CHAPTER 7

INFANT AND CHILD MORTALITY

7.1 Background

Reported in this chapter is information on levels, trends, and differentials in neonatal, postneonatal, infant and child mortality. This information is relevant to the demographic assessment of both population and health policies and programs. Estimates of infant and child mortality may be used as inputs into population projections, particularly if the level of adult mortality is known from another source or can be inferred with reasonable confidence. Information on mortality of children also serves the needs of agencies providing health services by identifying sectors of the population which are at high mortality risk.

In this report, infant and child mortality are measured using the following rates:

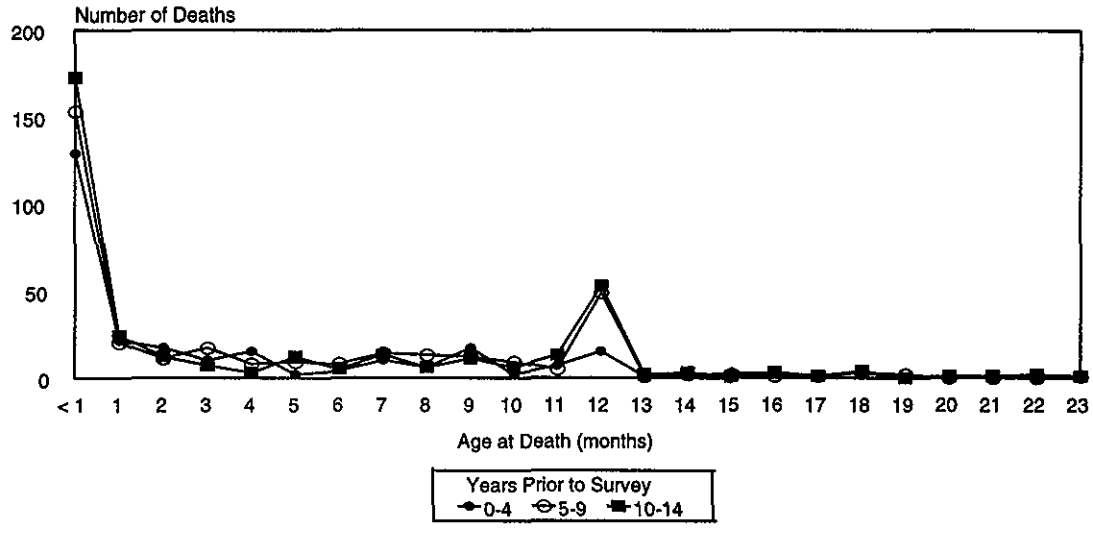
- Neonatal mortality (NN): the probability of dying within the first month of life;
- Postneonatal mortality (PNN): the probability of dying after the first month of life but before age one year;
- Infant mortality (${}_1q_0$): the probability of dying between birth and age one year;
- Child mortality (${}_4q_1$): the probability of dying between exact age one and age five;
- Under-five mortality (${}_5q_0$): the probability of dying between birth and exact age five.

The mortality rates presented in this chapter are computed from information derived from the questions asked in the pregnancy history section of the 1998 National Demographic and Health Survey (NDHS) individual woman's questionnaire. Data collection proceeded as follows: first, each woman was asked about the number of sons and daughters living with her in the same household as well as those who are living elsewhere, and the number who had died. At this point, the respondent was also asked about the number of pregnancies which did not result in a live birth. Next, the respondent was asked to give information on each of the pregnancies she had experienced. For each pregnancy, she was asked whether the pregnancy ended in a live birth or not. The name, sex, date of birth, age at last birthday, whether the birth was an outcome of a single or multiple birth, and survival status were recorded for all live births. If the child had died, the woman was asked the age at death. If the child was still living, information about his/her age at last birthday and whether the child lived with his/her mother was obtained. For pregnancies that did not result in a live birth, the respondent was asked if she or someone else did something to end the pregnancy, and what the duration of the pregnancy was at the time of loss.

