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TOO YOUNG TO DIE: GENES OR GENDER?

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VII. CAN USE OF HEALTH CARE EXPLAIN SEX DIFFERENTIALS IN CHILD MORTALITY IN THE DEVELOPING WORLD?

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The present chapter examines differential use of preventive and curative health-care services by boys and girls. The focus is on children under the age of five years. The analysis is comparative in nature. It is based on the national surveys conducted by the Demographic and Health Surveys (DHS) programme during the past decade, supplemented by the National Family Health Survey (NFHS) of India.

The study of sex differentials in the use of child health services is an important topic in its own right. A right of access to facilities for the treatment of illness and rehabilitation of health is enshrined in the 1989 Convention on the Rights of the Child. In addition, modern health care can play a vital role in reducing susceptibility to disease and in improving the outcome of episodes of disease. If girls have more limited access to health care than boys, their health is likely to suffer.

Undoubtedly, the impact of service provision on child health varies between populations. It is likely to depend on the quality of the care provided, the accessibility of the services, the epidemiological environment within which they operate, and the social, cultural and economic characteristics of the population served. However, the potential efficacy of modern health technologies is not in doubt. Nevertheless, the relationship between sex differentials in service use and differential mortality is complex. Use of preventive and curative health care is only one of many factors affecting children's health. Thus, similar patterns of health care for boys and girls may coexist with differential health outcomes. Moreover, differential health service use may not be reflected directly in health. Its impact may be conditioned by the socialization of boys and girls into different patterns of behaviour or by how they are treated by their parents and other carers.

Excess female childhood mortality is particularly marked in South-central Asia, where it has been a major focus of research interest (Harriss, 1989). Field investigations into the factors responsible have shown that differential allocation of both food and health care is involved (Chen, Huq and D'Souza, 1981). However, recent research has emphasized the importance of health care (Das Gupta, 1987; Basu, 1989). It is argued that differentials in the use of curative health services are both larger and more widespread than those in food allocation, and that better health care is the main mechanism accounting for the more frequent survival of boys.

Limited uptake of preventive and curative care may reflect household and individual level constraints on demand. It may also stem from limited access to services, either because they are simply unavailable or because they are unaffordable or inappropriate. A study in Bangladesh reported lower rates of attendance at a free diarrhoeal disease clinic among girls aged less than 5 years than among boys, and found that that differential was related directly to the distance between the family's residence and the clinic (Rahaman and others, 1982). For distances of less than one mile, 90 per cent of diarrhoeal patients of both sexes were seen. At distances of one to two miles, the proportions fell to 70 per cent of boys and 45 per cent of girls, while at distances of two to three miles, 60 per cent of boys and only 35 per cent of girls were seen. Thus, in at least some populations sex differentials in service use are related inversely to service availability.

At the household level, the costs involved in obtaining care might have a differential impact on health-seeking behaviour for boys and girls. Ware (1981) states that in the Republic of Korea the introduction of a small fee for measles immunizations reduced the

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proportion of girls receiving the vaccine more than the proportion of boys; with free immunization, there had been no differential. Economic considerations may also affect the uptake of curative services by sex. Sex differentials in service use may be expected to be larger for more costly types of treatment and for more expensive sources of care. Nevertheless, Chen, Huq and D'Souza (1981) found significant sex differentials in the use of a diarrhoea clinic in Matlab, a rural district in Bangladesh, although both the service and travel to and from the facility were free. They concluded that that pattern reflects the fact that the social, time and indirect costs involved in using the clinic remained considerable. Girls may receive different forms of treatment from boys rather than no treatment at all. In particular, a major advantage of traditional medicines over allopathic treatment can be their ready availability and low cost (Findley and Mbacke, 1993). A longitudinal study of 310 families in Bangladesh found that despite the marked differential by sex in the use of modern facilities, the proportions of boys and girls less than 12 years whose illness received some form of treatment were only slightly different (Koenig and d'Souza, 1986).

The present chapter does not attempt to model the impact of use of health services on child mortality by sex. Instead, the aim is to assess whether inequalities in patterns of health care are large and pervasive enough to be worth pursuing as an important part of the explanation of sex differentials in child mortality. Particular attention is paid to the investigation of three issues. First, the direction and size of sex differentials according to the overall level of service use in a country is assessed. Second, sex differentials in the use of more effective forms of service compared with all types of care are examined. Third, because culture and the status and autonomy of women may to have an important impact on sex differentials in service use, the pattern of differentials between regions of the world is examined.

Much of the literature on the differential use of health services according to sex, usually favouring males, uses terms such as discrimination and bias. Those terms imply an intention to give one child less or poorer health care than another on the grounds of their sex. Evidence from the present study and others shows that boys and girls are sometimes treated differently. Such statistical regularities clearly imply the existence of social institutions and values that dispose mothers and other carers to act in ways that favour one sex or the other. They need not imply deliberate discrimination. Carers may never have conceptualized the matter in that way. Even if they have, such considerations may not be uppermost in their minds when they are deciding what to do to help a sick child. There is evidence from South-central Asia of deliberate neglect of children with older siblings of the same sex (Das Gupta, 1987; Muhuri and Preston, 1991). Such neglect may not be a widespread phenomenon. The poor have to decide what best to do for sick children, bearing in mind that the financial and other costs involved in seeking treatment often have an immediate adverse impact on other aspects of the family's welfare. The sex of the child may sway some such difficult decisions without that being apparent to the decision maker.

It is also important to recognize that perceptions of the cause of sickness and of the severity of illness influence the treatment of children. Gender may affect those perceptions and lead to sex differentials in the use of certain types and sources of treatment and in the timing of use (Santow, 1995). In Uttar Pradesh, Khan and others (1991) found that girls are treated less often than boys as families believe that they are inherently healthier. Issues of severity and duration of sickness interact. Girls in Uttar Pradesh are treated if their sickness persists. Perceived causes of illness also play a part in deciding which sources of treatment are used. For instance, a study in Gujarat shows that a quack doctor might be preferred to modern medicine if the cause of illness is perceived to be the evil eye (Visaria, 1988). Such diagnoses might be influenced by gender. Moreover, as Basu (1987), points out, a disinclination to take a girl to a doctor—especially a male doctor—may be the result of an over-protective attitude toward daughters rather than one of callousness towards their health. Thus, since the focus in the present chapter is on differences in patterns of parental behaviour and not on parents' intentions, the term discrimination is avoided. Similarly, while patterns of service use by boys and girls undoubtedly reflect the social construction of gender, the data are classified by children's biological sex.

The analysis uses data from 44 national surveys conducted by the DHS programme between 1986 and 1994 (table 48) and from the 1992-1993 NFHS of

TABLE 48. INFANT AND CHILD MORTALITY RATES, BY SEX, FOR THE 10-YEAR PERIOD PRECEDING THE SURVEY (DHS, 1986-1993)

		Infant mortality rate - $_1q_0$ (per 1,000 live births)		Child mortality rate - $_4q_1$ (per 1,000)	
Region/DHS phase/country or area	Year	Males	Females	Males	Females
Eastern and Southern Africa					
I Botswana	1988	47.7	31.5	18.3	15.8
Burundi	1987	98.8	75.7	101.0	113.8
Kenya	1989	63.0	54.3	35.4	33.2
Uganda	1988/89	111.0	101.7	97.3	86.0
Zimbabwe	1988/89	64.9	49.7	30.2	32.5
II Madagascar	1992	103.2	101.8	85.4	81.9
Malawi	1992	141.0	130.4	125.9	114.4
Namibia	1992	66.6	56.5	29.7	34.3
Rwanda	1992	98.2	82.1	86.6	72.5
United Rep. of Tanzania	1991/92	103.7	95.1	63.2	57.1
Zambia	1992	106.2	90.3	91.3	85.1
Western Africa					
I Ghana	1988	88.8	54.3	78.3	79.4
Liberia	1986	168.0	136.0	89.0	93.0
Mali	1987	138.0	125.0	166.0	174.0
Ondo State, Nigeria	1986	59.0	53.0	58.0	51.0
Senegal	1989/90	98.0	83.6	131.0	129.7
Togo	1988	87.7	78.5	74.9	90.1
II Burkina Faso	1993	114.5	100.3	107.1	110.3
Cameroon	1991	86.4	74.6	63.6	74.8
Niger	1992	135.8	133.0	211.5	231.7
Nigeria	1990	93.7	89.1	117.6	101.5
Senegal	1992/93	83.4	68.7	95.5	79.5
Northern Africa and Western Asia					
I Egypt	1988	95.1	93.4	38.1	46.2
Morocco	1987	83.4	81.4	38.2	39.3
Tunisia	1988	58.0	55.5	18.5	19.2
Sudan (Northern)	1989/90	83.4	70.6	62.2	63.1
II Egypt	1992	84.4	75.3	24.6	36.1
Jordan	1990	36.4	37.3	6.0	5.6
Morocco	1992	68.6	57.4	20.7	23.6
Yemen	1991/92	105.6	90.1	41.0	47.1
South-central and South-eastern Asia					
I Sri Lanka	1989	39.5	24.7	10.1	10.0
Thailand	1987	79.9	31.0	11.0	11.0
II India[a]	1993	88.6	83.9	29.4	42.0
Northern states		78.8	77.9	27.5	41.2
Southern states		72.7	62.0	18.8	23.0
Indonesia	1991	45.0	67.9	36.0	34.8
Pakistan	1990/91	102.1	85.5	22.0	36.5
III Bangladesh	1993/94	107.3	93.4	46.7	62.3
Latin America and the Caribbean					
I Bolivia	1989	105.5	85.5	50.7	51.1
Guatemala	1987	90.0	67.6	43.6	47.0
Mexico	1987	60.1	52.4	14.5	16.5
Peru	1986	83.2	74.8	36.4	41.0
Trinidad and Tobago	1987	28.8	33.5	3.4	3.4
II Colombia	1990	27.2	26.6	11.0	5.6
Dominican Republic	1991	53.3	35.1	17.5	20.4
Paraguay	1990	38.4	32.2	9.6	11.9
Peru	1991/92	68.0	59.0	29.0	31.0

Source: DHS-I, DHS-II and DHS-III country reports, NFHS national and state reports.
[a]The National Family Health Survey of India is not part of the DHS programme but used a similar questionnaire.

India, which adopted a design and questionnaire very similar to that used for DHS studies. Four countries are represented in the results twice because they participated and collected relevant data in both phase I and phase II of the DHS programme: Egypt, Morocco, Peru and Senegal. In addition, Ondo State in Nigeria is represented in phase I and the whole country in phase II. Results for northern India and southern India are presented separately, using a classification proposed by Dyson and Moore (1983) that reflects differences within India in the status and autonomy of women. Since state-level data were only available for 19 large states northern India is represented by Assam, Bihar, Delhi, Gujarat, Harayana, Himachal Pradesh, Jammu, Madhya Pradesh, Punjab, Rajasthan and Uttar Pradesh. Southern India comprises Andhra Pradesh, Gujarat, Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu and West Bengal. The all-India statistics incorporate data from the less populous states in north-east India but not from Kashmir.

The countries for which data are available are not a representative sample of all countries in the developing world. China has not participated in the DHS programme, and other parts of Eastern Asia are also under represented. In contrast, sub-Saharan African countries are heavily overrepresented. Most DHS surveys collected data from mothers on the immunization of children, on the recent prevalence of diarrhoea among children and on how that was treated. However, some DHS-I surveys in Latin America did not ask those questions. The core questionnaires also include questions about fever and cough. They have been used most often in sub-Saharan Africa and were also asked in India.

