# 4 Socioeconomic Differentials in Childhood Mortality

The evidence for large socioeconomic differentials in infant and child mortality is substantial, as demonstrated in several large cross-national studies (Rutstein, 1984; Hobcraft, McDonald, and Rutstein, 1985; Bicego and Boerma 1993; Sullivan, Rutstein, and Bicego, 1994). In this section, four types of characteristics are examined: residence, migration, parental education/literacy, and husband/father's occupation. Socioeconomic characteristics are highly correlated with one another and with bio-demographic characteristics which, in their own right, are important determinants of mortality. This warns against a causal interpretation of the bivariate associations discussed here. Using an appropriate analytical model, simultaneous consideration should be given to the various characteristics to differentiate properly among their effects.

## 4.1 RESIDENCE

### Urban-Rural Residence

*Residence* in this analysis refers to the de facto location (urban or rural) of the place where the mother's interview was conducted, and is based on the official classification system of the country (usually the most recent census designation). For respondents who have recently relocated, some births and deaths may have occurred at locations different from the de facto location. Such misclassification can operate to lessen observed differentials. Lack of migration history data precludes the classification of births and deaths according to actual place of occurrence.

Table 4.1 shows the percent distribution of births in the 10-year period preceding the survey by urban-rural residence. The proportion of births occurring in urban areas varies from 5 percent in Rwanda to 66 percent in Colombia (Figure 4.1).[9] In five countries (Rwanda, Kenya, Niger, Madagascar and Burkina Faso) less than 20 percent of births

were to mothers living in urban areas. In Nigeria, Ghana, Indonesia, Pakistan, Namibia, Senegal, Morocco and Cameroon, between 20 and 40 percent of the births were urban. In Zambia, the Philippines, Turkey and the Dominican Republic, the proportion of urban births was 40 to 60 percent. In Peru and Colombia, more than 60 percent of births took place in urban areas.

Table 4.1 Distribution of births by urban-rural residence

Percent distribution of births in the 10-year period preceding the survey by urban-rural residence, Demographic and Health Surveys 1990-1994

| Country | Residence | | Total | Number of births |
|---|---|---|---|---|
| | Urban | Rural | | |
| **Sub-Saharan Africa** | | | | |
| Namibia | 33 | 67 | 100.0 | 7,095 |
| Kenya | 12 | 88 | 100.0 | 12,474 |
| Ghana | 27 | 73 | 100.0 | 7,195 |
| Cameroon | 38 | 62 | 100.0 | 6,717 |
| Senegal | 33 | 67 | 100.0 | 11,068 |
| Rwanda | 5 | 95 | 100.0 | 11,388 |
| Madagascar | 13 | 87 | 100.0 | 10,680 |
| Burkina Faso | 15 | 85 | 100.0 | 12,311 |
| Zambia | 47 | 53 | 100.0 | 11,680 |
| Nigeria | 21 | 79 | 100.0 | 16,359 |
| Niger | 15 | 85 | 100.0 | 14,081 |
| **Asia/Near East/ North Africa** | | | | |
| Philippines | 48 | 52 | 100.0 | 17,371 |
| Turkey | 58 | 42 | 100.0 | 8,186 |
| Morocco | 35 | 65 | 100.0 | 10,534 |
| Indonesia | 27 | 73 | 100.0 | 3,570 |
| Pakistan | 30 | 70 | 100.0 | 14,754 |
| **Latin America/ Caribbean** | | | | |
| Colombia | 66 | 34 | 100.0 | 7,591 |
| Dominican Republic | 59 | 41 | 100.0 | 7,328 |
| Peru | 62 | 38 | 100.0 | 16,972 |

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[9] Malawi is excluded because the urban-rural distribution of births is not available.

Figure 4.1 Percentage of births in the 10-year period preceding the survey that occurred in urban areas, Demographic and Health Surveys, 1990-1994
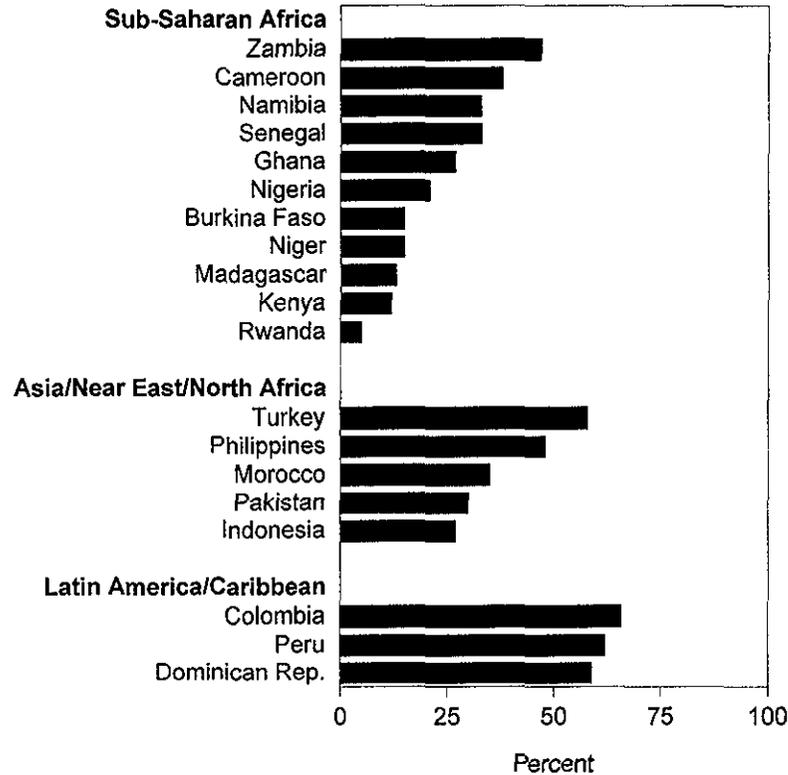


Table 4.2 presents childhood mortality rates by residence, with urban-to-rural risk ratios. Taking all countries together, the average risk of dying during the first five years is 31 percent lower in urban areas than in rural areas. The urban advantage increases with increasing age of the child: urban-to-rural relative risk falls from 0.78 in the neonatal period to 0.62 during ages 1-4 years. Mortality during ages 1-4 years is thus especially sensitive to conditions that vary between urban and rural areas. In five countries, child mortality risk is at least two times higher in rural than urban areas; in Morocco, it is four times higher.

In only one country (Colombia) does urban under-five mortality exceed rural levels, and in this case the urban-rural difference is in a range explainable by sampling fluctuation. Similarly, in two other countries, Namibia and Rwanda, urban mortality is only slightly lower than rural mortality—again within the bounds of sampling error.

## Type of urban area

The observation that urban-rural residence has little effect on mortality risk in many countries raises questions since greater access to health technologies and services is expected in urban areas. This apparent paradox is especially striking with regard to neonatal risk because access to services that mitigate the effects of adverse pregnancy outcome are often more available in towns and cities. Recently, more attention has been paid to the heterogeneity of the urban environment in developing countries. With the rapid rise in population levels and concomitant migration of significant numbers of men and women from the countryside to towns and cities, most developing countries are experiencing a sharp rise in urban and periurban populations. Seldom are these populations fully enfranchised with regard to economic life and health and human services.

Table 4.2 Childhood mortality rates by urban-rural residence and urban-rural risk ratios of dying

Childhood mortality rates by urban-rural residence, and the urban-rural risk ratios of dying, for the ten-year period preceding the survey, Demographic and Health Surveys 1990-1994

| Country | Neonatal mortality | | | Postneonatal mortality | | | Infant mortality | | | Child mortality | | | Under-five mortality | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Urban | Rural | Risk ratio | Urban | Rural | Risk ratio | Urban | Rural | Risk ratio | Urban | Rural | Risk ratio | Urban | Rural | Risk ratio |
| **Sub-Saharan Africa** | | | | | | | | | | | | | | | |
| Namibia | 34 | 36 | 0.93 | 29 | 25 | 1.20 | 63 | 61 | 1.04 | 25 | 36 | 0.69 | 86 | 95 | 0.91 |
| Kenya | 23 | 28 | 0.84 | 23 | 37 | 0.60 | 46 | 65 | 0.70 | 31 | 33 | 0.95 | 75 | 96 | 0.79 |
| Ghana | 39 | 49 | 0.80 | 16 | 33 | 0.48 | 55 | 82 | 0.67 | 37 | 73 | 0.51 | 90 | 149 | 0.60 |
| Cameroon | 42 | 43 | 0.98 | 30 | 43 | 0.69 | 72 | 86 | 0.84 | 52 | 80 | 0.66 | 120 | 159 | 0.76 |
| Senegal | 31 | 45 | 0.68 | 24 | 42 | 0.57 | 55 | 87 | 0.63 | 50 | 107 | 0.47 | 102 | 184 | 0.55 |
| Rwanda | 43 | 47 | 0.92 | 44 | 43 | 1.02 | 88 | 90 | 0.97 | 74 | 80 | 0.93 | 155 | 163 | 0.95 |
| Madagascar | 40 | 44 | 0.91 | 35 | 63 | 0.55 | 75 | 107 | 0.70 | 73 | 86 | 0.85 | 142 | 183 | 0.78 |
| Burkina Faso | 32 | 55 | 0.58 | 45 | 58 | 0.77 | 76 | 113 | 0.68 | 78 | 114 | 0.68 | 148 | 214 | 0.69 |
| Zambia | 32 | 47 | 0.67 | 46 | 69 | 0.67 | 78 | 116 | 0.67 | 79 | 97 | 0.82 | 151 | 201 | 0.75 |
| Nigeria | 41 | 47 | 0.87 | 35 | 49 | 0.71 | 76 | 96 | 0.79 | 59 | 124 | 0.48 | 130 | 208 | 0.63 |
| Malawi | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| Niger | 36 | 55 | 0.66 | 53 | 88 | 0.60 | 89 | 143 | 0.62 | 133 | 238 | 0.56 | 210 | 347 | 0.61 |
| **Asia/Near East/ North Africa** | | | | | | | | | | | | | | | |
| Philippines | 16 | 20 | 0.78 | 16 | 24 | 0.67 | 32 | 44 | 0.72 | 22 | 31 | 0.70 | 53 | 73 | 0.72 |
| Turkey | 36 | 39 | 0.92 | 22 | 43 | 0.51 | 58 | 83 | 0.70 | 10 | 18 | 0.54 | 67 | 99 | 0.68 |
| Morocco | 30 | 36 | 0.83 | 22 | 33 | 0.66 | 52 | 69 | 0.75 | 7 | 31 | 0.23 | 59 | 98 | 0.60 |
| Indonesia | 23 | 36 | 0.64 | 20 | 39 | 0.51 | 43 | 75 | 0.57 | 16 | 33 | 0.49 | 59 | 106 | 0.55 |
| Pakistan | 41 | 59 | 0.70 | 34 | 44 | 0.77 | 75 | 102 | 0.73 | 21 | 33 | 0.62 | 94 | 132 | 0.71 |
| **Latin America/ Caribbean** | | | | | | | | | | | | | | | |
| Colombia | 16 | 13 | 1.25 | 13 | 10 | 1.31 | 29 | 23 | 1.28 | 7 | 10 | 0.68 | 36 | 33 | 1.09 |
| Dominican Republic | 23 | 26 | 0.90 | 14 | 29 | 0.48 | 37 | 54 | 0.68 | 10 | 31 | 0.32 | 47 | 84 | 0.56 |
| Peru | 21 | 45 | 0.46 | 45 | 48 | 0.95 | 48 | 90 | 0.53 | 21 | 45 | 0.47 | 67 | 131 | 0.51 |
| Grand average | 31 | 40 | 0.78 | 30 | 43 | 0.69 | 60 | 83 | 0.72 | 42 | 68 | 0.62 | 100 | 145 | 0.69 |

Note: An asterisk indicates that a figure is based on fewer than 250 births and has been suppressed.

Using the standard DHS variable of household access to piped drinking water, Table 4.3.1 presents mortality rates for urban areas with piped water (more developed urban areas), urban areas without piped water (less developed urban areas), and rural areas. Table 4.3.2 presents the corresponding relative risks using rural areas as the reference category (i.e., equaling 1.0). In every country examined, under-five mortality is higher in the less developed urban areas than in the more developed urban areas, often much higher. During certain ages in some countries, mortality risk in the less developed urban areas even exceeds rural mortality. Taking all countries together, children in less developed urban areas experience an under-five mortality risk 57 percent higher than that of other urban children, although still 17 percent lower than that of rural children.

The *urban development* differential increases with increasing age of the child from 30 percent excess risk (less developed relative to more developed urban areas) during the neonatal period, to 62 percent during the postneonatal period, to 83 percent during ages 1-4 years (Figure 4.2).

