

PN-ACD 156

# DHS COMPARATIVE STUDIES

27

## Child Morbidity and Treatment Patterns



DEPARTMENT OF  
HEALTH AND HUMAN SERVICES  
INTERNATIONAL DEVELOPMENT DIVISION

The Demographic and Health Surveys (DHS) is a 13-years project to assist government and private agencies in developing countries to conduct national sample surveys on population and maternal and child health. Funded primarily by the U S Agency for International Development (USAID), DHS is administered by Macro International Inc in Calverton, Maryland.

The main objectives of the DHS program are (1) to promote widespread dissemination and utilization of DHS data among policymakers, (2) to expand the international population and health database, (3) to advance survey methodology, and (4) to develop in participating countries the skills and resources necessary to conduct high-quality demographic and health surveys.

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**Demographic and Health Surveys  
Comparative Studies No. 27**

**Childhood Morbidity and  
Treatment Patterns**

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# Contents

Preface	v
Acknowledgments	vi
Executive Summary	vii
1 Introduction	1
2 Data and Methods	3
2 1 Diarrhea	3
2 2 Fever and Respiratory Symptoms	3
3 Diarrhea	6
3 1 Prevalence Levels and Differentials	6
3 2 Treatment Patterns	15
4 Fever	28
4 1 Prevalence Levels and Differentials	28
4 2 Treatment Patterns	28
5 Respiratory Illness	34
5 1 Prevalence Levels and Differentials	34
5 2 Treatment Patterns	34
5 3 Co-existence of Symptoms	35
6 Summary and Conclusions	43
References	45
Appendix A	
Summary of DHS-I, DHS-II, and DHS-III Surveys, 1985-1997	47
Tables	
Table 2 1 Availability of selected information on morbidity among children under five years	4
Table 2 2 Mother's knowledge of diarrhea in children under five years by fostering status	5
Table 3 1 Prevalence of diarrhea in children under five by age	7
Table 3 2 Prevalence of diarrhea in children age 6-23 months by selected socioeconomic characteristics	9

Table 3 3	Prevalence of diarrhea in children age 6-23 months by selected demographic characteristics	10	Figures	
Table 3 4	Prevalence of diarrhea in children age 6-23 months by selected household characteristics	11	Figure 3 1	Prevalence of diarrhea among children age 0-59 months in the two weeks preceding the survey 8
Table 3 5	Prevalence of diarrhea in children age 12-35 months by measles vaccination status	13	Figure 3 2	Among children under five years with diarrhea in the two weeks preceding the survey, the percentage taken to a medical facility by prevalence of diarrhea, Demographic and Health Surveys, 1990-1995 26
Table 3 6	Prevalence of diarrhea in children age 0-11 months by age and feeding mode	14		
Table 3 7	Prevalence of diarrhea in children age 0-11 months by bottle use	16		
Table 3 8	Mother's knowledge of ORS by socio-economic characteristics and age	17		
Table 3 9	Mother's knowledge of ORS by whether or not child's health card was seen by interviewer	18		
Table 3 10	Treatment of diarrhea in children under five	19		
Table 3 11	Use of ORS to treat diarrhea in children under five	20		
Table 3 12	Use of ORS to treat diarrhea in children under five by background characteristics	22		
Table 3 13	Percentage of children under five with diarrhea who were taken to a medical facility, by background characteristics	24		
Table 3 14	Treatment received by children under five with diarrhea who were taken to a medical facility	27		
Table 4 1	Prevalence of fever in children under five by background characteristics	29		
Table 4 2	Treatment of children under five with fever	31		
Table 4 3	Percentage of children under five with fever taken to a medical facility, by background characteristics	32		
Table 5 1	Prevalence of cough with rapid breathing in children under five by background characteristics	36		
Table 5 2	Treatment of children under five with cough and rapid breathing	38		
Table 5 3	Use of oral antibiotics and/or injection to treat children under five with cough accompanied by rapid breathing by presence of fever	39		
Table 5 4	Percentage of children under five with cough accompanied by rapid breathing taken to a medical facility, by background characteristics	40		
Table 5 5	Prevalence of one, two, or three symptoms (diarrhea, fever, cough) in children under five	42		

## Preface

One of the most significant contributions of the DHS program is the creation of an internationally comparable body of data on the demographic and health characteristics of populations in developing countries. The *DHS Comparative Studies* series and the *DHS Analytical Reports* series examine these data across countries in a comparative framework, focusing on specific topics.

The objectives of the DHS comparative research are to describe similarities and differences between countries and regions, to highlight subgroups with specific needs, to provide information for policy formulation at the international level, and to examine individual country results in an international context. While *Comparative Studies* are primarily descriptive, *Analytical Reports* utilizes a more analytical approach.

The comparative analysis of DHS data is carried out primarily by staff at the DHS headquarters in Calverton, Maryland. The topics covered are selected by staff in conjunction with the DHS Scientific Advisory Committee and USAID.

The *Comparative Studies* are based on a variable number of data sets reflecting the number of countries for which data were available at the time the report was prepared. Each report provides detailed tables and graphs for countries in four regions: sub-Saharan Africa, the Near East and North Africa, Asia, Latin America and the Caribbean. Survey-related issues such as questionnaire comparability, survey procedures, data quality, and methodological approaches are addressed in each report, as necessary. Where appropriate, data from previous DHS surveys are used to evaluate trends over time.

*Comparative Studies* published under the current phase of the DHS program (DHS-III) are, in some cases, updates and expansions of reports published earlier in the series. Other reports, however, will cover new topics that reflect the expanded substantive scope of the DHS program.

It is hoped that the availability of comparable information for a large number of developing countries will have long-term usefulness for analysts and policymakers in the fields of international population and health.

Martin Vaessen  
Project Director

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## Executive Summary

Infectious diseases in children under five are a major concern in developing countries. Most deaths among persons under 50 years of age occur in the first five years of life. This study focuses on three major causes of child morbidity: diarrhea, fever, and respiratory infections. Information is presented on the prevalence and treatment of these illnesses among children under five (as reported by mothers) in 34 Demographic and Health Surveys (DHS) that were carried out between 1990 and 1995.

In interpreting the data in this analysis, several limitations should be kept in mind. Although the DHS-II and DHS-III surveys took every precaution to ensure the reliability and validity of questions, all cross-sectional surveys reflect variations in the ways questions are asked and understood. These variations are related to cultural (particularly linguistic) characteristics of the countries in which surveys were conducted.

The comparability of disease prevalence data collected in cross-sectional surveys is also affected by seasonality. The frequency with which diarrhea, fever, and respiratory symptoms occur is affected by rainfall and temperature, which in many countries have distinct seasonal patterns. Seasonal variation in disease prevalence should be kept in mind when comparing surveys from different countries and surveys conducted at different times in the same country.

The strength of cross-sectional, population-based sample surveys, such as those conducted under the DHS program, lies in their ability to provide statistically reliable estimates of reported morbidity and treatment for entire countries and for the major geographical, demographic, and socioeconomic subdivisions. DHS surveys present broad-based summaries of public health which can point to a need for targeted investigation of disease prevalence and associated treatment patterns.

In this report the average prevalence of diarrhea for children under five is 16 percent. Prevalence tends to increase after age 5 months to a high at 12 to 17 months, then declines to a low at 48 to 59 months. Prevalence is highest among children of young mothers. It is also slightly higher for male children and for children born after a short birth interval.

Diarrhea varies with background characteristics of the mother and child. Children of mothers with secondary or higher education have lower prevalence than those whose mothers have primary or no education. There is a tendency for children in urban areas to have lower diarrhea prevalence than those in rural areas. On average, children in households with a radio and, therefore, access to health education broadcasts, have slightly lower prevalence than children in households with no radio.

Household facilities indicative of domestic hygiene and socioeconomic status are also related to diarrhea prevalence. As

might be expected, lower prevalence coincides with the presence of piped water, toilet facilities (especially a flush toilet), and finished (versus unfinished) floors.

Measles vaccination appears to have a protective effect against diarrhea. Diarrhea prevalence is, on average, 18 percent lower among vaccinated children compared with those who have not been vaccinated. The protective effect of breastfeeding is even stronger than that of measles vaccination, particularly at ages 0 to 2 months. In this age range, a partially breastfed child is 57 percent more likely to have had diarrhea than a child who has been fully breastfed.

Oral rehydration therapy, which includes treatment with a solution prepared from commercially produced packets of oral rehydration salts (ORS), a homemade sugar-salt-water solution, or increased fluids is important in managing diarrhea, particularly in young children. On average, 73 percent of mothers said that they knew of ORS. Knowledge is noticeably higher in urban areas and among women who have had some formal education, particularly secondary or higher education. A mother is also more likely to know of ORS if she has a health card for her child. Possession of a health card indicates contact with a health facility, where the mother may have received information about ORS.

The average prevalence of use of ORS to treat children under five with diarrhea is 29 percent. Among children who were not given ORS, about half of the mothers reported knowing about the treatment. Use of ORS is higher in urban areas than in rural areas, and mothers with secondary or higher education are much more likely to give ORS to their sick children than less educated mothers.

Care-seeking behavior is of considerable interest in countries seeking to provide more effective treatment for sick children under five. On average, only one-third of children with diarrhea are taken to a medical facility for treatment. Prevalence of visits to medical facilities is highest among children age 6 to 23 months, children at lower birth orders, children in urban areas, and children of mothers with at least secondary education. If a child has a fever as well as diarrhea, the mother is more likely to seek medical attention than if the child has diarrhea alone.

Among children with diarrhea who were treated at a medical facility, ORS was the most common form of management, followed by drugs alone, and a combination of drugs and ORS. Use of antibiotics to treat diarrhea is widespread in the countries surveyed. This is most likely because mothers tend to view antibiotics as especially effective in treating infectious diseases, even when the use of antibiotics is not medically appropriate. The competence of clinicians is often judged by whether or not they dispense antibiotics.

The mean prevalence of fever among children under five is 31 percent. Prevalence tends to be higher at higher birth orders and lower among urban children and children whose mothers have secondary or higher education.

Use of antimalarial medicine to treat fever in children averages about 25 percent. Another 20 percent of children are given antibiotics in pill or syrup form and 8 percent are treated with injections, many of which are probably antibiotics. A further 42 percent receive unspecified, "other" pills or syrups. Whether in pills, syrups, or injections, antibiotics are widely used to treat children with fever.

On average, just over 43 percent of children with fever were taken to a medical facility for treatment. As in the case of diarrhea, clinic visits are most common among children age 6-11 months. Higher prevalence is also associated with lower birth order, increasing level of maternal education, and urban residence.

In more than 70 percent of the surveys male children with fever are more likely to be taken to a medical facility than female children with fever.

The average prevalence of cough accompanied by rapid breathing is 16 percent. As in the case of diarrhea and fever, higher prevalence of cough is associated with the post-weaning ages 6 to 23 months, higher birth order, low maternal education, and rural residence.

Treatment for cough with rapid breathing shows greater reliance on cough syrup than antibiotics. The average prevalence of treatment with cough syrup is 34 percent, compared with 18 percent for antibiotics. For injection, the prevalence is 9 percent, while for "other" pills or syrups, which may include antibiotics, the prevalence is 18 percent. On the average, 44 percent of children with cough accompanied by rapid breathing were taken to a medical facility.

# 1 Introduction

This study presents information on the prevalence of morbidity and treatment patterns among children under five years of age as reported by their mothers in the Demographic and Health Surveys (DHS). Infectious diseases in children under five are a major concern in developing countries because deaths among persons under age 50 are concentrated in the first five years of life. The focus of this study is the three major causes of child morbidity—diarrhea, fever, and respiratory infections.

With regard to diarrhea, fever, and respiratory illnesses, primary health care programs usually have two major objectives. First, they seek to alert mothers to dangerous signs and symptoms in their children. Second, they teach mothers how to manage the underlying illness appropriately. Definitions of appropriate management often include taking the sick child to public or private clinical facilities for advice and treatment.

In many developing countries there are also major efforts to improve the training of clinicians in syndrome-based diagnosis and treatment of childhood illness. Attempts are also made to enhance the reliability of the supplies of medicines and basic equipment. The goal of these initiatives is to make available effective clinical facilities to which mothers will want to take sick children for treatment.

The 34 DHS surveys on which this study is based are nationally representative samples. They provide a broad picture of the magnitude of problems facing planners in the management of childhood diarrhea, fever, and respiratory illnesses.

The World Health Organization (WHO) has estimated that diarrhea is responsible for more than 3 million deaths per annum worldwide among children under five (WHO, 1995). About half of these deaths are due to dehydration. Diarrhea deaths from dehydration are preventable by oral rehydration therapy (ORT), which includes administration of (1) a solution prepared from ORS packets<sup>1</sup> or a commercially prepared, premixed ORS solution, or (2) homemade fluids recommended by the national diarrhea control program (i.e., recommend home fluids (RHF) such as sugar-salt-water solution). Administration of increased fluids is also considered a type of ORT.

Virtually all maternal and child health (MCH) programs in the developing world attempt to achieve widespread use of ORS and/or RHF. Obstacles impeding widespread use of ORS and other types of ORT are often due to traditional views about diarrhea causation, including the idea that diarrhea is causally linked to the ingestion of foods and liquids.

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<sup>1</sup> ORS packets are a commercially prepared mixture of *salts* (i.e., oral rehydration salts (ORS)), *sugars* (e.g., glucose, sucrose) and *complex carbohydrates* (e.g., rice powder).

Another obstacle is the widespread belief among mothers in developing countries that antibiotics are more effective in treating diarrhea than ORT. Lack of availability of ORS packets in many areas is also a problem (Adetunji, 1991, Widarsa and Muninjaya, 1994). These impediments are at least part of the explanation why use of ORS/ORT is not more widely reported in the data presented below.

Malaria is another important cause of morbidity and mortality in young children. It may account for as much as 15 to 25 percent of deaths among children under five (WHO, 1995). Many fevers in tropical countries are due to malaria. Consequently, the WHO Sick Child Algorithm requires that all children with fever be treated with antimalarial medication, although other modalities may also be employed depending on the totality of signs and symptoms presented by the child. For children with fever to receive antimalarial medication, their mothers must understand the relevance of the treatment and have ready access to it. Lack of availability as well as the cost of antimalarial medications (along with a preference for home remedies) impedes their wider use in the treatment of sick children (Yeneneh et al., 1993).

A third important cause of sickness and death among children under five is respiratory disease. WHO estimates that acute respiratory infection (ARI) accounts for more than 4 million deaths annually among children under five (WHO/Republic of Zambia, n.d.). Data are presented here on the reported prevalence and treatment of cough accompanied by rapid or difficult breathing, which, along with fever, comprise the syndrome of ARI. The key diagnostic element of this syndrome is rapid or difficult breathing due to chest problems. The Sick Child Algorithm requires clinicians who detect this symptom along with chest in-drawing or harsh respiratory sounds (stridor) to diagnose a child as having ARI, including possible pneumonia, and to treat accordingly (WHO, 1996).

As with diarrhea and fever, many children with respiratory symptoms are not appropriately diagnosed or treated for ARI at medical outpatient facilities because of the inaccessibility of some facilities or maternal preference for home remedies. Distance to clinics, inconvenience of hours of operation, perceived cost of services, and preference for home treatment help explain why ARI symptoms are often not properly treated. Another problem is that mothers may fail to recognize the key symptoms of ARI, particularly rapid or difficult breathing due to chest problems (Saini et al., 1992, Herman et al., 1994, Harrison et al., 1995, Iyun and Tomson, 1996).

The data presented in this report should be interpreted in light of these and other difficulties confronting efforts to reduce childhood morbidity. It should also be remembered that

population-based surveys which are national in scope make estimates that mask a wide variety of local variations in knowledge and behavior. In this analysis, national prevalence levels are presented according to selected background characteristics of the mother and child. However, the prevalence levels reported in these 34 surveys should be seen as a starting point for health planners in individual countries in their efforts to assess achievements and the challenges to come.

## 2 Data and Methods

In the DHS-II and DHS-III surveys discussed here, mothers age 15 to 49 were asked to report the occurrence in their children of diarrhea and cough with rapid breathing. Most surveys also included questions on the occurrence of fever. Additionally, mothers were asked what was done to treat diarrhea, cough and fever in their children.

The recall period for diarrhea, cough, rapid breathing, and fever was the two weeks preceding the interview. Most surveys also asked about the occurrence of diarrhea, cough, and rapid breathing during the preceding 24 hours.

For DHS-II surveys, the sample of children consisted of those under five years. However, as indicated in Table 2.1, some of the DHS-III surveys limited coverage to children under three. The remaining DHS-III surveys continued the practice of including all children under five in the sample. The surveys included in this report are those for which standard recode files existed in late 1996.

### 2.1 DIARRHEA

The DHS-II and DHS-III questionnaires asked the following question about diarrhea in children under five (or under three):

*“Has (name of the child) had diarrhea in the last two weeks?”*

Positive responses by mothers were taken to represent the period prevalence of diarrhea. It should be noted that the signs and symptoms of diarrhea were not defined during the interview. Mothers were simply asked whether their children had had diarrhea (Boerma, Sommerfelt, and Rutstein, 1991).

How accurate is the reporting of diarrhea occurrence by mothers in the DHS surveys? This question was investigated by Boerma and colleagues (Boerma et al., 1991). They found that accuracy varies by mother’s level of education and that mothers are more likely to remember the incidence of diarrhea during the days immediately preceding the interview than bouts which occurred toward the beginning of the two-week recall period. Mothers may overreport recent diarrhea occurrence because they are unsure if it has stopped, or because they think their children may receive medical attention through the survey.

Another source of inaccuracy in reporting childhood illnesses is the practice of placing children in the foster care of a relative or friend outside the household. Mothers whose children

are in foster care are less likely to know about the occurrence of illness in their children than mothers whose children are living with them. In Table 2.2, this fact is illustrated with regard to diarrhea. Column 3 shows that the proportion of fostered children whose mothers did not know if they had had diarrhea in the past two weeks is substantially higher than the proportion of children living with their mothers (column 4).

If a mother reported that her child had had diarrhea in the past two weeks, she was asked about how the illness was treated. The objective of these questions was to provide data to help evaluate the degree to which the management of food and fluid intake and the seeking of clinical care conform to national protocols and to those established by the World Health Organization (WHO). Special emphasis in these management questions is placed on the use of oral rehydration therapy (either ORS or RHF) and on whether or not the mother knows how to prepare and administer it correctly. Clinical care outside the home was assessed by asking if the child had been taken for care outside the home and, if so, where the care was provided.

### 2.2 FEVER AND RESPIRATORY SYMPTOMS

The DHS-II and DHS-III questionnaires asked the following questions about fever and respiratory illness:

*“Has (name of the child) been ill with fever at any time in the last two weeks?”* and *“Has (name of the child) been ill with a cough at any time in the last two weeks?”*

Mothers of children with cough were asked if the cough was accompanied by rapid breathing. The presence of both cough and rapid breathing is associated with acute lower respiratory infection, which is a major cause of child mortality in developing countries.