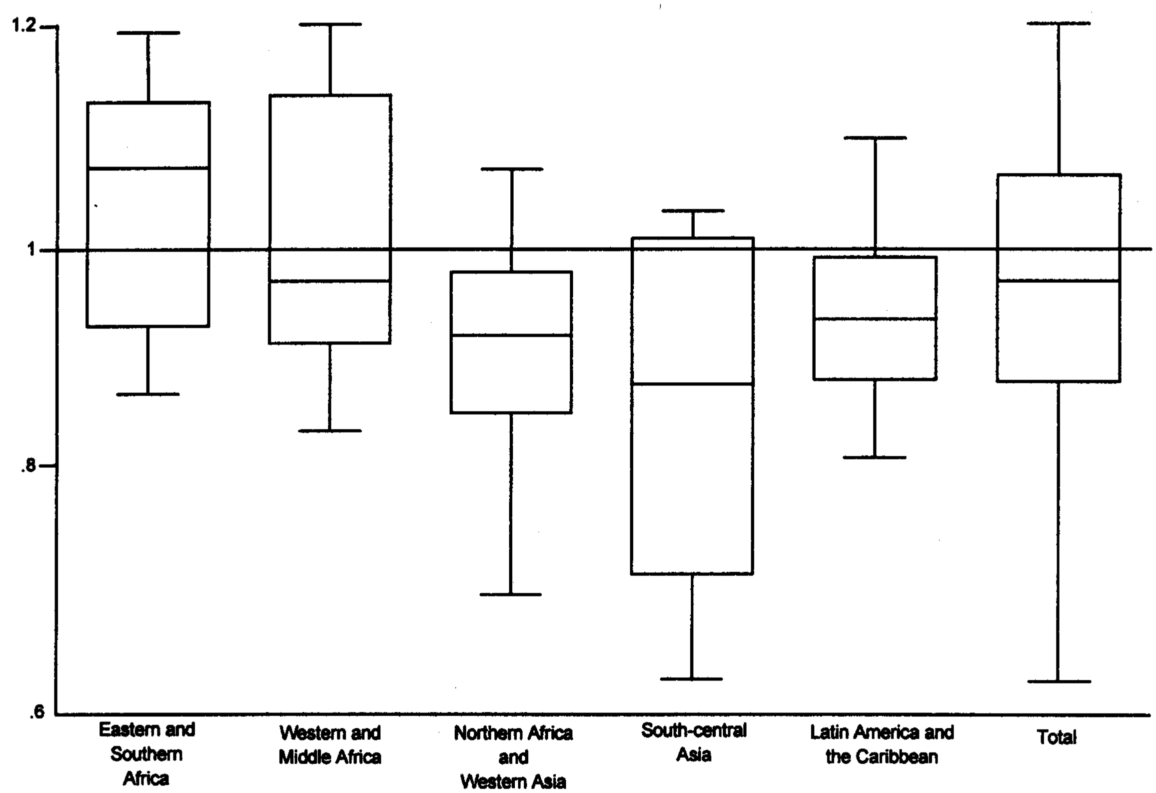
Interpretation of retrospective interview data on morbidity and service use is far from straightforward. Comparison across countries is obstructed by biased recall by respondents; the difficulty of translating questions about symptoms without modifying their meaning; and cultural variation in the salience of different symptoms (Assogba, Campbell and Hill, 1989). Although the focus of the present study on the comparison of results for boys and girls should avoid some of those problems, one influence on mothers' reports about the health of their children may be the sex of the child in question.

Most of the data presented here are culled from the first reports on the DHS and NFHS surveys or from other DHS publications. Few of those reports present confidence intervals for the estimates. For the present analysis, the significance of differences by sex has been calculated by assuming that the surveys used simple random sampling. They did not. Thus, the results will exaggerate the number of significant differences between the health care of boys and girls. Bearing that in mind, the overall pattern of the results is emphasized more than the findings for individual countries and aspects of health care.

The level of infant mortality varies greatly among the 41 countries (table 48). Based on data for the 10 years before the survey, the median infant mortality rate is 80 per 1,000 live births. In Colombia and Trinidad and Tobago, fewer than one in 30 children die before their first birthday, while in Liberia, nearly one child in six dies by age 1. The level of mortality after infancy is even more variable. Colombia, Jordan, and Trinidad and Tobago have the lowest levels of child mortality, with less than one child in a 100 dying between the age of one and five years. In contrast, child mortality remains high in most of tropical Africa: in the Niger, one in five children die between their first and fifth birthdays.

Sex differentials in infant and child mortality also vary greatly across the sample of countries analysed here. Only Jordan, Trinidad and Tobago, and half the northern Indian states have higher female than male mortality in infancy, but the excess mortality of boys is small in the three Northern African countries considered, Colombia, the Niger and the rest of Northern India. In contrast, mortality between the first and fifth birthdays is higher for girls than boys in the majority of the countries. Figure 36 summarizes regional patterns in the ratios of male to female child mortality in the form of box and whisker plots, which show the median, upper and lower quartile and extreme values of the ratios for countries within each region. In comparison with the historical experience of European countries, where girls usually had lower mortality than boys, the excess in girls' child mortality is even more marked (Hill and Upchurch, 1995). Most Northern African, Western and South-central Asian and Latin American countries, together with

Figure 36. Ratio of male to female childhood mortality (4q1), by region



Sources: DHS-I, DHS-II and DHS-III country reports, NFHS national and state reports.

some sub-Saharan African countries, have higher female than male mortality. Higher mortality among boys is found in most of sub-Saharan Africa, Colombia, Indonesia, Jordan and Sri Lanka.

B. Immunization

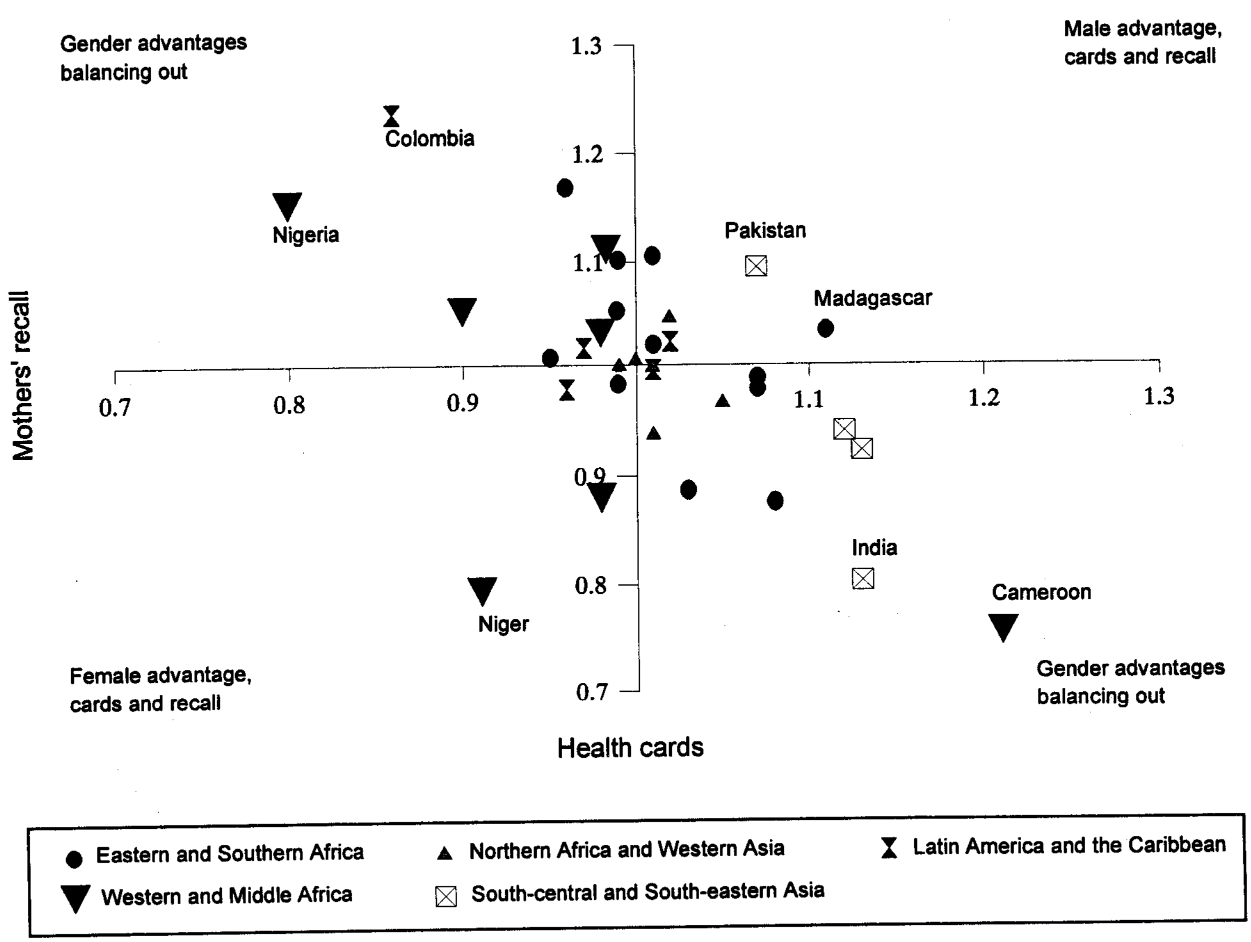
The present section investigates immunization coverage among boys and girls. The focus is on vaccines delivered to children by age 12-23 months as part of WHO's Expanded Programme on Immunization (EPI). Immunization against tuberculosis and measles and three doses of polio and DPT vaccines are recommended for all children by age one year.

The overall proportion of children aged 12-23 months who are fully vaccinated ranges from less than 20 per cent in Liberia and the Niger to almost 90 per cent in Botswana and Jordan. Many Eastern and Southern African countries have a high level of coverage, as do some countries in the Northern Africa, Western Asia, and Latin America and Caribbean regions. A similar mixture of countries has below 60 per cent coverage, with much of Western Africa and South-central Asia having particularly poor coverage.

One problem with those data is that in DHS-I surveys, information about specific vaccines was only collected for children whose vaccination status was recorded on health cards. In DHS-II surveys and the NFHS, such data were also collected for children whose vaccination status was recalled by mothers. The proportion of children with a health card varies from more than 85 per cent in Malawi and Rwanda to less than a quarter of that in Nigeria, with the median being about 58 per cent. Since the coverage of specific vaccines among children ever-vaccinated according to their mothers' report is 75-95 per cent of coverage among children with health cards (Boerma and others, 1990) comparisons cannot be made easily. Drop-out rates between the first and third doses of DPT and polio vaccines are also higher for children reported on only by mothers than for those with health cards.

