5 Conclusions

5.1 LEVELS AND TRENDS IN CHILDHOOD MORTALITY

This report describes patterns of childhood mortality in 20 countries where DHS surveys have been carried out. It is acknowledged that this statistical description of the state of young children expressed in the broadest terms—survival probabilities—is inadequate since it does not take into account the social and economic costs of childhood deaths for the household, community, and society. However, the findings presented here emphasize the enormity of the problem of childhood mortality and the challenges that remain for health workers in developing countries. This report follows an earlier report on childhood mortality by Sullivan, Rutstein, and Bicego (1994).

Among the countries analyzed, some successes are evident. In 15 of the 20 countries covered, declines in under-five mortality (over the 10-year period preceding the survey) exceed 15 percent, or about 1.5 percent per annum. However, it is difficult to generalize regarding so small a group of countries—variation is substantial in both levels and trends in mortality. In sub-Saharan countries such as Niger, Malawi, Nigeria, and Zambia, under-five mortality remains extremely high; and in two of these countries (Niger and Zambia) survival chances have worsened. In Malawi and Nigeria, improvements have been modest and 1 in 5 children still dies before the fifth birthday. The sub-Saharan region can claim some relative successes. In Cameroon, Senegal, and Rwanda[11] recent declines of 33 percent or more are reported. In Namibia and Kenya, under-five mortality has fallen below 100 per 1,000, although there is evidence of recent stagnation in Kenya.

Outside sub-Saharan Africa, the picture is more encouraging. In all countries except Pakistan, recent declines in under-five mortality exceed 25 percent and under-five mortality levels are below 85 per 1,000. In Colombia and Turkey, the declines approach or exceed 50 percent—less than 1 in 40 children dies before age five in Colombia. In Pakistan, however, mortality decline reaches only 15 percent over the reference period; consequently, the level of under-five mortality remains relatively high (112 per 1,000).

In sum, there is huge disparity in the level of progress toward the goals articulated nearly two decades ago in Alma Ata: "Health for All by the Year 2000" (WHO/UNICEF, 1978). In the 20 countries covered here, the child survival situation ranges from one of rapidly declining mortality (to currently low levels), to stagnation, to actual increases in mortality (at high levels). These disparities reflect, at least in part, the variations in political and institutional commitment (at both national and international levels) that exist regarding mobilization of the necessary resources for implementation of effective health and social development programs.

5.2 AGE PATTERNS OF CHILDHOOD MORTALITY

Age patterns of childhood mortality reflect the importance of age-specific causes of death. As such, knowledge of the distribution of mortality risk across age groups is important for designing programs aimed at mortality reduction. This report highlights two phenomena related to age patterns of mortality. The first has to do with shifts in the age pattern of mortality during mortality decline. In many of the countries examined, there have been rapid drops in the *level* of under-five mortality. Since mortality normally falls more rapidly at older ages (1-4 years) than at younger ages, the result is that under-five deaths have become increasingly comprised of infant deaths, with further declines concentrating infant deaths in the neonatal period. Turkey is an example of the shift in the age pattern of mortality. During a remarkable decline in under-five mortality from 114 to 61 per 1,000, the ratio ${}_4q_1/{}_5q_0$ was reduced from 0.21 to 0.14. Further declines in mortality will thus depend on concerted efforts to reduce risk at early ages. This statistical observation is not new; indeed, a shift in the age pattern of childhood mortality is anticipated by model mortality schedules during a period of declining mortality. However, the programmatic implications of these changes have received little attention. Health interventions that in the past had a significant impact on mortality (e.g., vaccinations, oral rehydration, and other treatment regimes), while of continuing importance, are not likely to be the source of substantial mortality declines in the future. Improving maternal health services, pregnancy outcome, and nutrition during the early weaning period are likely to figure prominently in the most effective child survival programs over the next decade.

[11] How far Rwanda has been set back by the 1995 civil war cannot yet be ascertained.

The second phenomenon is one limited to sub-Saharan Africa. Many countries in this region, especially those in the western part of the region, exhibit very high under-five mortality rates, which are a result of high child mortality rates ($_4q_1$). Niger and Nigeria exhibit $_4q_1/_5q_0$ ratios of 0.70 and 0.60, respectively. Unlike almost all countries outside the region (and all commonly used model mortality schedules), under-five mortality in these sub-Saharan countries occurs mostly *after* the first birthday. These findings support those of Sullivan, Rutstein, and Bicego (1994) and argue for a new "family" of model mortality schedules that can encompass the West African experience. More importantly, the findings point to the need for structured investigation into the cause(s) of very high child mortality. Fruitful areas of research should emphasize: (1) nutritional deficits (macro and micro) that result in unusually high levels of wasting and increased susceptibility to disease, (2) the importance of malaria and measles (in particular) in cause of death among children age 1-4 years, (3) environmental and human settlement factors that promote high exposure and susceptibility to the diseases such as malaria and measles, and (4) the potential impact of social and economic development, including women's education and women's employment.

5.3 BIO-DEMOGRAPHIC DIFFERENTIALS IN CHILDHOOD MORTALITY

Findings in the area of bio-demographic differentials confirm previously observed associations. Mortality differentials associated with sex of the child follow the expected patterns. Excess male mortality is pronounced in nearly all countries covered, but the effect is largely confined to the neonatal period with some residual effects extending to the postneonatal period. After the first birthday, the sex-related effect is minimal or nonexistent in most countries. Excess female child mortality ($_4q_1$) is notable however, exceeding 10 percent in five countries. In Pakistan, the excess is 40 percent, suggesting that household behaviors favoring the survival of male children may be operating.