The information on living and dead children is used to directly estimate mortality rates. It should be noted here that the reliability of these mortality estimates depends upon full recall about children who have died, the absence of significant differentials in birth dates between living and dead children, and accurate reporting of age at death. It should be said, however, that birth history data provide information that make detailed analyses of mortality possible.

A closer look at the pattern of reporting of age at death (Table C.6 in Appendix C and Figure 7.1) reveals some evidence of heaping of deaths. For the five years preceding the survey, a significantly high percentage of deaths was reported among infants 12 months of age. However, this heaping on age at death of 12 months is far lower for deaths occurring in the five years preceding the survey than it is for earlier deaths. Thus, reporting of age at death appears to be reasonable, though a more thorough investigation would result in more definitive conclusions.

Figure 7.1
Deaths among Children Under Two Years for Three 5-Year Periods Preceding the Survey



In order to analyze trends in mortality, direct estimates based on the 1983, 1988 and 1993 NDS, the 1986 Contraceptive Prevalence Survey (CPS), and the Republic of the Philippines Fertility Survey (RPFS) are also presented in this chapter as well as estimates from the Vital Registration System (VRS).

Data from the maternity histories collected in previous surveys cited earlier provided direct estimates of infant mortality at various periods preceding each survey. The estimates from the vital registration system were calculated using the ratio of registered infant deaths to births expressed in terms of 1,000 live births. Comparing the point estimates of infant mortality from various sources during the same periods provides some insights as to the levels and trends of infant mortality.

7.2 Levels and Trends in Infant and Child Mortality

Table 7.1 presents various mortality estimates for children under five based on the 1998 NDHS. The infant mortality rate during the five-year period prior to the survey was 35 deaths per 1,000 live births, while the neonatal mortality rate was 18 deaths per 1,000 live births. The probability of dying between birth and the fifth birthday was 48 per 1,000 live births. The data indicate that the under-five mortality rate declined from 72 in the period 10 to 14 years prior to the survey to 48 in the most recent five-year period. While the various measures of mortality showed a declining trend, a variable pattern was observed in mortality during the post-neonatal period.

Table 7.1 Infant and child mortality

Infant and child mortality rates by five-year periods preceding the survey, Philippines 1998

Years preceding survey	Neonatal mortality (NN)	Postneonatal mortality (PNN)	Infant mortality ($_1q_0$)	Child mortality ($_4q_1$)	Under-five Mortality ($_5q_0$)
0-4	17.8	17.3	35.1	13.8	48.4
5-9	20.7	16.1	36.8	26.2	62.1
10-14	26.5	19.1	45.6	27.9	72.3

Table 7.2 and Figure 7.2 show direct measures of infant mortality from various sources. During the 25-year period, infant mortality continued to decline though at varying paces. Prior to 1980, the IMR based on the Vital Registration System (VRS) was generally higher than those directly measured from the four national demographic surveys, with the exception of the 1975 IMR estimate from the 1978 RPFS, which was higher than the VRS estimate. The 1983 and 1988 NDS rounds yielded more or less comparable IMR estimates for 1975 and 1980. The pattern observed with vital registration as a source is reversed for the period since 1980 in which the rates are much lower than those estimated from the national surveys. Point estimates for 1980 appear to be similar from all sources. There is, however, wide divergence in the preceding and succeeding periods.

The estimates from the 1998 NDHS are slightly higher than those from the 1993 NDS for the same time period, but the trends of the IMR estimates from these two surveys are similar. The IMR appears to have dramatically declined between 1980 and 1990.