In some countries, the probability of children possessing a health card varies by sex. In most of them the difference is small (ratios of 0.95-1.05). In Cameroon, however, girls are 10 per cent less likely than boys to have a card, while in Nigeria boys are 8 per cent less likely to have one. Figure 37 shows a scatterplot of countries according to the sex ratio of children with at least one vaccination recorded on a health card and the sex ratio obtained from maternal recall only. The latter figures are estimated by subtracting the percentage with cards from the percentage who are ever-vaccinated recorded by both cards and recall. The upper-right quadrant contains countries where the sex ratio is greater than 1.0 for both sources of information, indicating a consistent male advantage in vaccination. The lower left quadrant contains cases where there is a consistent female advantage. The upper left and lower right quadrants denote countries where a gender advantage on one source is offset by a gender advantage in the opposite direction on the other

Figure 37. Ratio of the proportions of ever-vaccinated boys to girls aged 12-23 months, according to different reporting methods



Sources: DHS-I, DHS-II and DHS-III country reports, NFHS national and state reports.

source. Only 26 per cent of the variability in sex differentials in the proportion of children ever-vaccinated by recall is explained by sex differences in card possession. The association is negative, meaning that if boys are more likely to possess cards (and thus also be vaccinated at least once), girls are more likely to be ever-vaccinated among those reported by maternal recall only. Thus, to some extent the probability of being ever-vaccinated is more equitable by sex than card possession suggests. Nevertheless, some countries are characterized by a male advantage in both forms of reporting (Madagascar, Pakistan, Rwanda) or by a female advantage in both (Niger, Paraguay, Senegal (1992-1993)).

Proportions ever-vaccinated

Many studies have examined whether immunization coverage differs for boys and girls. In general, significant sex differentials have not been found. Examples include studies in Lahore, Pakistan (Sabir and Ebrahim, 1984); Delhi, India (Basu, 1989); Senegal (Cantrelle and others, 1986; Barbieri, 1989) and Mali (Mbacke and LeGrand, 1991). In a few populations, girls are disadvantaged in terms of immunization. For example, less preventive health care for girls was found in a squatter settlement in Jordan (Teçke and Shorter, 1984).

Detailed findings are presented in table 49 and figure 38. On average, the proportion ever-vaccinated is about the same for boys and girls, though there is some variation by country. The sex ratio of the probability of being vaccinated does not vary systematically with immunization coverage but exhibits some regional patterning. In seven of the nine Western African countries, girls are appreciably more likely to have received at least one vaccine than boys. In contrast, more boys than girls have received a vaccine in all the Northern African and Asian countries, and significantly more boys than girls are ever-vaccinated in Bangladesh, Northern India and Pakistan, together with Madagascar.

A similar pattern emerges for the single-dose measles vaccine. Coverage is higher among boys than girls in Northern Africa, and Western and South-central Asia. In Bangladesh, northern India and Pakistan, together with Tunisia, significantly more boys than girls have received the vaccine. On the other hand, measles immunization is more widespread among girls than boys in much of sub-Saharan Africa and Latin America and the girls' advantage is significant in two countries. Greater relative differentials by sex exist in countries with medium-to-low coverage.

Full immunization

Children need to receive all the EPI vaccinations recommended by WHO/UNICEF to protect them from childhood infections. For polio and DPT, three doses of each are needed before the vaccines are fully effective. Unfortunately, drop-out rates are often high. In urban areas of Mali, Mbacke and LeGrand (1991) found that sons were more likely than daughters to receive second and third doses of polio and DPT vaccine, although no significant difference existed for first doses or single-dose vaccines. According to their analysis, sex differentials in the likelihood that a child received a second or third dose of vaccine were even larger than those by maternal education.

Male-female ratios of the proportions of children fully immunized among those ever-vaccinated are presented in table 49. The dispersion of those ratios is similar to that of those for ever-vaccination. Both male and female advantage are found in particular countries. Only in northern India, Pakistan and Tunisia are boys significantly more likely to complete courses of vaccination than girls. In much of the rest of the world, girls who have received at least one vaccine are slightly more likely to be fully vaccinated than the equivalent group of boys. Moreover, in the Dominican Republic, Ghana, Kenya and the United Republic of Tanzania, girls are significantly more likely than boys to complete courses of vaccination.

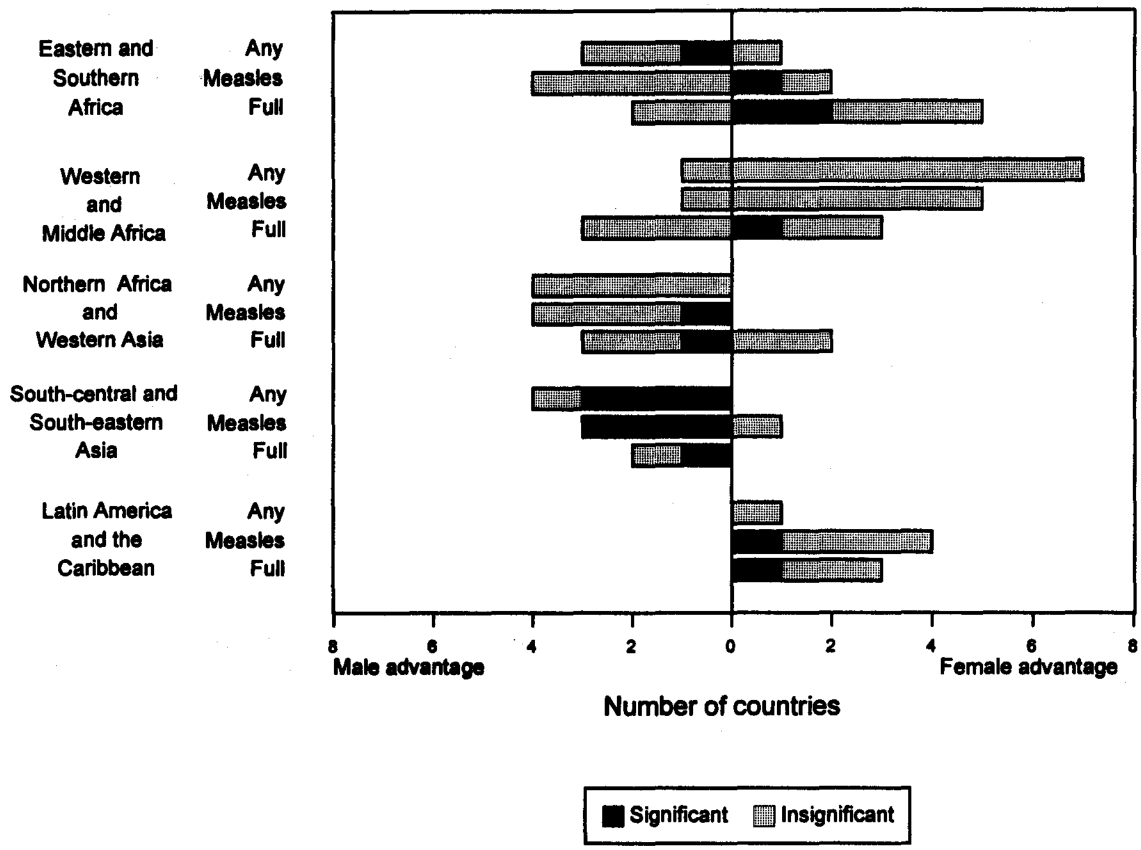
It is enlightening to compare the sex ratio of the proportion of children receiving at least one vaccine with the sex ratio of children receiving all the required doses as a proportion of those having at least one vaccine. Where both ratios exceed unity, increasing female disadvantage exists in immunization coverage. That pattern is seen most clearly in northern India and Pakistan. A few countries exhibit relatively higher female immunization for first doses, but coverage by subsequent doses begins to favour boys, for instance in Nigeria. Most countries exhibit the reverse tendency. In Madagascar, a male advantage in ever-vaccination is offset in full vaccination, while in

TABLE 49. MALE-TO-FEMALE RATIOS OF IMMUNIZATION COVERAGE AND COMPLETENESS AMONG CHILDREN AGED 12-23 MONTHS

Countries or areas according to overall percentage full immunized[a] in descending order	Year	Ever vaccinated[a]	Measles[b,c]	Completeness: Polio 3 as a proportion of those with Polio 1[b,c]	Completeness: DPT3 as a proportion of those with DPT1[b,c]	Completeness: Fully vaccinated[d] as a proportion of those ever vaccinated[b,c]
80-100 per cent						
Botswana	1988	1.00	1.02	1.01	1.04*	0.99
Malawi	1992	0.98	1.01	1.01	1.02	1.02
Rwanda	1992	1.02	1.00	0.99	0.99	0.98
Zimbabwe	1988/89	0.99	0.98	1.00	0.98	0.99
Tunisia	1988	0.99	1.06*	1.05*	1.05*	1.14**
Jordan	1990	0.99	1.00	1.00	1.00	1.00
Median		**0.99**	**1.01**	**1.00**	**1.01**	**1.00**
60-79 per cent						
Ondo State, Nigeria	1986	0.94	-	-	-	-
Kenya	1989	1.00	0.94*	1.00	1.00	0.92**
United Rep. of Tanzania	1991/92	1.00	1.00	0.94	0.96	0.94*
Zambia	1992	1.01	1.00	0.99	0.99	0.98
Morocco	1987	1.01	1.00	-	-	0.96
	1992	1.03	1.00	0.99	0.99	0.97
Egypt	1992	1.01	1.01	1.16	1.04	1.04
Colombia	1990	1.00	0.98	0.97	0.97	0.99
Median		**1.01**	**1.00**	**0.99**	**0.99**	**0.97**
40-59 per cent						
Ghana	1988	0.97	0.97	0.88*	0.96	0.84**
Senegal	1992/93	0.95	0.95	0.97	0.96	0.93
Sudan	1989/90	1.03	1.03	1.02	1.00	1.02
Uganda	1988/89	1.05	1.05	1.09	1.11	1.07
Namibia	1992	1.01	1.04	0.97	0.97	1.00
Madagascar	1992	1.09**	1.06	1.07	1.06	0.96
Yemen	1991/92	1.08	1.09	1.02	1.02	1.00
Bangladesh	1993/94	1.06**	1.11**	1.01	1.03	1.05
Indonesia	1991	1.02	0.98	1.00	1.01	0.99
Peru	1991/92	1.00	0.96	1.01	1.00	0.97
Median		**1.02**	**1.04**	**1.01**	**1.01**	**0.99**
20-39 per cent						
Nigeria	1990	0.94	0.98	1.08	1.07	1.15
Senegal	1989/90	0.95	-	-	-	-
Burkina Faso	1993	0.96	0.98	0.98	0.98	1.00
Cameroon	1991	1.03	1.08	1.03	1.00	1.04
Egypt	1988	-	1.03	1.03	1.03	-
India[e]	1993	1.07**	1.08**	1.00	1.01	1.01
Northern		1.09**	1.18**	1.02	1.04*	1.10**
Southern		1.02	1.00	0.99	1.00	0.96
Pakistan	1990/91	1.08*	1.18**	1.06	1.04	1.15*
Dominican Republic	1991	0.99	0.90*	0.95	0.97	0.77**
Paraguay	1990	0.97	0.92	0.93	0.99	0.86
Median		**0.98**	**1.01**	**1.01**	**1.01**	**1.01**
< 20 per cent						
Liberia	1986	1.00	0.99	1.10	1.08	1.02
Niger	1992	0.89	0.83	0.96	0.91	0.98
Median		**0.95**	**0.91**	**1.03**	**1.00**	**1.00**
Overall median		**1.00**	**1.00**	**1.00**	**1.00**	**0.99**

Sources: DHS-I, DHS-II and DHS-III Country Reports, NFHS National and State Reports.
NOTE: An asterisk (*) indicates that $p < 0.05$; two asterisks (**) indicate that $p < 0.01$.
[a]Recorded from health cards and maternal recall.
[b]DHS-I country reports; recorded from health cards only.
[c]DHS-II and DHS-III country reports; recorded from health cards and maternal recall.
[d]Fully-vaccinated children (those who have received BCG, measles, 3 doses of DPT and polio).
[e]National Family Health Survey.