In instances where mothers reported that their children had cough or fever, or both cough and fever, the DHS-II questionnaire followed up by asking if the mother had sought advice or treatment for these symptoms:

*“Did you seek advice or treatment for the fever/cough?”*

The DHS-III questionnaire asked about “advice or treatment” only with regard to cough:

*“Did you seek advice or treatment for the cough?”*

**Table 2.1 Availability of selected information on morbidity among children under five years**

Availability of information on morbidity among children under five years (three years for DHS-III), for diarrhea, fever, and cough/difficult breathing, Demographic and Health Surveys, 1990-1995

Country	Date of fieldwork		Number of respondents	Number of children	Diarrhea	Fever	Cough/Difficult breathing
<b>DHS-II</b>							
<b>Sub-Saharan Africa</b>							
Burkina Faso	Dec-Mar	1992-93	6 354	5 545	Yes	Yes	Yes
Cameroon	Apr-Sep	1991	3 871	3,189	Yes	Yes	Yes
Madagascar	May-Nov	1992	6 260	5 013	Yes	Yes	Yes
Malawi	Sep-Nov	1992	4 850	3 789	Yes	Yes	Yes
Namibia	Jul-Nov	1992	5,421	3 601	Yes	Yes	Yes
Niger	Mar-Jun	1992	6,503	5 717	Yes	Yes	Yes
Nigeria	Apr-Oct	1990	8 781	7 107	Yes	Yes	Yes
Rwanda	Jun-Oct	1992	6,551	5,042	Yes	Yes	Yes
Senegal	Nov-Aug	1992-93	6 310	5 124	Yes	Yes	Yes
Tanzania	Oct-Mar	1991-92	9,238	7 256	Yes	Yes	Yes
Zambia	Jan-May	1992	7,060	5 396	Yes	Yes	Yes
<b>Near East/North Africa</b>							
Egypt	Nov-Dec	1992	9 864	8 089	Yes	Yes	Yes
Morocco	Jan-Apr	1992	9,256	4 853	Yes	Yes	Yes
<b>Asia</b>							
India <sup>a</sup>	Apr Sep	1992-93	89,777	45 969	Yes	Yes	Yes
Indonesia	May-Jul	1991	22,909	13,392	Yes	Yes	Yes
Jordan	Oct-Dec	1990	6,461	7,962	Yes	Yes	Yes <sup>b</sup>
Pakistan	Dec-May	1990-91	6,611	5 860	Yes	Yes	Yes
<b>Latin America/Caribbean</b>							
Brazil (NE)	Sep-Dec	1991	6,222	3 163	Yes	Yes	Yes
Colombia	May-Aug	1990	8 644	3 659	Yes	Yes	Yes
Dominican Republic	Jul-Nov	1991	7,320	3,660	Yes	Yes	Yes
Paraguay	May Aug	1990	5 827	3 834	Yes	Yes	Yes
Peru	Oct-Mar	1991-92	15,882	7,999	Yes	No	Yes
<b>DHS-III</b>							
<b>Sub-Saharan Africa</b>							
Central African Republic	Sep-Mar	1994-95	5 884	2,577 <sup>c</sup>	Yes	Yes	Yes
Cote d'Ivoire	Jun-Nov	1994	8,099	3,645 <sup>c</sup>	Yes	Yes	Yes
Ghana	Sep-Dec	1993	4,562	2 056 <sup>c</sup>	Yes	Yes	Yes
Kenya	Feb Aug	1993	7,540	5 650	Yes	Yes	Yes
Zimbabwe	Jul Nov	1994	6,128	2 221 <sup>c</sup>	Yes	Yes	Yes
<b>Asia</b>							
Bangladesh	Nov-Mar	1993 94	9,640	3,603 <sup>c</sup>	Yes	No	Yes
Indonesia	Jul-Nov	1994	28 168	15 883	Yes	Yes	Yes
Philippines	Apr-Jun	1993	15,029	8,512	Yes	Yes	Yes
Turkey	Aug-Oct	1993	6,519	3 532	Yes	Yes	Yes
<b>Latin America/Caribbean</b>							
Bolivia	Nov-May	1993-94	8 603	3 335 <sup>c</sup>	Yes	Yes	Yes
Colombia	Apr-Jun	1995	11,140	4,891	Yes	Yes	Yes
Haiti	Jul-Jan	1994-95	5 356	3,265	Yes	Yes	Yes

<sup>a</sup> Although not an official part of DHS-II the National Family Health Survey 1992-93 carried out in India used similar survey instruments and procedures. Data were collected for children born in the four years before the survey

<sup>b</sup> Two separate categories in one question

<sup>c</sup> Three years before the survey date

Table 2.2 Mother's knowledge of diarrhea in children under five years by fostering status

Percentage of children under five years, by mother's knowledge of diarrhea in the two weeks preceding the survey and fostering status, Demographic and Health Surveys, 1990-1995

Country	Percentage of children <5 whose mothers did not know if their children had diarrhea	Percentage of children <5 who were fostered	Percentage of fostered children <5 whose mothers did not know if their children had diarrhea	Percentage of children <5 living with their mothers whose mothers did not know if their children had diarrhea	Number of children under five
<b>DHS-II</b>					
<b>Sub-Saharan Africa</b>					
Burkina Faso	1.7	2.5	61.1	0.2	5,545
Cameroon	4.3	6.3	60.4	0.5	3,189
Madagascar	2.5	4.1	56.7	0.2	5,013
Malawi	1.8	2.9	52.5	0.3	3,789
Namibia	8.5	15.9	47.6	1.0	3,601
Niger	2.8	4.2	60.4	0.2	5,717
Nigeria	1.2	3.8	23.6	0.3	7,107
Rwanda	1.4	2.6	48.8	0.1	5,042
Senegal	4.0	4.3	76.4	0.7	5,124
Tanzania	4.1	4.6	74.1	0.5	7,256
Zambia	2.1	3.1	53.1	0.4	5,396
<b>Asia/Near East/ North Africa</b>					
Egypt	0.3	0.2	63.3	0.2	8,089
India	0.2	U	U	U	45,969 <sup>a</sup>
Indonesia	0.7	1.2	52.2	0.1	13,392
Jordan	0.1	0.3	44.0	0.0	7,962
Morocco	0.7	0.9	69.6	0.1	4,853
Pakistan	0.1	0.3	9.0	0.0	5,860
<b>Latin America/ Caribbean</b>					
Brazil (NE)	1.5	2.7	51.1	0.1	3,163
Colombia	1.0	3.6	28.9	0.0	3,659
Dominican Republic	2.7	6.6	30.7	0.1	3,660
Peru	0.6	1.2	42.5	0.1	7,999
Paraguay	1.0	2.4	39.2	0.0	3,834
<b>DHS-III</b>					
<b>Sub-Saharan Africa</b>					
Central African Republic	2.3	2.4	79.9	0.4	2,577 <sup>b</sup>
Cote d'Ivoire	1.5	2.6	48.4	0.3	3,645 <sup>b</sup>
Ghana	0.3	1.0	33.3	0.0	2,056 <sup>b</sup>
Kenya	1.9	3.1	55.0	0.2	5,650
Zimbabwe	3.3	3.9	76.3	0.3	2,221 <sup>b</sup>
<b>Asia/Near East/ North Africa</b>					
Bangladesh	0.4	0.2	67.5	0.2	3,603 <sup>b</sup>
Philippines	0.2	1.2	17.4	0.0	8,512
Indonesia	0.6	0.8	39.8	0.2	15,883
Turkey	0.3	U	U	U	3,532
<b>Latin America/ Caribbean</b>					
Bolivia	0.3	0.4	65.5	0.0	3,335 <sup>b</sup>
Colombia	1.6	2.7	55.0	0.2	4,891
Haiti	2.8	6.8	41.7	0.0	3,265

U = Unknown (not available)

<sup>a</sup> Children under 4 years

<sup>b</sup> Children under 3 years

## 3 Diarrhea

### 3.1 PREVALENCE LEVELS AND DIFFERENTIALS

Table 3.1 shows the proportion of children age 0 to 59 months reported by their mothers to have had diarrhea in the two weeks preceding the interview. Diarrhea prevalence ranges from 8 percent in Paraguay to 28 percent in Niger. The average prevalence is 16 percent. Countries in the upper quartile (above 75 percent) with prevalence of 20.5 percent or more are Malawi, Niger, Rwanda, Zambia, Turkey, and Haiti. Countries in the lower quartile (below 25 percent) with prevalence of less than 12.3 percent are India, Indonesia (DHS-II and DHS-III), Jordan, Paraguay, and the Philippines.

For the 34 surveys including children age 0 to 35 months, the prevalence of diarrhea ranges from 10 percent in Paraguay to 37 percent in Haiti. The average prevalence is 21 percent. The upper quartile includes countries with prevalence above 26.2 percent, the lower quartile includes those with prevalence below 16.3 percent.

Two countries, Colombia and Indonesia, had surveys in both DHS-II and DHS-III. The prevalence of childhood diarrhea differed between the surveys, particularly in the case of Colombia. However, in both countries the surveys were conducted at different times of the year, with the result that seasonal factors such as rainfall may have affected diarrhea prevalence. Readers should bear in mind this difficulty when making longitudinal comparisons between surveys in the same country. Likewise, comparisons of diarrhea prevalence across countries should also be made with caution because rates may vary depending on the season.

Table 3.1 also shows diarrhea prevalence by age of child. The proportion of children with diarrhea rises rapidly after age 5 months to a peak at 12 to 17 months, after which there is a decline to a low at 48 to 59 months (Figure 3.1). This pattern reflects the immunity conferred by breastfeeding at the earliest ages (0 to 5 months), a subsequent increase in susceptibility after weaning, until the child's own immune system matures and prevalence declines.

#### Socioeconomic Characteristics

Table 3.2 shows the percentage of children with diarrhea in the two weeks preceding the survey by urban-rural residence, mother's level of education, and presence of a radio in the household. Data are presented for children age 6 to 23 months, the age at which the risk of diarrheal infections is greatest for children under five.

The difference in diarrhea prevalence between urban and rural areas was calculated for each of the 34 surveys summarized in Table 3.2. On average, prevalence among rural children age 6 to 23 months is 13 percent higher than among urban children. Exceptions to this are Cameroon, Tanzania, Egypt, Indonesia (DHS-II), Pakistan, Brazil, Paraguay, Côte d'Ivoire, and Bolivia, where diarrhea is slightly more prevalent in urban areas. However, with the exception of Pakistan, Northeast Brazil, and Côte d'Ivoire, prevalence in urban areas is less than 5 percentage points greater than it is in rural areas.

Greater education among mothers often reflects higher socioeconomic status and greater access to the resources and information necessary to prevent childhood diarrhea. However, Table 3.2 shows no clear difference in diarrhea prevalence between children whose mothers have no education and those whose mothers have some primary education.

Of the 34 surveys reporting data on childhood diarrhea and maternal education, 18 show a higher proportion of children of mothers with no education having had diarrhea compared with children of mothers with some primary education, 14 show lower prevalence among children whose mothers have no education compared with children of mothers with some primary schooling, and in 2 countries (Rwanda and Peru), prevalence is the same for both groups.

There is, however, a marked difference in prevalence among children whose mothers have secondary or higher education compared with those whose mothers have primary or no education. On average, diarrhea prevalence is 38 percent lower among children whose mothers have some secondary or higher education.

Households that have a radio may be better informed about diarrhea prevention and more able to afford the amenities necessary to prevent or to cope with diarrhea in young children. The data in Table 3.2 lend some support to this hypothesis. Of the 33 surveys that reported data on diarrhea prevalence among children and the presence of a radio in the household, 26 reported higher prevalence among households that lacked a radio compared with those that had one. On average, prevalence among children age 6-23 months is 11 percent higher in households with no radio compared with those having one. However, data from 12 surveys show absolute differences in prevalence levels of less than 2 percentage points between households with and without a radio.

Table 3 1 Prevalence of diarrhea in children under five by age

Percentage of children under five years with diarrhea in the two weeks preceding the survey, by age of child, Demographic and Health Surveys 1990-1995

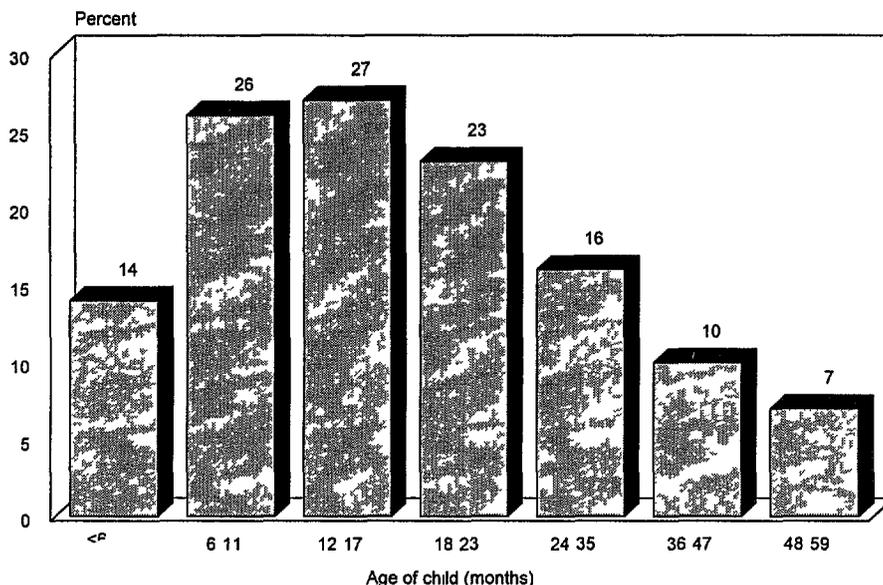
Country	Age of child (months)							Children under 3 years		Children under 5 years	
	<6	6-11	12-17	18-23	24-35	36-47	48-59	Percent	Number	Percent	Number
<b>DHS-II</b>											
<b>Sub-Saharan Africa</b>											
Burkina Faso	15.7	28.3	36.7	29.2	23.7	14.6	6.7	26.0	3,363	20.1	5,545
Cameroon	6.6	28.4	28.0	8.4	20.5	12.2	7.5	22.3	1,966	17.6	3,189
Madagascar	10.5	22.5	24.7	13.8	12.2	6.1	4.8	16.2	3,197	12.3	5,013
Malawi	16.0	41.8	41.5	31.2	21.2	10.1	8.1	28.8	2,421	21.7	3,789
Namibia	13.3	34.1	33.5	31.2	21.0	12.8	8.7	25.7	2,349	20.5	3,601
Niger	25.9	45.6	42.6	37.1	29.1	17.0	13.8	34.7	3,644	27.7	5,717
Nigeria	10.9	26.3	31.4	26.1	20.7	10.4	9.6	22.6	4,343	17.7	7,107
Rwanda	19.7	39.4	42.8	30.7	20.1	12.2	8.4	28.8	3,083	21.6	5,042
Senegal	21.4	32.8	35.2	30.3	20.5	13.6	8.2	26.7	3,086	20.4	5,124
Tanzania	10.7	26.0	25.3	16.5	10.5	7.4	4.3	16.8	4,679	12.9	7,256
Zambia	13.3	33.4	39.1	33.7	24.0	15.8	9.5	27.6	3,562	22.5	5,396
<b>Asia/Near East/</b>											
<b>North Africa</b>											
Egypt	17.6	27.8	24.5	18.5	12.5	6.8	4.7	18.9	4,673	13.3	8,089
India <sup>1</sup>	10.0	16.3	13.9	11.4	8.4	5.1	U	11.5	34,626	9.9	45,969
Indonesia	9.4	18.3	18.6	18.1	10.8	7.6	4.2	14.4	8,071	11.0	13,392
Jordan	13.5	17.9	18.9	12.5	5.3	3.3	2.3	12.2	4,798	8.5	7,962
Morocco	15.3	20.1	20.6	17.9	13.0	7.4	5.8	16.8	2,855	12.6	4,853
Pakistan	17.5	20.2	18.0	21.0	15.9	9.3	7.1	18.0	3,727	14.5	5,860
<b>Latin America/</b>											
<b>Caribbean</b>											
Brazil (NE)	19.9	24.0	24.1	20.2	14.0	11.3	7.8	19.2	1,829	15.1	3,163
Colombia	12.6	15.9	24.4	18.4	13.0	7.7	4.7	16.3	2,261	12.4	3,659
Dominican Republic	14.5	33.8	26.4	22.4	11.3	10.5	8.7	20.7	2,280	16.5	3,660
Paraguay	8.3	13.8	11.2	13.0	7.8	4.9	4.4	10.3	2,354	8.1	3,834
Peru	17.6	30.7	32.6	28.0	17.9	11.6	8.7	24.1	4,687	18.3	7,999
<b>DHS-III</b>											
<b>Sub-Saharan Africa</b>											
Central African Republic <sup>2</sup>	11.4	29.1	28.8	24.6	20.9	U	U	22.6	2,577	U	U
Côte d'Ivoire <sup>2</sup>	11.6	24.3	26.9	26.2	21.2	U	U	21.6	3,645	U	U
Ghana <sup>2</sup>	14.2	24.9	26.1	21.7	17.0	U	U	20.0	2,056	U	U
Kenya	13.5	23.8	26.7	21.9	13.0	8.0	4.7	18.8	3,364	13.8	5,650
Zimbabwe <sup>2</sup>	13.8	33.2	36.0	27.3	15.7	U	U	23.5	2,221	U	U
<b>Asia/Near East/</b>											
<b>North Africa</b>											
Bangladesh <sup>2</sup>	4.5	14.0	18.6	13.5	11.5	U	U	12.3	3,603	U	U
Indonesia	10.5	20.2	19.3	17.1	12.4	9.0	5.5	15.3	9,570	12.1	15,883
Philippines	8.8	17.0	15.1	16.1	9.6	6.6	4.9	12.8	5,205	10.1	8,512
Turkey	25.2	40.0	39.2	32.9	26.7	14.0	13.3	32.1	2,118	24.7	3,532
<b>Latin America/</b>											
<b>Caribbean</b>											
Bolivia <sup>2</sup>	16.5	33.3	41.0	38.0	24.3	U	U	29.6	3,335	U	U
Colombia	14.8	27.6	28.6	22.1	16.9	9.5	9.1	21.3	2,992	16.7	4,891
Haiti	29.5	48.7	45.4	40.1	28.4	13.2	12.2	37.1	1,965	27.4	3,265

U = Unknown (not available)

<sup>1</sup> Children under 4 years

<sup>2</sup> Children under 3 years

Figure 3 1 Prevalence of diarrhea among children age 0-59 months in the two weeks preceding the survey, Demographic and Health Surveys, 1990-1995



## Demographic Characteristics

Table 3 3 shows the percentage of children with diarrhea in the two weeks before the survey by selected demographic characteristics. Differences between the sexes favor females, with the prevalence of diarrhea among girls lower than that among boys in 28 of 34 surveys, although for several countries the differences are negligible. On average, prevalence is 9 percent higher among boys.

Differences in diarrhea prevalence by birth interval show a trend toward lower prevalence at longer intervals. On average, children born after an interval of 36 months or more have the lowest prevalence, while children born after 24 to 35 months have prevalence 5 percent higher. Among those born less than 24 months after a preceding birth, prevalence is 13 percent higher than among those born after an interval of 36 months or more.

Higher birth order might be hypothesized as associated with higher levels of childhood diarrhea, since larger families are more likely to have constrained resources. However, there is no strong evidence in Table 3 3 to support this hypothesis. In fact, in 17 of the 34 surveys, diarrhea prevalence for the highest birth order (greater than 6) is lower than that for the lowest birth order. Additionally, there are fluctuations in prevalence between birth order categories in most countries and no clear trends are evident.

Differentials in diarrhea prevalence based on mother's age are more consistent. In 27 of the 34 surveys, children whose

mothers were age 15 to 19 had the highest reported prevalence. In 18 countries, the lowest prevalence is among children with mothers age 35 and older. In 17 countries, diarrhea prevalence declines with increasing age of the mother, while in three countries—Burkina Faso, Rwanda, and Brazil—the lowest prevalence of diarrhea is among children with mothers age 15 to 19. On average, prevalence is about 21 percent higher among children of mothers age 15 to 19 compared with children of mothers 35 and over, while prevalence is only 5 percent greater among children of mothers age 20 to 34.

## Environmental and Domestic Hygiene

Diarrhea is a symptom of infections caused by a wide variety of bacterial, parasitic, and viral agents. Many of these are associated with poor living conditions and related lack of domestic hygiene. The Demographic and Health Surveys collects information on a number of relevant household indicators. Table 3 4 relates diarrhea prevalence among children age 6 to 23 months to type of water supply, toilet facilities, and the presence of dirt floors in dwellings.

In most countries, survey questionnaires used locally relevant categories to classify water supplies and sanitation facilities. In the interest of comparability, local terminology was regrouped into basic functional categories in Table 3 4. Water supplies were defined as piped and non-piped, and toilet facilities as flush, other, and no toilet.