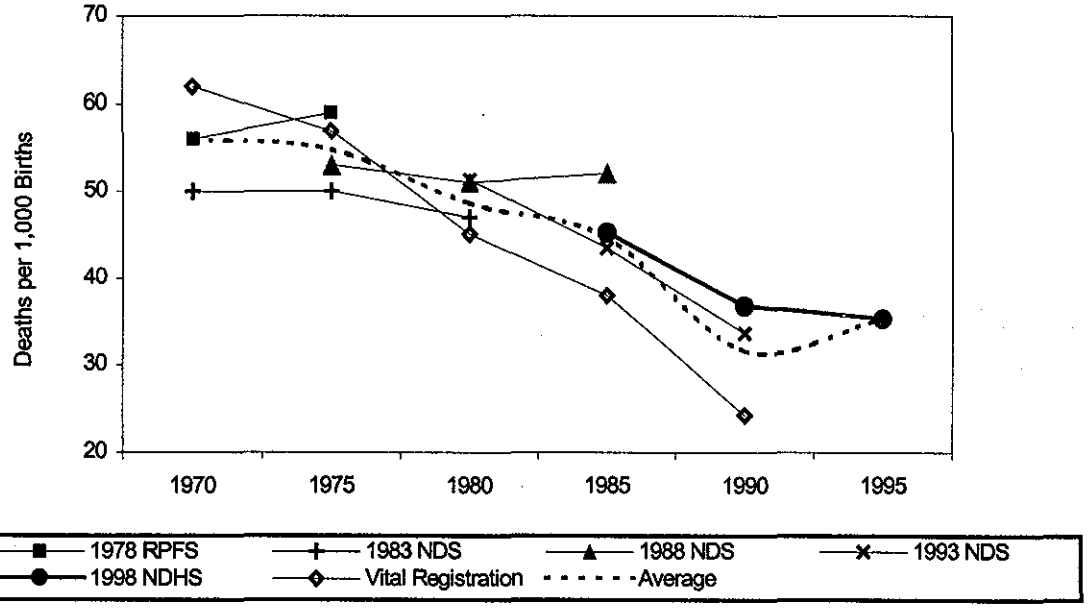
Table 7.2 Trend in infant mortality rate

Infant mortality rates from various sources, Philippines 1970-1995

Approximate Midpoint	1998 NDHS	1993 NDS	1988 NDS	1983 NDS	1978 RPFS	Vital Registration System
1995	35.1	-	-	-	-	-
1990	36.8	33.6	-	-	-	24.3
1985	45.6	43.5	52.0	-	-	38.0
1980	-	51.3	51.0	47.0	-	45.1
1975	-	-	53.0	50.0	59.0	56.9
1970	-	-	-	50.0	56.0	62.0

Source: Final Report of the Task Force on Infant Mortality Rate, NSCB, December 1992
1993 NDS and 1998 NDHS

Figure 7.2
Trends in Infant Mortality in the Philippines
Various Sources, 1970-1995



7.3 Infant and Child Mortality Differentials by Socioeconomic Characteristics

Socioeconomic factors are important determinants of the levels of infant and child mortality. In the 1998 NDHS, several socioeconomic factors have been measured such as place of residence and education of parents. Health beliefs and practices as well as accessibility or availability of health care services have also been collected. This section deals with the relationship between the childhood mortality measures and some of these variables.

Table 7.3 shows mortality measures by selected background characteristics of the mother for the 10-year period preceding the survey. In general, mortality in urban areas is lower than in rural areas.