Figure 38. Number of countries according to the direction of the sex differential in vaccination coverage, by region



Sources: DHS-I, DHS-II and DHS-III country reports, NFHS national and state reports.

Ghana slightly higher levels of ever-vaccination among girls are compounded by much higher rates of continuation. Data on specific multiple-dose vaccines, namely DPT and polio, are also presented in table 49 and generally echo those patterns.

C. Morbidity

Many attempts to explain sex differentials in mortality by sex differentials in morbidity have either found few morbidity differentials or found morbidity patterns that could not explain the mortality differentials (Murray and Chen, 1992). Thus, the linkages between the severity and duration of infection, the medical treatment received, its timing and case-fatality rates by sex are clearly complex (Faveau, Koenig and Wojtyniak, 1991). Diarrhoeal disease, malaria and acute respiratory infections are leading causes of infant and child mortality in developing countries and the most frequently experienced illnesses (Boerma, Sommerfelt and Rutstein, 1991). Most of the surveys include questions on the symptoms and treatment of diarrhoea. Some, including the Indian NFHS, asked questions on fever and on cough or difficult breathing.

Questions about symptoms of disease were asked about living children less than five years of age in all the DHS surveys except that in Bangladesh, where the questions were asked about children aged less than three years. In the NFHS, the questions were asked about children aged less than four years. Mothers are asked whether their children have had diarrhoea in the previous 24 hours or in the two weeks before the survey. Most phase-I DHS surveys that collected data on the prevalence of fever or cough, with or without breathing difficulties, used a four-week reference period. Phase II surveys and the NFHS used a two-week reference period.

Those data have several limitations. First, recall biases are a problem: mothers might not be sure exactly when their child was ill. Underreporting of illness increases with the length of the recall period. Although there is no universal agreement on the ideal length of the recall period, for diarrhoea there is some consensus that reporting errors are inevitable if the reference period exceeds two days (Blum and Feachem, 1983; Alam, Fitzroy and Rahaman, 1989). Thus, underreporting of diarrhoea is likely with DHS data (Boerma, Sommerfelt and Rutstein, 1991). Although recall biases probably vary by country for the different symptoms, they are unlikely to affect male-female comparisons greatly.

A second problem is that the DHS questions about symptoms vary somewhat between countries and have evolved over time. Diarrhoea is usually defined only in the instructions for interviewers, and only phase II questionnaires probe about the severity of symptoms. Similarly, most DHS-I surveys asked whether children had suffered from cough or difficult breathing but others about difficult breathing only, while the DHS-II core and NFHS questionnaires include separate questions about each symptom. Such differences in the questionnaire obviously limit the cross-national comparability of the data. In addition, if the sex of the child affects the perceived severity of the condition, the data obtained about boys and girls will be affected differentially. Apparently lower female morbidity might result from a bias against reporting sickness among female children that is affected by the exact questions asked (Hill and Upchurch, 1994). Moreover, if girls are only classified as ill by mothers when they have more severe disease than boys, that difference could affect treatment patterns. Those considerations argue for caution in the interpretation of survey data on morbidity and its treatment.

As with mortality, great variations in levels of morbidity in children less than five years of age exist between countries and by symptom (table 50). Those differentials in the period prevalence of ill-health probably reflect differing interpretations of the questions and variation in the average duration of disease episodes, as well as variation in the incidence of new episodes of disease. Unfortunately, only a few of the surveys allow one to differentiate between the incidence and the duration of ill-health. The prevalence of reported diarrhoeal and fever morbidity both exhibit less variation between countries than cough prevalence. For cough, half the countries in the present study have relatively low morbidity, while the other half are spread out over a wide range from 17-57 per cent. Sub-Saharan African countries tend to report the highest levels of diarrhoea and fever, but many Western African countries report a rather low prevalence of cough or breathing difficulties.

For the statistics on the prevalence of ill-health a sex ratio above one represents male disadvantage, while sex ratios below one indicate female disadvantage. Thus, a pattern of lower female morbidity emerges for all three symptom groups (tables 51, 52 and 53). The results are summarized in the form of a box and whisker plot[1] in figure 39. Outliers, defined as countries with a ratio that falls more than one and a half times the inter-quartile range outside the inter-quartile range, are indicated separately. The excess morbidity of boys is most marked for diarrhoea, with many countries having ratios above 1.15, and is least clear

TABLE 50. MINIMUM, MAXIMUM AND MEDIAN VALUES OF THE PREVALENCE OF DIARRHOEA, FEVER AND COUGH

Prevalence (in last 2 weeks) percentage	*Minimum*	*Maximum*	*Median*
Diarrhoea	5.1 (Ondo State)	37.9 (Senegal, 1989/90)	18.2
Fever	3.9 (Botswana)	51.2 (Liberia)	33.6
Cough/difficult breathing	6.6 (Mali)	57 (Ecuador)	16.6

Sources: DHS-I, DHS-II and DHS-III country reports, NFHS national and state reports.

TABLE 51. MALE-TO-FEMALE RATIOS OF DIARRHOEA MORBIDITY AND TREATMENT AMONG CHILDREN AGED UNDER 5 YEARS

				As proportions of those treated				
				Source		*Type*		
Countries or areas according to overall level of use of any curative treatment in descending order	*Year*	*Diarrhoea prevalence in previous two weeks*	*Received any treatment as a proportion of those sick*	*Health facility/ provider*	*Traditional practitioner*	*Home solution*	*ORS packets*	*ORS and/or home solution and/or increased fluid intake*
80-100 per cent								
Zimbabwe	1988/89	1.08	1.00	1.01	0.80	-	-	0.95
Sri Lanka	1989	1.20	1.04	1.06	-	1.34	0.98	1.06
Kenya	1989	1.02	1.02	0.99	-	0.90	0.64**	0.81**
Ghana	1988	1.03	0.99	0.91	0.90	1.38	1.06	1.11
Uganda	1988/89	1.09	0.98	0.89	-	1.64	0.95	0.99
Ondo State, Nigeria	1986	-	1.04	0.76	-	1.42	0.00	1.22
United Rep. of Tanzania	1991/92	0.98	0.98	0.94	-	0.83	0.97	1.00
Botswana	1988	1.01	1.02	0.94	-	1.27	1.02	1.09e
Thailand	1987	1.22*	1.02	1.05	-	0.76	0.87	0.85
Zambia	1992	1.14*	1.01	1.03	-	0.95	1.05	1.02
Mexico	1987	1.11	1.01	-	-	-	-	1.03
Malawi	1992	1.17*	1.02	1.17*	0.94	1.06	1.10	1.00
Bangladesh[a,b]	1993/94	0.92	0.98	0.96	1.15	0.64*	1.36**	1.15**
Namibia	1992	1.00	1.02	0.99	1.05	-	1.05	1.04
Togo	1988	1.01	1.03	0.88	0.85	1.10	0.96	0.98
India[c,d]	1993	1.05	1.04**	1.02	0.99	0.98	1.23**	1.03
Northern		1.15**	1.06**	0.98	1.03	0.89	1.28**	1.00
Southern		1.04	1.03	1.02	0.94	1.06	1.10	1.06
Median		**1.06**	**1.02**	**0.99**	**0.90**	**1.09**	**1.00**	**1.00**
60-79 per cent								
Trinidad and Tobago	1987	-	0.88	0.81	-	1.50	1.22	1.27*
Burkina Faso	1993	1.16**	0.99	0.83	0.98	1.22	0.96	1.08
Jordan	1990	1.05	1.04[e]	0.96	-	1.03	1.08	1.00
Indonesia	1991	1.07	1.01	1.00	0.94	-	1.08	1.01
Bolivia	1989	0.96	1.16**	0.96	-	1.11	0.89	0.98[f]
Rwanda	1992	1.02	1.02	0.99	1.01	0.76*	1.01	0.92
Peru[g]	1986	1.09	-	-	-	-	1.20	-
Peru	1991/92	1.06	1.06[e]	1.19**	0.84**	1.03	1.14	1.00
Paraguay	1990	0.92	1.04[e]	0.91	1.20	0.89	1.13	1.00
Egypt	1992	1.17**	0.99	1.09	-	1.48	1.14	0.97
Sudan	1989/90	1.05	0.97	1.03	-	0.79	1.02	0.96
Senegal	1989/90	1.05	1.10**	0.91	0.90	1.03	1.51	1.15
Cameroon	1991	1.18*	0.99[e]	0.94	1.62*	1.10	0.77	1.00
Mali	1987	1.08	1.00	1.33	1.06	0.82	1.53	1.25
Guatemala	1987	1.18*	0.91	1.19	-	0.94	1.41	1.30
Morocco	1992	1.10	1.00	0.93	-	1.71	1.13	1.00
Burundi	1987	0.96	0.93	1.05	-	1.24	0.96	1.01
Egypt[a]	1988	1.11*	1.04	1.01	-	-	1.14	1.14
Tunisia	1988	1.14*	0.99	1.29*	-	-	0.89	0.89
Madagascar	1992	1.21*	1.04[e]	0.90	1.04	1.15	1.16	1.00
Median		**1.09**	**1.00**	**0.99**	**1.01**	**1.07**	**1.13**	**1.00**
40-59 per cent								
Morocco	1987	1.08	1.07	1.07	-	1.09	0.95	0.96
Senegal	1992/93	1.19**	1.06[e]	0.97	1.00	0.93	0.93	1.00
Niger	1992	1.05	1.13*	0.86	1.05	1.03	1.04	1.04
Pakistan	1990/91	1.06	0.99[e]	-	0.76**	0.88	0.98	1.00
Colombia	1990	1.09	0.79*[e]	-	1.07	0.78	0.78**	0.98
Yemen	1991/92	1.05	1.13*	0.99	1.77	1.00	0.99	1.00
Median		**1.07**	**1.07**	**0.98**	**1.05**	**0.96**	**0.96**	**1.00**

TABLE 51 (*continued*)

Countries or areas according to overall level of use of any curative treatment in descending order	Year	Diarrhoea prevalence in previous two weeks	Received any treatment as a proportion of those sick	As proportions of those treated: Source: Health facility/ provider	Traditional practitioner	Type: Home solution	ORS packets	ORS and/or home solution and/or increased fluid intake
20-39 per cent								
Nigeria	1990	1.18**	0.92[e]	0.96	1.00	1.01	1.15	1.03[f]
Dominican Republic	1991	1.06	1.08[e]	0.98	-	0.91	1.02	1.00[f]
Median		**1.02**	**1.00**	**0.97**	**1.00**	**0.96**	**1.15**	**1.01**
Overall median		**1.07**	**1.02**	**0.98**	**1.00**	**1.03**	**1.04**	**1.00**

Sources: DHS-I, DHS-II and DHS-III country reports, NFHS national and state reports.
NOTE: An asterisk (*) indicates that $p < 0.05$; two asterisks (**) indicate that $p < 0.01$.
[a]Reference period for prevalence and treatment is 7 days.
[b]Children under 3 years.
[c]Children under 4 years.
[d]National Family Health Survey.
[e]Percentage treated is equal to 100 per cent minus percentage not treated, assumed to be "percentage not receiving ORT or increased fluids."
[f]Significance not tested as the "proportion" adds up to over 100 per cent since more than one treatment can be reported per child.
[g]Reference period for prevalence and treatment is 15 days.

for cough. The only loose regional pattern in the data is that unlike other regions, Eastern and Southern Africa do not exhibit clearly higher male morbidity from diarrhoea and fever. For all three symptom groups, the sex ratio of reported morbidity is unrelated to the level of reported morbidity.