## 4.2 MIGRATION

Information used to determine migration status was obtained from respondents. Mothers were asked to identify their childhood place of residence (first 12 years of life), and their current place of residence if not at the site of interview. From these data, a variable was created that captures the *impact* of migration as well as the *direction* of migration on

Table 4.3.1 Childhood mortality rates by urban-rural residence and access to piped water

*Childhood mortality rates by urban-rural residence and access to piped water, for the ten-year period preceding the survey, Demographic and Health Surveys, 1990-1994*

| Country | Neonatal mortality Urban Piped water | Neonatal mortality Urban No piped water | Neonatal mortality Rural | Postneonatal mortality Urban Piped water | Postneonatal mortality Urban No piped water | Postneonatal mortality Rural | Infant mortality Urban Piped water | Infant mortality Urban No piped water | Infant mortality Rural | Child mortality Urban Piped water | Child mortality Urban No piped water | Child mortality Rural | Under-five mortality Urban Piped water | Under-five mortality Urban No piped water | Under-five mortality Rural |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sub-Saharan Africa** | | | | | | | | | | | | | | | |
| Namibia | 28 | 48 | 36 | 27 | 35 | 25 | 55 | 83 | 61 | 22 | 32 | 36 | 76 | 112 | 95 |
| Kenya | 24 | 22 | 28 | 20 | 26 | 37 | 43 | 48 | 65 | 20 | 45 | 33 | 63 | 90 | 96 |
| Ghana | 38 | 40 | 49 | 10 | 19 | 33 | 48 | 59 | 82 | 35 | 38 | 73 | 82 | 94 | 149 |
| Cameroon | 27 | 44 | 43 | 14 | 33 | 43 | 41 | 78 | 86 | 39 | 55 | 80 | 79 | 128 | 159 |
| Senegal | 26 | 36 | 45 | 18 | 30 | 41 | 43 | 66 | 87 | 42 | 60 | 107 | 83 | 122 | 184 |
| Rwanda | * | 44 | 47 | * | 48 | 43 | * | 91 | 90 | * | 78 | 80 | * | 163 | 163 |
| Madagascar | 29 | 43 | 44 | 27 | 37 | 63 | 56 | 81 | 107 | 46 | 81 | 86 | 99 | 155 | 183 |
| Burkina Faso | 36 | 30 | 55 | 46 | 44 | 58 | 82 | 75 | 113 | 37 | 90 | 114 | 116 | 158 | 214 |
| Zambia | 27 | 39 | 47 | 39 | 57 | 69 | 66 | 96 | 116 | 67 | 99 | 97 | 128 | 186 | 201 |
| Nigeria | 33 | 42 | 47 | 32 | 36 | 49 | 65 | 78 | 96 | 56 | 60 | 124 | 117 | 133 | 208 |
| Malawi | * | 49 | * | * | 87 | * | * | 136 | * | * | 120 | * | * | 240 | * |
| Niger | 22 | 40 | 54 | 42 | 56 | 88 | 64 | 96 | 143 | 74 | 150 | 238 | 134 | 232 | 347 |
| **Asia/Near East** | | | | | | | | | | | | | | | |
| **North Africa** | | | | | | | | | | | | | | | |
| Philippines | 15 | 17 | 20 | 14 | 18 | 24 | 28 | 34 | 44 | 13 | 27 | 30 | 41 | 60 | 73 |
| Turkey | 34 | 42 | 39 | 21 | 24 | 43 | 56 | 66 | 83 | 10 | 10 | 18 | 65 | 75 | 99 |
| Morocco | 27 | 38 | 36 | 19 | 31 | 33 | 45 | 69 | 69 | 7 | 9 | 31 | 52 | 77 | 98 |
| Indonesia | 24 | 23 | 36 | 12 | 22 | 39 | 35 | 45 | 75 | 7 | 18 | 33 | 43 | 62 | 106 |
| Pakistan | 34 | 46 | 59 | 26 | 40 | 44 | 60 | 86 | 102 | 15 | 25 | 33 | 74 | 110 | 132 |
| **Latin America/** | | | | | | | | | | | | | | | |
| **Caribbean** | | | | | | | | | | | | | | | |
| Colombia | 17 | 10 | 13 | 10 | (46) | 10 | 26 | (56) | 23 | 6 | (14) | 10 | 33 | (69) | 34 |
| Dominican Republic | 21 | 24 | 26 | 8 | 16 | 29 | 29 | 40 | 54 | 7 | 11 | 31 | 36 | 51 | 84 |
| Peru | 20 | 23 | 45 | 22 | 36 | 45 | 41 | 59 | 90 | 15 | 33 | 45 | 55 | 90 | 131 |
| Grand average | 27 | 35 | 40 | 23 | 37 | 43 | 49 | 72 | 83 | 29 | 53 | 68 | 76 | 120 | 145 |

Note: Figures in parentheses are based on 250-500 births. An asterisk indicates that a figure is based on fewer than 250 births and has been suppressed.
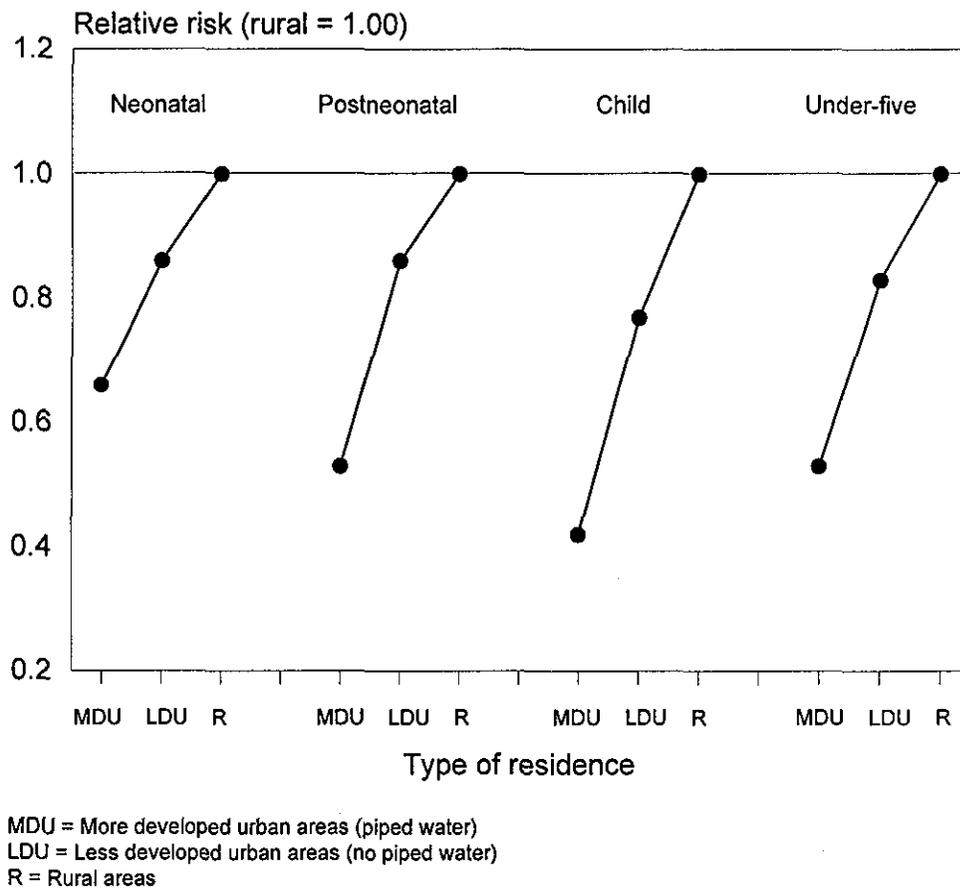
Table 4.3.2 Relative risk of dying in childhood, by urban-rural residence and access to piped water

Relative risk of dying in childhood by urban-rural residence and access to piped water, for the ten-year period preceding the survey, Demographic and Health Surveys, 1990-1994

| Country | Neonatal mortality | | | Postneonatal mortality | | | Infant mortality | | | Child mortality | | | Under-five mortality | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Urban | | | Urban | | | Urban | | | Urban | | | Urban | | |
| | Piped water | No piped water | Rural | Piped water | No piped water | Rural | Piped water | No piped water | Rural | Piped water | No piped water | Rural | Piped water | No piped water | Rural |
| **Sub-Saharan Africa** | | | | | | | | | | | | | | | |
| Namibia | 0.78 | 1.33 | 1.00 | 1.08 | 1.40 | 1.00 | 0.90 | 1.36 | 1.00 | 0.61 | 0.89 | 1.00 | 0.80 | 1.18 | 1.00 |
| Kenya | 0.86 | 0.79 | 1.00 | 0.54 | 0.70 | 1.00 | 0.66 | 0.74 | 1.00 | 0.61 | 1.36 | 1.00 | 0.66 | 0.94 | 1.00 |
| Ghana | 0.78 | 0.82 | 1.00 | 0.30 | 0.58 | 1.00 | 0.59 | 0.72 | 1.00 | 0.48 | 0.52 | 1.00 | 0.55 | 0.63 | 1.00 |
| Cameroon | 0.63 | 1.02 | 1.00 | 0.33 | 0.77 | 1.00 | 0.48 | 0.91 | 1.00 | 0.49 | 0.69 | 1.00 | 0.50 | 0.81 | 1.00 |
| Senegal | 0.58 | 0.80 | 1.00 | 0.44 | 0.73 | 1.00 | 0.49 | 0.76 | 1.00 | 0.39 | 0.56 | 1.00 | 0.45 | 0.66 | 1.00 |
| Rwanda | * | 0.94 | 1.00 | * | 1.12 | 1.00 | * | 1.01 | 1.00 | * | 0.98 | 1.00 | * | 1.00 | 1.00 |
| Madagascar | 0.66 | 0.98 | 1.00 | 0.43 | 0.59 | 1.00 | 0.52 | 0.76 | 1.00 | 0.53 | 0.94 | 1.00 | 0.54 | 0.85 | 1.00 |
| Burkina Faso | 0.65 | 0.55 | 1.00 | 0.79 | 0.76 | 1.00 | 0.73 | 0.66 | 1.00 | 0.32 | 0.79 | 1.00 | 0.54 | 0.74 | 1.00 |
| Zambia | 0.57 | 0.83 | 1.00 | 0.57 | 0.83 | 1.00 | 0.57 | 0.83 | 1.00 | 0.69 | 1.02 | 1.00 | 0.64 | 0.93 | 1.00 |
| Nigeria | 0.70 | 0.89 | 1.00 | 0.65 | 0.73 | 1.00 | 0.68 | 0.81 | 1.00 | 0.45 | 0.48 | 1.00 | 0.56 | 0.64 | 1.00 |
| Malawi | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| Niger | 0.41 | 0.74 | 1.00 | 0.48 | 0.64 | 1.00 | 0.45 | 0.67 | 1.00 | 0.31 | 0.63 | 1.00 | 0.39 | 0.67 | 1.00 |
| **Asia/Near East/ North Africa** | | | | | | | | | | | | | | | |
| Philippines | 0.75 | 0.85 | 1.00 | 0.58 | 0.75 | 1.00 | 0.64 | 0.77 | 1.00 | 0.43 | 0.90 | 1.00 | 0.56 | 0.82 | 1.00 |
| Turkey | 0.87 | 1.08 | 1.00 | 0.49 | 0.56 | 1.00 | 0.67 | 0.80 | 1.00 | 0.56 | 0.56 | 1.00 | 0.66 | 0.76 | 1.00 |
| Morocco | 0.75 | 1.06 | 1.00 | 0.58 | 0.94 | 1.00 | 0.65 | 1.00 | 1.00 | 0.23 | 0.29 | 1.00 | 0.53 | 0.79 | 1.00 |
| Indonesia | 0.67 | 0.64 | 1.00 | 0.31 | 0.56 | 1.00 | 0.47 | 0.60 | 1.00 | 0.21 | 0.55 | 1.00 | 0.41 | 0.58 | 1.00 |
| Pakistan | 0.58 | 0.78 | 1.00 | 0.59 | 0.91 | 1.00 | 0.59 | 0.84 | 1.00 | 0.45 | 0.76 | 1.00 | 0.56 | 0.83 | 1.00 |
| **Latin America/ Caribbean** | | | | | | | | | | | | | | | |
| Colombia | 1.31 | 0.77 | 1.00 | 1.00 | (4.60) | 1.00 | 4.60 | (2.43) | 1.00 | 0.60 | (1.40) | 1.00 | 0.97 | (2.03) | 1.00 |
| Dominican Republic | 0.81 | 0.92 | 1.00 | 0.28 | 0.55 | 1.00 | 4.60 | 0.74 | 1.00 | 0.23 | 0.35 | 1.00 | 0.43 | 0.61 | 1.00 |
| Peru | 0.44 | 0.51 | 1.00 | 0.49 | 0.80 | 1.00 | 4.60 | 0.66 | 1.00 | 0.33 | 0.73 | 1.00 | 0.42 | 0.69 | 1.00 |
| Grand average | 0.66 | 0.86 | 1.00 | 0.53 | 0.86 | 1.00 | 0.59 | 0.86 | 1.00 | 0.42 | 0.77 | 1.00 | 0.53 | 0.83 | 1.00 |

Note: Figures in parentheses are based on 250-500 births. An asterisk indicates that a figure is based on fewer than 250 births and has been suppressed.