Table 7.3 Infant and child mortality by socioeconomic characteristics

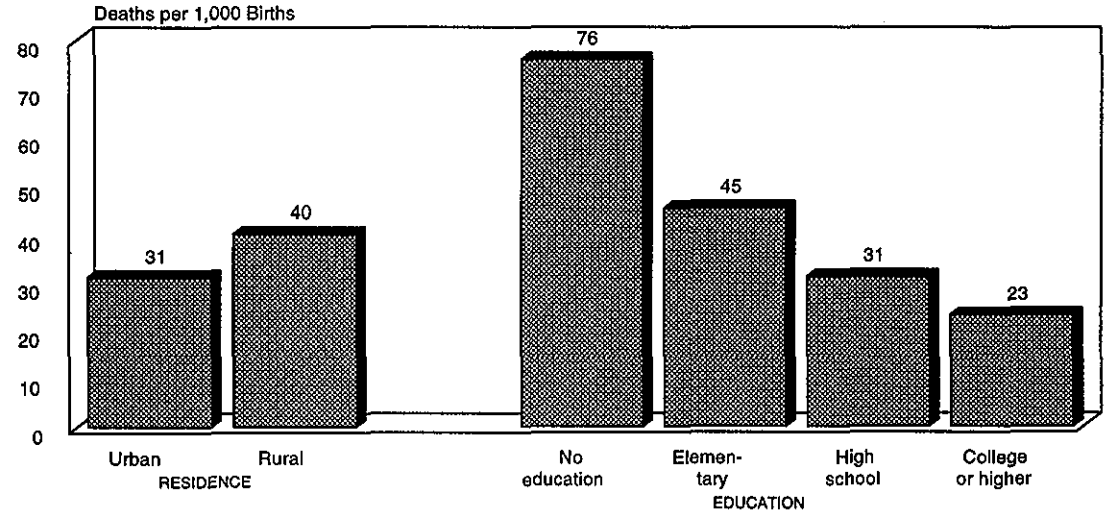
Infant and child mortality rates for the 10-year period preceding the survey, by selected socioeconomic characteristics, Philippines 1998

Socioeconomic characteristic	Neonatal mortality (NN)	Postneonatal mortality (PNN)	Infant mortality ($_1q_0$)	Child mortality ($_4q_1$)	Under-five mortality ($_5q_0$)
Residence					
Urban	17.6	13.3	30.9	15.4	45.8
Rural	20.6	19.6	40.2	23.3	62.5
Region					
Metro Manila	15.1	8.6	23.7	15.3	38.6
Cordillera Admin.	18.7	24.0	42.7	10.1	52.4
Ilocos	27.7	13.9	41.5	10.2	51.3
Cagayan Valley	15.4	21.7	37.1	16.1	52.6
C. Luzon	20.1	8.5	28.7	11.1	39.4
S. Tagalog	21.1	14.2	35.3	18.5	53.2
Bicol	14.7	16.7	31.4	21.8	52.5
W. Visayas	11.2	14.8	26.0	16.1	41.6
C. Visayas	11.5	12.1	23.6	15.1	38.4
E. Visayas	31.3	29.5	60.8	26.4	85.6
W. Mindanao	19.5	25.1	44.6	31.7	74.9
N. Mindanao	21.1	19.9	41.0	24.8	64.8
S. Mindanao	19.1	21.8	40.9	21.1	61.2
C. Mindanao	27.0	21.4	48.4	29.0	75.9
ARMM	23.6	31.5	55.1	45.0	97.6
Caraga	28.6	24.6	53.2	31.0	82.5
Education					
No education	35.4	43.1	78.5	62.0	135.7
Elementary	20.4	24.7	45.1	29.2	73.0
High school	19.5	11.9	31.4	14.8	45.7
College or higher	15.3	8.1	23.4	5.0	28.3
Medical maternity care					
No antenatal/delivery care	29.2	47.6	76.8	36.6	110.6
Either antenatal or delivery	16.3	20.2	36.5	12.7	48.7
Both antenatal & delivery	15.4	7.2	22.5	7.6	30.0
Total	19.3	16.7	36.0	19.7	54.9

Among regions, infant mortality is lowest in Metro Manila and Central Visayas and highest in Eastern Visayas. Child mortality is lowest in Cordillera Administrative Region and Ilocos Region and highest in ARMM.

Table 7.3 also indicates that mortality rates for children of mothers with no education or elementary education are much higher than those with a high school or, especially, college education (see Figure 7.3). This supports the findings from the 1993 NDS and of previous studies which showed that children born to better educated mothers have a higher probability of surviving their early years. In reviewing Philippines studies in this area, using various statistical techniques and mortality indicators, Costelo (n.d.) concluded that there is an inverse relationship between maternal education and infant mortality.