Although apparently lower female morbidity may result from a bias in favour of reporting sickness of male children, other studies of sex differentials in morbidity have also found that female children under the age of five are generally healthier than males. For example, Chen, Huq and D'Souza (1981) found that in Matlab male incidence rates exceed those for females for a range of infectious diseases. A study by Levinson (1974) in rural India found that boys have higher infection and prevalence rates than girls.

D. TREATMENT

Most deaths from acute diarrhoea result from dehydration of the child, so the most effective treatment is oral rehydration therapy (ORT) in the form of manufactured oral rehydration solution (ORS) packets, home salt-sugar solutions or any increase in fluid intake. Upper respiratory tract infections are responsible for most of the non-fatal acute respiratory infections in young children. Lower respiratory tract infections, especially pneumonia, are a more important cause of death. Antibiotics are usually the most effective form of treatment. Attacks of malaria in young children with little or no immunity have a high case-fatality rate. Treatment with chloroquine or other drugs is very effective if the organism causing the disease is not resistant to the drug (Boerma, Sommerfelt and Rutstein, 1991). Other approaches to the treatment of those diseases, such as antibiotics for diarrhoea, cough syrup or traditional remedies, are unlikely to be as effective.

Studies in diverse parts of the world of populations with differing levels of health service provision and epidemiological and mortality profiles have found that girls receive less curative health care of any kind than boys. One review of that research is found in the annotated bibliography of Le Grand (1992). For example, in slums in Lahore, Pakistan, 27 per cent of sick girls compared with only 12 per cent of sick boys were not taken for any medical treatment (Sabir and Ebrahim, 1984). In rural Egypt, girls are less likely to receive medical care for diarrhoea than boys of the

TABLE 52. MALE-TO-FEMALE RATIOS OF FEVER MORBIDITY AND TREATMENT AMONG CHILDREN AGED UNDER 5 YEARS

Countries or areas according to overall level of use of any curative treatment in descending order	Year	Fever prevalence in previous two weeks	Received any treatment as a proportion of those sick	As proportions of those treated: Source: Health facility/ provider	Traditional practitioner	Type: Anti-malarials	Antibiotics
80-100 per cent							
Paraguay	1990	0.99	0.99*	1.04	1.00	0.98	1.15
Nigeria	1990	1.05	1.00	1.12	1.41*	1.24**	1.23**
Ghana[a]	1988	1.06	0.98	0.97	1.07	0.95	0.79
Ondo State, Nigeria[a]	1986	1.00	1.00	1.11	-	1.09	-
Botswana[a]	1988	0.86	0.94	0.95	-	-	-
Colombia	1990	1.21**	1.02	1.11*	0.90	1.87	1.10
Togo	1988	1.02	1.03	0.97	1.05	0.99	1.01
Indonesia	1991	1.01	1.14**	0.96	0.65**	-	-
Uganda	1988/89	1.00	0.99	1.11*	-	1.00	1.88**
Senegal	1989/90	1.05	1.06**	0.97	0.87	0.88	1.00
Dominican Republic	1991	1.05	1.05*	0.97	1.33	-	1.01
Cameroon	1991	1.10	1.03	1.18	0.95	-	0.99
Malawi	1992	1.01	1.00	1.03	1.14	1.02	1.08
Pakistan	1990/91	1.01	1.03	1.03	1.40	0.86	0.90
Zambia	1992	1.02	1.00	1.00	1.01	1.04	0.99
Madagascar	1992	1.04	0.92**	1.15**	1.09	1.02	1.08
United Rep. of Tanzania	1991/92	0.98	1.01	0.96	0.75	0.89**	1.03
India[b,c]	1993	1.09**	1.05**	1.05**	0.83*	1.01	1.05
Northern		1.10**	1.07**	1.04**	1.03	1.10	1.03
Southern		1.05	1.03	1.06**	0.69**	0.88	1.04
Liberia[a]	1986	1.00	1.01	-	1.10	0.97	1.17
Median		**1.02**	**1.01**	**1.03**	**1.03**	**1.00**	**1.04**
60-79 per cent							
Namibia	1992	0.99	0.98	1.00	1.08	0.85	0.98
Burundi[a]	1987	1.04	1.07	0.98	-	1.04	0.89
Mali[a]	1987	1.11	0.94	4.35**	0.91	1.13	0.96
Burkina Faso	1993	1.08*	0.94*	1.09	1.01	1.20**	0.86
Senegal	1992/93	1.04	1.03	1.13*	0.85	1.02	0.93
Rwanda	1992	1.01	1.05	1.13*	0.98	1.34	0.93
Median		**1.04**	**1.01**	**1.11**	**0.98**	**1.09**	**0.93**
40-59 per cent							
Yemen	1991/92	1.03	1.09**	-	-	0.81	1.09
Morocco	1992	1.03	1.01	0.95	1.30	0.99	1.11
Niger	1992	1.00	1.11**	1.06	1.06	1.16*	0.89
Kenya[a]	1989	0.97	-	-	-	-	-
Median		**1.02**	**1.09**	**1.01**	**1.18**	**0.99**	**1.09**
Overall median		**1.03**	**1.01**	**1.04**	**1.01**	**1.01**	**1.01**

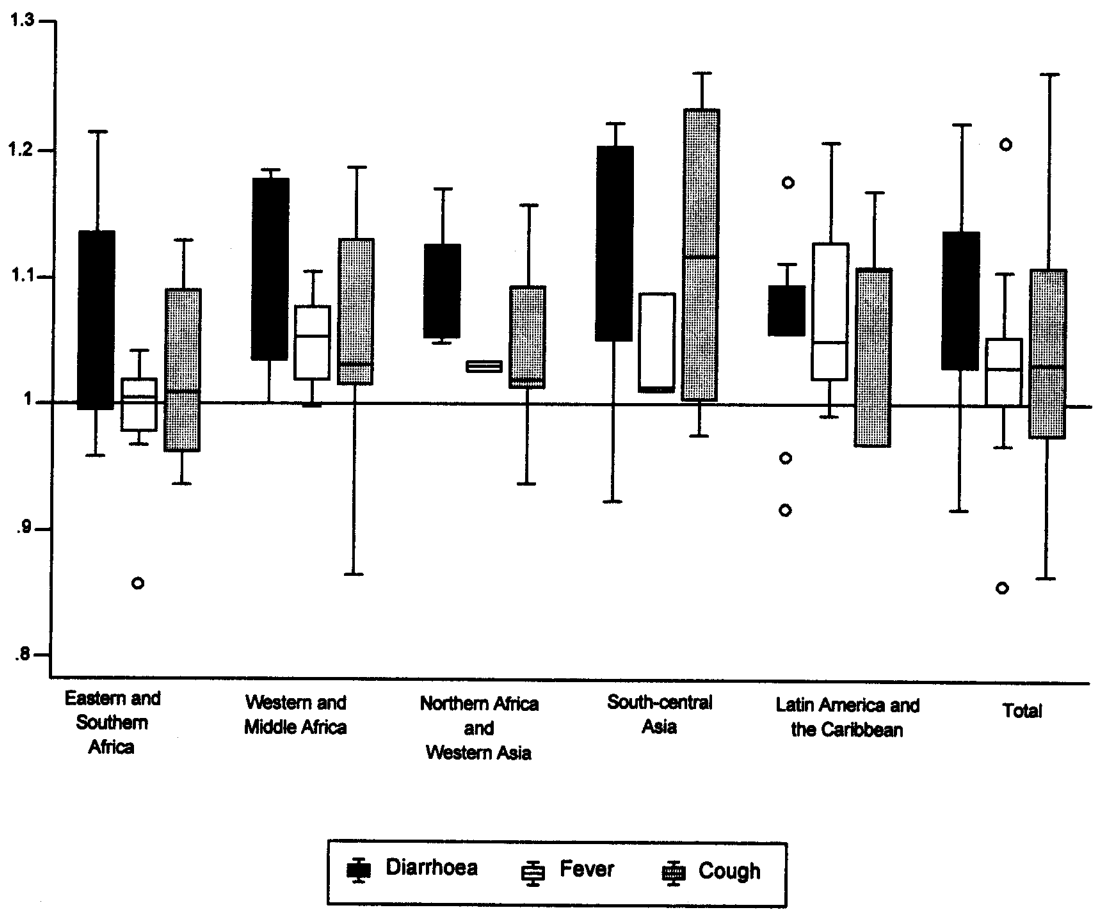
Sources: DHS-I, DHS-II and DHS-III country reports, NFHS national and state reports.
NOTE: An asterisk (*) indicates that $p < 0.05$; two asterisks (**) indicate that $p < 0.01$.
[a]Reference period for prevalence and treatment is 4 weeks, not 2 weeks.
[b]Children under 4 years.
[c]National Family Health Survey.

TABLE 53. MALE-TO-FEMALE RATIOS OF COUGH/DIFFICULT BREATHING MORBIDITY AND TREATMENT AMONG CHILDREN AGED UNDER 5 YEARS

Countries or areas according to overall level of use of any curative treatment in descending order	Year	Cough/difficult breathing prevalence in previous two weeks	Received any treatment as a proportion of those sick	As proportions of those treated: Source: Health facility/ provider	Traditional practitioner	Type: Antibiotics	Cough syrup
80-100 per cent							
Paraguay	1990	1.17*	1.00	1.01	0.94	1.43*	1.01
Nigeria	1990	1.18	1.01	0.88	1.81*	1.03	0.96
Zimbabwe[a]	1988/89	1.09*	1.02	0.91	0.94	1.00	-
Ondo State, Nigeria[a]	1986	0.86	1.03	0.97	-	1.35	-
Indonesia	1991	1.03	1.01	1.06	1.02	-	-
Colombia	1990		1.07**	1.05	1.29	0.96	1.08
United Rep. of Tanzania	1991/92	1.13	0.99	1.02	0.64	0.89	0.90
Kenya[a]	1989	0.97	0.96*	0.94*	-	-	1.01
Botswana[a]	1988	1.03	1.02	0.99	-	-	-
Dominican Republic	1991	0.97	1.01	1.03	1.14	1.07	0.96
Malawi	1992	0.95	0.96	0.97	1.22	0.87	0.93
Ghana[a]	1988	1.02	0.96	0.97	1.16	0.85	1.07
Zambia	1992	1.02	0.96	1.01	1.23	0.99	1.08
Uganda[a]	1988/89	1.01	1.00	1.00	-	1.00	1.00
Pakistan	1990/91	0.98	0.99	1.05	1.82	1.00	0.99
Cameroon	1991	1.03	1.07	1.14	0.82	1.04	1.07
Peru	1991/92	1.11*	1.01	1.04	-	1.17	0.97
Togo	1988	1.19	1.09	0.87	-	1.24	0.45*
Liberia[a]	1986	1.04	1.01	-	1.38*	0.68	0.92
Madagascar	1992	1.09	0.93*	0.95	1.30	1.05	0.98
India[b,c]	1993	1.20**	1.06**	1.09**	0.85	1.00	0.99
Northern		1.28**	1.07**	1.06**	1.15	0.93	0.99
Southern		1.15**	1.03	1.11**	0.70	1.00	1.05
Median		**1.04**	**1.01**	**1.01**	**1.15**	**1.00**	**0.99**
60-79 per cent							
Egypt	1992	1.16*	1.12**	0.96	1.34	1.31*	1.00
Burkina Faso	1993	1.03	0.96	1.00	1.02	0.98	0.90
Sudan	1989/90	1.02	1.08**	-	0.87	1.01	0.94
Namibia	1992	0.98	0.97	1.04	0.90	0.96	0.93
Rwanda	1992	0.99	1.03	1.08	1.01	1.24	0.99
Senegal	1992/93	1.13	0.99	1.05	0.84	0.96	0.98
Bangladesh[d]	1993/94	1.26	1.12*	1.06	-	-	-
Mali	1987	1.02	1.11	-	-	1.61	0.94
Niger	1992	0.97	1.06	1.36	0.92	1.08	0.81
Median		**1.02**	**1.06**	**1.05**	**0.92**	**1.05**	**0.97**
40-59 per cent							
Burundi[a]	1987	0.94	0.97	0.95	-	0.56	0.90
Morocco	1992	1.01	1.08	1.20	1.13	1.55	1.04
Yemen	1991/92	1.09*	1.05	1.00	4.76	1.01	0.97
Median		**1.01**	**1.02**	**1.00**	**2.94**	**1.01**	**0.97**
Overall median		**1.03**	**1.01**	**1.01**	**1.08**	**1.01**	**0.98**