Figure 4.2  Relative risk of dying in childhood by residence and access to piped water (averages for all countries combined), selected Demographic and Health Surveys, 1990-1994



MDU = More developed urban areas (piped water)
LDU = Less developed urban areas (no piped water)
R = Rural areas

childhood mortality. Comparison is made of the childhood mortality experience of:

- urban natives,
- rural-to-urban migrants,
- urban-to-rural migrants, and
- rural natives.

Individuals are considered urban or rural natives if they have lived in a particular setting all their lives. They are classified as rural-to-urban migrants if they are currently living in an urban area but their childhood place of residence was rural, and vice versa for urban-to-rural migrants.

Table 4.4.1 presents childhood mortality rates by migration status of the mother and direction of migration. Corresponding relative risks are presented in Table 4.4.2. In general, urban natives have the lowest under-five mortality rates, followed by rural-to-urban migrants; urban-to-rural migrants have rates that are closer to those of rural natives.

The advantage held by urban natives and rural-to-urban migrants exists at all ages but tends to be more pronounced as age of the child increases. For example, rural-to-urban migrants in Cameroon experience essentially the same neonatal mortality risk as rural natives but have 20 percent and 43 percent lower mortality risk during the postneonatal and 1-4 year periods, respectively.

## 4.3  EDUCATION AND LITERACY

The positive impact of parental education and literacy on child survival is well documented. While the behavioral mechanisms that drive the education-child survival relationship are not completely understood, it is generally recognized that improved and/or increased use of preventive and curative health technologies by more educated mothers is part of the explanation. In a recent study using DHS data from 17 countries, Bicego and Boerma (1993) showed that child health status and use of maternal and child health

Table 4.4.1  Childhood mortality rates by migration status of mother and direction of migration

Childhood mortality rates by migration status of mother and direction of migration, for the ten-year period preceding the survey, Demographic and Health Surveys, 1990-1994

| Country | Neonatal mortality | | | | Postneonatal mortality | | | | Infant mortality | | | | Child mortality | | | | Under-five mortality | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Urban native | Rural-to-urban migrant | Urban-to-rural migrant | Rural native | Urban native | Rural-to-urban migrant | Urban-to-rural migrant | Rural native | Urban native | Rural-to-urban migrant | Urban-to-rural migrant | Rural native | Urban native | Rural-to-urban migrant | Urban-to-rural migrant | Rural native | Urban native | Rural-to-urban migrant | Urban-to-rural migrant | Rural native |
| **Sub-Saharan Africa** | | | | | | | | | | | | | | | | | | | | |
| Namibia | 29 | 37 | * | 36 | 24 | 33 | * | 24 | 53 | 70 | * | 61 | 17 | 30 | * | 36 | 69 | 99 | * | 94 |
| Kenya | (23) | 23 | 29 | 27 | (18) | 25 | 69 | 34 | (41) | 48 | 97 | 61 | (41) | 27 | 52 | 31 | (80) | 73 | 144 | 90 |
| Ghana | 40 | (36) | 53 | 47 | 15 | (20) | 30 | 35 | 55 | (56) | 83 | 82 | 33 | (50) | 53 | 81 | 86 | (103) | 132 | 156 |
| Cameroon | 41 | 43 | (36) | 44 | 26 | 37 | (25) | 46 | 67 | 80 | (61) | 90 | 56 | 46 | (73) | 81 | 119 | 122 | (129) | 163 |
| Senegal | 31 | 31 | 34 | 47 | 21 | 29 | 49 | 41 | 52 | 60 | 83 | 87 | 42 | 67 | 68 | 111 | 92 | 124 | 145 | 189 |
| Rwanda | 59 | 35 | * | 47 | (52) | 40 | * | 43 | (111) | 75 | * | 91 | (101) | 60 | * | 80 | (201) | 131 | * | 163 |
| Madagascar | 40 | 38 | 47 | 43 | 30 | 49 | 63 | 63 | 71 | 87 | 109 | 106 | 70 | 81 | 78 | 87 | 136 | 161 | 179 | 184 |
| Burkina Faso | 29 | 36 | 58 | 54 | 42 | 49 | 54 | 59 | 71 | 85 | 111 | 113 | 74 | 84 | (116) | 114 | 140 | 161 | (214) | 214 |
| Zambia | 31 | 33 | 42 | 49 | 49 | 42 | 70 | 68 | 80 | 75 | 111 | 117 | 84 | 72 | 94 | 97 | 157 | 142 | 194 | 203 |
| Nigeria | 39 | 44 | 59 | 45 | 32 | 43 | 38 | 51 | 71 | 88 | 97 | 96 | 62 | 51 | 122 | 124 | 128 | 135 | 207 | 208 |
| Malawi | 49 | * | * | * | 87 | * | * | * | 136 | * | * | * | 120 | * | * | * | 240 | * | * | * |
| Niger | 32 | 41 | (52) | 55 | 54 | 52 | (110) | 87 | 86 | 93 | (162) | 142 | 119 | 151 | * | 240 | 194 | 230 | * | 348 |
| **Asia/Near East/ North Africa** | | | | | | | | | | | | | | | | | | | | |
| Philippines | 15 | 16 | 10 | 22 | 14 | 18 | 18 | 25 | 29 | 34 | 28 | 47 | 18 | 25 | 27 | 31 | 47 | 58 | 54 | 76 |
| Turkey | 31 | 42 | (33) | 40 | 16 | 29 | (49) | 43 | 47 | 71 | (82) | 83 | 10 | 9 | * | 18 | 57 | 79 | * | 99 |
| Morocco | 22 | 39 | 29 | 37 | 16 | 29 | 15 | 34 | 38 | 67 | 44 | 71 | 4 | 11 | 8 | 32 | 42 | 78 | (51) | 101 |
| Indonesia | 25 | 21 | 34 | 36 | 10 | 30 | 24 | 40 | 35 | 51 | 58 | 76 | 12 | 20 | 18 | 34 | 46 | 69 | 75 | 108 |
| Pakistan | 33 | 56 | (21) | 61 | 31 | 38 | (58) | 43 | 64 | 95 | (79) | 104 | 19 | 25 | (47) | 32 | 81 | 117 | (122) | 133 |
| **Latin America/ Caribbean** | | | | | | | | | | | | | | | | | | | | |
| Colombia | 17 | 13 | (16) | 12 | 11 | 19 | (4) | 13 | 28 | 33 | (20) | 24 | 7 | 6 | (12) | 10 | 35 | 38 | (32) | 34 |
| Dominican Republic | 22 | 25 | 14 | 28 | 15 | 12 | (29) | 29 | 37 | 37 | (42) | 57 | 9 | 13 | (36) | 30 | 45 | 50 | (76) | 86 |
| Peru | 20 | 24 | 40 | 48 | 23 | 47 | 42 | 47 | 43 | 71 | 81 | 95 | 18 | 38 | 45 | 45 | 60 | 106 | 123 | 136 |
| Grand average | 31 | 33 | 36 | 41 | 29 | 34 | 44 | 43 | 61 | 67 | 79 | 84 | 46 | 46 | 57 | 69 | 103 | 109 | 125 | 147 |

Note:  Figures in parentheses are based on 250-500 births.  An asterisk indicates that a figure is based on fewer than 250 births and has been suppressed.

Table 4.4.2  Relative risk of dying in childhood by migration status of mother and direction of migration

Relative risk of dying in childhood by migration status of mother and direction of migration, for the ten-year period preceding the survey, Demographic and Health Surveys, 1990-1994

| Country | Neonatal mortality | | | | Postneonatal mortality | | | | Infant mortality | | | | Child mortality | | | | Under-five mortality | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Urban native | Rural-to-urban migrant | Urban-to-rural migrant | Rural native | Urban native | Rural-to-urban migrant | Urban-to-rural migrant | Rural native | Urban native | Rural-to-urban migrant | Urban-to-rural migrant | Rural native | Urban native | Rural-to-urban migrant | Urban-to-rural migrant | Rural native | Urban native | Rural-to-urban migrant | Urban-to-rural migrant | Rural native |
| **Sub-Saharan Africa** | | | | | | | | | | | | | | | | | | | | |
| Namibia | 0.81 | 1.03 | * | 1.00 | 1.00 | 1.38 | * | 1.00 | 0.87 | 1.15 | * | 1.00 | 0.47 | 0.83 | * | 1.00 | 0.73 | 1.05 | * | 1.00 |
| Kenya | (0.85) | 0.85 | 1.07 | 1.00 | (0.53) | 0.74 | 2.03 | 1.00 | (0.67) | 0.79 | 1.59 | 1.00 | (1.32) | 0.87 | 1.68 | 1.00 | (0.89) | 0.81 | 1.60 | 1.00 |
| Ghana | 0.85 | (0.77) | 1.13 | 1.00 | 0.43 | (0.57) | 0.86 | 1.00 | 0.67 | (0.68) | 1.01 | 1.00 | 0.41 | (0.62) | 0.65 | 1.00 | 0.55 | (0.66) | 0.85 | 1.00 |
| Cameroon | 0.93 | 0.98 | (0.82) | 1.00 | 0.57 | 0.80 | (0.54) | 1.00 | 0.74 | 0.89 | (0.68) | 1.00 | 0.69 | 0.57 | (0.90) | 1.00 | 0.73 | 0.75 | (0.79) | 1.00 |
| Senegal | 0.66 | 0.66 | 0.72 | 1.00 | 0.51 | 0.71 | 1.20 | 1.00 | 0.60 | 0.69 | 0.95 | 1.00 | 0.38 | 0.60 | 0.61 | 1.00 | 0.49 | 0.66 | 0.77 | 1.00 |
| Rwanda | 1.26 | 0.74 | * | 1.00 | (1.21) | 0.93 | * | 1.00 | (1.22) | 0.82 | * | 1.00 | (1.26) | 0.75 | * | 1.00 | (1.23) | 0.80 | * | 1.00 |
| Madagascar | 0.93 | 0.88 | 1.09 | 1.00 | 0.48 | 0.78 | 1.00 | 1.00 | 0.67 | 0.82 | 1.03 | 1.00 | 0.80 | 0.93 | 0.90 | 1.00 | 0.74 | 0.88 | 0.97 | 1.00 |
| Burkina Faso | 0.54 | 0.67 | 1.07 | 1.00 | 0.71 | 0.83 | 0.92 | 1.00 | 0.63 | 0.75 | 0.98 | 1.00 | 0.65 | 0.74 | (1.02) | 1.00 | 0.65 | 0.75 | (1.00) | 1.00 |
| Zambia | 0.63 | 0.67 | 0.86 | 1.00 | 0.72 | 0.62 | 1.03 | 1.00 | 0.68 | 0.64 | 0.95 | 1.00 | 0.87 | 0.74 | 0.97 | 1.00 | 0.77 | 0.70 | 0.96 | 1.00 |
| Nigeria | 0.87 | 0.98 | 1.31 | 1.00 | 0.63 | 0.84 | 0.75 | 1.00 | 0.74 | 0.92 | 1.01 | 1.00 | 0.50 | 0.41 | 0.98 | 1.00 | 0.62 | 0.65 | 1.00 | 1.00 |
| Malawi | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| Niger | 0.58 | 0.75 | (0.95) | 1.00 | 0.62 | 0.60 | (1.26) | 1.00 | 0.61 | 0.65 | (1.14) | 1.00 | 0.50 | 0.63 | * | 1.00 | 0.56 | 0.66 | * | 1.00 |
| **Asia/Near East/ North Africa** | | | | | | | | | | | | | | | | | | | | |
| Philippines | 0.68 | 0.73 | 0.45 | 1.00 | 0.56 | 0.72 | 0.72 | 1.00 | 0.62 | 0.72 | 0.60 | 1.00 | 0.58 | 0.81 | 0.87 | 1.00 | 0.62 | 0.76 | 0.71 | 1.00 |
| Turkey | 0.78 | 1.05 | 0.83 | 1.00 | 0.37 | 0.67 | 1.14 | 1.00 | 0.57 | 0.86 | 0.99 | 1.00 | 0.56 | 0.50 | * | 1.00 | 0.58 | 0.80 | * | 1.00 |
| Morocco | 0.59 | 1.05 | 0.78 | 1.00 | 0.47 | 0.85 | 0.44 | 1.00 | 0.54 | 0.94 | 0.62 | 1.00 | 0.13 | 0.34 | 0.25 | 1.00 | 0.42 | 0.77 | 0.50 | 1.00 |
| Indonesia | 0.69 | 0.58 | 0.94 | 1.00 | 0.25 | 0.75 | 0.60 | 1.00 | 0.46 | 0.67 | 0.76 | 1.00 | 0.35 | 0.59 | 0.53 | 1.00 | 0.43 | 0.64 | 0.69 | 1.00 |
| Pakistan | 0.54 | 0.92 | 0.34 | 1.00 | 0.72 | 0.88 | 1.35 | 1.00 | 0.62 | 0.91 | 0.76 | 1.00 | 0.59 | 0.78 | 1.47 | 1.00 | 0.61 | 0.88 | 0.92 | 1.00 |
| **Latin America/ Caribbean** | | | | | | | | | | | | | | | | | | | | |
| Colombia | 1.42 | 1.08 | 1.33 | 1.00 | 0.85 | 1.46 | 0.31 | 1.00 | 1.17 | 1.38 | 0.83 | 1.00 | 0.70 | 0.60 | 1.20 | 1.00 | 1.03 | 1.12 | 0.94 | 1.00 |
| Dominican Republic | 0.79 | 0.89 | 0.50 | 1.00 | 0.52 | 0.41 | 1.00 | 1.00 | 0.65 | 0.65 | 0.74 | 1.00 | 0.30 | 0.43 | 1.20 | 1.00 | 0.52 | 0.58 | 0.88 | 1.00 |
| Peru | 0.42 | 0.50 | 0.83 | 1.00 | 0.49 | 1.00 | 0.89 | 1.00 | 0.45 | 0.75 | 0.85 | 1.00 | 0.40 | 0.84 | 1.00 | 1.00 | 0.44 | 0.78 | 0.90 | 1.00 |
| **Grand average** | 0.77 | 0.81 | 0.87 | 1.00 | 0.67 | 0.78 | 1.01 | 1.00 | 0.72 | 0.80 | 0.94 | 1.00 | 0.66 | 0.66 | 0.82 | 1.00 | 0.70 | 0.75 | 0.85 | 1.00 |