Table 3 2 Prevalence of diarrhea in children age 6-23 months by selected socioeconomic characteristics

Percentage of children age 6-23 months with diarrhea in the two weeks preceding the survey, by residence, mother's level of education and presence of a radio in the household Demographic and Health Surveys, 1990-1995

Country	Residence		Highest level of education			Radio present		Percentage of children w/diarrhea	Number of children
	Urban	Rural	No education	Primary	Secundary+	No	Yes		
<b>DHS-II</b>									
<b>Sub-Saharan Africa</b>									
Burkina Faso	28.3	32.3	31.6	38.6	13.6	33.9	29.5	31.7	1,669
Cameroon	29.6	27.4	31.1	26.1	27.3	32.9	25.8	28.3	1,038
Madagascar	18.4	21.0	21.1	19.9	22.4	20.5	20.7	20.6	1,620
Malawi	35.0	38.4	40.2	35.8	40.8	36.8	40.5	38.2	1,234
Namibia	24.6	37.0	31.7	39.4	23.0	36.2	31.8	33.0	1,178
Niger	35.4	43.7	42.4	43.9	30.8	43.4	40.8	42.3	1,738
Nigeria	19.2	30.7	31.1	26.4	19.1	28.0	28.3	28.2	2,194
Rwanda	35.1	38.1	38.4	38.5	30.3	40.2	33.2	38.0	1,518
Senegal	26.3	36.5	33.9	32.5	20.3	33.9	32.7	33.0	1,489
Tanzania	25.3	22.0	20.4	24.3	15.8	22.1	23.9	22.7	2,416
Zambia	30.1	39.9	45.8	35.8	26.3	38.8	31.2	35.3	1,774
<b>Asia/Near East/</b>									
<b>North Africa</b>									
Egypt	24.7	22.9	23.4	27.3	21.2	28.1	20.8	23.6	2,331
India	12.5	14.4	14.2	14.8	12.6	14.3	13.3	13.9	17,734
Indonesia	20.8	17.3	17.3	20.0	15.0	19.3	17.6	18.4	4,105
Jordan	16.0	17.5	18.4	13.4	17.0	21.3	15.7	16.5	2,434
Morocco	15.6	21.6	20.5	18.1	13.3	21.8	19.2	19.6	1,482
Pakistan	23.6	17.7	18.7	27.6	18.5	18.0	22.2	19.5	1,823
<b>Latin America/</b>									
<b>Caribbean</b>									
Brazil (NE)	25.8	19.7	18.7	26.3	14.9	21.8	23.3	22.8	868
Colombia	19.2	19.7	25.4	21.2	16.7	23.0	18.4	19.4	1,185
Dominican Republic	27.5	27.7	26.0	29.2	26.1	29.6	26.1	27.6	1,251
Paraguay	13.2	12.3	16.9	14.5	7.2	12.9	12.6	12.7	1,174
Peru	26.6	36.3	37.4	37.3	24.1	35.1	29.3	30.4	2,322
<b>DHS-III</b>									
<b>Sub-Saharan Africa</b>									
Central African Republic	26.0	28.9	27.6	27.2	29.0	30.2	25.8	27.7	1,276
Cote d'Ivoire	30.2	23.3	25.1	25.6	31.2	27.5	24.4	25.8	1,761
Ghana	20.7	25.7	27.6	23.2	13.8	24.6	24.0	24.3	1,005
Kenya	22.9	24.4	27.2	25.9	17.5	24.5	23.9	24.2	1,717
Zimbabwe	21.3	36.2	39.6	33.5	27.4	35.6	27.3	32.1	1,097
<b>Asia/Near East/</b>									
<b>North Africa</b>									
Bangladesh	11.2	16.2	14.5	20.6	12.1	15.6	16.1	15.7	1,755
Indonesia	18.1	19.3	25.3	19.2	16.5	19.9	18.3	18.9	4,676
Philippines	15.0	17.2	15.8	19.0	14.2	U	U	16.1	2,648
Turkey	33.2	43.6	43.5	37.6	25.7	42.9	35.5	37.5	1,102
<b>Latin America/</b>									
<b>Caribbean</b>									
Bolivia	38.5	36.0	42.5	39.1	33.6	38.6	37.0	37.3	1,702
Colombia	26.0	26.3	35.6	28.6	23.2	31.0	25.2	26.1	1,541
Haiti	43.2	45.6	45.6	48.2	30.6	46.9	41.6	44.8	1,020

U = Unknown (not available)

**Table 3.3 Prevalence of diarrhea in children age 6-23 months by selected demographic characteristics**

Percentage of children age 6-23 months with diarrhea in the two weeks preceding the survey by sex of child, birth interval, birth order, and mother's age, Demographic and Health Surveys, 1990-1995

Country	Child's sex		Birth interval (months)			Birth order				Mother's age		
	Male	Female	<24	24-35	36+	1	2-3	4-5	6+	15-19	20-34	35+
<b>DHS-II</b>												
<b>Sub-Saharan Africa</b>												
Burkina Faso	33.9	29.4	35.2	34.7	29.2	29.5	35.1	29.6	31.3	28.7	32.1	31.4
Cameroon	31.3	25.2	27.8	27.8	29.1	28.5	30.3	27.0	26.9	31.8	28.5	23.0
Madagascar	21.0	20.3	21.7	18.1	20.0	24.8	19.7	20.4	19.3	25.5	20.7	17.4
Malawi	41.2	35.2	43.9	35.3	35.5	44.5	36.1	32.9	40.7	43.7	36.4	41.2
Namibia	34.9	31.2	35.3	35.3	32.4	30.5	31.9	37.2	33.8	36.8	33.4	30.1
Niger	43.2	41.3	41.8	41.9	41.4	45.1	42.2	40.7	42.1	49.5	41.1	42.0
Nigeria	31.1	25.4	30.0	24.3	29.9	29.9	29.0	26.9	27.1	33.9	28.5	24.1
Rwanda	36.5	39.5	35.0	36.0	42.5	35.7	38.1	43.3	35.1	30.5	39.7	34.3
Senegal	35.9	30.1	33.2	29.8	36.0	32.8	35.7	30.6	32.4	38.3	32.3	32.8
Tanzania	23.2	22.3	23.4	22.6	21.2	24.9	22.3	21.6	22.4	24.4	23.2	20.0
Zambia	36.9	33.7	36.6	34.9	32.3	39.3	37.1	32.5	31.6	35.9	35.9	32.0
<b>Asia/Near East/ North Africa</b>												
Egypt	25.8	21.1	24.9	21.7	22.4	26.2	22.2	21.6	25.2	25.5	24.1	20.3
India	14.1	13.8	13.6	14.2	13.4	14.6	13.4	14.5	13.3	15.5	13.8	13.3
Indonesia	18.4	18.3	24.7	16.6	18.0	17.2	19.5	19.6	15.8	23.9	18.4	15.7
Jordan	17.6	15.4	17.1	14.6	14.6	19.9	18.2	14.0	15.0	25.4	16.4	14.6
Morocco	20.5	18.6	22.5	20.2	17.5	19.6	19.2	20.3	19.3	25.0	19.8	18.1
Pakistan	19.3	19.8	22.3	21.6	17.7	17.1	21.2	16.1	22.3	27.0	18.3	21.9
<b>Latin America/ Caribbean</b>												
Brazil (NE)	24.2	21.2	26.7	24.2	23.7	16.7	21.3	28.8	26.9	16.6	23.8	22.2
Colombia	19.0	19.7	24.8	19.6	17.3	18.4	20.0	17.9	24.0	20.9	19.0	20.4
Dominican Rep	31.4	23.9	34.9	28.9	20.9	26.9	27.7	28.5	28.3	31.6	27.9	19.2
Paraguay	13.0	12.3	12.2	15.4	11.3	12.1	13.2	13.1	12.2	18.1	12.7	10.7
Peru	31.3	29.5	33.7	34.7	28.8	26.3	28.0	33.1	40.0	38.9	29.5	30.9
<b>DHS-III</b>												
<b>Sub-Saharan Africa</b>												
Central African Rep	28.4	26.9	28.9	25.4	25.9	32.9	28.1	26.4	23.3	30.1	27.8	24.9
Côte d'Ivoire	27.5	24.0	22.3	23.6	28.0	26.0	24.1	26.1	27.4	25.5	24.8	30.2
Ghana	24.8	23.7	31.9	23.9	23.2	25.0	20.0	29.5	25.1	25.6	24.5	22.8
Kenya	24.3	24.0	25.2	23.6	23.7	25.0	25.5	20.7	24.8	26.0	23.0	28.6
Zimbabwe	34.0	30.2	36.2	31.3	31.8	31.7	30.5	33.2	34.1	31.9	31.8	33.1
<b>Asia/Near East/ North Africa</b>												
Bangladesh	14.8	16.5	15.8	18.6	13.7	15.9	15.4	12.4	20.5	18.1	15.3	13.8
Indonesia	20.6	17.2	19.5	20.4	19.9	16.2	18.9	21.5	21.8	21.6	18.3	20.5
Philippines	15.7	16.5	14.9	17.3	16.7	15.6	14.3	16.3	19.9	22.3	15.3	18.0
Turkey	40.6	34.0	41.3	36.5	35.9	37.4	37.7	34.7	40.3	53.1	36.1	37.4
<b>Latin America/ Caribbean</b>												
Bolivia	37.8	36.8	42.2	38.7	34.0	36.4	34.9	46.3	33.9	41.5	37.5	34.8
Colombia	25.8	26.3	32.0	23.4	27.1	23.3	25.1	32.6	31.6	29.4	25.5	26.6
Haiti	48.5	40.7	43.6	48.1	46.0	39.1	47.8	43.7	46.7	51.5	44.7	43.2

**Table 3 4 Prevalence of diarrhea in children age 6-23 months by selected household characteristics**

Percentage of children 6-23 months with diarrhea in the two weeks preceding the survey, by source of drinking water, access to toilet facilities and type of floor, Demographic and Health Surveys, 1990-1995

Country	Percentage of households with piped water	Percentage of children with diarrhea by water source		Percentage of households with some toilet facility	Percentage of children with diarrhea by type of toilet			Percentage of households with non-dirt floor	Percentage of children with diarrhea by type of floor	
		Piped water	Other source		Flush toilet	Other type of toilet	No toilet		Non-dirt floor	Dirt floor
<b>DHS-II</b>										
<b>Sub-Saharan Africa</b>										
Burkina Faso	12.8	33.4	31.4	25.0	64.0	32.4	31.3	28.6	27.4	33.1
Cameroon	36.6	23.5	31.0	87.5	18.0	28.8	31.1	47.4	25.4	30.9
Madagascar	14.0	17.6	21.0	37.9	2.3	15.6	23.8	39.7	22.2	19.4
Malawi	22.3	35.7	39.0	75.0	31.8	38.7	37.3	14.2	37.3	38.4
Namibia	49.4	27.6	38.7	33.1	21.7	23.9	38.6	36.2	22.8	38.7
Niger	17.2	41.5	42.4	18.8	31.1	37.6	43.4	16.3	40.3	42.6
Nigeria	22.7	22.5	29.8	70.9	11.4	28.8	30.6	56.9	26.5	30.3
Rwanda	22.2	42.3	36.4	91.5	24.6	37.9	35.5	12.9	28.9	38.9
Senegal	42.0	29.2	35.7	61.0	22.9	32.0	36.3	58.9	30.5	36.3
Tanzania	31.2	25.3	21.6	82.7	12.0	23.2	20.9	18.7	23.0	22.7
Zambia	48.1	31.1	39.1	70.6	26.0	36.0	42.3	51.9	30.8	40.1
<b>Asia/Near East/ North Africa</b>										
Egypt	74.8	22.6	26.5	87.9	22.3	27.8	24.1	58.1	23.7	23.5
India	28.8	13.7	14.0	25.9	12.7	11.8	14.5	U	U	U
Indonesia	15.3	16.6	18.6	U	U	U	U	71.4	18.1	19.0
Jordan	95.8	16.2	22.5	99.0	15.6	16.6	29.2	U	U	U
Morocco	43.3	18.7	20.2	52.1	17.7	20.6	21.0	61.9	18.2	22.1
Pakistan	37.0	22.2	17.9	46.9	22.8	23.1	16.5	U	U	U
<b>Latin America/ Caribbean</b>										
Brazil (NE)	52.1	23.8	21.6	53.5	23.5	25.2	21.4	74.6	24.7	17.2
Colombia	82.2	19.1	21.1	81.1	18.3	15.4	25.0	85.5	19.7	16.9
Dominican Rep	69.1	29.5	23.3	86.5	24.4	29.2	30.7	86.8	27.5	28.3
Paraguay	28.6	11.2	13.3	98.5	9.0	13.3	32.9	56.7	9.9	16.4
Peru	60.4	27.0	36.3	64.2	20.6	33.9	36.7	52.0	24.3	37.1
<b>DHS-III</b>										
<b>Sub-Saharan Africa</b>										
Central African	22.1	28.7	27.4	75.9	20.2	26.5	31.9	18.4	25.2	28.1
Côte d'Ivoire	40.7	29.7	23.1	56.0	33.9	26.1	23.3	74.2	26.3	23.9
Ghana	29.1	21.6	25.4	73.6	8.7	20.6	36.7	82.5	23.7	26.1
Kenya	26.1	20.9	25.2	82.4	10.1	25.1	26.4	24.9	21.5	25.0
Zimbabwe	33.9	23.7	36.2	57.1	20.5	32.1	39.0	51.8	27.0	37.3
<b>Asia/Near East/ North Africa</b>										
Bangladesh	4.0	7.3	16.1	71.2	12.1	16.4	15.2	9.3	10.0	16.3
Indonesia	14.5	16.2	19.4	U	U	U	U	75.1	19.9	16.2
Philippines	35.2	14.2	17.2	83.6	14.2	19.9	16.5	92.1	15.9	18.9
Turkey	69.8	35.6	41.9	97.3	31.9	43.7	52.2	87.7	37.3	39.1
<b>Latin America/ Caribbean</b>										
Bolivia	60.3	38.1	36.1	53.6	28.9	38.8	40.9	55.7	37.4	37.4
Colombia	81.6	25.4	29.5	81.0	24.3	33.9	31.4	84.2	24.7	32.8
Haiti	31.9	42.9	45.7	49.8	14.6	43.9	47.8	46.9	41.6	47.6

U = Unknown (not available)

On average, diarrhea prevalence is 15 percent higher among children without access to piped water. Prevalence is higher in these households in 25 of the 34 countries. In the nine remaining countries, Burkina Faso, Rwanda, Tanzania, Pakistan, Brazil, the Dominican Republic, Central African Republic, Côte d'Ivoire, and Bolivia, there is an excess risk of diarrhea associated with piped water ranging from 5 to 22 percent. An explanation of this inconsistency is not presented here, but there are a number of possible interpretations of risk associated with piped water supplies, including contamination of the supplies. Seasonal rainfall and related run-off, along with lack of routine protection of reservoirs from human and animal use, can result in contamination of water supplies and these supplies becoming sources of intestinal infection.

The association between the presence of toilet facilities and lower diarrhea prevalence among children age 6 to 23 months is more consistent. The availability of a toilet in a household should be seen as an indicator of household hygiene rather than of hygiene in the individual child since most children age 6 to 23 months would not be using household toilet facilities. Compared with households having flush toilets, average prevalence is 60 percent higher in households with other types of toilets, and 94 percent higher in households with no toilet facilities.

The validity of toilet facilities as an indicator of overall household hygiene and lower risk of diarrhea in children is further suggested by the tendency of diarrhea prevalence to increase with decreasing quality of toilet facilities. In 19 of 32 surveys the results indicate that the lowest diarrhea prevalence among children age 6 to 23 months is in households with flush toilets, followed by those with some other type of toilet, and then those with no toilet (the highest prevalence).

Table 3.4 also gives the prevalence of diarrhea among children age 6 to 23 months living in houses with dirt floors and those in house with non-dirt (or finished) floors. With the exception of 5 countries—Madagascar, Brazil, Colombia (DHS-II), Côte d'Ivoire, and Indonesia (DHS-III)—prevalence is lower among children living in households with non-dirt floors. On average, reported prevalence is 16 percent higher in houses with dirt floors than those with non-dirt floors.

### Measles Vaccination Status

Diarrhea attributed to measles can be a cause of chronic diarrhea and mortality among children (Foster, McFarland, and John, 1993). Vaccination against measles should remove the portion of risk of diarrhea attributable to measles. Lower prevalence of diarrhea would be expected among vaccinated children compared with unvaccinated children.

For the most part, the data in Table 3.5 for children age 12 to 35 months are consistent with this hypothesis. The prevalence of diarrhea is higher among unvaccinated children than among vaccinated children, with the exception of 5 countries: Indonesia (DHS-II), Morocco, Rwanda, Tanzania, and Zimbabwe. However, the excess prevalence in vaccinated children in these countries is

small. In 15 of 32 countries, the prevalence of diarrhea is more than 20 percent higher among unvaccinated children than vaccinated children. On average, prevalence is 18 percent higher among unvaccinated children.

### Feeding Mode

Several studies in developing countries have found that exclusive breastfeeding plays an important role in protecting infants against diarrhea (Martines, Phillips, and Feachem, 1993). The introduction of supplemental foods while an infant is being breastfed can expose the child to intestinal pathogens which cause diarrhea. The prevalence of diarrhea in infants may therefore be related to supplemental feeding.

Table 3.6 shows the prevalence of diarrhea among infants by age and breastfeeding status (full, partial, or no breastfeeding). Since the prevalence of diarrhea and feeding methods varies by age, data are presented separately for age groups 0 to 2 months, 3 to 5 months, and 6 to 11 months. Data were obtained by asking mothers if they were still breastfeeding a child. For children currently breastfeeding (including those also being fed with a bottle), mothers were asked if over the preceding 24 hours they had given supplemental food and fluids.

The 24-hour recall period has the advantage of more accurate recollection of feeding details than longer periods, however, there are two limitations. The first is omission of infants given supplemental feeding just prior to the 24 hours preceding the interview. Such infants would be classified as fully breastfed. The second limitation is related to the presence of diarrhea during the 24-hour recall period. Mothers may withdraw supplemental foods when diarrhea is present. Again, these children would be classified as fully breastfed, although they may have received supplements previously.

In 24 of 31 countries for which data are available (i.e., a sufficient number of children for statistical analysis), it appears that children age 0-2 months who are fully breastfed have lower prevalence of diarrhea than those who are partially breastfed. On average, diarrhea prevalence is 57 percent higher among partially breastfed children. The countries reporting lower prevalence among partially breastfed children are Cameroon, Malawi, Jordan, Morocco, Paraguay, Bangladesh, and Indonesia (DHS-III). There was insufficient data for comparison with children who were not breastfed.

For children age 3 to 5 months, the advantage of full breastfeeding is less pronounced. Data are available for 27 surveys, and, of those, 17 show lower prevalence among fully breastfed children. The average deficit among those who are fully breastfed compared with those who receive supplements is 20 percent. The countries in which prevalence is lower among children given supplemental foods are Cameroon, Madagascar, Nigeria, Rwanda, Zambia, Peru, Philippines, Turkey, and Bolivia. Again, there was insufficient data for comparison with children who were not breastfed.