Sources: DHS-I, DHS-II and DHS-III country reports, NFHS national and state reports.
NOTE: An asterisk (*) indicates that $p < 0.05$; two asterisks (**) indicate that $p < 0.01$.
[a]Reference period for prevalence and treatment is 4 weeks, not 2 weeks.
[b]Children under 4 years.
[c]National Family Health Survey.
[d]Children under 3 years.

Figure 39. Ratio of the proportions of boys to girls aged less than 5 years with diarrhoea, fever and cough, by region



Sources: DHS-I, DHS-II and DHS-III country reports, NFHS national and state reports.

adequate health care than their male counterparts (Delgado, Valverde and Hurtado, 1986). DHS data from Senegal indicate that male children with diarrhoea and fever are more likely to receive treatment than girls (Barbieri, 1989).

A systematic examination was made of whether among those children who are sick there are sex differentials in being treated at all, and whether among those children who are sick and treated there are sex differentials in where treatment was obtained or the type of treatment received. The results are presented in tables 51, 52 and 53. The countries are ranked according to the overall level of treatment for the sexes combined, which varies greatly. The proportion of children under 5 years with diarrhoea who were treated varies from 31 per cent in the Dominican Republic to virtually 100 per cent in Zimbabwe. The overall level of treatment for fever is 53 per cent in the Niger but almost 100 per cent in Paraguay. For cough, it is 44 per cent in Yemen but almost 100 per cent in Paraguay and Nigeria. No clear regional variation in the amount of treatment is apparent for any of the symptom groups.

The sex ratios in the probability of being treated in any way vary only moderately. The widest range is for the treatment of diarrhoea, with ratios from 0.79 to 1.16. In countries where most children with diarrhoea receive treatment, differentials by sex tend to be small. One exception to that pattern is northern India, where levels of treatment are high but still favour boys. At intermediate levels of treatment (60-80 per cent), one finds both male-advantage and female-advantage countries. In countries where only a minority of children are treated, boys tend to be at an advantage. The pattern for treatment of fever is similar. Significantly more boys than girls were treated in six countries and significantly more girls in three. For cough, a significant sex differential in favour of girls is found in two countries but one in favour of boys in five countries.

Little consistency is detectable across the three symptom groups within individual countries. Only in India, the Niger, Togo and Yemen are boys more likely to be treated than girls for all three symptoms. In the Niger and Yemen, the differential is significant for two of the three symptoms and in India for all three. In addition, as Barbieri (1989) reported, boys with diarrhoea and fever in Senegal were significantly more likely to be treated than girls according to the survey in 1986. By the time of the 1992-1993 survey, however, those differentials had disappeared. No survey suggests that girls are treated more often than boys for all three symptoms. Despite the lack of consistency in the reports for particular countries, one regional pattern is apparent (figure 40). Eastern and Southern Africa is the only region of the world in which girls are as likely to receive treatment as boys for those symptoms of infectious disease. Elsewhere, particularly in Northern Africa and Western and South-central Asia, boys tend to be at an advantage.

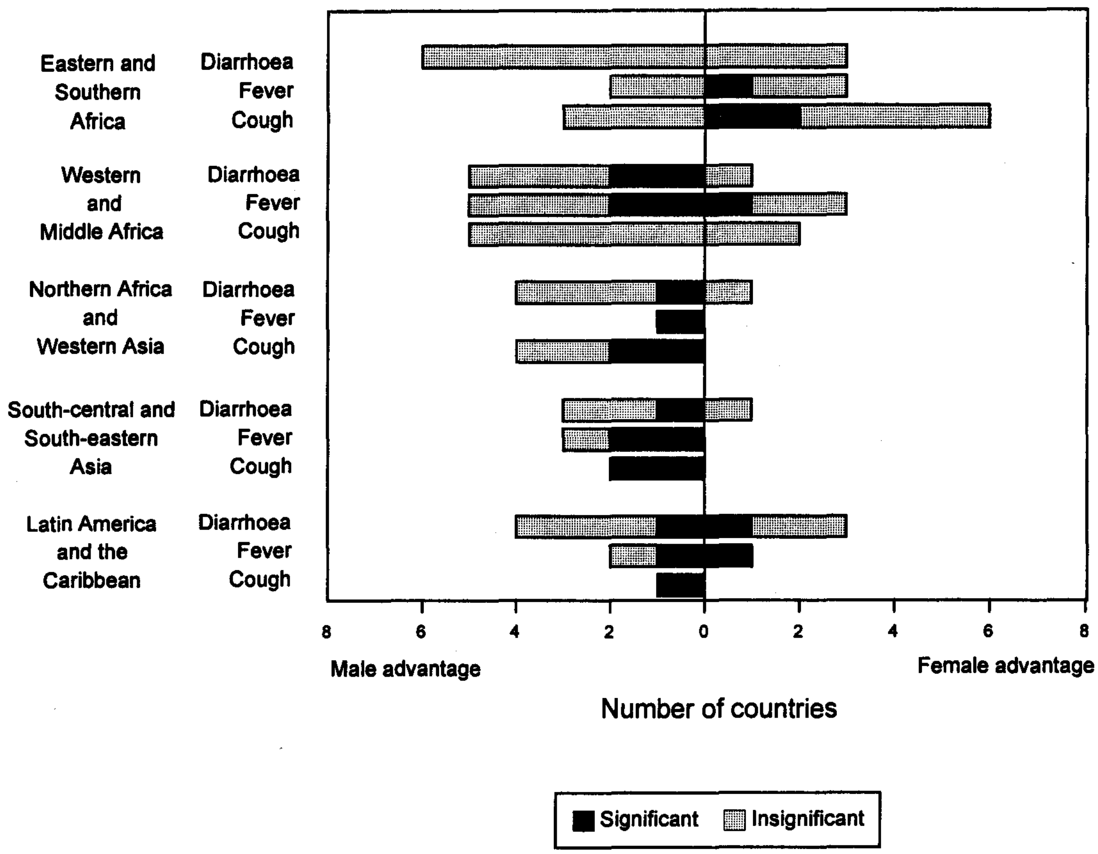
E. Source of treatment

In the present section, sex differentials in the propensity to use particular providers of curative health care are examined. If the quality of care obtained from different providers varies, that factor will have implications for child health. Thus, sex differentials in the source of treatment might help to explain sex differentials in mortality. However, that relationship is confounded by sex differentials in the timing of use of different providers and in the severity of the condition. For instance, girls might be taken to an effective provider only after their condition has deteriorated too far for treatment to save their lives. Unfortunately, data on the timing of the use of different health services were not collected in the DHS and NFHS surveys, so that issue cannot be investigated here.

Many studies have analysed sex differentials in the use of different health-care providers, though few consider the severity of illness or the timing of treatment. That large body of literature spans various sources of treatment and many regions. In Isfahan, Iran, male infants were taken to a public health centre more often than girls (Froozani, Malekafzali and Bahrini, 1980). In Lahore's slums, 58 per cent of ill boys were taken to a private practitioner, compared with only 37 per cent of ill girls (Sabir and Ebrahim, 1984). In Uttar Pradesh, northern India, boys were taken to city hospitals when warranted, while girls saw less qualified doctors (Khan and others, 1991). Girls in rural Egypt were less likely to receive any treatment outside the home than boys. If outside treatment was sought, girls were more likely to be taken to the public health unit, while boys were often taken to a private doctor (Makinson, 1985). Basu (1989) examined both the source and type of treatment in conjunction. Her study focused on two groups of children aged less than 12 years living in a resettlement slum in New Delhi; the parents of one group had emigrated from Uttar Pradesh and those of the other from Tamil Nadu. In addition to sex differences in both groups in the proportion of illnesses receiving no treatment, the northern Indian girls were more likely to receive non-professional treatment than the boys.

The counterpart of greater use of modern health services for treatment of sick children of one sex may be more use of home remedies and traditional healers for treatment of the other sex. In a rural district of Gujarat in northern India, 80 per cent of boys who died of diarrhoea, wasting or respiratory ailments had been taken to an urban centre for treatment but only 20 per cent of girls; 50 per cent of girls were taken to a local medical practitioner and 30 per cent were treated with home remedies alone (Visaria, 1988). A study of longitudinal data on the treatment of diarrhoeal disease from Matlab, Bangladesh, found that the treatment rate for boys aged less than five at the diarrhoea clinic was 66 per cent higher than that for

Figure 40. Number of countries according to the direction of the sex differential in the treatment of symptoms of disease, by region



Sources: DHS-I, DHS-II and DHS-III country reports, NFHS national and state reports.

girls. Girls were treated more often using indigenous health systems than boys (Chen, Huq and D'Souza, 1981). Similarly, Bourne and Walker (1991) found that use of traditional remedies to treat girls equalled or exceeded their use to treat boys in six rural Bangladeshi villages.

In most DHS questionnaires and the NFHS, the information on use of modern health facilities and providers covers public and private health centres and clinics and pharmacies. The present section focuses on sex differentials in the use of such facilities since they usually provide more effective treatment. Because DHS definitions of the sources and types of treatment are not standard across all countries, categories such as "other treatment" need to be interpreted carefully. Most of the questionnaires allow women to report on more than one source of treatment per episode of sickness in their child. Thus, if all the providers consulted are considered, it is possible for them to sum to more than 100 per cent. The relative sex ratios will only be affected if there is a sex differential in the number of different providers consulted.

The relative frequency with which different types of health-care provider are consulted for boys and girls is shown in tables 51, 52 and 53. The ratios are calculated as the percentage of boys receiving treatment from a particular source among boys who are both sick and treated, divided by the equivalent percentage of girls. Use of different types of provider varies by symptom and by region. For modern health facilities, it ranges among those sick and treated from 3 per cent in Mali to 95 per cent in the Dominican Republic for diarrhoea; from 4 per cent in Mali to 95 per cent in Botswana for fever; and from 22 per cent in the Niger to 90 per cent in Botswana for cough or difficulty in breathing. The proportion of treated children who are treated by traditional healers or with home remedies also varies very widely for diarrhoea but more narrowly for fever (up to 46 per cent in Mali) and cough or difficulty in breathing (up to 52 per cent in Burkina Faso). There is no consistent inverse relation between the use of modern health facilities and the use of traditional sources. Some sub-Saharan African countries, such as Madagascar, Nigeria, Rwanda and Senegal, combine frequent resort to traditional healers and home remedies with relatively high use of modern health facilities.