Note:  Figures in parentheses are based on 250-500 births.  An asterisk indicates that a figure is based on fewer than 250 births and has been suppressed.

services are closely linked to educational status of the mother, and that the association is only partly explained by the economic standing of the household. In DHS surveys, information on respondent's education was collected using the following questions:

"Have you ever attended school?"
"What was the highest level of school you attended?"
"What was the highest (Grade, Form, Year) you completed at that level?"

For women who had attended primary school, an additional question on literacy was asked, "Can you read a letter or newspaper easily, with difficulty or not at all?" Women who had not attended school were assumed to be illiterate. Women were also asked similar questions about their current or last husband/live-in partner.

In this section, two related variables are examined. The first is the level of maternal education, which has the categories: no schooling, primary incomplete, primary complete and secondary or above. Those who have not been to school at all or who have been to school but have not completed the first year of primary school are grouped into the "no schooling or none" category. This category also includes people who have attended only preschool, kindergarten or Koranic instruction. An advantage of this construction—versus number of years of education—is that it captures the important transition from having completed primary school to starting secondary education, which involves a major investment of household resources. A disadvantage is that it does not precisely quantify exposure to formal schooling; this can make cross-national comparisons difficult (e.g., there are differences among countries in the number of years required to complete "primary" school). All formulations of an education variable using survey data will, however, inevitably fail to capture variations in the quality (i.e., content and character) of the education received.

A second variable measures joint literacy of parents: both parents illiterate, father only literate, mother only literate, and both parents literate. This construction attempts to more directly measure practical skills that, presumably,

function to bring health-related information into the household, although it is understood that the variable also proxies other important aspects of household dynamics.

The following section compares the consistency, magnitude and the direction of the gross education-mortality association.

**Mother's Level of Education**

Table 4.5 shows the percent distribution of births in the 10 years preceding the survey by mother's level of education. The percentage of births to women with no education ranges from 4 percent in the Philippines to over 93 percent in Niger (Figure 4.3). In six countries (the Philippines, Colombia, the Dominican Republic, Peru, Indonesia and Zambia), less than 20 percent of all births are to women with no education. At the other extreme, more than 80 percent of births are to women with no education in Pakistan, Morocco, Senegal, Burkina Faso, and Niger.

The proportion of births to women with secondary or higher education ranges from 1 percent in Niger to over 50 percent in the Philippines. In eight countries (all in Africa), less than 10 percent of the births are to women with secondary or higher education: Niger (1 percent), Burkina Faso (3 percent), Malawi (3 percent), Rwanda (4 percent), Senegal (5 percent), Ghana (6 percent), Morocco (7 percent), and Nigeria (9 percent).

Table 4.6.1 presents childhood mortality rates by mother's level of education. Table 4.6.2 shows the corresponding relative risks using *primary incomplete* as the reference category. Without exception, all countries show a strong positive association between higher level of maternal education and lower mortality risk. Taking all countries together, under-five mortality varies by a factor of more than two between children of mothers with no education (164 per 1,000) and children of mothers with secondary education (71 per 1,000). These aggregate findings are similar to those described in the previous DHS analysis of childhood mortality (Sullivan, Rutstein, and Bicego, 1994).

Table 4.5  Distribution of births by mother's level of education

Percent distribution of births in the ten-year period preceding the survey by mother's level of education, Demographic and Health Surveys, 1990-1994

| Country | No education | Primary incomplete | Primary complete | Secondary/ higher | Total | Number of births |
|---|---|---|---|---|---|---|
| **Sub-Saharan Africa** | | | | | | |
| Zambia | 19 | 30 | 32 | 19 | 100 | 11,680 |
| Namibia | 21 | 41 | 10 | 28 | 100 | 7,095 |
| Madagascar | 23 | 55 | 3 | 19 | 100 | 10,680 |
| Kenya | 24 | 37 | 19 | 20 | 100 | 12,474 |
| Ghana | 45 | 13 | 36 | 6 | 100 | 7,195 |
| Cameroon | 47 | 27 | 9 | 17 | 100 | 6,717 |
| Rwanda | 50 | 43 | 3 | 4 | 100 | 11,388 |
| Malawi | 54 | 37 | 6 | 3 | 100 | 8,802 |
| Nigeria | 67 | 10 | 14 | 9 | 100 | 16,359 |
| Senegal | 83 | 6 | 6 | 5 | 100 | 11,068 |
| Burkina Faso | 89 | 5 | 3 | 3 | 100 | 12,311 |
| Niger | 93 | 6 | 0 | 1 | 100 | 14,081 |
| **Asia/Near East/ North Africa** | | | | | | |
| Philippines | 4 | 18 | 26 | 52 | 100 | 17,371 |
| Indonesia | 16 | 34 | 27 | 23 | 100 | 3,570 |
| Turkey | 34 | 7 | 45 | 14 | 100 | 8,186 |
| Pakistan | 81 | 3 | 6 | 10 | 100 | 14,754 |
| Morocco | 83 | 5 | 5 | 7 | 100 | 10,534 |
| **Latin America/ Caribbean** | | | | | | |
| Colombia | 7 | 33 | 19 | 41 | 100 | 7,591 |
| Dominican Republic | 10 | 48 | 9 | 33 | 100 | 7,328 |
| Peru | 12 | 24 | 20 | 44 | 100 | 16,972 |

Figure 4.3  Percent distribution of births that occurred in the 10-year period preceding the survey by mother's level of education, selected Demographic and Health Surveys, 1990-1994
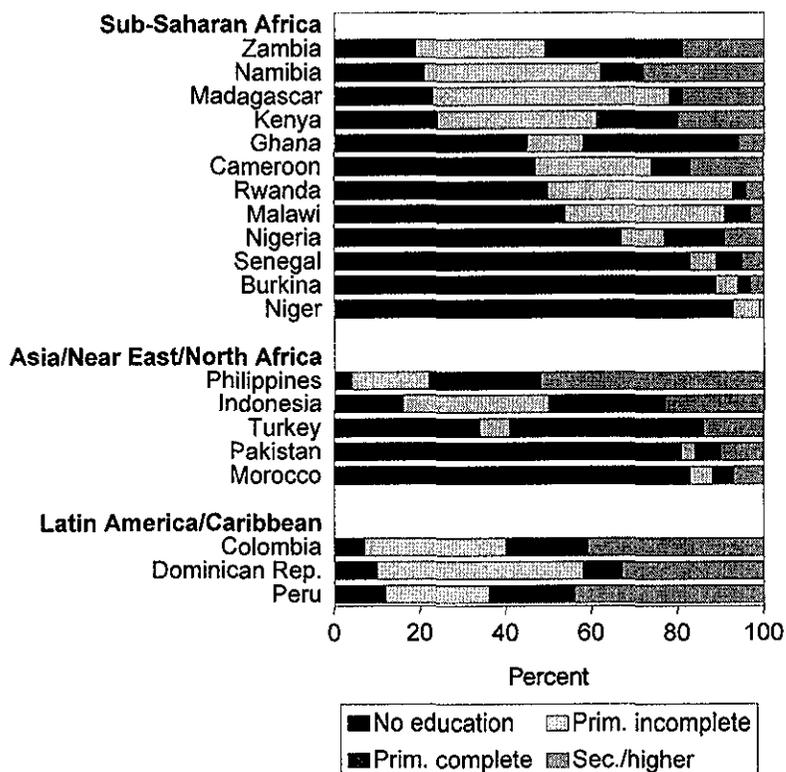
Table 4.6.1  Childhood mortality rates by mother's level of education

Childhood mortality rates by mother's level of education, for the ten-year period preceding the survey, Demographic and Health Surveys, 1990-1994