**Table 3.5 Prevalence of diarrhea in children age 12-35 months by measles vaccination status**

Percentage of children 12-35 months with diarrhea in the two weeks preceding the survey by measles vaccination status Demographic and Health Surveys 1990-1995

Country	Children vaccinated against measles		Children not vaccinated against measles	
	Percentage with diarrhea	Number of children	Percentage with diarrhea	Number of children
<b>DHS-II</b>				
<b>Sub-Saharan Africa</b>				
Burkina Faso	26.3	1,373	34.1	692
Cameroon	23.7	731	25.4	529
Madagascar	14.1	1,225	19.7	769
Malawi	29.0	1,292	30.0	159
Namibia	25.6	1,223	32.4	271
Niger	32.8	689	35.4	1,512
Nigeria	23.0	1,329	27.0	1,339
Rwanda	28.8	1,842	28.4	175
Senegal	24.5	1,214	31.1	684
Tanzania	16.7	2,532	13.7	477
Zambia	28.9	1,821	35.5	390
<b>Asia/Near East/ North Africa</b>				
Egypt	16.4	2,647	20.5	509
India	9.7	9,924	11.5	12,201
Indonesia	15.4	3,092	13.6	2,168
Jordan	10.2	2,970	14.2	254
Morocco	16.3	1,591	15.9	309
Pakistan	16.5	1,296	18.7	959
<b>Latin America/ Caribbean</b>				
Brazil (NE)	17.4	1,065	21.8	145
Colombia	16.1	1,258	21.4	189
Dominican Rep	16.9	1,141	23.8	335
Paraguay	9.8	1,039	10.3	520
Peru	22.6	2,465	30.9	547
<b>DHS-III</b>				
<b>Sub-Saharan Africa</b>				
Central African	23.4	966	24.4	694
Côte d'Ivoire	23.4	1,340	24.4	986
Ghana	18.6	884	25.3	396
Kenya	17.6	1,889	24.7	336
Zimbabwe	23.7	1,274	19.9	149
<b>Asia/Near East/ North Africa</b>				
Bangladesh	13.7	1,733	14.8	631
Indonesia	13.1	4,200	19.4	2,154
Philippines	12.1	2,889	14.4	556
Turkey	29.8	1,116	39.8	211
<b>Latin America/ Caribbean</b>				
Bolivia	31.4	1,335	32.8	808
Colombia	20.7	1,779	24.2	237
Haiti	33.8	692	38.3	536

**Table 3.6 Prevalence of diarrhea in children age 0-11 months by age and feeding mode**

Percentage of children age 0-2 months, 3-5 months and 6-11 months with diarrhea in the two weeks preceding the survey, by feeding mode: full breastfeeding, partial or supplemented breastfeeding and no breastfeeding. Demographic and Health Surveys 1990-1995

Country	Children age 0-2 months			Children age 3-5 months			Children age 6-11 months		
	Full breast-feeding	Partial breast-feeding	No breast-feeding	Full breast-feeding	Partial breast-feeding	No breast-feeding	Full breast-feeding	Partial breast-feeding	No breast-feeding
<b>DHS-II</b>									
<b>Sub-Saharan Africa</b>									
Burkina Faso	9.2	14.4	*	14.5	20.8	*	23.9	29.8	*
Cameroon	3.0	1.1	*	(22.9)	6.5	*	(36.4)	27.1	(28.0)
Madagascar	2.6	8.1	*	17.8	13.8	*	(33.6)	22.3	*
Malawi	9.6	7.7	*	*	23.0	*	*	42.4	*
Namibia	3.1	14.1	*	15.7	20.4	*	39.8	36.9	16.5
Niger	17.8	27.2	*	27.1	29.7	*	38.4	47.0	*
Nigeria	5.6	5.8	*	20.4	12.8	*	25.8	27.1	15.1
Rwanda	15.5	*	*	26.5	14.4	*	32.7	41.0	*
Senegal	13.2	21.7	*	26.6	27.9	*	29.5	34.0	*
Tanzania	3.2	9.7	*	15.3	15.7	*	27.3	25.7	*
Zambia	4.7	10.5	*	22.3	19.5	*	(20.1)	34.3	*
<b>Asia/Near East/ North Africa</b>									
Egypt	8.1	15.5	*	23.1	24.1	*	17.3	28.7	35.8
India	6.2	8.0	10.8	11.3	14.7	19.5	15.4	16.3	21.1
Indonesia	4.3	9.5	*	11.1	11.2	*	22.1	16.7	29.4
Jordan	10.6	8.5	*	15.3	15.6	29.1	24.5	16.7	18.1
Morocco	8.8	8.6	*	21.0	25.8	(14.6)	25.3	19.2	18.5
Pakistan	9.5	13.1	*	21.0	23.8	(17.4)	11.3	22.4	28.9
<b>Latin America/ Caribbean</b>									
Brazil (NE)	*	9.4	(16.8)	*	35.1	17.6	*	24.8	23.6
Colombia	(3.6)	4.5	*	*	16.6	(15.2)	*	16.0	16.3
Dominican Republic	(9.2)	9.9	*	*	17.9	19.3	*	32.9	34.2
Paraguay	8.0	6.3	*	*	10.2	(10.1)	*	18.2	7.3
Peru	11.0	11.6	*	23.2	21.6	(20.9)	(33.4)	30.9	29.5
<b>DHS-III</b>									
<b>Sub-Saharan Africa</b>									
Central African Republic	3.7	(10.9)	*	13.7	22.5	*	24.9	31.6	*
Côte d'Ivoire	6.3	7.6	*	16.0	16.2	*	18.5	25.1	*
Ghana	9.1	11.1	*	15.1	19.3	*	29.9	23.5	*
Kenya	3.3	3.9	*	*	20.3	*	*	23.8	*
Zimbabwe	4.0	11.0	*	(4.3)	22.9	*	(25.6)	33.7	*
<b>Asia/Near East/ North Africa</b>									
Bangladesh	2.0	1.3	*	6.3	7.0	*	10.6	15.4	*
Indonesia	6.0	5.6	*	9.6	16.9	*	17.3	20.6	17.4
Philippines	3.3	4.3	5.3	12.9	10.3	16.1	(15.2)	18.6	14.6
Turkey	21.8	23.8	*	(30.0)	27.2	(23.3)	*	37.0	41.6
<b>Latin America/ Caribbean</b>									
Bolivia	7.9	11.2	*	25.8	19.7	*	(15.3)	34.4	33.4
Colombia	6.9	10.3	*	(15.9)	19.8	(16.7)	*	25.9	30.8
Haiti	*	17.7	*	*	39.2	*	*	49.5	(39.2)

Note: Full breastfeeding refers to exclusive breastfeeding or breastfeeding with water. An asterisk indicates that the unweighted N is less than 25 cases. Parentheses indicate that the unweighted N is between 25 and 49 cases.

Among children age 6 to 11 months, the advantage of exclusive breastfeeding persists. Of 25 surveys for which data are available, 16 showed lower prevalence among children with no supplementation. The mean excess among partially breastfed children is 18 percent. There was insufficient data for comparison with children who were not breastfed.

It is often suggested that bottle-feeding in developing countries increases the risk of diarrhea in infants because of the possibility of contamination. In Table 3.7, diarrhea prevalence among breastfed children under age 6 months and children 6 to 11 months who also received water or other supplementation in a bottle is compared with prevalence among children in the same age groups who were not bottle-fed. The data are mixed regarding the hypothesis that bottle-feeding is associated with enhanced risk of diarrhea. On average, diarrhea prevalence is 17 percent greater among bottle-fed children under 6 months, while for those age 6 months and above the average excess of prevalence among bottle-fed children is only 6 percent.

Although, on average, diarrhea prevalence is lower among children who are not bottle-fed, a number of countries reported lower prevalence among bottle-fed children. For children under 6 months, 12 countries reported lower prevalence among bottle-fed children. For children 6 months and older, 10 of 27 countries reported lower prevalence among children who were bottle-fed.

## 3.2 TREATMENT PATTERNS

### Knowledge of ORS

ORS (oral rehydration salts) is a commercially prepared mixture of salts, sugars, and complex carbohydrates that when mixed correctly with water is an effective treatment for diarrhea in children.

Table 3.8 shows the prevalence of knowledge of ORS among mothers in 32 surveys. Information was collected from all women with at least one live birth in the five years preceding the DHS-II surveys. As indicated in Table 2.1, in 6 DHS-III surveys (Central African Republic, Côte d'Ivoire, Ghana, Zimbabwe, Bangladesh, and Bolivia) the sample of children was limited to those under three years of age at the time of the survey. In these surveys, the sample of women was therefore limited to those with at least one live birth in the three years preceding the survey. In India, the sample of children was limited to those under four years of age.

Mothers were classified as knowing about ORS if they met one of the following conditions: (1) had used ORS at least once in the last two weeks to treat a child with diarrhea, (2) in the absence of usage, reported having heard of ORS (DHS-II and DHS-III), or (3) in the absence of having heard of ORS, said that they had seen an ORS packet when shown one (DHS-II).

Prevalence of knowledge of ORS among mothers ranges from 2 percent in Bangladesh to 99 percent in Egypt and Jordan.

The average prevalence is 73 percent. Twenty-five percent of the countries for which data are available have prevalences of more than 92.6 percent and are in the upper quartile. In addition to Egypt and Jordan, these are Zambia, Colombia (DHS-II and DHS-III), the Dominican Republic, and Haiti. The lower quartile includes countries that have prevalences of less than 48.6 percent. In addition to Bangladesh, these are Burkina Faso, Cameroon, Madagascar, Nigeria, Rwanda, India, and Côte d'Ivoire.

Within countries, knowledge of ORS varies by residence, education, access to a radio, and age. With few exceptions, prevalence is higher among urban women, those with formal education (especially secondary or higher education), those whose households have a radio, and women 20 and older.

Differences are most marked in terms of level of education. Compared with women who have no education, prevalence of ORS knowledge is, on average, 30 percent higher among women with primary education, and 46 percent higher among those with secondary or higher education. Urban women are 23 percent more likely to know about ORS than rural women. Women living in households with a radio are 19 percent more likely to have heard of ORS or to have used it than women in households without a radio. On average, knowledge of ORS is less prevalent among women age 15 to 19 than older women.

Table 3.9 presents knowledge of ORS by the availability of health cards for children age 6 to 23 months. The hypothesis underlying this is that mothers who can show a health card to the interviewer are more likely to have had contact with primary health care services than those who are unable to show a card. A second inference is that contact with health services increases the likelihood that a mother will have heard of ORS. Table 3.9 indicates that, in the majority of countries, knowledge of ORS is more prevalent among mothers who can show a child health card than among those who cannot. On average, prevalence of knowledge of ORS is 34 percent higher among women with cards.

### Use of Oral Rehydration Therapy

Table 3.10 presents data regarding the management of diarrhea in children. Treatment of diarrhea cases with ORS ranges from 7 percent in Senegal to 63 percent in Namibia. The average prevalence among the 33 countries is 29 percent. The upper quartile consists of countries in which the prevalence of ORS treatment exceeds 42.2 percent. In addition to Namibia, these are Malawi, Tanzania, Zambia, Indonesia (DHS-II and DHS-III), Colombia, and Bangladesh. Besides Senegal, the lower quartile (below 15.9 percent) includes Burkina Faso, Madagascar, Niger, Nigeria, Morocco, Côte d'Ivoire, and Turkey. In Turkey, however, women were not specifically asked if they had used ORS if they did not spontaneously mention its use in an open-ended question. In all other countries, women were prompted regarding ORS if they had not previously mentioned its use in connection with a child's diarrhea.

**Table 3 7 Prevalence of diarrhea in children age 0-11 months by bottle use**

Percentage of breastfed children under 6 months and 6-11 months who received supplements in a bottle during the 24 hours preceding the survey, and the prevalence of diarrhea in the two weeks preceding the survey by use a bottle, Demographic and Health Surveys, 1990 1995

Country	Breastfed children <6 months of age			Breastfed children 6-11 months of age		
	Percentage who received bottle	Percentage with diarrhea		Percentage who received bottle	Percentage with diarrhea	
		Received bottle	No bottle received		Received bottle	No bottle received
<b>DHS-II</b>						
<b>Sub-Saharan Africa</b>						
Burkina Faso	1 5	*	15 1	1 3	*	28 7
Cameroon	16 2	4 1	7 8	8 0	20 3	30 4
Madagascar	3 3	*	11 0	1 9	*	23 9
Malawi	5 9	(22 3)	16 2	4 5	(53 5)	41 5
Namibia	30 8	23 6	11 9	28 9	43 0	35 7
Niger	2 9	(14 9)	26 8	3 3	(26 0)	46 6
Nigeria	31 0	6 1	13 5	23 0	19 9	29 6
Rwanda	1 8	*	20 1	2 3	*	40 1
Senegal	5 5	(20 6)	22 0	3 5	*	33 1
Tanzania	4 0	9 9	10 9	5 7	(18 3)	26 2
Zambia	4 6	(18 2)	13 2	7 0	(40 8)	33 0
<b>Asia/Near East/</b>						
<b>North Africa</b>						
Egypt	19 8	19 9	19 7	12 0	32 9	26 2
India	10 9	15 4	10 2	13 6	18 5	16 2
Indonesia	8 7	10 0	10 5	9 8	14 3	19 1
Jordan	30 7	19 8	15 7	30 5	22 2	21 5
Morocco	24 3	22 7	16 3	16 7	25 4	24 0
Pakistan	25 9	16 8	19 2	25 4	30 2	17 9
<b>Latin America/</b>						
<b>Caribbean</b>						
Brazil (NE)	76 8	34 5	(35 1)	62 9	40 7	(24 7)
Colombia	59 8	19 1	13 3	58 4	25 8	18 2
Dominican Republic	82 4	35 7	9 3	67 6	49 3	45 5
Paraguay	51 3	12 1	10 7	47 3	24 3	15 8
Peru	43 0	19 0	21 0	50 2	30 4	34 9
<b>DHS-III</b>						
<b>Sub-Saharan Africa</b>						
Central African Republic	2 0	*	11 4	0 2	*	29 2
Cote d'Ivoire	4 6	(12 6)	11 9	0 8	*	23 9
Ghana	26 6	9 8	16 2	16 1	16 1	27 3
Kenya	15 7	14 0	13 4	10 0	18 4	24 4
Zimbabwe	5 4	*	14 4	6 9	(18 8)	34 9
<b>Asia/Near East/</b>						
<b>North Africa</b>						
Indonesia	9 0	14 9	10 8	13 3	23 8	20 6
Philippines	31 1	10 9	11 9	29 1	27 8	21 3
Turkey	26 9	23 2	31 9	24 9	42 8	45 9
<b>Latin America/</b>						
<b>Caribbean</b>						
Bolivia	30 1	23 8	17 6	32 0	37 5	33 3
Colombia	71 3	23 0	19 8	64 0	34 3	28 8
Haiti	30 9	33 2	29 7	11 0	(56 6)	50 8

Note An asterisk indicates that the unweighted N is less than 25 cases. Parentheses indicate that the unweighted N is between 25 and 49 cases.

**Table 3 8 Mother's knowledge of ORS by socioeconomic characteristics and age**

Percentage of mothers who have heard of ORS (commercially produced mixture of salt, sugar, and complex carbohydrates), by socioeconomic characteristics and age of mother, Demographic and Health Surveys 1990-1995

Country	Socioeconomic characteristic										Percentage of mothers who have heard of ORS	Number of mothers
	Residence		Education			Radio present		Mother's age				
	Urban	Rural	No education	Primary	Secundary+	No	Yes	15-19	20-34	35+		
<b>DHS-II</b>												
<b>Sub-Saharan Africa</b>												
Burkina Faso	75.9	43.5	44.3	73.5	92.2	40.6	55.7	38.1	50.6	46.6	48.6	4,145
Cameroon	59.5	33.6	27.1	50.7	64.8	28.3	53.2	34.2	47.7	35.9	43.7	2,168
Madagascar	69.7	34.4	23.9	36.1	62.1	32.0	53.1	28.3	40.5	40.9	39.3	3,433
Malawi	97.0	89.4	86.2	93.4	95.3	88.3	92.2	82.5	91.4	88.7	89.8	2,854
Namibia	81.2	85.4	75.7	85.8	85.1	83.7	84.1	80.6	84.8	82.4	83.9	2,656
Niger	88.1	51.3	54.9	74.8	92.1	50.5	66.8	43.3	58.5	59.0	57.1	4,198
Nigeria	21.3	12.3	10.6	18.6	24.5	8.9	18.6	15.0	15.3	10.8	14.2	5,073
Rwanda	93.6	83.9	80.7	86.6	96.4	81.6	90.4	78.9	86.0	81.9	84.5	3,616
Senegal	52.4	40.5	41.0	60.6	58.3	38.3	46.7	33.3	45.7	45.2	44.6	3,534
Tanzania	94.8	92.4	88.6	95.1	98.6	91.6	95.4	89.2	94.0	91.5	93.0	5,312
Zambia	96.3	93.5	85.3	96.2	98.5	92.3	97.9	91.2	96.0	93.1	94.8	3,982
<b>Asia/Near East/ North Africa</b>												
Egypt	99.3	98.3	98.1	99.2	99.3	98.2	99.1	98.2	98.9	98.4	98.7	5,676
India	55.6	38.9	31.4	54.5	68.9	35.7	53.9	36.0	44.6	34.5	42.7	38,175
Indonesia	95.0	81.1	61.2	86.2	97.4	78.7	90.6	81.3	87.1	78.4	85.1	11,098
Jordan	99.0	97.3	95.8	98.9	99.3	96.1	98.9	99.2	98.9	97.6	98.5	4,421
Morocco	96.0	81.0	83.7	97.2	98.8	79.5	88.0	77.1	88.1	85.0	86.8	3,387
Pakistan	96.7	86.6	87.2	98.3	99.0	87.8	93.3	83.4	90.2	89.1	89.6	4,061
<b>Latin America/ Caribbean</b>												
Brazil (NE)	94.0	90.9	90.0	92.7	97.1	93.1	92.4	92.5	93.2	91.0	92.6	2,241
Colombia	96.2	93.1	89.3	94.4	96.6	93.8	95.5	89.9	95.3	96.7	95.2	2,801
Dominican Republic	95.6	92.6	87.2	94.9	95.3	94.0	94.8	84.0	95.6	94.6	94.5	2,609
Paraguay	94.1	88.0	75.9	89.9	95.4	87.0	91.8	83.5	92.3	90.0	91.1	2,569
Peru	86.6	58.5	45.0	66.0	90.2	59.8	80.2	52.0	79.9	73.5	76.8	5,868
<b>DHS-III</b>												
<b>Sub-Saharan Africa</b>												
Central African Rep	76.3	46.5	44.8	69.5	87.1	48.7	67.1	44.3	68.1	54.3	59.2	5,884
Côte d'Ivoire	33.1	43.7	41.7	39.6	28.1	41.6	37.6	22.5	53.3	25.5	39.2	8,099
Ghana	91.5	68.7	60.3	84.0	98.2	70.2	82.2	69.0	76.7	72.6	75.3	1,980
Kenya	83.5	78.8	73.0	78.7	86.9	77.8	80.8	61.5	82.5	75.4	79.5	3,936
<b>Asia/Near East/ North Africa</b>												
Bangladesh	2.1	2.3	1.9	2.8	2.7	2.3	2.2	3.0	2.9	0.8	2.3	9,640
Indonesia	95.3	84.3	66.9	88.6	98.4	81.3	91.0	86.5	90.9	83.0	87.5	28,168
Philippines	84.3	84.7	45.2	85.1	85.8	U	U	72.8	85.2	83.8	84.5	5,626
<b>Latin America/ Caribbean</b>												
Bolivia	88.0	63.4	57.3	70.9	89.8	63.8	81.2	74.5	82.2	76.3	78.8	8,603
Colombia	94.7	90.0	86.3	90.5	95.8	90.7	93.8	86.7	95.4	94.7	93.5	11,140
Haiti	99.3	92.2	89.9	98.4	100.0	92.5	98.3	93.7	95.3	93.4	94.7	2,302

U = Unknown (not available)

**Table 3 9 Mother's knowledge of ORS by whether or not child's health card was seen by interviewer**

Percentage of mothers with children age 6-23 months who have heard of ORS (commercially produced mixture of salt, sugar and complex carbohydrates), by whether or not health card was seen by interviewer Demographic and Health Surveys, 1990-1995

Country	Health card seen		Health card not seen	
	Percentage who know ORS	Number of mothers	Percentage who know ORS	Number of mothers
<b>DHS-II</b>				
<b>Sub-Saharan Africa</b>				
Burkina Faso	54.4	1,348	31.5	311
Cameroon	54.1	772	31.1	265
Madagascar	46.3	1,214	24.8	405
Malawi	90.6	1,194	(73.5)	39
Namibia	87.1	1,135	(63.7)	36
Niger	81.4	751	44.1	974
Nigeria	21.0	1,407	8.0	782
Rwanda	87.8	1,445	71.2	71
Senegal	48.8	1,204	35.8	282
Tanzania	94.7	2,313	65.2	93
Zambia	96.2	1,686	84.4	88
<b>Asia/Near East/ North Africa</b>				
Egypt	98.9	2,252	100.0	79
India	53.5	9,985	32.0	7,726
Indonesia	93.0	2,919	73.3	1,178
Jordan	99.0	2,376	98.2	58
Morocco	88.5	1,263	72.4	217
Pakistan	94.1	1,163	86.2	653
<b>Latin America/ Caribbean</b>				
Brazil (NE)	92.5	764	91.8	102
Colombia	94.2	1,133	93.4	51
Dominican Republic	94.3	1,109	95.6	139
Paraguay	91.4	879	83.9	285
Peru	76.7	2,145	51.3	176
<b>DHS-III</b>				
<b>Sub-Saharan Africa</b>				
Central African	80.2	966	44.4	309
Côte d'Ivoire	83.6	1,492	79.1	266
Ghana	81.0	838	52.7	167
Kenya	78.8	1,645	68.2	70
<b>Asia/Near East/ North Africa</b>				
Indonesia	95.0	3,640	82.0	1,028
Philippines	87.4	2,355	74.8	284
<b>Latin America/ Caribbean</b>				
Bolivia	84.7	1,278	60.4	405
Colombia	95.8	1,454	89.5	86
Haiti	96.9	761	90.7	257

Note: Parentheses indicate that the unweighted N is between 25 and 49 cases

It is the assumption of interventions designed to improve diarrhea management that knowledge of the importance of ORS in treating diarrhea in children will influence mothers to use it. Table 3 11 shows the proportion of children not treated with ORS by mothers' knowledge of ORS. It appears that awareness of ORS is high among mothers who did not use it to treat their children's diarrhea. In 75 percent of the surveys, 36 percent or more of children were not treated with ORS although their mothers reported knowing about it. On average, 46 percent of children with diarrhea were not treated with ORS even though their mothers said they knew of it. A number of variables could contribute to the disparity between knowledge and use including lack of ORS packets at the time of the child's illness and the belief that other treatments are preferable to ORS.