Over the past decade, there has been an accumulation of evidence that confirms and clarifies the associations between the pace and pattern of childbearing and child survival chances. Hobcraft (1994) provides a comprehensive examination of the subject. Children of teenage mothers, children who are first births or are very high birth order, and children that are spaced too closely have been shown to be at increased risk of dying in early childhood. The findings presented in this report further substantiate these relationships and expand the list of national settings in which the effects are observed.

The excess risk associated with young mother's maternal age at birth averages 34 percent during the neonatal period and falls to 21 percent by ages 1-4 years. However, these averages hide important country-level variations.[12] In many countries, the effect of young mother's age at birth is limited to the first year of life (e.g., Senegal, Niger, Dominican Republic, Morocco), suggesting the primacy of maternity factors and adverse pregnancy outcome. In other settings (largely outside sub-Saharan Africa), excess risk is greatest after the neonatal and postneonatal periods, suggesting that social factors associated with young mother's age at birth are driving the relationship.

First births carry an average of 33 percent excess neonatal risk, but no excess risk following the neonatal period. A large part of the excess neonatal risk is probably associated with young mother's age at birth. The first birth-mortality association shows wide variation in magnitude and even in direction. In four countries (Namibia, Colombia, the Dominican Republic, and Peru), first births are actually at lower neonatal risk than other births. This may be due to: (1) greater access to and use of high quality antenatal and delivery services, and (2) the later age at first birth among women in these countries. Later age at first birth is also associated with higher socioeconomic status, which enhances survival chances but confounds bivariate analysis as undertaken here. Thus, extended analyses of the first birth association should simultaneously take into account other bio-demographic variables, especially mother's age at birth.

[12] In some studies, 18 years (rather than 20 years) has been used with better success as a cut-off in delineating heightened mortality risk associated with "teenage" childbearing. Of course, the cultural and biological rationale for adoption of any particular "threshold" will vary across countries and should be evaluated on a country-by-country basis.

The effect of high birth order (7+) on child survival chances varies greatly within and between age periods and from country to country. In general, the neonatal period poses the greatest risk for high order births (an average of 47 percent excess risk); this diminishes significantly in the 1-4 year age period (10 percent). In several countries of sub-Saharan African, high birth order is not associated with heightened risk at ages 1-4 years, indicating that other mitigating (cultural) factors are probably operating. It is important to take into consideration these other variables that may impinge on the relationship.

The most important bio-demographic variable affecting child survival chances is the length of the preceding birth interval. This is so because:

(1) A significant percentage of children are born after a short birth interval (less than 24 months), placing them at high risk of illness and death,

(2) The strength and consistency of the birth interval-mortality association is compelling, even after taking into account various extraneous factors (Boerma and Bicego, 1992; Hobcraft, 1994), and

(3) There is considerable scope for programs that can decrease the numbers of births in this high-risk category.

In the bivariate analysis presented here, short birth intervals are associated with 58 percent greater risk of dying before the age of five and 116 percent greater risk during the neonatal period. Hobcraft (1994) estimates that: "...achieving adequate spacing (through family planning) might serve to reduce child(hood) mortality by up to 20 percent or more in the countries of the Americas and Northern Africa....and up to a third in Brazil and Egypt." In other settings, including sub-Saharan Africa, the potential scope for mortality reduction is less because birth intervals are already fairly long due to long breastfeeding durations and various postpartum taboos that delay the resumption of sexual relations. In sub-Saharan Africa, it has been suggested that traditional breastfeeding patterns be maintained to avoid a rise in births occurring after a short birth interval, which could result in the deterioration of child health and survival. Given that women are increasingly taking advantage of educational and employment opportunities (which often preclude the practice of full breastfeeding), it may be helpful to focus program efforts on a combination of nutrition/breastfeeding education and postpartum use of modern contraception.

5.4 SOCIOECONOMIC DIFFERENTIALS IN CHILDHOOD MORTALITY

In this report, mortality differentials were examined for the following background characteristics: urban-rural residence, migration status, mother's level of education/literacy, and father's occupation. Substantial differences in mortality were found in each category. Mother's education, particularly, showed a strong positive association with improvement of child survival chances, and was most pronounced at age 1-4 years. Because of the high correlation among socioeconomic characteristics, direct causal interpretation of the observed bivariate associations should not be made.

While social and economic development are the key to progress in reducing childhood mortality, further analysis is necessary to quantify and clarify the potential gains. Survival-enhancing behaviors and characteristics that have been suggested as important in mediating the socioeconomics-mortality association include:

(1) access to, positive attitudes toward, and use of preventive and curative child health services,

(2) knowledge and adoption of proper nutrition and hygiene practices, and

(3) reduction in exposure to disease-causing agents.

During the process of social and economic development in a country, these behaviors and characteristics typically become institutionalized and mortality reduction is sustained in the process. Unfortunately, economic downturns may lead to society's inability to satisfy the demand for health and human services that comes with increasing education and urbanization. These constraints are most acute, and the consequences most severe, in sub-Saharan Africa.