| Country | Neonatal mortality | | | | Postneonatal mortality | | | | Infant mortality | | | | Child mortality | | | | Under-five mortality | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No educa-tion | Primary incom-plete | Primary complete | Second-ary/higher | No educa-tion | Primary incom-plete | Primary complete | Second-ary/higher | No educa-tion | Primary incom-plete | Primary complete | Second-ary/higher | No educa-tion | Primary incom-plete | Primary complete | Second-ary/higher | No educa-tion | Primary incom-plete | Primary complete | Second-ary/higher |
| **Sub-Saharan Africa** | | | | | | | | | | | | | | | | | | | | |
| Namibia | 34 | 37 | 47 | 31 | 24 | 26 | 32 | 26 | 58 | 62 | 79 | 57 | 41 | 37 | (25) | 20 | 97 | 97 | (102) | 76 |
| Kenya | 28 | 32 | 26 | 17 | 38 | 48 | 27 | 17 | 66 | 79 | 53 | 35 | 36 | 42 | 22 | 20 | 100 | 118 | 74 | 54 |
| Ghana | 52 | 54 | 38 | (35) | 36 | 32 | 22 | (10) | 87 | 85 | 60 | (45) | 86 | 65 | 38 | (26) | 166 | 145 | 96 | 69 |
| Cameroon | 57 | 35 | 18 | 25 | 56 | 20 | 21 | 25 | 113 | 56 | 39 | 51 | 96 | 54 | (29) | 31 | 198 | 107 | (67) | 80 |
| Senegal | 43 | 38 | 26 | 19 | 38 | 27 | 26 | 13 | 81 | 65 | 52 | 32 | 98 | (47) | (38) | (21) | 171 | (109) | (89) | 52 |
| Rwanda | 52 | 43 | (31) | 38 | 45 | 43 | (46) | 27 | 97 | 85 | (77) | 65 | 88 | 75 | * | (31) | 177 | 154 | * | 94 |
| Madagascar | 52 | 39 | (68) | 39 | 86 | 57 | (48) | 34 | 138 | 97 | (115) | 73 | 99 | 90 | * | 44 | 223 | 178 | * | 114 |
| Burkina Faso | 54 | 28 | 42 | 29 | 58 | 51 | 48 | 24 | 111 | 80 | 90 | 53 | 113 | 95 | (64) | (36) | 212 | 167 | (148) | 87 |
| Zambia | 47 | 47 | 33 | 35 | 68 | 70 | 50 | 44 | 115 | 116 | 83 | 79 | 101 | 104 | 81 | 60 | 204 | 208 | 157 | 135 |
| Nigeria | 49 | 43 | 39 | 36 | 48 | 54 | 41 | 34 | 96 | 97 | 80 | 70 | 127 | 103 | 63 | 46 | 211 | 190 | 138 | 113 |
| Malawi | 52 | 49 | 34 | (35) | 92 | 88 | 49 | (61) | 143 | 137 | 84 | (96) | 131 | 116 | 85 | (34) | 255 | 237 | 162 | 127 |
| Niger | 53 | 48 | * | (16) | 84 | 68 | * | (32) | 137 | 116 | * | (49) | 228 | 134 | * | (60) | 334 | 234 | * | 106 |
| **Asia/Near East/** | | | | | | | | | | | | | | | | | | | | |
| **North Africa** | | | | | | | | | | | | | | | | | | | | |
| Philippines | 18 | 23 | 18 | 17 | 59 | 34 | 21 | 12 | 77 | 58 | 39 | 29 | 81 | 40 | 32 | 14 | 152 | 95 | 70 | 42 |
| Turkey | 49 | 50 | 33 | 18 | 44 | 48 | 25 | 7 | 92 | 98 | 58 | 25 | 18 | 24 | 9 | 5 | 109 | 119 | 67 | 30 |
| Morocco | 36 | 31 | (33) | 14 | 32 | 24 | (19) | 7 | 68 | 55 | (52) | 21 | 25 | 10 | (5) | (2) | 91 | 64 | (56) | 22 |
| Indonesia | 38 | 38 | 29 | 25 | 52 | 42 | 30 | 14 | 91 | 79 | 59 | 40 | 45 | 34 | 22 | 12 | 131 | 111 | 80 | 51 |
| Pakistan | 56 | (47) | 51 | 33 | 43 | (35) | 43 | 26 | 99 | (83) | 94 | 59 | 33 | (14) | 20 | 6 | 128 | (95) | 113 | 65 |
| **Latin America/** | | | | | | | | | | | | | | | | | | | | |
| **Caribbean** | | | | | | | | | | | | | | | | | | | | |
| Colombia | (26) | 14 | 15 | 14 | (34) | 17 | 6 | 7 | (60) | 31 | 21 | 20 | (15) | 10 | 8 | 5 | (74) | 41 | 29 | 25 |
| Dominican Republic | 23 | 30 | 21 | 18 | 25 | 27 | 20 | 8 | 48 | 56 | 41 | 26 | 45 | 22 | (15) | 6 | 91 | 77 | (56) | 31 |
| Peru | 49 | 46 | 31 | 16 | 51 | 50 | 36 | 18 | 100 | 96 | 67 | 34 | 56 | 48 | 30 | 11 | 150 | 140 | 96 | 45 |
| Grand average | 43 | 39 | 33 | 26 | 51 | 43 | 32 | 22 | 94 | 82 | 65 | 48 | 78 | 58 | 34 | 25 | 164 | 134 | 94 | 71 |

Note: Figures in parentheses are based on 250-500 births. An asterisk indicates that a figure is based on fewer than 250 births and has been suppressed.

Table 4.6.2 Relative risk of dying in childhood by mother's level of education

Relative risk of dying in childhood by mother's level of education, for the ten-year period preceding the survey, Demographic and Health Surveys, 1990-1994

| Country | Neonatal mortality | | | | Postneonatal mortality | | | | Infant mortality | | | | Child mortality | | | | Under-five mortality | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No education | Primary incomplete | Primary complete | Secondary/ higher | No education | Primary incomplete | Primary complete | Secondary/ higher | No education | Primary incomplete | Primary complete | Secondary/ higher | No education | Primary incomplete | Primary complete | Secondary/ higher | No education | Primary incomplete | Primary complete | Secondary/ higher |
| **Sub-Saharan Africa** | | | | | | | | | | | | | | | | | | | | |
| Namibia | 0.92 | 1.00 | 1.27 | 0.84 | 0.92 | 1.00 | 1.23 | 1.00 | 0.94 | 1.00 | 1.27 | 0.92 | 1.11 | 1.00 | (0.68) | 0.54 | 1.00 | 1.00 | (1.05) | 0.78 |
| Kenya | 0.88 | 1.00 | 0.81 | 0.53 | 0.79 | 1.00 | 0.56 | 0.35 | 0.84 | 1.00 | 0.67 | 0.44 | 0.86 | 1.00 | 0.52 | 0.48 | 0.85 | 1.00 | 0.63 | 0.46 |
| Ghana | 0.96 | 1.00 | 0.70 | (0.65) | 1.13 | 1.00 | 0.69 | (0.31) | 1.02 | 1.00 | 0.71 | (0.53) | 1.32 | 1.00 | 0.58 | (0.40) | 1.14 | 1.00 | 0.66 | 0.48 |
| Cameroon | 1.63 | 1.00 | 0.51 | 0.71 | 2.80 | 1.00 | 1.05 | 1.25 | 2.02 | 1.00 | 0.70 | 0.91 | 1.78 | 1.00 | (0.54) | 0.57 | 1.85 | 1.00 | (0.63) | 0.75 |
| Senegal | 1.13 | 1.00 | 0.68 | 0.50 | 1.41 | 1.00 | 0.96 | 0.48 | 1.25 | 1.00 | 0.80 | 0.49 | 2.09 | (1.00) | (0.81) | (0.45) | 1.57 | (1.00) | (0.82) | 0.48 |
| Rwanda | 1.21 | 1.00 | (0.72) | 0.88 | 1.05 | 1.00 | (1.07) | 0.63 | 1.14 | 1.00 | (0.91) | 0.76 | 1.17 | 1.00 | * | (0.41) | 1.15 | 1.00 | * | 0.61 |
| Madagascar | 1.33 | 1.00 | (1.74) | 1.00 | 1.51 | 1.00 | (0.84) | 0.60 | 1.42 | 1.00 | (1.19) | 0.75 | 1.10 | 1.00 | * | 0.49 | 1.25 | 1.00 | * | 0.64 |
| Burkina Faso | 1.93 | 1.00 | 1.50 | 1.04 | 1.14 | 1.00 | 0.94 | 0.47 | 1.39 | 1.00 | 1.13 | 0.66 | 1.19 | 1.00 | (0.67) | (0.38) | 1.27 | 1.00 | (0.89) | 0.52 |
| Zambia | 1.00 | 1.00 | 0.70 | 0.74 | 0.97 | 1.00 | 0.71 | 0.63 | 0.99 | 1.00 | 0.72 | 0.68 | 0.97 | 1.00 | 0.78 | 0.58 | 0.98 | 1.00 | 0.75 | 0.65 |
| Nigeria | 1.14 | 1.00 | 0.91 | 0.84 | 0.89 | 1.00 | 0.76 | 0.63 | 0.99 | 1.00 | 0.82 | 0.72 | 1.23 | 1.00 | 0.61 | 0.45 | 1.11 | 1.00 | 0.73 | 0.59 |
| Malawi | 1.06 | 1.00 | 0.69 | (0.71) | 1.05 | 1.00 | 0.56 | (0.69) | 1.04 | 1.00 | 0.61 | (0.70) | 1.13 | 1.00 | 0.73 | (0.29) | 1.08 | 1.00 | 0.68 | 0.54 |
| Niger | 1.10 | 1.00 | * | (0.33) | 1.24 | 1.00 | * | (0.47) | 1.18 | 1.00 | * | (0.42) | 1.70 | 1.00 | * | (0.45) | 1.43 | 1.00 | * | 0.45 |
| **Asia/Near East/ North Africa** | | | | | | | | | | | | | | | | | | | | |
| Philippines | 0.78 | 1.00 | 0.78 | 0.74 | 1.74 | 1.00 | 0.62 | 0.35 | 1.33 | 1.00 | 0.67 | 0.50 | 2.03 | 1.00 | 0.80 | 0.35 | 1.60 | 1.00 | 0.74 | 0.44 |
| Turkey | 0.98 | 1.00 | 0.66 | 0.36 | 0.92 | 1.00 | 0.52 | 0.15 | 0.94 | 1.00 | 0.59 | 0.26 | 0.75 | 1.00 | 0.38 | 0.21 | 0.92 | 1.00 | 0.56 | 0.25 |
| Morocco | 1.16 | 1.00 | (1.06) | 0.45 | 1.33 | 1.00 | (0.79) | 0.29 | 1.24 | 1.00 | (0.95) | 0.38 | 2.50 | 1.00 | (0.50) | (0.20) | 1.42 | 1.00 | (0.88) | 0.34 |
| Indonesia | 1.00 | 1.00 | 0.76 | 0.66 | 1.24 | 1.00 | 0.71 | 0.33 | 1.15 | 1.00 | 0.75 | 0.51 | 1.32 | 1.00 | 0.65 | 0.35 | 1.18 | 1.00 | 0.72 | 0.46 |
| Pakistan | 1.19 | (1.00) | 1.09 | 0.70 | 1.23 | (1.00) | 1.23 | 0.74 | 1.19 | (1.00) | 1.13 | 0.71 | 2.36 | (1.00) | 1.43 | 0.43 | 1.35 | (1.00) | 1.19 | 0.68 |
| **Latin America/ Caribbean** | | | | | | | | | | | | | | | | | | | | |
| Colombia | (1.86) | 1.00 | 1.07 | 1.00 | (2.00) | 1.00 | 0.35 | 0.41 | (1.94) | 1.00 | 0.68 | 0.65 | (1.50) | 1.00 | 0.80 | 0.50 | (1.80) | 1.00 | 0.71 | 0.61 |
| Dominican Republic | 0.77 | 1.00 | 0.70 | 0.60 | 0.93 | 1.00 | 0.74 | 0.30 | 0.86 | 1.00 | 0.73 | 0.46 | 2.05 | 1.00 | (0.68) | 0.27 | 1.18 | 1.00 | (0.73) | 0.40 |
| Peru | 1.07 | 1.00 | 0.67 | 0.35 | 1.02 | 1.00 | 0.72 | 0.36 | 1.04 | 1.00 | 0.70 | 0.35 | 1.17 | 1.00 | 0.63 | 0.23 | 1.07 | 1.00 | 0.69 | 0.32 |
| Grand average | 1.12 | 1.00 | 0.86 | 0.66 | 1.18 | 1.00 | 0.75 | 0.52 | 1.15 | 1.00 | 0.80 | 0.59 | 1.34 | 1.00 | 0.59 | 0.42 | 1.22 | 1.00 | 0.70 | 0.53 |

Note: Figures in parentheses are based on 250-500 births. An asterisk indicates that a figure is based on fewer than 250 births and has been suppressed.

The magnitude of the education-mortality association varies with age of the child, with the strongest effects occurring after infancy (Figure 4.4), a finding consistent with many previous studies. The relative risk of dying among children of mothers with secondary education (compared with primary incomplete) falls from 0.66 during the neonatal period, to 0.52 in the postneonatal period, to 0.42 during the period 1-4 years.

Wide variation in the strength of this relationship was found in the countries examined here. Additionally, there is a tendency for the effect to be less pronounced in sub-Saharan countries and more pronounced in the other regions. A comparison of Namibia and Peru indicates that children of women with secondary education in Namibia experience more than three-quarters (0.78) the under-five mortality risk of children of women with primary incomplete; the comparable figure for Peru is 0.32. Possible explanations for this finding have been reported previously (Bicego and Boerma, 1993, Sullivan, Rutstein, and Bicego, 1994).

## Literacy

Table 4.7.1 presents childhood mortality rates by literacy status of the parents. Corresponding relative risks are shown in Table 4.7.2. In all countries, under-five mortality is lowest when both parents are literate, highest when both are illiterate, and intermediate when only one of the parents can read. With a few exceptions, this pattern is observed for all ages.

Figure 4.5 shows the relative risk of dying in childhood by literacy status of the parents. As with mother's education, the effect of parental literacy is most dramatic during ages 1-4 years. When both parents are literate the effect is more than double that when only one parent is literate. When only one parent is literate, mother's literacy appears to have greater impact than father's literacy during the period 1-4 years.

