1 Introduction

1.1 PURPOSE OF THE STUDY

The principal aim of this report is to provide a reference set of standard childhood mortality statistics for policymaking, program evaluation, and research purposes. The report is as an update of a previous Demographic and Health Surveys (DHS) publication on infant and child mortality (Sullivan, Rutstein, and Bicego, 1994). The earlier paper presented a series of childhood mortality statistics for 28 Phase I DHS countries. The present study presents a similar set of statistics for an additional 20 DHS countries under Phase II and III of the DHS program. The document also highlights variations in mortality risk and, therefore, may be useful in identifying promising directions for both national and international health programs.

Section 1 of the report provides a brief summary of data sources, the methodology for collecting mortality data, issues relating to data quality, and the principles underlying the calculation of mortality rates. Section 2 presents a variety of country-specific childhood mortality indicators for the five-year period preceding the survey, and trends in mortality rates over the 15 years preceding the survey. Biodemographic and socioeconomic differentials in childhood mortality are described in Sections 3 and 4, respectively. Section 5 summarizes the findings of these analyses.

1.2 SOURCES OF DATA

The primary criterion for the inclusion of specific countries in this report was the availability of a standard recode data file at the time of the analysis. The 20 surveys covered in this report are listed below with the dates of fieldwork. Surveys that constitute repeat DHS surveys are marked with an asterisk.

Sub-Saharan Africa

Burkina Faso	1993
Cameroon	1991
Ghana*	1993
Kenya*	1993
Madagascar	1992
Malawi	1992
Namibia	1992
Niger	1992
Nigeria	1990
Rwanda	1992
Senegal*	1992/1993
Zambia	1992

Asia/Near East/North Africa

Indonesia*	1994
Morocco*	1992
Pakistan	1990/1991
Philippines	1993
Turkey	1993

Latin America/Caribbean

Colombia*	1990
Dominican Republic*	1991
Peru*	1991/1992

All of the surveys are national in scope and were conducted during the period 1990-1994. The report presents country-specific summary figures. For reference purposes, countries are grouped into three regions: 12 countries in sub-Saharan Africa, 5 countries in Asia, the Near East, and North Africa, and 3 countries in Latin America and the Caribbean.

1.3 COLLECTION OF MORTALITY DATA

In the DHS surveys, women age 15-49 are eligible for the Individual Questionnaire, which includes nine questions designed to determine the aggregate number of children ever born to a woman. In addition, questions relevant to direct estimation of mortality rates are collected using a complete maternal birth history: the sex and date of birth of every live birth,[1] survival status, current age (surviving children), and age at death (dead children). Interviewers check for and then resolve inconsistencies between the aggregate information on children ever born and the complete birth history data. In addition to providing suitable data for the estimation of levels of childhood mortality, the complete birth history approach allows the analysis of trends and patterns in mortality.

[1] Separate information is obtained for each live birth of a multiple birth.

The data on age at death require additional explanation. These data were collected in *days* for children dying within a month of birth, in *months* for children dying after the first month but before the second birthday, and in *completed years* for deaths occurring at or after the second birthday. With these data it is possible to use direct estimation procedures to calculate mortality rates by days or weeks of life for the neonatal period, by months through the first two years of life, and by single year of age thereafter. The primary advantage of this approach is that, coupled with standard field procedures for probing, the precision in age at death data at exact age 12 months (the cutoff between infant and child mortality) is improved.

1.4 DATA QUALITY

All retrospective survey data are subject to errors arising from faulty respondent recall. Birth history data, in particular, are susceptible to several special problems. In this report, only the most important aspects of data quality are reviewed. For more extensive analyses of the quality of DHS mortality see Sullivan, Bicego, and Rutstein (1990) and Curtis (1995). The surveys covered by Curtis include most of those presented in this report; the findings indicate that:

(1) The quality of data used to directly estimate rates of childhood mortality is generally good.

(2) In certain areas, notably completeness of birth date data and age at death misreporting, recent modifications in DHS procedures have led to improvements in mortality data quality (compared with previous DHS and WFS surveys). The effect on mortality estimates of misreporting of age at death or birth date is largely mitigated when rates are calculated for broad age intervals and time periods. For example, rates for 5- or 10-year periods or for the age interval from birth to age five are little affected by misreporting errors. Rates for neonatal and infant mortality are potentially more susceptible to such error.

(3) The problem of displacement of birth dates (shifting birth dates of children to an earlier calendar period) continues in some recent surveys, despite changes in procedures designed to counter the problem. Yet, simulations show that the impact of such displacement on estimates of childhood mortality is small or negligible.

(4) In a few surveys, mortality estimates for calendar periods more than 10 years prior to the survey appear to be implausibly low (perhaps due to event omission) and should be regarded with caution. Serious problems were not identified for estimates close to the survey date.[2] Whenever possible, trend analysis should involve multiple data sources.

In addition to the potential problems associated with recall error, there are structural reasons for limiting mortality estimation to more recent periods. In DHS surveys, the oldest respondents are women age 49. The birth history data for progressively earlier time periods are restricted to births whose mothers were progressively younger at the time of birth. It is known that a mother's age at birth affects child survival chances, so that the systematic exclusion of births to older women (when they were younger) may bias estimates of mortality for earlier periods.

Also, birth history data collected by sample survey is limited to the experience of children born to surviving (i.e., surveyed) mothers. The children of nonsurviving mothers are likely to be at greater than average mortality risk. The further back in time from the survey date, the greater the proportion of children with relatively high mortality risk who are not represented in the birth history data.

Based on these considerations, mortality rates are not presented for periods more than 15 years prior to a survey and most rates pertain to periods less than 10 years before a survey. No adjustments to the observed data were made in the calculation of the rates presented in this report.

1.5 RATE CALCULATION

A life table approach is used to estimate probabilities of dying between two exact ages. It is based on the number of deaths among a real or synthetic cohort of children in a specified age range who have been exposed to the risk of dying in that age range during a specified calendar period. The rates in this report are based on synthetic cohorts, with children of different birth years (i.e., different birth cohorts) contributing to the exposure and mortality experience used

[2] In a report examining the DHS data from Pakistan, Curtis and Arnold (1994) found evidence of omission of infant deaths throughout the birth history (i.e., even during recent calendar periods).

for estimation of a period-specific, age-specific probability estimate. Seven indices of childhood mortality are used:

Under-five mortality: the probability of dying between birth and exact age five years (${}_5q_0$);

Infant mortality: the probability of dying between birth and exact age one year (${}_1q_0$);

Neonatal mortality: the probability of dying between birth and exact age one month;

Postneonatal mortality[3]**:** the difference between infant and neonatal mortality rates;

Child mortality: the probability of dying between exact ages one and five years (${}_4q_1$);

Early child mortality: the probability of dying between exact ages one and two years (${}_1q_1$);

Late child mortality: the probability of dying between exact ages two and five years (${}_3q_2$).

A technical description of the calculation of the synthetic cohort probabilities presented in this report is provided in Appendix A.

[3] The conventional postneonatal mortality rate is not a mortality probability and is calculated by subtracting the neonatal mortality rate from the infant mortality rate. However, the rate closely approximates a probability measure.