5	24.6	61.0	4.9	27.1	16.9	818
High	25.0	24.2	47.3	44.0	4.9	37.6	72.6	5.9	29.1	8.3	425
Exposure to mass media											
Exposed to any media	19.2	16.5	40.5	37.3	3.3	29.9	66.4	5.6	27.3	12.9	1,363
Listens to radio weekly	21.3	15.9	39.3	40.6	3.2	29.5	67.0	5.7	29.4	12.3	985
Watches television weekly	19.7	19.2	43.7	35.4	3.3	31.4	67.5	5.9	28.0	11.2	1,012
Goes to cinema/theatre monthly	24.7	23.0	42.3	41.6	4.4	42.5	75.1	6.2	30.1	6.5	179
Reads newspaper/magazine weekly	25.2	25.0	48.2	42.8	4.4	33.1	74.1	5.3	30.7	6.8	435
Not regularly exposed to any media	8.1	6.9	35.9	24.3	0.9	16.6	44.8	2.3	17.3	26.0	364
Total	16.9	14.5	39.5	34.5	2.8	27.1	61.8	4.9	25.2	15.7	1,727

Note: Total includes 2 women belonging to 'other' religions and 7 women with missing information on the standard of living index, who are not shown separately.
( ) Based on 25–49 unweighted cases