Figure 4.4   Relative risk of dying in childhood by mother's level of education (averages for all countries combined), selected Demographic and Health Surveys, 1990-1994



NE = No education        PC = Primary complete
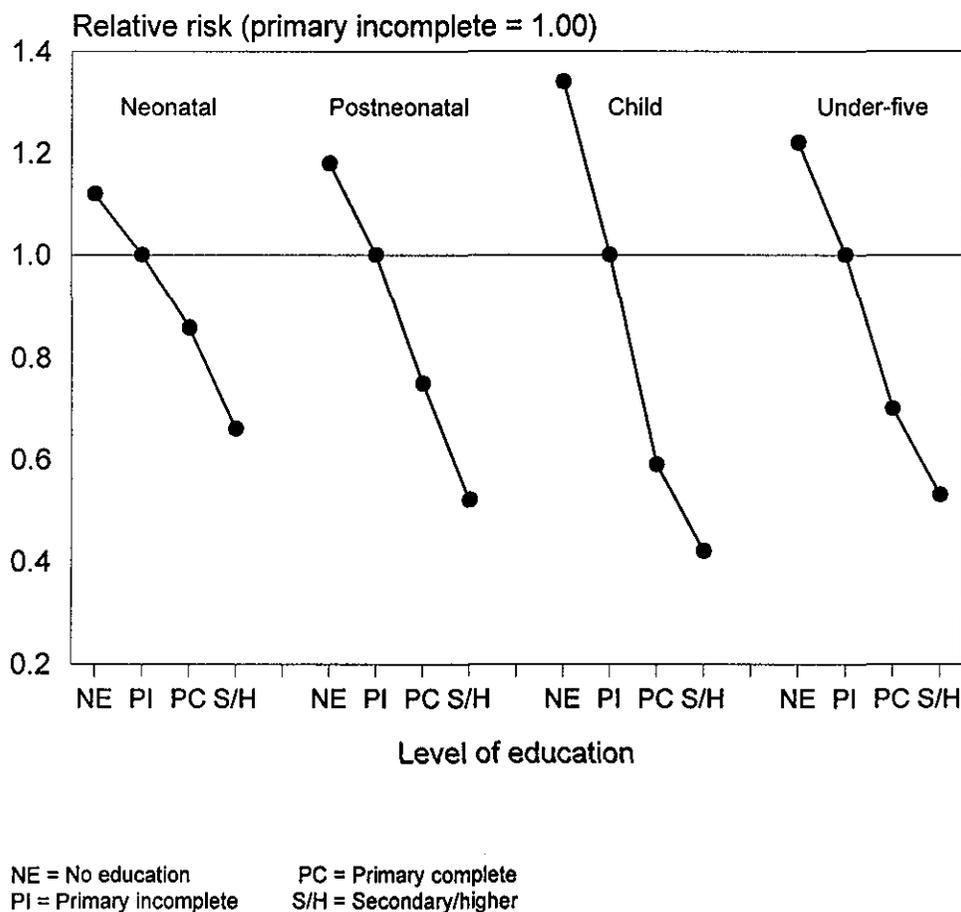PI = Primary incomplete  S/H = Secondary/higher

Table 4.7.1  Childhood mortality rates by literacy status of parents

Childhood mortality rates by literacy status of parents, for the ten-year period preceding the survey, Demographic and Health Surveys, 1990-1994

| Country | Neonatal mortality | | | | Postneonatal mortality | | | | Infant mortality | | | | Child mortality | | | | Under-five mortality | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Both illit-erate | Father literate | Mother literate | Both literate | Both illit-erate | Father literate | Mother literate | Both literate | Both illit-erate | Father literate | Mother literate | Both literate | Both illit-erate | Father literate | Mother literate | Both literate | Both illit-erate | Father literate | Mother literate | Both literate |
| **Sub-Saharan Africa** | | | | | | | | | | | | | | | | | | | | |
| Namibia | 37 | 28 | 37 | 34 | 25 | 32 | 27 | 26 | 62 | 59 | 64 | 60 | 32 | 40 | 30 | 31 | 92 | 97 | 92 | 89 |
| Kenya | 36 | 26 | 33 | 24 | 43 | 38 | 64 | 30 | 78 | 64 | 97 | 54 | 37 | 39 | 49 | 27 | 113 | 100 | 141 | 80 |
| Ghana | 56 | 44 | * | 38 | 37 | 28 | * | 21 | 93 | 72 | * | 59 | 95 | 60 | * | 34 | 179 | 128 | * | 92 |
| Cameroon | 56 | 49 | 30 | 25 | 49 | 52 | 25 | 21 | 105 | 100 | 55 | 46 | 96 | 60 | * | 35 | 191 | 155 | * | 79 |
| Senegal | 44 | 34 | 27 | 22 | 39 | 29 | 15 | 25 | 83 | 64 | 42 | 47 | 103 | 50 | 54 | 20 | 177 | 110 | 93 | 66 |
| Rwanda | 48 | 51 | 34 | 45 | 43 | 45 | 43 | 42 | 91 | 96 | 77 | 87 | 90 | 77 | 76 | 55 | 173 | 165 | 147 | 137 |
| Madagascar | 44 | 47 | 50 | 36 | 74 | 63 | 62 | 37 | 118 | 110 | 112 | 73 | 92 | 98 | 81 | 62 | 199 | 197 | 184 | 130 |
| Burkina Faso | 53 | 52 | 29 | 34 | 58 | 51 | 43 | 36 | 111 | 103 | 72 | 69 | 112 | 115 | 90 | 45 | 211 | 206 | 156 | 111 |
| Zambia | 50 | 44 | 39 | 36 | 71 | 69 | 66 | 51 | 121 | 113 | 104 | 87 | 100 | 108 | 83 | 79 | 210 | 209 | 179 | 159 |
| Nigeria | 52 | 36 | 45 | 35 | 49 | 45 | 38 | 41 | 101 | 81 | 83 | 76 | 132 | 95 | 88 | 63 | 220 | 169 | 164 | 135 |
| Malawi | 54 | 48 | 84 | 40 | 95 | 86 | 108 | 74 | 149 | 134 | 191 | 115 | 132 | 124 | * | 93 | 261 | 241 | * | 197 |
| Niger | 53 | 31 | 61 | 8 | 85 | 62 | 60 | 49 | 138 | 93 | 120 | 56 | 229 | 175 | 143 | 58 | 335 | 252 | 246 | 111 |
| **Asia/Near East/** | | | | | | | | | | | | | | | | | | | | |
| **North Africa** | | | | | | | | | | | | | | | | | | | | |
| Philippines | 24 | 22 | 27 | 17 | 43 | 35 | 36 | 16 | 67 | 57 | 63 | 33 | 52 | 48 | 44 | 21 | 116 | 102 | 104 | 53 |
| Turkey | 59 | 44 | * | 31 | 40 | 47 | * | 18 | 99 | 91 | * | 49 | 23 | 16 | * | 8 | 120 | 106 | * | 56 |
| Morocco | 37 | 33 | * | 16 | 33 | 26 | * | 11 | 69 | 60 | * | 27 | 26 | 19 | * | 2 | 94 | 77 | * | 29 |
| Indonesia | 40 | 39 | 39 | 27 | 55 | 39 | 36 | 24 | 94 | 78 | 75 | 52 | 40 | 37 | 34 | 20 | 131 | 112 | 107 | 70 |
| Pakistan | 56 | 56 | 69 | 37 | 43 | 42 | 38 | 30 | 99 | 98 | 106 | 67 | 37 | 26 | 35 | 8 | 132 | 121 | 138 | 75 |
| **Latin America/** | | | | | | | | | | | | | | | | | | | | |
| **Caribbean** | | | | | | | | | | | | | | | | | | | | |
| Colombia | 17 | 12 | 17 | 14 | 17 | 22 | 10 | 7 | 35 | 34 | 27 | 22 | 13 | 4 | 8 | 6 | 47 | 38 | 35 | 28 |
| Dominican Republic | 26 | 21 | 36 | 23 | 34 | 22 | 24 | 14 | 60 | 44 | 60 | 36 | 38 | 30 | 9 | 11 | 96 | 72 | 69 | 47 |
| Peru | 52 | 43 | 42 | 20 | 54 | 44 | 39 | 25 | 106 | 86 | 80 | 45 | 51 | 51 | 43 | 17 | 152 | 133 | 120 | 61 |
| Grand average | 45 | 38 | 41 | 28 | 49 | 44 | 43 | 30 | 94 | 82 | 84 | 58 | 77 | 64 | 58 | 35 | 162 | 140 | 132 | 90 |

Note:  Figures in parentheses are based on 250-500 births.  An asterisk indicates that a figure is based on fewer than 250 births and has been suppressed.

Table 4.7.2  Relative risk of dying in childhood by literacy status of parents

Relative risk of dying in childhood by literacy status of parents, for the ten-year period preceding the survey, Demographic and Health Surveys, 1990-1994

| Country | Neonatal mortality | | | | Postneonatal mortality | | | | Infant mortality | | | | Child mortality | | | | Under-five mortality | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Both illit- erate | Father literate | Mother literate | Both literate | Both illit- erate | Father literate | Mother literate | Both literate | Both illit- erate | Father literate | Mother literate | Both literate | Both illit- erate | Father literate | Mother literate | Both literate | Both illit- erate | Father literate | Mother literate | Both literate |
| **Sub-Saharan Africa** | | | | | | | | | | | | | | | | | | | | |
| Namibia | 1.00 | 0.76 | 1.00 | 0.92 | 1.00 | 1.28 | 1.08 | 1.04 | 1.00 | 0.95 | 1.03 | 0.97 | 1.00 | 1.25 | 0.94 | 0.97 | 1.00 | 1.05 | 1.00 | 0.97 |
| Kenya | 1.00 | 0.72 | 0.92 | 0.67 | 1.00 | 0.88 | 1.49 | 0.70 | 1.00 | 0.82 | 1.24 | 0.69 | 1.00 | 1.05 | 1.32 | 0.73 | 1.00 | 0.88 | 1.25 | 0.71 |
| Ghana | 1.00 | 0.79 | * | 0.68 | 1.00 | 0.76 | * | 0.57 | 1.00 | 0.77 | * | 0.63 | 1.00 | 0.63 | * | 0.36 | 1.00 | 0.72 | * | 0.51 |
| Cameroon | 1.00 | 0.88 | 0.54 | 0.45 | 1.00 | 1.06 | 0.51 | 0.43 | 1.00 | 0.95 | 0.52 | 0.44 | 1.00 | 0.63 | * | 0.36 | 1.00 | 0.81 | * | 0.41 |
| Senegal | 1.00 | 0.77 | 0.61 | 0.50 | 1.00 | 0.74 | 0.38 | 0.64 | 1.00 | 0.77 | 0.51 | 0.57 | 1.00 | 0.49 | 0.52 | 0.19 | 1.00 | 0.62 | 0.53 | 0.37 |
| Rwanda | 1.00 | 1.06 | 0.71 | 0.94 | 1.00 | 1.05 | 1.00 | 0.98 | 1.00 | 1.05 | 0.85 | 0.96 | 1.00 | 0.86 | 0.84 | 0.61 | 1.00 | 0.95 | 0.85 | 0.79 |
| Madagascar | 1.00 | 1.07 | 1.14 | 0.82 | 1.00 | 0.85 | 0.84 | 0.50 | 1.00 | 0.93 | 0.95 | 0.62 | 1.00 | 1.07 | 0.88 | 0.67 | 1.00 | 0.99 | 0.92 | 0.65 |
| Burkina Faso | 1.00 | 0.98 | 0.55 | 0.64 | 1.00 | 0.88 | 0.74 | 0.62 | 1.00 | 0.93 | 0.65 | 0.62 | 1.00 | 1.03 | 0.80 | 0.40 | 1.00 | 0.98 | 0.74 | 0.53 |
| Zambia | 1.00 | 0.88 | 0.78 | 0.72 | 1.00 | 0.97 | 0.93 | 0.72 | 1.00 | 0.93 | 0.86 | 0.72 | 1.00 | 1.08 | 0.83 | 0.79 | 1.00 | 1.00 | 0.85 | 0.76 |
| Nigeria | 1.00 | 0.69 | 0.87 | 0.67 | 1.00 | 0.92 | 0.78 | 0.84 | 1.00 | 0.80 | 0.82 | 0.75 | 1.00 | 0.72 | 0.67 | 0.48 | 1.00 | 0.77 | 0.75 | 0.61 |
| Malawi | 1.00 | 0.89 | 1.56 | 0.74 | 1.00 | 0.91 | 1.14 | 0.78 | 1.00 | 0.90 | 1.28 | 0.77 | 1.00 | 0.94 | * | 0.70 | 1.00 | 0.92 | 0.00 | 0.75 |
| Niger | 1.00 | 0.58 | 1.15 | 0.15 | 1.00 | 0.73 | 0.71 | 0.58 | 1.00 | 0.67 | 0.87 | 0.41 | 1.00 | 0.76 | 0.62 | 0.25 | 1.00 | 0.75 | 0.73 | 0.33 |
| **Asia/Near East/ North Africa** | | | | | | | | | | | | | | | | | | | | |
| Philippines | 1.00 | 0.92 | 1.13 | 0.71 | 1.00 | 0.81 | 0.84 | 0.37 | 1.00 | 0.85 | 0.94 | 0.49 | 1.00 | 0.92 | 0.85 | 0.40 | 1.00 | 0.88 | 0.90 | 0.46 |
| Turkey | 1.00 | 0.75 | * | 0.53 | 1.00 | 1.18 | * | 0.45 | 1.00 | 0.92 | * | 0.49 | 1.00 | 0.70 | * | 0.35 | 1.00 | 0.88 | * | 0.47 |
| Morocco | 1.00 | 0.89 | * | 0.43 | 1.00 | 0.79 | * | 0.33 | 1.00 | 0.87 | * | 0.39 | 1.00 | 0.73 | * | 0.08 | 1.00 | 0.82 | * | 0.31 |
| Indonesia | 1.00 | 0.98 | 0.98 | 0.68 | 1.00 | 0.71 | 0.65 | 0.44 | 1.00 | 0.83 | 0.80 | 0.55 | 1.00 | 0.93 | 0.85 | 0.50 | 1.00 | 0.85 | 0.82 | 0.53 |
| Pakistan | 1.00 | 1.00 | 1.23 | 0.66 | 1.00 | 0.98 | 0.88 | 0.70 | 1.00 | 0.99 | 1.07 | 0.68 | 1.00 | 0.70 | 0.95 | 0.22 | 1.00 | 0.92 | 1.05 | 0.57 |
| **Latin America/ Caribbean** | | | | | | | | | | | | | | | | | | | | |
| Colombia | 1.00 | 0.71 | 1.00 | 0.82 | 1.00 | 1.29 | 0.59 | 0.41 | 1.00 | 0.97 | 0.77 | 0.63 | 1.00 | 0.31 | 0.62 | 0.46 | 1.00 | 0.81 | 0.74 | 0.60 |
| Dominican Republic | 1.00 | 0.81 | 1.38 | 0.88 | 1.00 | 0.65 | 0.71 | 0.41 | 1.00 | 0.73 | 1.00 | 0.60 | 1.00 | 0.79 | 0.24 | 0.29 | 1.00 | 0.75 | 0.72 | 0.49 |
| Peru | 1.00 | 0.83 | 0.81 | 0.38 | 1.00 | 0.81 | 0.72 | 0.46 | 1.00 | 0.81 | 0.75 | 0.42 | 1.00 | 1.00 | 0.84 | 0.33 | 1.00 | 0.88 | 0.79 | 0.40 |
| Grand average | 1.00 | 0.85 | 0.92 | 0.63 | 1.00 | 0.89 | 0.87 | 0.61 | 1.00 | 0.87 | 0.89 | 0.62 | 1.00 | 0.83 | 0.76 | 0.45 | 1.00 | 0.86 | 0.81 | 0.56 |