Table 3 10 provides information on use of other treatments for diarrhea. Recommended home fluids (RHF) are less widely used than ORS in all countries except Cameroon, Madagascar, Nigeria, Senegal, India, Brazil, and the Philippines. Additionally, ORS is not generally available in Zimbabwe because the modalities preferred by health authorities there are sugar-salt-water solution and other recommended home fluids.

In 21 of 32 surveys, more children with diarrhea were treated with drugs<sup>2</sup> than with ORS. In Burkina Faso, Madagascar, Senegal, India, Côte d'Ivoire, and Turkey, use of antibiotics is more than twice that of ORS.

Antibiotics are widely used in treating diarrhea in developing countries. This is partly due to the belief of mothers that antibiotics are a more reliable modality for managing diarrhea in their children (DeClerque et al, 1992). In some countries, pharmacies may advise mothers that antibiotics are preferable to ORS (Tomson and Sterky, 1986).

Recognition of the necessity to increase fluid intake in diarrhea cases appears to be widespread among mothers. In only 9 of 31 countries was the proportion of women who reported decreases in fluids larger than the proportion who reported increases in fluids. These countries are Namibia, Niger, Nigeria, Rwanda, Egypt, Pakistan, Colombia (DHS-II), and Ghana.

Table 3 10 also contains information on mothers' practices regarding the feeding of solid food when their children are ill with diarrhea. World Health Organization guidelines for the management of childhood diarrhea stress that the amount of solid food usually offered to a child should not be decreased because of the presence of diarrhea. This is a difficult concept to grasp because it is counter intuitive. In all 10 of the countries for which information is available on child food intake, large proportions of women reported decreasing the amount of solid food given to children with diarrhea.

<sup>2</sup> Drugs include pills, syrup, antibiotics injection and IV

**Table 3 10 Treatment of diarrhea in children under five**

Among children age 0-59 months with diarrhea in the two weeks preceding the survey, the percentage who were treated with ORS (commercially prepared mixture of salt, sugar and complex carbohydrates) recommended home fluids (RHF), and drugs (including pills, syrup, antibiotics, injection, and IV), changes in the amount of fluids and solid food given during diarrhea, and the percentage of children who received no oral rehydration therapy (ORS, RHF, or increased fluids), Demographic and Health Surveys, 1990-1995

Country	Treatment received			Changes in amount of				Percentage who received no oral rehydration therapy	Number of children
	ORS	RHF	Drugs	Fluids		Solid food			
				More	Less	More	Less		
<b>DHS-II</b>									
<b>Sub-Saharan Africa</b>									
Burkina Faso	12.0	7.7	25.8	35.2	15.5	10.8	37.6	56.9	1,114
Cameroon	18.0	25.3	15.9	56.5	7.2	U	U	34.1	560
Madagascar	14.2	15.1	35.3	53.2	14.8	U	U	38.8	616
Malawi	43.2	38.8	17.7	33.5	25.5	U	U	26.7	821
Namibia	63.2	2.1	25.2	8.5	20.8	U	U	33.2	738
Niger	10.4	9.5	15.6	8.6	30.1	5.7	37.7	76.5	1,584
Nigeria	11.7	23.6	18.7	10.3	31.3	U	U	66.5	1,258
Rwanda	27.6	19.4	15.4	25.2	28.5	U	U	51.3	1,091
Senegal	6.6	11.4	34.0	40.6	6.2	U	U	53.1	1,047
Tanzania	57.2	18.9	28.8	27.1	13.2	U	U	29.6	939
Zambia	52.9	22.8	21.6	42.7	9.7	U	U	25.7	1,217
<b>Asia/Near East/ North Africa</b>									
Egypt	28.9	5.8	53.3	16.5	27.1	U	U	57.5	1,077
India <sup>1</sup>	17.5	18.6	63.9	9.7	19.5	U	U	64.1	4,573
Indonesia	43.0	32.9	35.2	43.7	9.1	U	U	25.8	1,480
Jordan	41.4	64.4	30.1	U	U	U	U	58.6	675
Morocco	13.9	2.5	11.0	45.8	8.0	U	U	46.3	611
Pakistan	38.5	12.0	19.4	8.7	20.9	7.7	21.7	54.7	849
<b>Latin America/ Caribbean</b>									
Brazil (NE)	25.2	35.4	4.8	42.0	16.2	U	U	32.2	478
Colombia	31.1	17.5	36.7	19.2	27.1	U	U	51.4	455
Dominican Republic	25.2	12.1	39.2	U	U	U	U	69.3	604
Paraguay	24.0	10.6	24.9	45.6	20.6	U	U	41.6	311
Peru	19.8	11.5	21.0	35.6	17.5	1.7	42.2	49.6	1,464
<b>DHS-III</b>									
<b>Sub-Saharan Africa</b>									
Central African Republic <sup>2</sup>	27.7	7.2	26.7	73.8	18.3	20.1	63.4	21.1	582
Côte d'Ivoire <sup>2</sup>	11.1	8.7	26.6	45.7	18.7	16.6	38.2	48.1	788
Ghana <sup>2</sup>	28.6	13.8	49.0	14.1	20.4	U	U	54.4	412
Kenya	31.6	U	35.2	43.9	14.3	U	U	42.6	779
Zimbabwe <sup>2</sup>	U	79.5	19.7	59.0	22.3	24.0	51.5	13.7	521
<b>Asia/Near East/ North Africa</b>									
Bangladesh	50.3	15.5	40.1	50.9	15.5	U	U	28.4	445
Indonesia	45.1	U	U	55.5	12.8	18.6	44.5	26.0	1,921
Philippines	27.1	36.2	34.5	20.9	19.2	U	U	41.4	856
Turkey	11.3	4.8	30.3	55.3	7.4	U	U	40.0	872
<b>Latin America/ Caribbean</b>									
Bolivia <sup>2</sup>	33.3	9.7	40.8	52.4	22.4	9.2	36.0	35.2	988
Colombia	44.5	8.4	49.7	50.2	17.1	4.7	53.5	32.1	815
Haiti	25.7	9.4	30.9	38.5	12.2	U	U	42.8	894

U = Unknown (not available)

<sup>1</sup> Children under 4 years

<sup>2</sup> Children under 3 years

**Table 3 11 Use of ORS to treat diarrhea in children under five**

Percent distribution of children age 0-59 months with diarrhea in the two weeks preceding the survey by treatment with ORS (commercially produced mixture of salt, sugar, and complex carbohydrates), and among those not treated with ORS, by whether or not the mother knew of ORS, Demographic and Health Surveys, 1990-1995

Country	Treatment of diarrhea with ORS				Total	Number of children
	Percentage of children treated with ORS	Percentage of children not treated with ORS		Missing		
		Mother knew of ORS	Mother did not know of ORS			
<b>DHS-II</b>						
<b>Sub-Saharan Africa</b>						
Burkina Faso	12.0	42.0	45.7	0.3	100.0	1,114
Cameroon	18.0	28.4	52.7	0.8	100.0	560
Madagascar	14.2	32.0	52.3	1.5	100.0	616
Malawi	43.2	47.2	8.5	1.1	100.0	821
Namibia	63.2	29.1	5.9	1.8	100.0	738
Niger	10.4	47.3	41.9	0.5	100.0	1,584
Nigeria	11.7	11.0	75.2	2.1	100.0	1,258
Rwanda	27.6	61.0	9.9	1.6	100.0	1,091
Senegal	6.6	41.1	51.7	0.7	100.0	1,047
Tanzania	57.2	38.8	3.1	0.8	100.0	939
Zambia	52.9	42.5	4.1	0.6	100.0	1,217
<b>Asia/Near East/ North Africa</b>						
Egypt	28.9	70.8	0.3	0.0	100.0	1,077
India <sup>1</sup>	17.5	33.1	48.3	1.1	100.0	4,573
Indonesia	43.0	47.8	8.2	1.0	100.0	1,480
Jordan	41.4	57.2	0.4	0.9	100.0	675
Morocco	13.9	73.0	12.6	0.5	100.0	611
Pakistan	38.5	53.2	7.4	1.0	100.0	849
<b>Latin America/ Caribbean</b>						
Brazil (NE)	25.2	68.3	6.4	0.0	100.0	478
Colombia	31.1	62.0	6.2	0.7	100.0	455
Dominican Republic	25.2	69.6	3.8	1.4	100.0	604
Paraguay	24.0	64.8	9.7	1.5	100.0	311
Peru	19.8	52.6	26.5	1.1	100.0	1,464
<b>DHS-III</b>						
<b>Sub-Saharan Africa</b>						
Central African Republic <sup>2</sup>	27.7	41.1	30.3	0.9	100.0	582
Côte d'Ivoire <sup>2</sup>	11.1	24.4	64.4	0.0	100.0	788
Ghana <sup>2</sup>	28.6	39.6	26.0	5.8	100.0	412
Kenya	31.6	47.6	16.9	4.0	100.0	779
<b>Asia/Near East/ North Africa</b>						
Bangladesh <sup>2</sup>	50.3	0.1 <sup>a</sup>	48.8	0.8	100.0	445
Indonesia	45.1	46.8	7.8	0.3	100.0	1,921
Philippines	27.1	59.9	11.4	1.6	100.0	856
Turkey	11.3	U	U	U	100.0	872
<b>Latin America/ Caribbean</b>						
Bolivia <sup>2</sup>	33.3	48.9	17.3	0.5	100.0	988
Colombia	44.5	50.3	4.4	0.9	100.0	815
Haiti	25.7	68.6	5.5	0.3	100.0	894

U = Unknown (not available)

<sup>1</sup> Children limited to those under 4 years

<sup>2</sup> Children limited to those under 3 years

<sup>a</sup> Based on usage only

The next to last column in Table 3 10, shows the proportion of children who received no oral rehydration of any kind, i e , no ORS, no recommended home fluids, and no increased fluids The percentage of children who receive no oral rehydration ranges from 14 percent in Zimbabwe to 77 percent in Niger In addition to Niger, the upper quartile (above 54 4 percent) includes Burkina Faso, Niger, Nigeria, Egypt, India, Jordan, Pakistan, and the Dominican Republic The lower quartile (below 31 5 percent) comprises Malawi, Tanzania, Zambia, Indonesia (DHS-II and DHS-III), Central African Republic, Zimbabwe, and Bangladesh The average prevalence of no oral rehydration for the 32 surveys in Table 3 10 is 43 percent

Table 3 12 shows the prevalence of ORS use for treatment of diarrhea by background characteristics of the child, mother, and household For age of child, use is usually lowest under age six months Although there are inconsistencies in some countries, on average the prevalence of ORS use rises after age five months and drops off after 23 months Differences between the sexes are most noticeable in the Asia/ Near East/ North Africa region, where, with the exception of Pakistan, prevalence of ORS use is higher among male children than female children Women age 35 and older are less likely to use ORS than younger women

Socioeconomic characteristics of the mother and child appear to be more predictive of the prevalence of ORS use than demographic characteristics On average, urban use of ORS is about 42 percent higher than rural use Use of ORS also increases with increasing education of the mother Prevalence is 31 percent higher among women with primary education compared with those with no education, while among women with some secondary or higher education it is 54 percent greater On average, ORS use is 29 percent higher in households with a radio compared with those lacking a radio

### **Treatment of Diarrhea at Medical Facilities**

Table 3 13 shows the percentage of children with diarrhea who were taken to a medical facility for treatment Facilities include hospitals and government and private clinics but not pharmacies The percentage of children with diarrhea who were taken to a hospital or clinic ranges from 10 percent in Niger to 68 percent in Namibia The average prevalence is 34 percent In addition to Namibia, the upper quartile (above 46 4 percent) includes Malawi, Tanzania, Zambia, India, Jordan, Pakistan and Indonesia (DHS-III) Beside Niger, the lower quartile (below 23 percent) comprises Burkina Faso, Cameroon, Rwanda, Senegal, Morocco, Peru, and Bangladesh

Most surveys included a question on the presence of fever during the two weeks prior to interview When both fever and diarrhea were reported as having been present, it did not necessarily follow that they were part of the same disease syndrome However, it is safe to assume that in many cases there was such an association The coexistence of diarrhea and fever should indicate to mothers the presence of a more severe illness than when diarrhea alone is present It might also be expected that the perceived greater severity of the illness would provide stronger motivation for mothers to seek medical care for their children The data in Table 3 13 give some support to this hypothesis On average, about 10 percent more children with diarrhea and fever were taken for medical care than children with diarrhea alone

The prevalence of treatment at medical facilities varies by background characteristics Medical treatment tends to be less common among children under 6 months and over 23 months Compared with birth order 6 and above, prevalence is, on average, 21 percent higher for birth order 1, 17 percent higher for birth orders 2 and 3, and 11 percent higher for birth orders 4 and 5 Medical treatment is 16 percent more prevalent among children of women age 20 to 34 than among children of younger or older women Urban children are about 47 percent more likely to be taken for medical treatment than their rural counterparts Compared with women who have no education, mothers with primary education are 25 percent more likely to seek medical care for children with diarrhea, while among mothers with secondary or higher schooling the prevalence is 62 percent greater The presence of a radio in the household is associated with 18 percent higher prevalence of clinical treatment

Most of the background correlates for medical treatment of diarrhea are similar to those for ORS use This is because in many countries ORS packets are available mainly through primary health care facilities Therefore, ORS use is largely a function of clinical treatment and related health-seeking behavior

Figure 3 2 shows a plot of the percentage of children taken to a medical facility for treatment of diarrhea against the prevalence of the disease An obvious hypothesis is that high rates of diarrhea infection lead to increased prevalence of visits to medical facilities However, Figure 3 2 indicates that this assumption is not accurate for many of the countries surveyed in DHS-II and DHS-III In fact, as the correlation coefficient shows, there is a weak, statistically non-significant negative association between the prevalence of disease and health-seeking behavior The negative association has been explained as resulting from inadequate primary health care resources in countries where diarrhea is prevalent among children (Boerma, Sommerfelt and Rutstein, 1991)

Table 3 12 Use of ORS to treat diarrhea in children under five by background characteristics

Percentage of children 0-59 months with diarrhea in the two weeks preceding the survey who were treated with ORS (commercially produced mixture of salt, sugar and complex carbohydrates) by age of child sex of child birth order and mother's age residence mother's level of education and presence of a radio in the household Demographic and Health Surveys 1990-1995

Country	Child's age (months)					Child's sex		Birth order				Mother's age			Residence		Mother's level of education			Radio present		Percentage of children treated with ORS	Number of children
	<6	6-11	12-23	24-35	36-59	Male	Female	1	2-3	4-5	6+	15-19	20-34	35+	Urban	Rural	No education	Primary	Sec- dary+	No	Yes		
<b>DHS-II</b>																							
<b>Sub-Saharan Africa</b>																							
Burkina Faso	10.4	14.3	10.1	13.9	12.3	11.8	12.3	14.5	14.4	11.0	9.1	13.8	13.1	8.3	22.7	10.3	10.8	21.5	24.3	9.3	15.0	12.0	1 114
Cameroon	2.5	20.9	22.6	16.7	12.5	15.8	20.7	15.1	23.2	16.4	15.5	15.4	18.8	16.7	23.2	14.9	15.3	20.0	22.5	13.9	21.3	18.0	560
Madagascar	18.4	12.9	14.1	16.3	10.7	15.4	12.7	16.8	18.7	8.4	11.6	13.8	14.6	13.1	23.1	13.0	8.0	13.8	20.9	10.6	21.7	14.2	616
Malawi	37.9	49.5	39.9	45.1	41.7	46.0	39.8	43.2	45.5	41.3	42.3	38.9	45.3	39.6	43.9	43.1	37.7	48.2	68.9	39.3	49.0	43.2	821
Namibia	42.8	63.4	67.3	65.2	61.4	65.4	61.1	64.1	61.0	61.8	66.6	63.7	62.6	64.7	32.8	7.3	9.2	20.3	40.1	7.6	15.0	10.4	1 584
Niger	3.2	12.8	11.6	11.9	9.4	11.3	9.3	11.2	11.7	8.1	10.7	6.9	10.9	10.4	25.5	9.4	8.1	20.4	18.5	8.0	14.8	11.7	1 258
Nigeria	11.0	12.5	10.4	10.0	14.8	12.0	11.4	14.6	11.7	11.2	10.0	12.2	12.6	8.0	60.2	64.1	58.8	62.6	68.6	59.2	65.5	63.2	738
Rwanda	11.9	30.8	34.0	29.3	18.9	28.0	27.1	26.3	23.3	34.1	26.6	31.7	27.2	28.2	28.4	27.5	28.5	26.2	34.5	26.6	30.4	27.6	1 091
Senegal	1.5	6.9	9.1	6.5	5.8	6.5	6.7	3.2	6.6	6.0	8.4	3.5	6.3	8.3	7.7	6.2	6.2	9.4	6.9	4.7	7.3	6.6	1 047
Tanzania	45.9	65.0	57.5	54.3	55.4	55.6	58.8	61.0	59.5	56.5	51.1	62.4	59.3	46.2	56.1	57.6	54.6	57.9	81.5	59.2	54.8	57.2	939
Zambia	40.0	55.3	56.7	54.1	47.2	54.4	51.1	58.3	53.7	49.4	49.0	56.7	53.9	45.7	59.3	48.3	44.7	52.2	66.3	49.8	57.7	52.9	1 217
<b>Asia/Near East/ North African</b>																							
Egypt	23.1	42.3	32.4	24.9	16.8	30.4	27.0	26.7	27.3	28.2	34.2	27.0	28.2	32.4	23.5	32.3	32.7	25.1	25.1	30.6	27.5	28.9	1 077
India <sup>1</sup>	8.4	18.9	20.9	17.7	U	19.6	15.2	19.3	17.8	17.7	11.6	15.7	18.2	12.7	16.8	17.7	15.3	20.3	22.6	16.0	20.0	17.5	4 573
Indonesia	12.1	45.0	51.2	42.5	41.1	44.6	41.2	42.3	45.0	45.9	34.5	35.5	45.1	37.2	41.5	43.8	39.9	44.5	40.1	41.0	44.8	43.0	1 480
Jordan	30.0	48.3	46.5	33.0	36.3	43.8	38.9	37.8	38.7	39.9	47.2	46.4	39.8	45.5	38.6	48.9	50.1	43.7	38.3	41.1	41.5	41.4	675
Morocco	16.2	12.0	18.4	12.4	9.1	14.8	12.9	15.2	21.1	7.8	10.1	12.5	14.2	13.4	15.9	13.1	13.1	16.4	21.6	9.7	14.8	13.9	611
Pakistan	24.4	42.5	43.9	37.7	39.9	37.7	39.4	32.2	36.2	39.2	45.4	28.5	39.5	38.6	46.7	34.5	37.5	38.2	45.6	34.4	45.8	38.5	849
<b>Latin America/ Caribbean</b>																							
Brazil (NE)	43.3	36.0	14.3	21.3	24.3	29.2	20.5	21.8	18.1	34.6	31.8	18.2	29.5	11.8	23.4	28.0	24.4	25.4	26.5	25.2	25.3	25.2	478
Colombia	17.2	37.9	42.3	24.5	19.0	26.4	36.0	37.8	25.1	27.3	39.1	32.8	31.6	26.1	33.1	27.1	28.7	31.8	30.4	33.7	30.4	31.1	455
Dominican Republic	36.1	33.6	23.2	20.6	17.5	26.3	23.9	21.2	27.2	21.6	34.3	29.0	25.2	18.9	28.1	20.8	40.3	24.8	23.2	23.1	26.8	25.2	604
Paraguay	12.6	23.9	29.8	30.0	15.9	25.8	22.2	31.3	21.2	24.7	19.8	28.3	22.1	27.7	29.0	19.6	22.9	24.4	22.2	22.7	24.3	24.0	311
Peru	19.3	18.1	24.2	18.2	16.6	21.5	17.8	21.0	20.0	22.1	15.8	18.3	21.2	15.3	23.3	15.5	10.5	19.6	23.0	14.5	21.2	19.8	1 464