Figure 7.3
Infant Mortality by Background Characteristics



Note: Figures are for the 10-year period preceding the survey.

1998 NDHS

Meanwhile, mortality among infants/children whose mothers had no antenatal care or medical assistance at the time of delivery is much higher than among those whose mothers had either or both antenatal care and medical assistance during delivery. This observation reinforces the findings of local studies which show that accessibility and availability of health services/facilities can be linked empirically to reduced rates of infant mortality. For instance, it was found that access to a midwife, hospital, primary health care center, or pharmacy is inversely associated with neonatal mortality, and that access to a health worker and hospital has a similar impact on postneonatal mortality. Access to modern medical practitioners can be linked to lower infant mortality.

7.4 Infant and Child Mortality Differentials by Demographic and Health Characteristics

Table 7.4 shows mortality by selected demographic characteristics which have been shown to influence the survival chances of children. In general, mortality is higher for males than for females. One of the variables known to have an effect on infant mortality is the mother's age at the time of delivery. The level of infant mortality, particularly during the neonatal period, and under-five mortality is higher among children whose mothers were less than age 20 at the time of delivery, decreases among mothers age 20-29, and increases among mothers age 40-49. Child mortality does not show a definite pattern of variation with mother's age.

Table 7.4 Infant and child mortality by demographic characteristics

Infant and child mortality rates for the 10-year period preceding the survey, by selected demographic characteristics, Philippines 1998

Demographic characteristic	Neonatal mortality (NN)	Postneonatal mortality (PNN)	Infant mortality ($_1q_0$)	Child mortality ($_4q_1$)	Under-five mortality ($_5q_0$)
Sex of child					
Male	20.6	18.7	39.4	20.8	59.4
Female	17.8	14.5	32.3	18.5	50.2
Age of mother at birth					
<20	26.4	15.0	41.4	19.1	59.7
20-29	16.3	17.0	33.3	18.1	50.8
30-39	21.0	16.7	37.6	23.3	60.0
40-49	35.3	16.7	52.0	16.0	67.2
Birth order					
1	20.8	11.0	31.8	10.5	42.0
2-3	16.6	15.3	31.9	14.3	45.7
4-6	18.5	20.2	38.8	28.4	66.0
7+	26.9	26.2	53.1	39.7	90.7
Previous birth interval					
<2 yrs	20.9	25.1	46.1	28.5	73.2
2-3 yrs	14.1	14.1	28.2	21.8	49.4
4 yrs+	22.7	14.8	37.5	11.2	48.3
Size at birth[1]					
Small or very small	30.6	18.0	48.6	13.9	61.9
Average or larger	13.8	14.8	28.6	12.6	40.8

[1]Rates for the 10-year period preceding the survey

The levels of infant and child mortality among children of birth order 1 to 3 are similar but rise thereafter with increasing birth order. Mortality according to the length of the previous birth interval indicates the usual pattern of high mortality among children born less than two years after the previous birth. Mortality rates decline considerably for children born 2-3 years after a prior birth. However, neonatal mortality is markedly higher while the mortality rates after the neonatal period but before the age of 5 years are lower for children born 4 or more years after a previous birth compared to those born 2-3 years after a previous birth.

Children who were judged by their mothers to be "average or larger" at birth generally have lower mortality levels than children judged to be "small or very small" at birth. Within the first month of life, the level of mortality for small or very small infants is about twice that for those whose birth size is average or larger.

7.5 High-Risk Fertility Behavior

The distribution of women and children according to categories of increased risk of infant and child mortality as a result of fertility behavior of the mother is shown in Table 7.5. Children at elevated risk include those born to mothers who are too young or too old when they give birth, children of high parity, and children born after a short interval. The table also presents the relative risk of dying for children born in the last five years by comparing the proportion dead in each high-risk category with the proportion dead among children who are not in any high-risk category. This information is useful for designing and monitoring programs both to avoid high-risk behavior and to cope with elevated risks.