Note: Figures in parentheses are based on 250-500 births.  An asterisk indicates that a figure is based on fewer than 250 births and has been suppressed.

Figure 4.5  Relative risk of dying in childhood by literacy status of parents (averages for all countries combined), selected
Demographic and Health Surveys, 1990-1994



BI = Both illiterate        ML = Mother literate
FL = Father literate        BL = Both literate
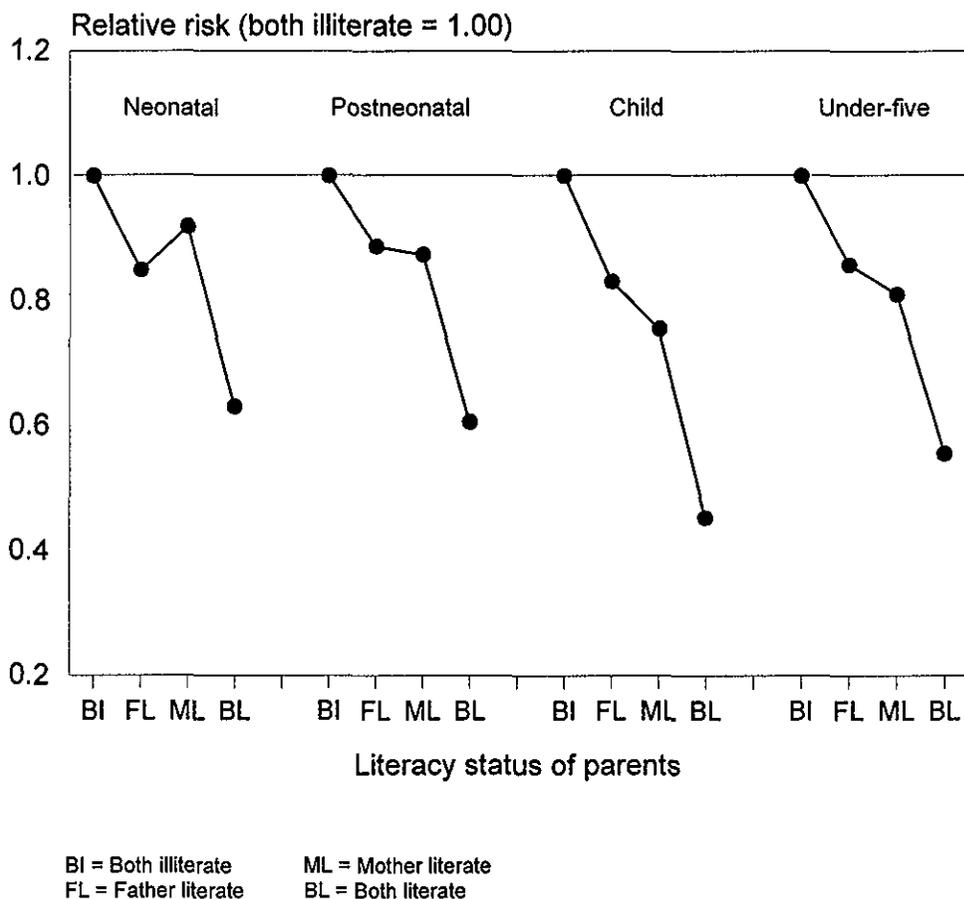
## 4.4   FATHER'S OCCUPATION

The nature of a parent's occupation can have both positive and negative effects on a child's well-being and survival chances. For instance, professional employment may bring certain benefits to the mother and child that are not associated with other types of employment. Such benefits include health insurance and maternity leave. In addition, occupation is an important determinant of economic circumstance (i.e., wealth and income), which in turn often influences decisions regarding use of health services. Agricultural occupations may bring nonmonetary income into the household, but are often associated with low levels of disposable income and poor sanitary conditions in the household.

The DHS survey question on mother's occupation is not specific to the period of exposure of each child to mortality risk but rather is limited to current occupation. The

present analysis, therefore, focuses on the husband's occupation, which is likely to have been more stable over time. Father's occupation is also more likely to be representative of a household's overall level of disposable income and wealth. Based on the question posed to women about their current or latest partner—"What kind of work does (did) your husband/partner mainly do?"—occupations have been recoded and grouped into four categories:

- agricultural,
- blue collar (skilled and unskilled),
- sales and service, and
- professional, technical, managerial, and clerical (PTMC).

A fifth category includes children of unmarried mothers and mothers whose partners are not employed. It should be noted that this classification system, although based on the international scheme for coding occupations, when applied

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uniformly across widely divergent cultures is likely to result in some level of misclassification, which can lead to faulty conclusions. For instance, in the more developed countries of Latin America, a larger part of the agricultural sector will be comprised of large landowners, compared with sub-Saharan Africa where the vast majority of agricultural workers are subsistence farmers or estate/commercial workers. Clearly, these agricultural occupations are operating at different socioeconomic levels.

Table 4.8 presents the distribution of births that occurred in the 10-year period preceding the survey by occupation of the father. The percentage of children whose fathers work in agriculture ranges from 20 percent in Turkey to around 80 percent in Burkina Faso, Niger and Rwanda.[10]

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[10] Namibia was excluded from consideration because the fathers of a large proportion of children (47 percent) fall into the category "father unemployed/mother not married."

At the other end of the spectrum, less than 10 percent of children in eight countries (six of these in sub-Saharan Africa) have fathers who have PTMC occupations, compared with 23 percent in Peru.

Table 4.9.1 presents childhood mortality rates by father's occupation; corresponding relative risks are shown in Table 4.9.2. Because of the small numbers of births for most countries, the category "father unemployed/mother not married" is not shown. In nearly all countries and at all ages, children whose fathers work in the PTMC occupations have the lowest mortality, while children whose fathers work in agricultural occupations have the highest. Taking all countries together, under-five mortality in children of fathers in the PTMC occupations averages about half that of children of agricultural workers (82 versus 156 deaths per 1,000).

Table 4.8  Distribution of births by father's occupation

Percent distribution of births in the 10-year period preceding the survey by father's occupation, Demographic and Health Surveys, 1990-1994

| Country | Father unemployed or mother not married | Agricultural | Blue collar | Sales/ service | Professional, technical or clerical | Total | Number of births |
|---|---|---|---|---|---|---|---|
| **Sub-Saharan Africa** | | | | | | | |
| Namibia | 47 | 10 | 22 | 12 | 9 | 100 | 7,095 |
| Kenya | 9 | 36 | 26 | 16 | 13 | 100 | 12,474 |
| Ghana | 3 | 57 | 18 | 9 | 13 | 100 | 7,195 |
| Cameroon | 7 | 44 | 23 | 12 | 14 | 100 | 6,717 |
| Senegal | 8 | 42 | 24 | 17 | 9 | 100 | 11,068 |
| Rwanda | 3 | 80 | 8 | 6 | 3 | 100 | 11,388 |
| Madagascar | 7 | 70 | 13 | 4 | 6 | 100 | 10,680 |
| Burkina Faso | 1 | 78 | 8 | 11 | 2 | 100 | 12,311 |
| Zambia | 6 | 39 | 32 | 13 | 10 | 100 | 11,680 |
| Nigeria | 2 | 58 | 3 | 25 | 12 | 100 | 16,359 |
| Malawi | 1 | 51 | 25 | 13 | 10 | 100 | 8,802 |
| Niger | 2 | 76 | 12 | 8 | 2 | 100 | 14,081 |
| **Asia/Near East/ North Africa** | | | | | | | |
| Philippines | 3 | 42 | 35 | 13 | 7 | 100 | 17,371 |
| Turkey | 9 | 20 | 39 | 21 | 11 | 100 | 8,186 |
| Morocco | 4 | 37 | 33 | 17 | 9 | 100 | 10,534 |
| Indonesia | 2 | 43 | 26 | 18 | 11 | 100 | 3,570 |
| Pakistan | 5 | 32 | 34 | 19 | 10 | 100 | 14,754 |
| **Latin America/ Caribbean** | | | | | | | |
| Colombia | 5 | 28 | 32 | 19 | 16 | 100 | 7,591 |
| Dominican Republic | 6 | 28 | 33 | 21 | 12 | 100 | 7,328 |
| Peru | 5 | 36 | 25 | 11 | 23 | 100 | 16,972 |