Continued

Table 3 12—Continued

Country	Child's age (months)					Child's sex		Birth order				Mother's age			Residence		Mother's level of education			Radio present		Percentage of children treated with ORS	Number of children
	<6	6-11	12-23	24-35	36-59	Male	Female	1	2-3	4-5	6+	15-19	20-34	35+	Urban	Rural	No education	Primary	Secondary+	No	Yes		
<b>DHS-III</b>																							
<b>Sub-Saharan Africa</b>																							
Central African Re-	16.7	26.6	35.8	21.7	U	25.7	29.8	29.5	26.3	31.8	24.1	18.6	30.9	20.8	38.3	21.7	23.9	29.1	37.2	20.6	33.7	27.7	582
Côte d'Ivoire <sup>2</sup>	4.6	9.2	10.7	14.8	U	10.8	11.5	13.8	10.1	10.1	11.3	13.0	12.0	6.9	14.3	9.1	8.5	16.9	15.1	9.9	12.4	11.1	788
Ghana <sup>2</sup>	23.6	33.0	32.7	22.1	U	28.8	28.4	36.8	25.6	29.3	23.7	32.4	28.5	27.7	44.0	23.7	22.0	34.4	33.3	24.7	34.3	28.6	412
Kenya	17.6	31.3	34.6	32.9	31.5	33.2	29.9	28.6	33.9	33.9	29.2	25.5	32.4	30.7	40.4	30.5	39.5	28.4	33.2	30.8	32.4	31.6	779
<b>Asia/Near East/ North Africa</b>																							
Bangladesh <sup>2</sup>	26.4	49.2	50.5	55.3	U	57.5	43.2	47.7	51.5	49.3	52.6	49.5	50.0	53.8	59.4	49.3	45.7	50.9	68.4	48.2	56.1	50.3	445
Indonesia	23.1	44.6	50.2	44.1	47.8	43.7	46.8	54.0	42.2	47.2	35.8	43.3	47.2	37.6	42.1	46.3	44.3	44.3	47.5	45.3	44.9	45.1	1 921
Philippines	25.5	23.6	31.0	25.4	26.5	25.7	28.7	23.5	25.3	33.0	27.3	11.2	27.9	27.3	26.0	28.2	23.1	25.6	28.8	U	U	27.1	856
Turkey	9.0	15.4	15.2	9.8	5.4	12.1	10.4	13.4	9.9	7.8	13.8	15.9	11.1	9.9	12.2	10.2	8.0	12.8	14.9	10.1	11.8	11.3	872
<b>Latin America/ Caribbean</b>																							
Bolivia <sup>2</sup>	8.3	29.9	41.8	30.6	U	35.4	31.1	26.0	37.3	36.2	32.7	21.3	35.3	31.9	37.8	27.9	24.3	31.4	39.6	26.6	35.2	33.3	988
Colombia	38.2	54.4	46.2	40.9	39.5	43.4	45.6	50.8	44.9	42.3	27.2	41.4	46.0	39.9	48.8	37.0	34.0	37.1	53.0	45.2	44.4	44.5	815
Haiti	19.2	26.9	31.1	21.7	22.9	22.5	29.2	30.8	28.8	22.3	20.1	34.0	26.2	22.3	37.8	20.1	18.1	30.3	45.9	22.1	32.5	25.7	894

U = Unknown (not available)

<sup>1</sup> Children under 4 years<sup>2</sup> Children under 3 years

Table 3.13 Percentage of children under five with diarrhea who were taken to a medical facility, by background characteristics

Percentage of children 0-59 months with diarrhea in the two weeks preceding the survey who were taken to a medical facility by background characteristics Demographic and Health Surveys 1990-1995

Country	Child's age (months)					Child's sex		Birth order				Mother's age				Residence		Mother's level of education			Radio present		Percentage of children with diarrhea and fever taken to medical facility	Percentage of children with diarrhea taken to medical facility	Number of children
	<6	6-11	12-23	24-35	35-59	Male	Female	1	2-3	4-5	6+	15-19	20-34	35+	Urban	Rural	No education	Primary	Secondary	No	Yes				
<b>DHS II</b>																									
<b>Sub-Saharan Africa</b>																									
Burkina Faso	100	155	149	156	155	134	164	167	181	112	134	103	157	136	282	127	130	262	424	120	177	146	148	1114	
Cameroon	150	226	262	168	126	195	208	89	282	222	165	61	220	230	232	182	149	269	226	178	219	218	201	560	
Madagascar	388	349	368	337	304	340	364	430	354	289	330	354	348	356	418	341	247	348	452	319	412	392	350	616	
Malawi	452	506	447	521	429	512	425	422	435	527	493	444	487	445	470	472	436	506	629	433	536	493	472	821	
Namibia	592	670	697	660	717	686	675	657	672	680	721	675	682	676	700	675	633	670	750	672	684	728	680	738	
Niger	28	108	117	99	105	97	100	107	87	88	111	89	96	109	324	67	90	142	408	94	103	93	98	1584	
Nigeria	242	285	295	231	262	255	284	292	266	254	266	297	280	208	403	246	243	350	250	248	284	268	268	1258	
Rwanda	150	238	261	227	199	230	226	243	228	290	163	240	239	197	291	225	223	228	296	214	252	253	228	1091	
Senegal	143	241	281	205	229	234	228	187	248	241	230	176	236	236	303	206	215	333	310	188	246	237	231	1047	
Tanzania	431	647	632	599	523	566	621	642	622	558	538	629	608	519	701	562	536	616	854	588	606	612	594	939	
Zambia	463	568	567	549	514	557	533	574	566	497	525	598	542	527	619	494	383	561	697	497	621	540	546	1217	
<b>Asia/Near East/</b>																									
<b>North Africa</b>																									
Egypt	478	595	496	406	254	467	434	507	459	412	417	446	466	394	478	436	439	373	557	418	481	510	452	1077	
India <sup>1</sup>	541	617	650	618	U	630	591	642	614	585	574	608	617	564	687	592	582	635	694	574	676	657	611	4573	
Indonesia	273	481	503	472	443	463	460	476	484	468	352	377	478	423	509	439	365	466	517	431	489	501	461	1480	
Jordan	472	536	566	332	422	498	496	459	464	479	563	482	481	565	468	574	631	500	459	549	487	660	497	675	
Morocco	162	100	116	83	68	98	105	116	126	78	83	83	98	115	125	92	94	180	81	78	106	101	101	611	
Pakistan	406	529	539	444	448	426	534	478	467	445	518	492	485	447	622	407	447	582	574	463	510	496	477	849	
<b>Latin America/</b>																									
<b>Caribbean</b>																									
Brazil (NE)	536	290	172	190	205	291	198	242	218	239	306	250	276	151	267	222	281	228	356	267	239	334	249	478	
Colombia	264	373	427	270	336	421	281	488	279	298	266	305	357	362	394	273	451	300	410	342	356	487	353	455	
Dominican Rep	375	426	268	345	151	308	290	326	324	216	217	263	318	130	323	264	323	250	376	279	316	372	300	604	
Paraguay	203	359	434	477	253	382	351	431	376	306	332	172	384	396	508	242	400	327	526	344	371	384	366	311	
Peru	214	214	244	196	208	238	197	219	226	254	169	194	222	216	249	183	181	191	265	226	186	219	219	1464	

Continued

Table 3 13—Continued

Country	Child's age (months)					Child's sex		Birth order				Mother's age				Residence		Mother's level of education			Radio present		Percentage of children with diarrhea and fever taken to medical facility	Percentage of children with diarrhea taken to medical facility	Number of children
	<6	6-11	12-23	24-35	35-59	Male	Female	1	2	3	4	5	6+	15-19	20-34	35+	Urban	Rural	No education	Primary	Secondary	No			
<b>DHS-III</b>																									
<b>Sub Saharan Africa</b>																									
Central African Rep. <sup>2</sup>	26.8	30.1	37.5	21.5	U	31.1	28.8	26.9	27.7	40.2	26.2	23.0	32.0	26.9	37.3	25.9	24.4	34.9	35.8	24.1	34.7	31.5	30.0	582	
Cote d'Ivoire <sup>2</sup>	27.7	25.0	23.4	20.5	U	23.5	22.8	24.7	26.4	22.1	19.5	22.2	25.8	15.1	30.8	18.4	17.7	27.3	53.2	19.9	26.5	22.4	23.2	788	
Ghana <sup>2</sup>	16.4	29.5	28.2	17.7	U	25.6	22.3	28.7	22.6	25.9	18.4	8.8	26.8	20.5	35.0	20.5	22.0	25.8	25.0	22.6	26.0	25.3	24.0	412	
Kenya	41.8	41.3	42.0	38.1	40.6	45.1	36.4	43.6	46.0	39.7	32.8	34.0	42.4	37.3	52.5	39.4	34.0	37.9	39.4	49.1	36.5	44.5	41.4	40.8	779
Zimbabwe <sup>2</sup>	26.6	27.2	26.9	39.5	U	28.9	30.7	27.2	36.2	28.4	23.8	24.7	30.3	30.0	26.7	30.5	22.2	29.6	33.3	26.5	35.2	35.1	29.7	521	
<b>Asia/Near East/</b>																									
<b>North Africa</b>																									
Bangladesh <sup>2</sup>	13.2	27.8	18.8	19.2	U	19.6	20.8	26.8	16.2	19.3	19.1	22.9	19.9	17.5	30.3	19.2	14.0	24.8	35.3	17.8	27.5	U	20.2	445	
Indonesia	46.0	60.3	55.3	49.2	52.0	52.6	54.1	60.8	51.5	52.5	46.7	55.0	53.3	52.5	59.7	50.6	43.5	51.5	63.4	49.5	56.0	58.1	53.2	1 921	
Philippines	34.5	41.1	33.4	33.0	29.0	32.0	35.8	39.2	34.2	33.4	29.1	19.7	35.5	30.8	36.2	31.7	38.3	29.5	37.5	U	U	35.8	33.8	856	
Turkey	25.5	35.7	28.4	20.9	13.8	25.7	23.4	27.2	25.0	22.8	19.8	39.0	23.7	22.6	29.8	18.4	23.9	23.6	31.6	24.3	24.8	27.2	24.6	872	
<b>Latin America/</b>																									
<b>Caribbean</b>																									
Bolivia <sup>2</sup>	14.5	35.1	37.1	28.7	U	33.4	31.3	31.3	34.6	35.7	26.8	26.7	34.3	28.0	37.4	26.2	22.7	29.4	40.2	26.6	33.9	41.9	32.4	988	
Colombia	42.8	50.4	33.4	24.9	23.8	35.5	30.7	39.1	32.9	29.6	23.6	34.6	33.4	31.9	36.7	27.4	22.3	23.8	44.1	30.5	34.0	41.6	33.3	815	
Haiti	15.2	24.9	27.9	25.4	20.5	22.6	25.8	26.3	25.5	25.3	19.3	29.6	25.2	20.1	33.9	19.6	16.6	28.6	44.7	21.4	29.3	25.9	24.1	894	

U = Unknown (not available)

<sup>1</sup> Children under 4 years<sup>2</sup> Children under 3 years

Figure 3 2 Among children under five years with diarrhea in the two weeks preceding the survey, the percentage taken to a medical facility by prevalence of diarrhea, Demographic and Health Surveys, 1990-1995

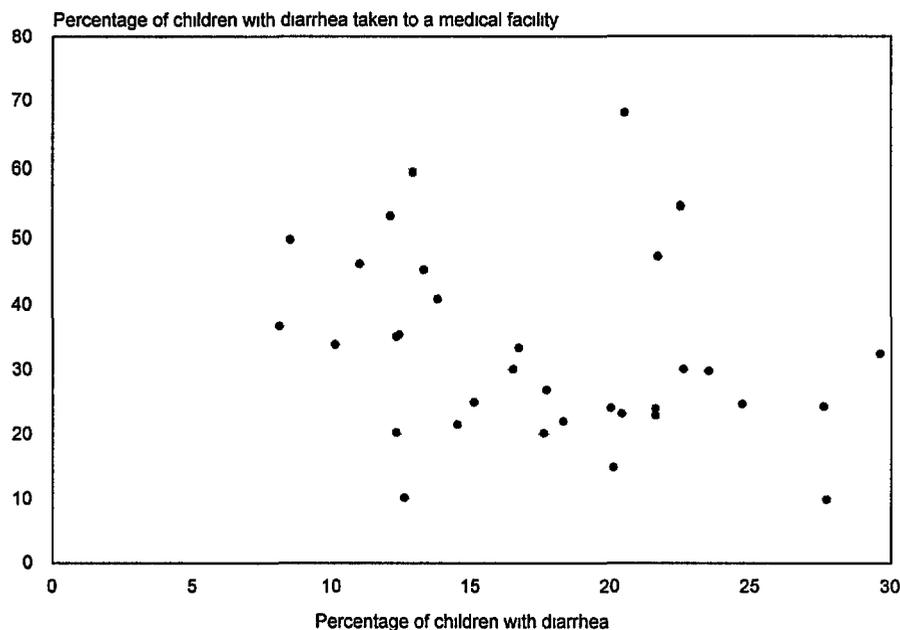


Table 3 14 presents treatment information on children with diarrhea who were taken to a medical facility. The data cover three types of diarrhea treatment: ORS only, ORS and drugs, and drugs only. In many countries, children would have been given ORS, or drugs, or a combination of the two, at or as a consequence of a clinic visit. However, because of the wide availability of ORS packets and antibiotic drugs without prescription at pharmacies and other outlets, ORS and drugs would not necessarily have been given or prescribed during a clinic visit.

As shown in Table 3 14, the prevalence of treatment with ORS alone, ORS and drugs, and drugs alone reflects to some extent the preferences of mothers and clinicians. In connection with Table 3 10 it was noted that, in many countries, mothers believe that antibiotics are the most effective means for treating diarrhea and other childhood illnesses. They expect clinicians to dispense

antibiotics on demand, and many clinicians comply with this expectation as a means of securing a good reputation with patients.

In Table 3 14 the prevalence of exclusive ORS use to treat children with diarrhea ranges from 4.2 percent in India to 65 percent in Malawi (DHS-III). The upper quartile (above 40.8 percent) includes, in addition to Malawi, Namibia, Rwanda, Tanzania, Zambia, Morocco, Brazil, the Dominican Republic, and the Central African Republic. The lower quartile (below 22.0 percent) includes Madagascar, Nigeria, Senegal, Egypt, India, Turkey, and Bolivia. The mean prevalence of treatment with ORS exclusively is 34 percent. The overall average prevalence of ORS use (with or without drugs) is 56 percent. Thus, the use of drugs in treating diarrhea in children taken to medical facilities is widespread. The average prevalence of children receiving drugs with or without ORS is 50 percent.

**Table 3 14 Treatment received by children under five with diarrhea who were taken to a medical facility**

Percent distribution of children age 0-59 months with diarrhea in the two weeks preceding the survey who were taken to a medical facility, by type of treatment received, Demographic and Health Surveys, 1990-1995

Country	Treatment received at medical facility				Total	Number of children
	ORS only	ORS and drugs	Drugs only	Other		
<b>DHS-II</b>						
<b>Sub-Saharan Africa</b>						
Burkina Faso	35.1	14.2	40.8	9.9	100.0	165
Cameroon	36.6	7.3	17.5	38.5	100.0	112
Madagascar	19.2	15.8	49.4	15.6	100.0	216
Malawi	64.9	7.7	14.6	12.8	100.0	387
Namibia	62.4	22.9	10.3	4.5	100.0	502
Niger	38.6	15.5	28.8	17.1	100.0	155
Nigeria	21.2	7.2	28.1	43.5	100.0	338
Rwanda	48.1	25.9	19.0	7.0	100.0	249
Senegal	11.2	11.6	55.8	21.5	100.0	242
Tanzania	58.4	25.0	11.8	4.9	100.0	557
Zambia	59.8	20.7	10.3	9.2	100.0	664
<b>Asia/Near East/</b>						
<b>North Africa</b>						
Egypt	14.9	34.9	46.7	3.5	100.0	487
India <sup>1</sup>	4.2	20.7	71.5	3.6	100.0	2 797
Indonesia	40.6	23.7	21.2	14.5	100.0	683
Jordan	38.7	26.2	23.7	11.5	100.0	335
Morocco	51.6	21.0	16.1	11.3	100.0	62
Pakistan	37.0	18.9	15.2	28.8	100.0	405
<b>Latin America/</b>						
<b>Caribbean</b>						
Brazil (NE)	54.4	3.3	5.1	37.1	100.0	119
Colombia	29.6	24.5	17.7	28.3	100.0	161
Dominican Republic	16.9	30.1	35.4	17.6	100.0	181
Paraguay	25.9	22.3	31.0	20.8	100.0	114
Peru	31.4	15.6	21.8	31.1	100.0	320
<b>DHS-III</b>						
<b>Sub-Saharan Africa</b>						
Central African Republic <sup>2</sup>	40.9	21.8	15.4	21.9	100.0	174
Cote d'Ivoire <sup>2</sup>	25.3	11.6	48.3	14.7	100.0	183
Ghana <sup>2</sup>	33.3	32.3	32.3	2.0	100.0	99
Kenya	38.0	21.1	33.0	7.8	100.0	318
<b>Asia/Near East/</b>						
<b>North Africa</b>						
Bangladesh <sup>2</sup>	28.8	54.5	11.4	5.3	100.0	90
Philippines	32.8	18.4	37.6	11.3	100.0	289
Turkey	16.9	12.1	50.3	20.8	100.0	215
<b>Latin America/</b>						
<b>Caribbean</b>						
Bolivia <sup>2</sup>	18.9	40.8	32.7	7.6	100.0	320
Colombia	24.5	44.7	20.7	10.2	100.0	271
Haiti	35.2	24.9	31.6	8.4	100.0	215

Note: Drugs includes pills, syrup, antibiotics, injection, and IV

ORS = Oral rehydration salts (commercially prepared mixture of salt, sugar, and complex carbohydrates)

<sup>1</sup> Children under 4 years

<sup>2</sup> Children under 3 years

## 4 Fever

### 4.1 PREVALENCE LEVELS AND DIFFERENTIALS

In the 32 countries included in Table 4.1, mothers were asked if their children under age five had had fever in the two weeks preceding the survey. While many reported fevers would have been symptoms of malaria, fevers are also symptomatic of many other childhood diseases. No means were available in the surveys to distinguish between underlying causes of reported fever.

Background information available from surveys permits an examination of some of the socioeconomic and demographic correlates of fever prevalence among children. In interpreting variations by country and background variables, it should be borne in mind that fever prevalence varies seasonally and that prevalence reported in a survey reflects the season in which the survey was conducted. (See Table 2.1 for survey dates.)

Table 4.1 indicates there are substantial variations in reported fever prevalence among children under five. Prevalence ranges from 17 percent in Jordan to 45 percent in Niger. The average prevalence is 31 percent. The upper quartile (above 39.2 percent) includes Malawi, Rwanda, Zambia, Côte d'Ivoire, Kenya, Zimbabwe, and Haiti, in addition to Niger. The lower quartile (26.7 percent or less) includes Cameroon, Egypt, India, Indonesia, Jordan, Brazil, Colombia (DHS-II), and the Philippines.

The greatest variation in fever prevalence by background characteristics is according to child's age. On average, prevalence increases after five months of age, reaching a high at 6 to 11 months, declining slightly at 12 to 23 months, dropping significantly at 24 to 35 months, and reaching a low at 36 to 59 months. In most surveys, fever is more common among male than female children, but the differences are not large.

Differentials by other background characteristics are less consistent, however, in most countries there is evidence of increasing fever prevalence with ascending birth order. The relationship with mother's age is inconsistent. On average, prevalence is slightly higher among children whose mothers are 15-19 compared with children of older mothers. However, in some countries, fever prevalence is highest among children of older women (e.g., Morocco, Central African Republic, Côte d'Ivoire, and Ghana).

In several countries, prevalence is noticeably lower in urban areas than in rural areas (Namibia, Niger, Nigeria, Rwanda, Senegal, Zambia, Paraguay, Côte d'Ivoire, Ghana, and Zimbabwe). Fever is more common among children whose mothers have no education compared with those with schooling, particularly secondary or higher. Lack of a radio in the household is strongly associated with higher prevalence in three countries: Rwanda, Zambia, and Morocco.