The relative frequency by sex with which children whose diarrhoea is treated are taken to a modern health facility ranges from a ratio in favour of girls of 0.76 to one in favour of boys of 1.33. For the treatment of fever and of cough the range is narrower, excepting an extreme ratio (4.35) for fever in Mali that reflects very low use of health facilities for the treatment of either sex. Among those children with fever who are treated, boys are significantly more likely to be taken to a modern service provider than girls in seven countries. For diarrhoea, boys are at a significant advantage in three countries. For cough or difficulty breathing, however, only in India is there evidence that boys are more likely than girls to be taken to a modern health facility.

Few consistent patterns exist in the ratio of boys to girls using modern health facilities across the three symptom groups. The only survey that detected a significant difference by sex in the use of modern health facilities for more than a single symptom was the very large one in India. Indian boys whose symptoms are treated are about 5 per cent more likely to be taken to a modern facility than sick girls who are treated. There is also little regional consistency when looking at health facility use for the individual symptom groups (figure 41). Boys are slightly more likely to be treated at a health facility in most parts of the world. However, all but one of the Western African surveys found that girls with diarrhoea who are treated are more likely to be taken to a provider of modern services than boys who are treated. Equally, in most of the Western African surveys, boys whose fever is treated are more likely to be taken to a modern facility than girls whose fever is treated.

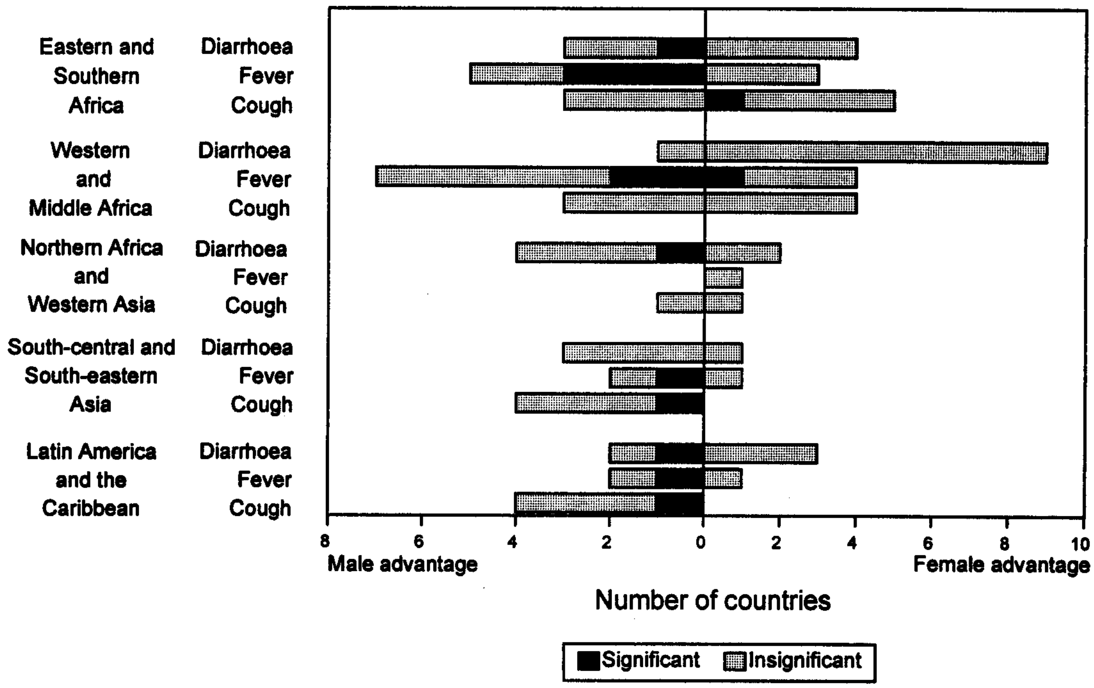
F. Type of treatment

The last three columns of table 51 and two columns of tables 52 and 53 present ratios of boys to girls who receive the most appropriate types of treatment for diarrhoea, fever and cough/respiratory difficulties as proportions of those treated in any way. Those data are summarized in figure 42. As Boerma, Sommerfelt and Rutstein (1991) note, there are limitations to those data. Mothers may not know what type of treatment was given to the child if it was administered outside the home and standardized definitions were not applied in every survey. However, it is unlikely that the impact of those problems varies by sex of the child, although mothers might tend to respond with the perceived best treatment for the preferred sex.

In most countries in the prsent study, ORS is used to treat less than 50 per cent of episodes of diarrhoea. In several Eastern and Southern Africa countries, together with Trinidad and Tobago, it is used more often. There is no clear pattern of differentials by sex. Use of ORS among children who are treated is significantly higher for boys than girls in Bangladesh, the Dominican Republic and northern India but significantly higher for girls in Colombia and Kenya. Moreover, no evidence exists that the sex ratio in ORS use is associated with that in the use of modern service providers. The use of home salt and sugar solutions or any increased intake of fluids also can help to prevent dehydration from diarrhoea. In most countries with a significant sex differential in ORS use, that contrast is offset by greater use of other forms of rehydration therapy to treat children of the opposite sex. Only in Bangladesh and Kenya are there significant differences by sex in the overall likelihood that the type of treatment used for childhood diarrhoea is appropriate.

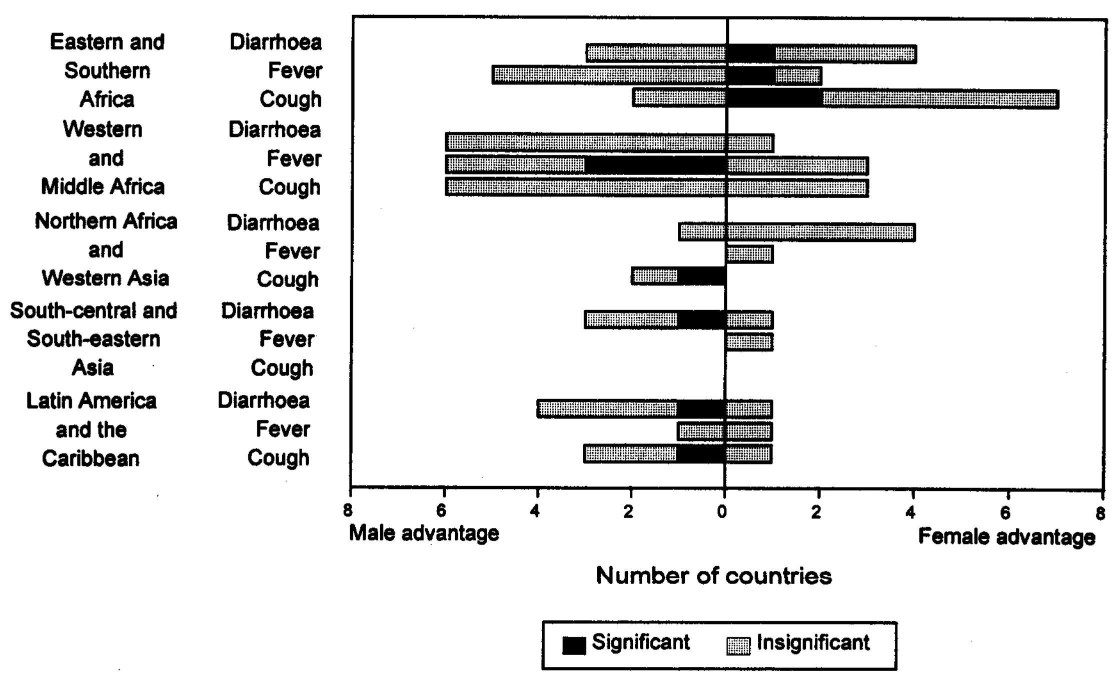
Fewer observations exist for the treatment of fever by antimalarials or antibiotics. Overall levels of use vary from almost zero to about 57 per cent for antibiotics in Cameroon and 73 per cent for antimalarials in

Figure 41. Number of countries according to the direction of the sex differential in treatment at a facility among those treated, by region



Sources: DHS-I, DHS-II and DHS-III country reports, NFHS national and state reports.

Figure 42. Number of countries according to the direction of the sex differential in effective treatment among those treated, by region



Sources : DHS-I, DHS-II and DHS-III country reports, NFHS national and state reports.

Liberia. There are modest differences by sex in the treatment of fever by antimalarials or antibiotics in most countries. They tend to favour boys. For both antimalarial and antibiotic use, a significant difference in either direction is associated with the equivalent differential in health facility use. The explanation is not only that those drugs are dispensed at clinics because that finding extends to several African populations where more children are given antimalarials or antibiotics than attend modern health facilities.

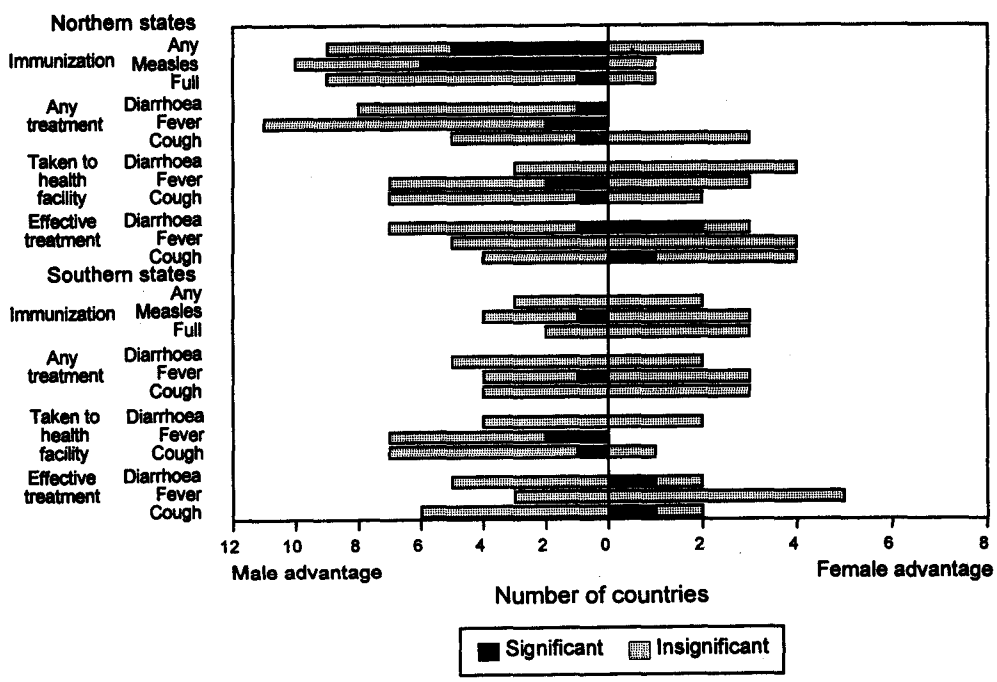
Use of antibiotics to treat children with coughs is uncommon; it exceeds 33 per cent only in Togo. Use of cough syrup is much more prevalent, ranging from just 7 per cent in Mali to 72 per cent in Peru (1991-1992). Two thirds of the countries in the present study record higher use of antibiotics by boys than girls among those treated. The differential is statistically significant only in Egypt (1992) and Paraguay. In most countries, girls who receive any treatment are more likely to receive cough syrup than boys. Only in one country (Togo), however, is there evidence that antibiotics and cough syrup are alternative treatments for cough that are used differentially for the two sexes.