## Table 4.9.1 Childhood mortality rates by father's occupation

Childhood mortality rates by father's occupation, for the ten-year period preceding the survey, Demographic and Health Surveys, 1990-1994

| Country | Neonatal mortality | | | | Postneonatal mortality | | | | Infant mortality | | | | Child mortality | | | | Under-five mortality | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Agri-cul-tural | Blue collar | Sales/ service | Profes-sional, tech-nical or clerical | Agri-cul-tural | Blue collar | Sales/ service | Profes-sional, tech-nical or clerical | Agri-cul-tural | Blue collar | Sales/ service | Profes-sional, tech-nical or clerical | Agri-cul-tural | Blue collar | Sales/ service | Profes-sional, tech-nical or clerical | Agri-cul-tural | Blue collar | Sales/ service | Profes-sional, tech-nical or clerical |
| **Sub-Saharan Africa** | | | | | | | | | | | | | | | | | | | | |
| Namibia | 36 | 30 | 33 | 20 | 27 | 23 | 19 | 29 | 63 | 53 | 52 | 49 | 30 | 32 | 37 | 22 | 91 | 84 | 87 | 70 |
| Kenya | 29 | 23 | 33 | 18 | 42 | 32 | 35 | 22 | 71 | 55 | 68 | 40 | 37 | 33 | 34 | 21 | 106 | 87 | 100 | 60 |
| Ghana | 51 | 40 | 39 | 37 | 33 | 21 | 29 | 24 | 84 | 60 | 69 | 61 | 79 | 46 | 38 | 33 | 156 | 104 | 104 | 92 |
| Cameroon | 50 | 34 | 59 | 20 | 51 | 23 | 34 | 28 | 101 | 57 | 93 | 49 | 85 | 65 | 57 | 36 | 178 | 118 | 144 | 83 |
| Senegal | 44 | 37 | 45 | 27 | 42 | 30 | 35 | 20 | 85 | 67 | 80 | 47 | 115 | 68 | 73 | 39 | 191 | 130 | 147 | 84 |
| Rwanda | 48 | 40 | 54 | 41 | 43 | 42 | 44 | 53 | 91 | 83 | 98 | 94 | 85 | 54 | 47 | (43) | 168 | 132 | 141 | (132) |
| Madagascar | 47 | 26 | 36 | 25 | 65 | 49 | (42) | 25 | 112 | 75 | (77) | 50 | 88 | 86 | (92) | 43 | 190 | 154 | (162) | 91 |
| Burkina Faso | 54 | 44 | 42 | (24) | 58 | 57 | 51 | (35) | 112 | 101 | 92 | (59) | 114 | 95 | 99 | (32) | 213 | 186 | 182 | (89) |
| Zambia | 49 | 32 | 40 | 27 | 72 | 49 | 57 | 36 | 121 | 81 | 96 | 63 | 102 | 81 | 97 | 57 | 211 | 156 | 184 | 116 |
| Nigeria | 51 | 36 | 39 | 33 | 52 | 62 | 35 | 37 | 102 | 97 | 74 | 70 | 129 | (61) | 91 | 65 | 218 | (153) | 159 | 131 |
| Malawi | 48 | 57 | 44 | 46 | 94 | 87 | 70 | 64 | 142 | 144 | 114 | 111 | 134 | 110 | 113 | 78 | 257 | 238 | 214 | 180 |
| Niger | 54 | 49 | 50 | 11 | 89 | 57 | 73 | 29 | 143 | 106 | 124 | 40 | 236 | 185 | 166 | 108 | 345 | 271 | 269 | 144 |
| **Asia/Near East/ North Africa** | | | | | | | | | | | | | | | | | | | | |
| Philippines | 20 | 17 | 15 | 20 | 28 | 15 | 14 | 12 | 48 | 32 | 29 | 32 | 32 | 26 | 17 | 5 | 79 | 58 | 45 | 37 |
| Turkey | 42 | 36 | 36 | 29 | 48 | 33 | 19 | 13 | 90 | 68 | 56 | 42 | 26 | 13 | 7 | 2 | 114 | 81 | 62 | 44 |
| Morocco | 35 | 37 | 31 | 19 | 32 | 28 | 29 | 17 | 67 | 64 | 61 | 36 | 27 | 26 | 12 | 13 | 92 | 89 | 72 | 48 |
| Indonesia | 34 | 33 | 33 | 19 | 42 | 30 | 32 | 16 | 76 | 63 | 66 | 35 | 36 | 24 | 23 | 14 | 110 | 86 | 87 | 49 |
| Pakistan | 68 | 48 | 46 | 38 | 44 | 42 | 40 | 35 | 111 | 90 | 86 | 74 | 34 | 25 | 33 | 17 | 142 | 113 | 116 | 90 |
| **Latin America/ Caribbean** | | | | | | | | | | | | | | | | | | | | |
| Colombia | 17 | 15 | 16 | 9 | 9 | 18 | 15 | 4 | 25 | 33 | 31 | 13 | 11 | 7 | 8 | 5 | 36 | 39 | 39 | 17 |
| Dominican | 34 | 24 | 21 | 13 | 32 | 18 | 13 | 8 | 66 | 43 | 34 | 21 | 33 | 12 | 14 | 13 | 97 | 54 | 47 | 33 |
| Peru | 43 | 24 | 36 | 15 | 48 | 33 | 25 | 19 | 91 | 57 | 61 | 35 | 45 | 28 | 22 | 15 | 131 | 83 | 82 | 49 |
| **Grand average** | 43 | 34 | 37 | 25 | 48 | 37 | 36 | 26 | 90 | 71 | 73 | 51 | 74 | 54 | 54 | 33 | 156 | 121 | 122 | 82 |

Note: Figures in parentheses are based on 250-500 births.

Table 4.9.2  Relative risk of dying in childhood by father's occupation

Relative risk of dying in childhood by father's occupation, for the ten-year period preceding the survey, Demographic and Health Surveys, 1990-1994

| Country | Neonatal mortality | | | | Postneonatal mortality | | | | Infant mortality | | | | Child mortality | | | | Under-five mortality | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Agri-cul-tural | Blue collar | Sales/ service | Profes-sional, tech-nical or clerical | Agri-cul-tural | Blue collar | Sales/ service | Profes-sional, tech-nical or clerical | Agri-cul-tural | Blue collar | Sales/ service | Profes-sional, tech-nical or clerical | Agri-cul-tural | Blue collar | Sales/ service | Profes-sional, tech-nical or clerical | Agri-cul-tural | Blue collar | Sales/ service | Profes-sional, tech-nical or clerical |
| **Sub-Saharan Africa** | | | | | | | | | | | | | | | | | | | | |
| Namibia | 1.00 | 0.83 | 0.92 | 0.56 | 1.00 | 0.85 | 0.70 | 1.07 | 1.00 | 0.84 | 0.83 | 0.78 | 1.00 | 1.07 | 1.23 | 0.73 | 1.00 | 0.92 | 0.96 | 0.77 |
| Kenya | 1.00 | 0.79 | 1.14 | 0.62 | 1.00 | 0.76 | 0.83 | 0.52 | 1.00 | 0.77 | 0.96 | 0.56 | 1.00 | 0.89 | 0.92 | 0.57 | 1.00 | 0.82 | 0.94 | 0.57 |
| Ghana | 1.00 | 0.78 | 0.76 | 0.73 | 1.00 | 0.64 | 0.88 | 0.73 | 1.00 | 0.71 | 0.82 | 0.73 | 1.00 | 0.58 | 0.48 | 0.42 | 1.00 | 0.67 | 0.67 | 0.59 |
| Cameroon | 1.00 | 0.68 | 1.18 | 0.40 | 1.00 | 0.45 | 0.67 | 0.55 | 1.00 | 0.56 | 0.92 | 0.49 | 1.00 | 0.76 | 0.67 | 0.42 | 1.00 | 0.66 | 0.81 | 0.47 |
| Senegal | 1.00 | 0.84 | 1.02 | 0.61 | 1.00 | 0.71 | 0.83 | 0.48 | 1.00 | 0.79 | 0.94 | 0.55 | 1.00 | 0.59 | 0.63 | 0.34 | 1.00 | 0.68 | 0.77 | 0.44 |
| Rwanda | 1.00 | 0.83 | 1.13 | 0.85 | 1.00 | 0.98 | 1.02 | 1.23 | 1.00 | 0.91 | 1.08 | 1.03 | 1.00 | 0.64 | 0.55 | (0.51) | 1.00 | (0.79) | 0.84 | (0.79) |
| Madagascar | 1.00 | 0.55 | 0.77 | 0.53 | 1.00 | 0.75 | (0.65) | 0.38 | 1.00 | 0.67 | (0.69) | 0.45 | 1.00 | 0.98 | (1.05) | 0.49 | 1.00 | 0.81 | (0.85) | 0.48 |
| Burkina Faso | 1.00 | 0.81 | 0.78 | (0.44) | 1.00 | 0.98 | 0.88 | (0.60) | 1.00 | 0.90 | 0.82 | (0.53) | 1.00 | 0.83 | 0.87 | (0.28) | 1.00 | 0.87 | 0.85 | (0.42) |
| Zambia | 1.00 | 0.65 | 0.82 | 0.55 | 1.00 | 0.68 | 0.79 | 0.50 | 1.00 | 0.67 | 0.79 | 0.52 | 1.00 | 0.79 | 0.95 | 0.56 | 1.00 | 0.74 | 0.87 | 0.55 |
| Nigeria | 1.00 | 0.71 | 0.76 | 0.65 | 1.00 | 1.19 | 0.67 | 0.71 | 1.00 | 0.95 | 0.73 | 0.69 | 1.00 | (0.47 | 0.71 | 0.50 | 1.00 | 0.70 | 0.73 | 0.60 |
| Malawi | 1.00 | 1.19 | 0.92 | 0.96 | 1.00 | 0.93 | 0.74 | 0.68 | 1.00 | 1.01 | 0.80 | 0.78 | 1.00 | 0.82 | 0.84 | 0.58 | 1.00 | 0.93 | 0.83 | 0.70 |
| Niger | 1.00 | 0.91 | 0.93 | 0.20 | 1.00 | 0.64 | 0.82 | 0.33 | 1.00 | 0.74 | 0.87 | 0.28 | 1.00 | 0.78 | 0.70 | 0.46 | 1.00 | 0.79 | 0.78 | 0.42 |
| **Asia/Near East/ North Africa** | | | | | | | | | | | | | | | | | | | | |
| Philippines | 1.00 | 0.85 | 0.75 | 1.00 | 1.00 | 0.54 | 0.50 | 0.43 | 1.00 | 0.67 | 0.60 | 0.67 | 1.00 | 0.81 | 0.53 | 0.16 | 1.00 | 0.73 | 0.57 | 0.47 |
| Turkey | 1.00 | 0.86 | 0.86 | 0.69 | 1.00 | 0.69 | 0.40 | 0.27 | 1.00 | 0.76 | 0.62 | 0.47 | 1.00 | 0.50 | 0.27 | 0.08 | 1.00 | 0.71 | 0.54 | 0.39 |
| Morocco | 1.00 | 1.06 | 0.89 | 0.54 | 1.00 | 0.88 | 0.91 | 0.53 | 1.00 | 0.96 | 0.91 | 0.54 | 1.00 | 0.96 | 0.44 | 0.48 | 1.00 | 0.97 | 0.78 | 0.52 |
| Indonesia | 1.00 | 0.97 | 0.97 | 0.56 | 1.00 | 0.71 | 0.76 | 0.38 | 1.00 | 0.83 | 0.87 | 0.46 | 1.00 | 0.67 | 0.64 | 0.39 | 1.00 | 0.78 | 0.79 | 0.45 |
| Pakistan | 1.00 | 0.71 | 0.68 | 0.56 | 1.00 | 0.95 | 0.91 | 0.80 | 1.00 | 0.81 | 0.77 | 0.67 | 1.00 | 0.74 | 0.97 | 0.50 | 1.00 | 0.80 | 0.82 | 0.63 |
| **Latin America/ Caribbean** | | | | | | | | | | | | | | | | | | | | |
| Colombia | 1.00 | 0.88 | 0.94 | 0.53 | 1.00 | 2.00 | 1.67 | 0.44 | 1.00 | 1.32 | 1.24 | 0.52 | 1.00 | 0.64 | 0.73 | 0.45 | 1.00 | 1.08 | 1.08 | 0.47 |
| Dominican Republic | 1.00 | 0.71 | 0.62 | 0.38 | 1.00 | 0.56 | 0.41 | 0.25 | 1.00 | 0.65 | 0.52 | 0.32 | 1.00 | 0.36 | 0.42 | 0.39 | 1.00 | 0.56 | 0.48 | 0.34 |
| Peru | 1.00 | 0.56 | 0.84 | 0.35 | 1.00 | 0.69 | 0.52 | 0.40 | 1.00 | 0.63 | 0.67 | 0.38 | 1.00 | 0.62 | 0.49 | 0.33 | 1.00 | 0.63 | 0.63 | 0.37 |
| Grand average | 1.00 | 0.80 | 0.88 | 0.57 | 1.00 | 0.79 | 0.75 | 0.55 | 1.00 | 0.79 | 0.81 | 0.57 | 1.00 | 0.74 | 0.76 | 0.47 | 1.00 | 0.77 | 0.78 | 0.52 |

Note:  Figures in parentheses are based on 250-500 births.

The averages presented mask substantial variation in the magnitude and direction of the differentials among countries. Examining differences in occupation across age periods of risk, it is apparent that much of the variation in occupation categories and among countries within occupation category is explained by variation during ages 1-4 years. That is, the *paternal occupation effect* is most pronounced after infancy. This finding is similar to that observed regarding education differentials, indicating that both dimensions of socioeconomic condition (and perhaps their interacting influence) relate to important constraints on decisions about use of preventive and curative child health services that affect child survival (i.e., immunizations, visits to clinic, etc.), and feeding patterns that affect children's susceptibility to disease and death, particularly during ages 1-4 years.

There are exceptions to the general pattern. During the neonatal and postneonatal periods in some countries, children of agricultural workers are not at highest mortality risk. For example, in Cameroon, Kenya, Rwanda, and Indonesia, neonatal mortality is highest for children of sales and service workers, while in Malawi and Morocco it is highest for children of blue collar workers.

During the postneonatal period, mortality is highest for children of blue collar workers in Rwanda and Colombia. In Colombia, postneonatal risk in the blue collar category is twice that of the agricultural category, which emphasizes the problems inherent in interpreting occupation data using a single set of definitions.