### 4.2 TREATMENT PATTERNS

In DHS-II, but not DHS-III, mothers were asked what medicine was given to treat fevers in their children. The data are presented in Table 4.2. Among children 0 to 59 months who were ill with fever, the prevalence of treatment with antimalarials ranges from 2 percent in Morocco to 57 percent in Cameroon. In addition to Cameroon, countries in the upper quartile (above 45.1 percent) are Tanzania and Zambia. The lowest quartile (below 5.8 percent) includes Rwanda and Colombia in addition to Morocco. The average prevalence of treatment with antimalarials for the 14 countries for which data are available is 25 percent.

Prevalence of treatment with antibiotic pills or syrups ranges from 4 percent in Rwanda to 54 percent in Indonesia. The average prevalence is 20 percent. Countries in the upper quartile of the range (above 24.4 percent) are, in addition to Indonesia, Egypt, Colombia, and the Dominican Republic. Along with Rwanda, Burkina Faso, Cameroon, and Morocco are in the lower quartile (below 10.2 percent). Indonesia is the only country where prevalence of antibiotic treatment exceeds 50 percent.

Most injections given to children are likely to be antibiotics. Injections are less prevalent than oral antimalarials and antibiotics. Prevalence ranges from 2 percent in Burkina Faso and Morocco to 21 percent in Nigeria. A majority of countries reported prevalence of less than 10 percent, while only Nigeria reported more than 20 percent. The "other" pills tabulated in Table 4.2 also include antibiotics. In interpreting data in Table 4.2, it should be remembered that many mothers find it difficult to recall accurately the names of medicines given either during clinical visits or at a pharmacy.

In DHS-II and DHS-III, mothers of children with fever were asked if they had taken their sick children to a medical facility. The results are presented in Table 4.3 by background characteristics of the mother and child. The average prevalence of referrals to medical facilities for children with fever is 43 percent. In almost every country, children with fever are more likely to be taken to a medical facility for treatment than children with diarrhea. There are associations with age of child, birth order, mother's education, presence of a radio in the household, and residence. On average, prevalence tends to be highest at 6 to 11 months with no marked difference between other ages, but the pattern is not consistent. There is also a tendency for referrals to decline in prevalence with increasing birth order. Again, there are several countries in which this is not the case. Positive association with increasing education of the mother, urban residence, and presence of a radio in the household are also evident in the data. Male children appear more likely to be taken for treatment than female children, but the differences are small.

Table 4.1 Prevalence of fever in children under five by background characteristics

Percentage of children 0-59 months with fever in the two weeks preceding the survey by age of child, sex of child, birth order, mother's age, residence, mother's level of education, and presence of a radio in the household. Demographic and Health Surveys 1990-1995

Country	Child's age					Child's sex		Birth order				Mother's age			Residence		Mother's level of education			Radio present		Percentage of children with fever	Number of children
	<6	6-11	12-23	24-35	36-59	Male	Female	1	2-3	4-5	6+	15-19	20-34	35+	Urban	Rural	No Education	Primary	Secondary+	No	Yes		
<b>DHS II</b>																							
<b>Sub-Saharan Africa</b>																							
Burkina Faso	31.9	48.2	45.3	36.3	25.9	36.0	33.3	32.6	31.6	35.8	38.0	33.4	34.3	36.0	27.6	35.9	35.0	34.2	26.2	35.0	34.4	34.7	5 545
Cameroon	18.2	30.4	27.7	23.5	18.1	23.5	21.6	19.8	20.5	26.7	23.4	22.4	22.3	23.7	20.7	23.8	17.5	27.3	23.9	19.3	24.5	22.6	3 189
Madagascar	17.7	35.7	33.4	30.4	21.3	27.3	26.3	25.8	26.8	28.6	26.3	33.7	26.2	26.5	22.6	27.5	27.6	27.3	25.0	27.3	25.9	26.8	5 013
Malawi	38.8	59.1	52.0	42.1	26.2	40.2	39.8	38.0	39.5	42.1	40.1	41.4	40.3	38.8	33.6	40.3	40.4	40.3	30.3	39.7	40.5	40.0	3 789
Namibia	32.6	45.3	42.1	32.8	26.7	33.8	34.3	32.0	31.6	36.2	38.6	38.9	33.0	35.6	28.5	36.8	35.9	37.2	28.0	34.1	34.0	34.0	3 601
Niger	40.1	58.4	56.0	46.3	35.3	44.6	44.7	43.4	41.4	45.4	47.6	47.4	44.0	46.3	26.9	48.3	45.8	36.2	24.7	45.3	44.0	44.7	5 717
Nigeria	23.5	37.4	41.4	34.9	27.7	33.2	31.5	29.5	30.1	33.6	35.8	32.1	32.5	31.8	22.0	35.2	33.2	34.0	24.5	30.9	33.3	32.3	7 107
Rwanda	39.6	60.8	57.5	37.5	30.4	41.5	41.1	40.2	38.7	45.5	41.1	45.7	41.7	40.1	32.0	41.8	41.7	42.4	28.3	44.2	36.1	41.3	5 042
Senegal	40.4	56.2	49.1	37.5	27.0	38.6	37.0	35.7	35.0	37.1	41.9	42.0	37.3	38.0	31.8	41.0	39.6	33.2	22.8	38.3	37.7	37.8	5 124
Tanzania	24.9	43.8	40.8	30.3	22.5	30.3	31.1	28.1	31.9	30.6	31.6	31.7	31.0	29.5	36.2	29.4	29.8	31.3	29.3	30.3	31.8	30.7	7 256
Zambia	30.1	54.4	54.2	46.8	35.2	43.6	42.9	40.7	43.4	41.1	46.7	44.9	42.6	44.8	33.7	51.8	51.6	45.3	30.2	48.5	37.1	43.2	5 396
<b>Asia/Near East/ North Africa</b>																							
Egypt	17.2	32.6	29.8	21.2	15.4	22.2	19.9	20.9	20.7	19.5	23.6	19.6	21.3	20.5	22.4	20.3	21.1	23.1	19.2	22.0	20.5	21.1	8 089
India <sup>1</sup>	14.0	25.9	25.0	18.7	16.3	20.9	19.1	20.3	19.5	20.4	20.3	21.8	19.8	19.7	18.6	20.5	19.6	22.9	19.1	20.3	19.4	20.0	45 969
Indonesia	20.0	38.1	35.2	29.8	19.4	26.9	26.5	26.9	25.5	28.3	27.4	33.2	26.8	24.7	26.1	26.9	23.5	28.2	24.5	27.9	25.7	26.7	13 392
Jordan	12.3	25.3	22.0	17.1	12.2	17.8	15.2	19.5	15.6	15.4	16.6	24.6	16.2	16.6	16.4	17.0	15.8	14.9	17.4	17.6	16.4	16.6	7 962
Morocco	20.2	34.2	31.9	27.7	23.8	27.3	26.6	23.6	24.4	27.6	31.2	20.0	26.5	28.4	25.5	27.7	27.4	28.4	20.9	33.4	25.8	26.9	4 853
Pakistan	28.0	42.6	35.5	30.4	23.4	30.1	29.7	29.2	29.6	29.8	30.7	32.5	29.1	31.9	30.8	29.5	30.8	29.7	24.4	29.5	30.6	29.9	5 860
<b>Latin America/ Caribbean</b>																							
Brazil (NE)	20.8	30.0	30.6	21.0	17.3	22.3	21.6	19.8	22.9	21.1	23.7	21.8	22.3	20.9	23.2	20.7	23.2	21.1	24.1	21.4	22.4	22.0	3 163
Colombia	22.8	28.6	23.1	21.2	12.0	20.8	17.4	20.5	17.9	20.4	16.1	30.4	19.2	14.6	20.5	16.3	28.8	18.5	18.4	22.6	18.2	19.1	3 659
Dominican Republic	24.0	36.5	30.0	25.7	23.2	27.5	26.2	24.6	28.4	26.0	28.7	30.7	27.0	23.2	27.7	25.6	28.7	27.3	25.9	29.6	24.7	26.9	3 660
Paraguay	20.6	40.9	38.1	34.6	26.1	31.0	31.5	27.0	28.7	34.3	37.2	31.9	30.5	32.9	26.3	35.4	33.2	33.9	23.6	34.6	30.5	31.2	3 834

Continued

Table 4 1—Continued

Country	Child's age					Child's sex		Birth order				Mother's age			Residence		Mother's level of education			Radio present		Percentage of children with fever	Number of children
	<6	6-11	12-23	24-35	36-59	Male	Female	1	2-3	4-5	6+	15-19	20-34	35+	Urban	Rural	No Education	Primary	Sec+ dary+	No	Yes		
<b>DHS III</b>																							
<b>Sub-Saharan Africa</b>																							
Central African Republic <sup>2</sup>	18.0	42.3	41.6	33.4	U	34.5	35.2	30.2	33.3	38.4	37.7	30.9	34.4	40.0	33.7	35.6	34.0	35.1	37.0	32.8	36.2	34.8	2 577
Cote d'Ivoire <sup>2</sup>	29.7	55.0	48.6	40.4	U	43.2	43.7	39.7	42.0	45.9	45.9	40.8	42.7	49.2	38.8	45.9	43.6	42.8	44.3	45.8	41.6	43.5	3 645
Ghana <sup>2</sup>	16.8	33.1	30.0	28.5	U	28.7	26.3	23.3	27.5	28.2	31.4	21.9	27.2	30.4	21.3	30.0	32.2	25.3	17.5	28.2	26.5	27.5	2 056
Kenya	35.0	55.1	50.1	42.5	34.6	42.2	40.7	39.4	40.4	43.7	42.2	43.0	41.5	40.7	38.5	41.9	40.4	41.7	41.5	42.4	40.6	41.4	5 650
Zimbabwe <sup>2</sup>	30.4	50.5	42.4	36.0	U	39.5	39.9	36.3	38.6	42.7	43.2	36.1	40.5	37.9	34.5	41.5	44.7	41.7	35.4	40.6	38.6	39.7	2 221
<b>Asia/Near East/ North Africa</b>																							
Indonesia	19.9	41.7	35.9	28.6	22.0	28.3	27.4	26.3	28.0	30.4	27.7	35.2	28.1	25.5	29.8	27.1	28.5	27.8	27.8	27.8	27.9	27.9	15 883
Philippines	17.1	36.5	32.3	26.3	20.2	25.5	25.2	22.5	23.5	28.1	29.3	29.7	25.2	25.5	24.2	26.4	21.9	28.6	23.2	U	U	25.4	8 512
Turkey	32.0	41.6	38.9	26.8	22.9	30.9	28.7	30.0	28.5	30.7	33.1	36.6	28.9	33.7	27.1	34.1	33.3	28.6	27.6	29.7	29.9	29.9	3 532
<b>Latin America/ Caribbean</b>																							
Bolivia <sup>2</sup>	19.5	36.9	31.8	26.4	U	28.9	28.9	28.0	27.1	31.1	30.6	29.8	28.9	28.4	30.2	27.5	28.2	28.1	30.2	31.6	28.4	28.9	3 335
Colombia	24.8	37.1	33.6	27.9	23.0	26.8	29.1	27.5	26.6	30.4	31.9	31.0	27.2	29.8	28.7	26.3	26.3	27.0	28.8	29.1	27.7	27.9	4 891
Haiti	31.5	57.2	49.8	41.3	31.3	39.9	39.7	36.0	40.5	38.9	43.2	43.3	40.0	38.7	36.2	41.5	42.9	38.6	31.1	41.5	37.1	39.8	3 265

U = Unknown (not available)

<sup>1</sup> Children under 4 years<sup>2</sup> Children under 3 years

**Table 4 2 Treatment of children under five with fever**

Among children 0-59 months with fever in the two weeks preceding the survey the percentage taken to a medical facility and the percentage receiving various treatments, Demographic and Health Surveys, 1990-1995

Country	Percentage of children with fever taken to medical facility	Treatment received for fever					Number of children with fever
		Antimalarial pill/syrup	Antibiotic pill/syrup	Injection	Other pill/syrup	Other	
<b>DHS-II</b>							
<b>Sub-Saharan Africa</b>							
Burkina Faso	19.3	31.5	7.7	1.6	8.1	44.2	1,922
Cameroon	40.8	56.6	8.0	6.8	32.0	36.2	720
Madagascar	39.2	43.5	17.0	6.2	29.8	13.2	1,345
Malawi	50.7	28.9	18.3	4.0	45.1	4.7	1,517
Namibia	64.9	8.0	24.0	4.1	61.0	4.3	1,226
Niger	10.8	22.6	12.5	3.9	9.1	13.3	2,554
Nigeria	32.4	26.8	20.9	21.1	40.3	8.3	2,297
Rwanda	30.5	4.4	4.2	8.5	36.3	26.5	2,082
Senegal	31.5	21.8	21.2	4.7	21.4	11.2	1,937
Tanzania	57.2	50.0	15.6	16.0	48.2	5.9	2,229
Zambia	61.2	51.1	10.2	5.6	50.4	7.9	2,333
<b>Asia/Near East/</b>							
<b>North Africa</b>							
Egypt	59.1	U	25.5	14.2	73.0	2.9	1,706
Indonesia	60.0	U	54.0	U	63.8	13.5	3,574
Morocco	18.0	1.9	8.0	1.9	28.2	31.7	1,307
Pakistan	64.6	6.3	19.5	14.3	62.1	5.5	1,751
<b>Latin America/</b>							
<b>Caribbean</b>							
Brazil (NE)	36.3	U	11.6	3.1	31.1	77.5	696
Colombia	48.0	2.8	40.7	6.2	52.0	24.7	698
Dominican Rep	42.7	U	40.0	7.5	52.2	14.2	983
Paraguay	57.4	U	24.4	5.1	56.3	84.5	1,197

U = Unknown (not available)

Table 4.3 Percentage of children under five with fever taken to a medical facility, by background characteristics

Percentage of children 0-59 months with fever in the two weeks preceding the survey who were taken to a medical facility by background characteristics Demographic and Health Surveys 1990-1995

Country	Child's age						Child's sex		Birth order				Mother's age			Residence		Mother's level of education			Radio present		Percentage of children with fever taken to medical facility	Number of children with fever
	<6	6-11	12-23	24-35	36-59	Male	Female	1	2-3	4-5	6+	15-19	20-34	35+	Urban	Rural	No Education	Primary	Secondary+	No	Yes			
	<b>DHS II</b>																							
<b>Sub-Saharan Africa</b>																								
Burkina Faso	15.7	18.7	21.8	20.5	17.9	19.5	19.1	23.2	19.7	18.1	17.9	15.5	20.5	16.7	33.8	17.4	17.6	31.0	44.2	16.7	21.5	19.3	1 922	
Cameroon	44.5	48.0	43.6	41.2	33.5	44.7	36.5	38.5	40.0	46.1	37.8	42.3	40.7	40.6	50.1	35.6	31.7	47.2	40.6	31.0	45.3	40.8	720	
Madagascar	41.9	41.1	44.2	37.2	34.3	40.8	37.4	42.5	38.3	42.5	35.7	43.4	37.9	41.3	54.3	37.2	32.6	36.2	54.4	36.7	44.1	39.2	1 345	
Malawi	50.1	52.8	50.9	54.1	46.6	51.0	50.5	45.1	52.0	52.4	51.2	52.0	51.3	48.7	47.9	50.8	48.6	53.0	53.7	49.5	52.8	50.7	1 517	
Namibia	64.4	68.8	66.5	65.1	61.4	64.1	65.6	67.2	64.2	64.8	63.5	71.2	64.7	63.6	70.6	62.7	58.7	62.3	74.9	65.0	64.7	64.9	1 226	
Niger	5.7	15.7	13.0	11.8	8.1	11.6	9.9	13.3	12.5	8.5	10.2	11.8	11.0	9.7	36.4	7.9	9.3	26.1	54.5	8.8	13.8	10.8	2 554	
Nigeria	39.9	35.8	37.5	30.6	26.6	34.1	30.8	29.6	34.0	32.4	32.4	26.4	32.5	33.7	49.3	29.5	27.7	35.6	54.3	28.9	34.9	32.4	2 297	
Rwanda	23.7	41.2	32.6	31.7	24.7	33.1	27.9	35.6	31.7	29.4	27.5	29.3	32.0	27.2	44.8	30.0	27.8	31.9	46.9	28.3	35.4	30.5	2 082	
Senegal	29.1	39.6	34.2	32.2	25.6	33.6	29.5	32.6	31.0	30.6	32.1	21.9	33.7	28.7	40.2	28.0	28.3	50.4	45.5	26.5	33.2	31.5	1 937	
Tanzania	56.2	60.7	60.8	56.3	51.8	56.3	58.0	63.0	58.9	53.7	53.2	59.9	58.5	51.4	65.0	54.8	50.3	59.4	88.2	54.5	61.9	57.2	2 229	
Zambia	58.4	70.3	63.9	58.3	56.8	61.4	61.0	64.3	61.9	60.2	59.0	63.9	62.1	56.5	73.1	54.3	44.4	62.6	78.5	56.9	67.9	61.2	2 333	
<b>Asia/Near East/ North Africa</b>																								
Egypt	57.3	64.2	63.2	59.6	53.2	61.1	56.7	64.5	61.3	60.2	50.2	58.6	60.2	55.3	66.6	53.9	54.2	58.0	70.8	52.1	63.8	59.1	1 706	
India <sup>1</sup>	61.8	70.6	71.2	67.9	65.9	71.6	64.9	74.6	68.7	64.1	60.4	70.7	68.9	61.6	80.1	65.3	64.8	70.6	78.3	65.0	74.1	68.5	9 200	
Indonesia	45.2	65.0	62.2	61.1	58.4	60.4	59.6	62.9	59.1	60.6	55.5	51.8	60.7	59.6	71.4	55.4	53.4	57.5	72.3	53.2	66.4	60.0	3 574	
Jordan	80.8	75.9	68.8	69.7	72.3	74.6	68.8	72.9	73.1	72.0	70.7	72.5	71.5	73.2	69.5	77.4	73.1	70.5	72.1	71.8	72.0	72.0	1 318	
Morocco	28.9	20.6	19.1	16.3	15.1	17.6	18.4	19.0	19.9	15.5	17.6	12.5	17.0	20.2	28.4	12.8	13.7	31.9	48.3	10.6	19.5	18.0	1 307	
Pakistan	66.4	66.6	65.0	65.9	61.5	66.3	62.8	67.3	63.7	67.5	61.3	62.3	65.2	63.2	75.7	59.2	61.0	78.7	78.9	61.7	69.7	64.6	1 751	
<b>Latin America/ Caribbean</b>																								
Brazil (NE)	28.6	52.7	37.3	39.6	29.5	37.1	35.4	51.6	29.9	37.1	30.8	43.5	37.6	30.1	40.5	31.0	31.1	35.4	50.9	31.4	39.4	36.3	696	
Colombia	64.0	50.5	43.1	48.4	43.6	52.8	42.5	55.8	44.1	39.8	48.6	50.7	48.8	40.9	51.0	40.9	46.5	37.9	59.7	35.3	52.0	48.0	698	
Dominican Republic	45.7	52.8	43.8	36.0	39.9	43.5	41.9	46.8	45.3	38.1	24.5	34.8	45.1	29.7	45.6	38.2	26.4	37.4	54.7	36.0	48.9	42.7	983	
Paraguay	51.8	59.8	60.0	60.4	53.3	58.6	56.1	69.7	64.6	50.2	44.4	57.7	57.6	56.6	75.6	45.9	40.9	51.9	82.4	45.0	60.3	57.4	1 197	