As with other aspects of the use of curative care, there is little consistency across the three symptom groups in the appropriateness of patterns of treatment. In the Niger, boys who are treated receive more appropriate care than girls for all three types of symptom, while in the United Republic of Tanzania girls receive consistently more suitable forms of treatment. More generally, there seems to be a tendency for treatment of sick boys to be more appropriate than that of girls in Western and Middle Africa but for treatment of sick girls to be more appropriate than that of boys in Eastern and Southern Africa.

G. Indian states

The results presented already demonstrate that there are more marked sex differentials in the health care of children in Bangladesh, India and Pakistan than in most other regions of the world. Moreover, patterns of health care differ between northern and southern India. Figure 43 examines state-level differences across India in the health care of boys and girls in slightly more detail. The indicators are defined and derived in the same way as those for national populations.

Figure 43. Number of large Indian States according to the direction of the sex differential in use of preventive and curative health services, by region of India



Sources: DHS-I, DHS-II and DHS-III country reports, NFHS national and state reports.

Immunization coverage is markedly higher among boys than girls throughout all of northern India except Assam. The differentials are largest and statistically significant in Bihar, Madhya Pradesh, Punjab, Rajasthan and Uttar Pradesh, where between 11 and 39 per cent more boys than girls have received both any vaccine and measles vaccine in particular. In Rajasthan and Uttar Pradesh, moreover, boys are about 15 per cent more likely than girls to complete courses of vaccination once they have received any vaccine. In southern India, in contrast, sex differentials in vaccination are small and insignificant, with the exception that boys are 11 per cent more likely than girls to have received measles vaccine in Kerala.

As in other parts of the world, mothers report more episodes of diarrhoea, fever and cough among their sons than their daughters in both northern and southern India. Sex differentials in whether those disease episodes had been treated in any way are smaller than those in immunization coverage in northern India, but except for cough still consistently favour boys. In southern India, there is no clear pattern in favour of either sex. For fever and cough, boys who receive treatment are more likely to be taken to a modern health care facility than girls in both northern and southern India. In southern India, girls who are treated are more likely than boys to be taken to traditional practitioners. In northern India, they tend to receive home remedies. Despite that pattern of consultations, the measures used here do not suggest that those sick boys who receive treatment obtain more appropriate care than those girls who are treated in either part of the country.

H. Discussion

The present study aims to identify the existence of and any regional patterns in sex differentials in the use of certain preventive and curative health services. Covariates of those differentials, such as overall levels of health service use, are also sought. As well as assessing whether gender affects use of any form of health care, sex differentials in effective service use are also investigated.

The investigation of sex differentials in immunization coverage divides the process into two components that are potentially affected by the sex of the child: the probability of receiving any vaccinations, including a specific look at the single dose of measles vaccine, and the probability of acquiring effective immune status through receiving the full series of doses of EPI vaccines. Differentials by sex in immunization coverage and completeness are small in most parts of the world, and do not clearly favour either boys or girls. Within countries, differentials by sex of the child in the direction or extent of gender bias are seldom consistent between indicators (figure 38). South-central Asia is a striking exception to that generalization. In Bangladesh, northern India and Pakistan, boys are more likely to be ever-vaccinated than girls, are more likely to be vaccinated against measles and are more likely to complete courses of vaccination. Boys are also slightly more likely to receive vaccines than girls in Northern Africa and Western Asia. In other parts of the developing world, coverage tends to be slightly higher among girls.

Only the DHS survey in Yemen asked about reasons for not taking a child for immunization. The most frequent response was that the place of vaccination was far away (just over 30 per cent), followed by "other" (unspecified) reasons, lack of awareness of the need for immunization (14 per cent) and that the child was perceived to be too young (14 per cent). Other reasons, such as fear of vaccination, intention to go, lack of awareness of the need to return for other doses and so on, accounted for a small proportion of responses. Although a sex differential existed in vaccination coverage in favour of boys, there was little difference by sex in the frequency of any of those responses.

For the treatment of diarrhoea, fever and cough, the source and type of treatment were examined, as well as the "any treatment" versus "no treatment" dichotomy. There is a small but widespread tendency for boys with symptoms of disease to be more likely to receive treatment than girls. That pattern extends to all regions except Eastern and Southern Africa. In addition, boys who are treated are more likely than girls to be taken to a modern health facility and to receive effective treatment. In general, therefore, the evidence that boys receive better health care than girls is clearer for curative than preventive measures. Nevertheless, when the different indicators for a single country are compared, they often reveal inconsistent patterns. In most countries, boys' advantage is restricted to certain types of disease or of treatment. There is also little evidence that sex differentials in service use are associated with the overall level of service use other than because by definition, differentials must disappear as uptake becomes universal.

As with immunization coverage, most of the surveys did not include questions on reasons for not taking a sick child to a service provider or not using particular treatments. Even if such questions are asked, responses may be biased if mothers perceive the question as threatening and thus attempt to give a socially acceptable answer. The Yemen DHS (1991-1992) did include a question about untreated episodes of diarrhoea. The major reason given for not seeking medical assistance was lack of access to facilities (29 per cent). For 18 per cent of the children, mothers considered the child's illness to be mild, and for 7 per cent they were too busy to find time to seek treatment. For more than two in five children, "other" reasons are mentioned. There are no significant differences by sex of the child in the frequency with which mothers proffer those explanations.

The present comparative study reveals that differential health service use favouring boys is relatively rare. Clear evidence of systematically greater use of health services by boys than girls only exists in four of the countries for which data are available: Bangladesh, India, Pakistan and Yemen (tables 51, 52 and 53). In Cameroon, Egypt, the Niger and Tunisia, there is weaker evidence of the same pattern. All those countries except Tunisia are among the 14 of those that have conducted DHS surveys in which girls' mortality at ages one to four is more than 10 per cent higher than boys' mortality at the same ages. Equally, in at least two countries parents make more use of preventive and curative services for their daughters than their sons. They are Ghana and Kenya; the United Republic of Tanzania may also fall into that category. Ghana and Kenya, however, are not among the nine countries in which male child mortality is at least 10 per cent higher than female child mortality, though the United Republic of Tanzania is. Thus, lower use of health care by girls than boys is associated with adverse mortality outcomes but not vice versa.

Examination of the whole sample of countries on which data are available, rather than just those for which there exists clear evidence of differential service use, also yields some evidence that differential child mortality by sex is associated with differential patterns of service use. Table 54 presents correlations between the sex differential in the child mortality rate ($_4q_1$) and sex differentials in ever-vaccination and ever-treatment and in full vaccination, treatment at a modern facility and effective treatment for those children who receive some care. For diarrhoea, ORS, home solutions and increased fluid intake are regarded as effective treatments. Antimalarials for fever and antibiotics for cough are also regarded as effective treatments, though they would not be appropriate for every disease episode. The outliers, Colombia and Mali for treatment of fever at a facility and Uganda for effective treatment of fever, are omitted from the analysis. The sex ratio in child mortality is associated inversely with the sex ratios of being treated or vaccinated at all. Only the associations between differential child mortality and differentials in the receipt of any vaccine and any treatment for cough are statistically significant. The associations between differential

TABLE 54. ASSOCIATIONS BETWEEN THE SEX DIFFERENTIAL IN CHILD MORTALITY ($_4q_1$) AND SEX DIFFERENTIALS IN THE USE OF HEALTH SERVICES

Breakdown of treatment process	*Vaccination*	*Curative*		
		Diarrhoea	*Fever*	*Cough*
Received any treatment/ever vaccinated ...	r = -0.390*	r = -0.016	r = -0.216	r = -0.426*
Treated at health facility	..	r = -0.140	r = -0.187	r = -0.201
Effectively treated/fully vaccinated	r = -0.111	r = -0.060	r = -0.196	r = -0.117

NOTE: An asterisk (*) indicates that $p < 0.05$.

child mortality and measures of the sex differential in more effective use of health care and child mortality are also consistently negative. However, none of those associations distinguishing differential patterns of care among ever-vaccinated children and children receiving any form of treatment are statistically significant.

In-depth field studies in South-central Asia have yielded convincing evidence both that girls attend health-care facilities less often than boys and that that difference is implicated in excess female childhood mortality. The nationally representative survey data examined in the present study are consistent with that view. In Bangladesh, northern India and Pakistan, girls receive less preventive care than boys. In Bangladesh and northern India, they are also less likely to have their symptoms of disease treated at all or to receive appropriate care than boys. What the present comparative study emphasizes is that that finding cannot be generalized to other parts of the world. Although aggregate analyses that fail to control for confounding variables can mislead, differential health care is neither widespread nor important enough to explain excess female mortality in childhood in most of the developing world. According to the DHS surveys, higher child mortality among girls than boys is characteristic of much of the developing world. Since there is limited evidence outside South-central Asia of marked sex differentials in health service use other factors must account for excess mortality among girls in other regions.

The apparent contradiction between that conclusion and those of earlier research probably arises from a publication bias affecting investigations of the present topic. Studies of sex differentials in health care are less likely to be initiated or pursued to the point of publication in regions of the world where they are unimportant. Thus, they have tended to focus on South-central Asia, where excess female child mortality is particularly marked and girls often receive worse health care than boys.

The survey data on reported morbidity reinforce existing evidence that even in populations where girls' mortality is higher, the reported prevalence of disease is at least as high among boys. Objective anthropometric data collected by the DHS suggest the same conclusion (chapter VI above). Thus, the reason why girls suffer higher mortality must be because they are less likely to recover from disease. Part of the explanation for the higher case fatality among girls may lie in more subtle aspects of health service use than are measured here. For example, parents' compliance with regimes of treatment may be more meticulous when they are caring for sick sons than when they are caring for daughters. In addition, wider aspects of the quality of child care within the home are probably relevant. It seems possible that subtle but pervasive differences in the way that parents interact with their sons and daughters are important. Thus, identifying particular aspects of behaviour that are of significance may be just as difficult as it has been to identify the mechanisms accounting for the impact of maternal education on child mortality (Cleland, 1990).

On occasion, boys receive worse health care than girls. That fact has been overlooked in the literature on sex differentials in mortality, largely because most studies of that subject have been conducted in societies where there is strong preference for sons. It seems unlikely that the instances of relative male disadvantage reflect deliberate discrimination by parents. Although that argument might be sustainable for some matrilineal populations in sub-Saharan Africa, the influence of gender on behaviour is probably more subtle. Equally, it seems likely that more complex processes than overt discrimination are also responsible for the mortality differential in at least some populations where it is girls that are disadvantaged.

Higher male service use in childhood is less pervasive than excess female mortality. Nevertheless, the health care received by boys and girls differs in countries with a range of levels of health service provision and epidemiological profiles. There is a long way to go before that potential source of inequalities in child health is eliminated. Plainly, the right of every child to facilities for the treatment of illness (UNICEF, 1990) is not being fulfilled.

NOTE

[1]Box plots indicate for a distribution, the location of the median (the horizontal line within the box) and the extremes of the distribution (the ends of the verticle lines extending beyond the central box or the individual points just above or below them if outliers exist).

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