Of the children born in the five years preceding the survey, 57 percent are in one or more elevated risk categories. High birth order and short birth interval were the most common high-risk factors. More than one-fifth of all births are subject to multiple risk characteristics. Under the single risk category, 2 percent were born to mothers younger than 18 years, 3 percent were born to mothers older than 34 years, 15 percent were born after an interval of less than 24 months, and 16 percent were of birth order greater than 3. Under the multiple high-risk category, 10 percent were born to mothers over 34 years of age and were of birth order greater than 3, and 9 percent were born after an interval of less than 24 months and were of birth order greater than 3.

The risk ratios shown in the second column of Table 7.5 illustrate the relationship between the risk factors and mortality levels. The risk ratios for children in the single high-risk categories are generally lower than risk ratios for children in multiple high-risk categories. Those who fall into only one elevated risk category have a risk ratio of 1.44, while children who are in the multiple high-risk categories have a risk ratio of 2.14. The highest risk ratios for those in single high-risk categories are observed for children with mothers who are older than 34 years of age (2.14). As for children who are in the multiple high-risk categories, the highest ratio is observed for those with mothers who are older than 34 years, with birth interval less than 24 months, and with birth order greater than 3 (2.60). High-risk ratios are also observed for children with birth order greater than 3 and with birth interval less than 24 months (2.09).

Table 7.5 High-risk fertility behavior

Percent distribution of children born in the five years preceding the survey who are at elevated risk of dying and the percent distribution of currently married women at risk of conceiving a child with an elevated risk of dying, by category of increased risk, Philippines 1998

Risk Category	Births in the 5 years preceding the survey		Percentage of currently married women[a]
	Percentage of births	Risk ratio	
Not in any high-risk category	20.7	1.00	26.3[b]
Unavoidable risk: first births	22.4	1.01	5.0
Single high-risk category			
Mother's age < 18	2.3	1.83	0.2
Mother's age > 34	2.6	2.14	9.2
Birth interval < 24	14.5	1.40	8.9
Birth order > 3	15.8	1.31	11.9
Subtotal	35.1	1.44	30.1
Multiple high-risk category			
Age <18 & birth interval <24[c]	0.3	(6.13)	0.1
Age >34 & birth interval <24	0.4	(2.24)	0.7
Age >34 & birth order >3	9.7	1.91	26.6
Age >34 & birth interval<24 & birth order >3	2.8	2.60	3.7
Birth interval <24 & birth order >3	8.7	2.09	7.4
Subtotal	21.9	2.14	38.6
In any high-risk category	56.9	1.71	68.7
Total	100.0	-	100.0
Number	7,567	-	8,336

Note: Risk ratio is the ratio of the proportion dead of births in a specific high-risk category to the proportion dead of births not in any high-risk category,
NA = Not applicable
[a]Women were assigned to risk categories according to the status they would have at the birth of a child, if the child were conceived at the time of the survey: age less than 17 years and 3 months, age older than 34 and 2 months, latest birth less than 15 months ago, and latest birth of order 3 or higher.
[b]Includes sterilized women
[c]Includes the combined categories age <18 and birth order >3.
() *Based on 25-49 unweighted cases*

The distribution of currently married women according to category of potential risk if they were to conceive at the time of the survey is also presented. The results indicate that 30 percent of married women have the potential for giving birth to a child in a single high-risk category, and 39 percent have the potential for having a child in a multiple high-risk category.

In summary, the aforementioned findings indicate that more than half of the births in the last five years are at an elevated mortality risk. Moreover, two-thirds of married women had the potential for giving birth to a child at an elevated risk at the time of the survey. This implies that a significant reduction in infant and child mortality could be achieved through changes in childbearing patterns.