Continued

Table 4.3—Continued

Country	Child's age					Child's sex		Birth order				Mother's age			Residence		Mother's level of education			Radio present		Percentage of children with fever taken to medical facility	Number of children with fever
	<6	6-11	12-23	24-35	36-59	Male	Female	1	2-3	4-5	6+	15-19	20-34	35+	Urban	Rural	No Education	Primary	Secondary+	No	Yes		
<b>DHS-III</b>																							
<b>Sub-Saharan Africa</b>																							
Central African Republic <sup>2</sup>	31.6	39.5	32.7	25.3	U	33.5	30.0	34.4	36.9	30.5	24.5	32.7	34.3	21.4	45.0	22.8	25.4	33.5	48.3	25.5	35.7	31.8	897
Côte d'Ivoire <sup>2</sup>	33.9	37.2	35.0	32.3	U	35.5	33.5	35.9	37.5	35.6	28.9	30.6	36.4	29.8	48.0	28.6	30.7	39.5	49.3	29.3	39.0	34.5	1 584
Ghana <sup>2</sup>	41.5	47.9	53.3	42.9	U	46.2	48.7	56.6	47.4	45.0	42.4	50.0	47.5	46.2	58.1	44.3	40.0	52.3	71.4	42.5	54.5	47.3	566
Kenya	44.2	50.7	50.6	45.9	45.1	49.2	45.3	52.0	48.2	46.0	44.1	47.0	48.0	44.7	59.8	45.6	41.2	46.5	54.4	42.9	50.8	47.3	2 340
Zimbabwe <sup>2</sup>	39.0	38.4	36.7	41.2	U	35.7	41.7	35.7	43.4	40.7	33.6	32.3	40.1	36.0	45.7	36.7	34.6	34.9	46.5	36.5	41.3	38.8	881
<b>Asia/Near East/ North Africa</b>																							
Indonesia	51.5	68.8	59.6	55.1	52.6	58.4	56.0	61.7	57.4	55.1	50.7	53.3	58.5	53.4	64.7	54.0	48.7	53.4	68.9	54.3	59.2	57.2	4 427
Philippines	54.5	48.3	43.6	42.1	39.0	42.1	44.5	47.9	44.3	40.3	40.7	45.0	42.9	44.1	44.8	42.0	20.2	38.3	48.7	U	U	43.3	2 159
Turkey	33.7	44.0	39.0	39.2	32.8	37.6	37.0	44.4	37.2	33.0	25.0	52.8	37.8	28.6	42.5	31.1	29.2	40.6	44.5	43.0	35.3	37.3	1 055
<b>Latin America/ Caribbean</b>																							
Bolivia <sup>2</sup>	24.3	28.9	29.3	26.3	U	28.8	26.7	34.0	31.0	22.2	22.3	39.8	27.8	23.0	33.0	21.2	18.4	22.1	37.4	19.4	29.9	27.8	964
Colombia	38.6	39.8	31.2	29.7	30.0	34.9	29.8	36.1	33.9	28.1	18.3	34.6	34.3	23.4	37.5	22.2	12.8	26.3	39.0	28.1	33.1	32.3	1 364
Haiti	22.4	30.5	29.4	22.8	19.1	26.2	22.7	30.5	26.5	25.5	16.1	35.9	24.2	23.3	34.4	20.5	17.3	30.1	42.0	22.6	28.0	24.5	1 299

U = Unknown (not available)

<sup>1</sup> Children under 4 years<sup>2</sup> Children under 3 years

## 5 Respiratory Illness

### 5.1 PREVALENCE LEVELS AND DIFFERENTIALS

In both DHS-II and DHS-III surveys, respondents were asked if their children had had cough during the preceding two weeks. Mothers who reported that their children had had a cough were also asked to specify if the cough was accompanied by rapid or difficult breathing. The presence of cough and rapid breathing in a child can be symptomatic of serious lower respiratory illness, including pneumonia. In many primary health care systems, public education programs are designed to spread awareness of the necessity for taking young children to medical facilities for diagnosis and treatment when rapid breathing due to chest problems, with or without cough, is detected.

Table 5.1 shows the prevalence of cough accompanied by rapid breathing among children under five in 31 surveys. Prevalence ranges from 7 percent in Nigeria to 32 percent in Rwanda. Seven countries (the upper quartile) have prevalence of more than 20.2 percent. These are, beside Rwanda, the Dominican Republic, Peru, Central African Republic, Bangladesh, Colombia, and Zimbabwe. The lower quartile includes surveys with prevalence of less than 10.0 percent. In addition to Nigeria, these are Cameroon, Egypt, India, Indonesia (DHS-II), Philippines, and Tanzania. Prevalence in half of the 31 countries is less than 14.4 percent, overall, it is 16 percent.

The prevalence of cough with rapid breathing by background characteristics of mother and child is shown in Table 5.1. Variations by age of child are similar to those for diarrhea and fever. The occurrence of cough with rapid breathing tends to increase after 5 months of age to a high at 6 to 11 months, after which prevalence declines in many countries to a low at 36 to 59 months. On average, birth order correlates are stable through birth order six and above, where there is a slight increase in prevalence. For mother's age, many surveys show the highest prevalence among women age 15 to 19. Mother's education is also a correlate, with children of mothers with secondary or higher education enjoying the lowest prevalence of cough with rapid breathing. On average, prevalence is higher in rural areas, and in households with a radio. In two-thirds of the surveys, prevalence is higher for males than females.

### 5.2 TREATMENT PATTERNS

If a child had had either or both fever and cough, mothers were asked what was given to treat the symptoms and whether they had sought advice or treatment. If advice or treatment had been sought, mothers were asked to specify the kinds of facilities or providers from which they had sought advice or care.

Table 5.2 shows the proportion of children with cough accompanied by rapid breathing who received treatment for their

symptoms. Prevalence of antibiotic use in pill or syrup form ranges from 4 percent in Rwanda to 42 percent in Indonesia. On average, 18 percent of children receive antibiotics in pill or syrup form.

The most prevalent form of treatment for cough with rapid breathing is cough syrup. On average, 34 percent of children are treated with cough syrup. Prevalence ranges from 11 percent in Burkina Faso to 66 percent in Indonesia. An average of 18 percent of children are treated with "other pills or syrups" (which may contain antibiotics), ranging from 1 percent in Brazil to 37 percent in Malawi. The prevalence of injections, many of which are antibiotics, ranges from 2 percent in Burkina Faso and Morocco to 25 percent in Tanzania. The mean prevalence is 9 percent.

When cough with rapid breathing is accompanied by fever, it is symptomatic of a more serious illness than cough with rapid breathing alone. The use of antibiotics is a more appropriate treatment in this context than it is when just cough with rapid breathing is involved. It is important for the health of young children that mothers recognize this distinction and manage the symptoms of cough with rapid breathing accompanied by fever more aggressively.

Table 5.3 compares the prevalence of antibiotic dosage in the presence of respiratory symptoms with and without fever. In all countries except Cameroon and Morocco, the prevalence of antibiotic treatment is more common for cases in which fever is present. On average, cases with fever are 92 percent more likely to receive antibiotics than those in which fever is not present.

Table 5.4 shows the proportion of children under five with cough accompanied by rapid breathing who were taken to a medical facility. Overall, prevalence ranges from 14 percent in Niger to 67 percent in Namibia. One-fourth of the countries have a prevalence of less than 32.1 percent (Burkina Faso, Niger, Rwanda, Senegal, Morocco, Bangladesh, and Haiti). The highest quartile (prevalence above 58.6 percent) includes Namibia, Tanzania, Zambia, India, Indonesia (DHS-II and DHS-III), and Pakistan. The overall mean prevalence is 44 percent.

Variations in the prevalence of children being taken to medical facilities for treatment of cough with rapid breathing are similar to those observed for the other disease management variables discussed above. On average, prevalence by age of child increases after 5 months to a high at 6 to 11 months. The frequency of visits then declines to a low at 36 to 59 months. In 70 percent of the surveys, male children are more likely than female children to be taken for treatment. In India, females are particularly disadvantaged relative to males, even though more than 60 percent of females are taken for treatment of cough with rapid breathing.

Table 5.1 Prevalence of cough with rapid breathing in children under five by background characteristics

Percentage of children 0-59 months who had cough with rapid breathing in the two weeks preceding the survey by background characteristics Demographic and Health Surveys 1990-1995

Country	Child's age					Child's sex		Birth order				Mother's age					Residence		Mother's level of education			Radio present		Percentage of children with cough and rapid breathing	Number of children
	<6	6-11	12-23	24-35	36-59	Male	Female	1	2	3	4	5	6+	15-19	20-34	35+	Urban	Rural	No education	Primary	Secondary+	No	Yes		
<b>DHS-II</b>																									
<b>Sub-Saharan Africa</b>																									
Burkina Faso	131	175	124	107	85	113	110	104	103	106	128		96	104	136	113	111	113	98	104	111	112	111		5 545
Cameroon	96	108	118	86	62	88	85	85	75	108	84		104	83	92	77	94	84	93	81	83	89	87		3 189
Madagascar	189	235	177	161	107	163	149	155	169	153	146		200	154	147	168	154	164	147	174	161	146	156		5 013
Malawi	167	228	177	140	91	141	147	165	137	144	139		189	147	121	119	145	142	150	97	150	134	144		3 789
Namibia	192	237	202	188	138	176	182	184	171	184	184		265	172	178	130	204	142	215	143	209	166	179		3 601
Niger	126	139	124	92	84	105	106	106	99	105	111		111	105	104	70	113	106	100	102	104	109	105		5 717
Nigeria	64	89	95	59	50	72	62	67	62	72	68		63	69	61	42	74	67	68	59	74	61	67		7 107
Rwanda	348	451	392	313	254	322	325	299	312	330	345		366	322	324	178	331	339	323	206	339	301	324		5 042
Senegal	180	208	184	126	93	147	130	141	132	129	150		156	138	135	123	147	142	139	86	124	143	139		5 124
Tanzania	56	162	116	61	55	86	76	81	87	85	71		112	79	81	114	73	68	90	72	76	91	81		7 256
Zambia	111	183	156	114	101	128	125	112	130	120	137		146	123	125	101	148	164	126	94	142	107	126		5 396
<b>Asia/Near East/ North Africa</b>																									
Egypt	83	117	113	78	61	87	76	92	79	65	94		126	82	76	79	83	81	92	75	90	77	82		8 089
India <sup>1</sup>	51	84	77	60	51	70	58	62	64	65	67		71	64	59	51	68	64	76	54	68	58	64		45 969
Indonesia	74	110	142	100	75	98	95	105	94	88	101		149	97	86	89	101	92	102	85	109	87	97		13 392
Morocco	155	211	178	141	129	153	151	147	131	148	180		175	149	156	117	170	161	142	77	194	145	152		4 853
Pakistan	160	234	180	162	122	155	162	168	148	159	165		186	155	162	138	168	164	164	122	164	149	158		5 860
<b>Latin America/ Caribbean</b>																									
Brazil (NE)	127	257	220	193	156	190	173	164	185	142	226		189	190	154	167	198	197	189	108	214	160	182		3 163
Dominican Rep	215	314	230	215	169	210	216	192	209	245	250		223	217	178	191	246	283	229	176	256	180	213		3 660
Peru	212	341	287	240	182	244	220	199	232	255	259		274	231	228	218	256	267	260	202	273	223	232		7 999

Continued

Table 5.1—Continued

Country	Child's age					Child's sex		Birth order				Mother's age				Residence		Mother's level of education			Radio present		Percentage of children with cough and rapid breathing	Number of children
	<6	6-11	12-23	24-35	36-59	Male	Female	1	2-3	4-5	6+	15-19	20-34	35+	Urban	Rural	No education	Primary	Secondary+	No	Yes			
<b>DHS-III</b>																								
<b>Sub-Saharan Africa</b>																								
Central African Republic <sup>2</sup>	26.4	38.8	28.9	22.6	U	28.8	27.5	26.3	28.1	29.8	28.4	28.9	28.0	28.4	28.1	28.2	28.8	27.7	27.3	27.4	28.7	28.2	2,577	
Côte d'Ivoire <sup>2</sup>	12.7	17.7	14.6	11.3	U	14.5	12.9	12.9	14.4	14.6	12.5	13.7	13.9	12.9	15.5	12.7	13.1	14.4	16.1	12.6	14.6	13.7	3,645	
Ghana <sup>2</sup>	9.3	15.5	11.1	6.8	U	11.2	8.9	9.7	9.2	11.9	10.1	9.6	10.4	9.4	6.9	11.4	12.6	8.7	6.7	10.3	9.7	10.1	2,056	
Kenya	16.9	22.6	24.0	18.9	14.1	17.6	18.8	18.0	18.4	18.8	17.5	20.0	18.3	17.3	14.7	18.7	14.6	19.4	18.2	18.0	18.3	18.2	5,650	
Zimbabwe <sup>2</sup>	23.4	33.7	26.2	21.2	U	26.3	24.6	23.3	25.5	25.2	28.1	24.7	25.6	25.1	15.2	29.0	29.9	27.4	21.3	28.2	22.0	25.4	2,221	
<b>Asia/Near East/ North Africa</b>																								
Bangladesh <sup>2</sup>	26.0	29.7	24.6	18.4	U	26.1	20.9	26.6	23.1	21.7	22.4	25.5	23.9	17.9	24.7	23.5	23.3	25.6	21.1	24.2	21.5	23.6	3,603	
Indonesia	6.9	13.3	12.3	11.5	8.0	10.7	9.3	9.4	9.7	11.1	11.1	12.6	10.2	8.9	9.3	10.3	12.1	10.2	8.8	11.2	9.2	10.0	15,883	
Philippines	6.9	10.7	11.0	9.3	6.9	8.6	8.7	7.6	8.8	8.4	9.9	12.1	8.5	8.8	7.4	9.8	9.7	9.9	7.7	U	U	8.7	8,512	
Turkey	12.3	14.5	17.6	9.7	10.2	12.9	11.7	11.4	12.9	13.7	11.4	14.3	12.2	12.0	10.1	15.6	14.3	12.1	9.4	12.1	12.3	12.3	3,532	
<b>Latin America/ Caribbean</b>																								
Bolivia <sup>2</sup>	11.9	24.5	18.0	17.1	U	18.7	16.9	17.7	16.4	18.1	20.0	19.7	17.9	17.0	18.4	17.2	18.0	18.2	17.3	18.9	17.7	17.8	3,335	
Colombia	22.7	29.9	28.6	24.7	20.5	23.8	24.8	24.5	23.4	26.0	25.0	26.4	25.0	20.2	24.3	24.3	20.9	24.0	24.9	26.5	23.9	24.3	4,891	
Haiti	22.6	26.0	25.9	18.1	16.1	19.9	20.4	18.3	23.4	19.1	18.3	26.3	20.8	17.7	18.9	20.8	19.4	22.6	15.1	20.7	19.4	20.2	3,265	

U = Unknown (not available)

<sup>1</sup> Children under 4 years<sup>2</sup> Children under 3 years

**Table 5.2 Treatment of children under five with cough and rapid breathing**

Among children 0-59 months with cough accompanied by rapid breathing in the two weeks preceding the survey, percentage receiving various treatments Demographic and Health Surveys 1990-1995

Country	Treatment received for cough with rapid breathing					Number of children
	Antibiotic pill/syrup	Cough syrup	Other pill/syrup	Injection	Other	
<b>DHS-II</b>						
<b>Sub-Saharan Africa</b>						
Burkina Faso	12.1	10.5	2.8	1.7	48.3	618
Cameroon	13.1	43.9	4.6	9.0	33.7	277
Madagascar	19.8	14.8	27.0	4.9	20.2	783
Malawi	23.7	21.0	37.3	5.8	6.4	545
Namibia	22.7	57.7	24.5	3.4	4.3	646
Niger	9.4	13.2	6.3	5.5	22.4	603
Nigeria	23.3	35.2	22.7	23.4	13.0	474
Rwanda	3.8	17.4	24.7	7.3	32.0	1,633
Senegal	18.3	20.3	12.7	4.4	13.7	710
Tanzania	21.7	49.5	19.3	25.0	7.9	591
Zambia	13.7	39.5	27.4	8.9	13.5	681
<b>Asia/Near East/ North Africa</b>						
Egypt	24.4	62.0	32.6	21.7	2.3	662
Indonesia	41.5	66.2	16.9	U	14.5	1,299
Morocco	6.5	32.2	2.8	2.0	30.7	737
Pakistan	16.3	33.6	34.9	13.4	5.8	928
<b>Latin America/ Caribbean</b>						
Brazil (NE)	13.1	41.4	0.8	3.7	56.5	574
Dominican Republic	28.5	45.7	14.9	5.7	18.3	779
Peru	18.0	14.2	U	U	52.9	1,857

U = Unknown (not available)

**Table 5.3 Use of oral antibiotics and/or injection to treat children under five with cough accompanied by rapid breathing by presence of fever**

Among children 0-59 months with cough accompanied by rapid breathing in the two weeks preceding the survey, the percentage who received oral antibiotics and/or injections (according to the mother) by presence of fever, Demographic and Health Surveys, 1990-1995

Country	Cough and rapid breathing with fever		Cough and rapid breathing without fever	
	Received oral antibiotics and/or injections	Number of children	Received oral antibiotics and/or injections	Number of children
<b>DHS-II</b>				
<b>Sub-Saharan Africa</b>				
Burkina Faso	14.1	480	11.6	138
Cameroon	18.2	159	22.4	117
Madagascar	25.6	470	20.8	313
Malawi	29.8	382	23.2	163
Namibia	26.4	513	20.1	133
Niger	15.6	506	5.5	97
Nigeria	41.0	368	21.9	106
Rwanda	12.1	1185	6.2	447
Senegal	23.8	585	8.0	125
Tanzania	44.1	459	24.8	131
Zambia	22.1	511	20.9	170
<b>Asia/Near East/ North Africa</b>				
Egypt	46.3	437	26.7	224
Indonesia	51.0	996	10.5	301
Morocco	7.0	559	11.8	178
Pakistan	30.3	709	15.3	218
<b>Latin America/ Caribbean</b>				
Brazil (NE)	20.7	254	10.6	320
Dominican Republic	44.8	469	13.8	310

Table 5.4 Percentage of children under five with cough accompanied by rapid breathing taken to a medical facility, by background characteristics

Percentage of children 0-59 months with cough accompanied by rapid breathing in the two weeks preceding the survey who were taken to a medical facility by background characteristics Demographic and Health Surveys 1990-1995

Country	Child's age					Child's sex		Birth order				Mother's age					Residence		Mother's level of education			Radio present		Percentage of children with cough and rapid breathing taken to medical facility	Number of children with cough and rapid breathing
	<6	6-11	12-23	24-35	36-59	Male	Female	1	2-3	4-5	6+	15-19	20-34	35+	Urban	Rural	No education	Primary	Secondary+	No	Yes				
<b>DHS-II</b>																									
<b>Sub-Saharan Africa</b>																									
Burkina Faso	13.1	23.8	26.7	10.4	17.9	18.6	19.0	23.0	20.6	19.5	14.8	15.4	19.8	17.2	36.1	15.7	17.1	25.0	56.8	17.1	19.8	18.8	618		
Cameroon	51.6	49.8	58.6	36.7	36.6	50.8	41.8	52.0	47.9	49.4	37.7	37.6	51.1	35.1	54.5	42.1	35.0	51.1	59.8	31.3	54.6	46.4	277		
Madagascar	40.2	49.1	42.8	40.6	37.1	39.0	44.6	44.8	41.6	42.4	38.9	44.1	40.5	44.2	58.0	38.8	38.5	37.6	53.3	39.2	47.1	41.6	783		
Malawi	59.7	54.2	52.8	58.3	46.7	52.6	54.8	45.7	59.7	57.6	50.0	47.9	56.6	46.9	50.0	53.9	55.4	51.9	53.3	51.5	57.7	53.7	545		
Namibia	60.8	80.5	69.2	69.8	59.2	67.3	67.1	72.5	63.5	63.1	69.8	69.7	68.5	63.0	73.8	65.2	61.5	64.7	76.3	64.7	68.6	67.2	646		
Niger	8.1	23.8	17.0	13.7	8.5	15.8	11.0	16.3	15.6	13.6	10.7	13.8	14.2	10.7	49.7	9.0	10.9	35.9	53.9	9.1	19.8	13.5	603		
Nigeria	46.1	27.7	39.6	33.2	38.6	34.4	40.2	37.5	38.3	42.2	30.7	24.5	36.4	43.4	43.5	36.1	31.9	37.4	65.3	35.0	38.8	37.2	474		
Rwanda	24.4	46.3	31.4	32.3	22.1	31.7	28.4	32.9	30.7	29.4	28.4	33.3	31.4	26.6	50.0	29.5	27.5	31.8	41.0	26.9	36.5	30.0	1 633		
Senegal	29.5	42.7	34.7	33.3	23.3	31.2	32.5	30.8	28.6	30.7	35.5	13.7	33.8	31.9	39.7	28.3	28.7	46.9	48.0	29.0	32.6	31.8	710		
Tanzania	48.3	73.8	71.1	65.4	54.2	65.4	64.6	68.5	64.1	56.2	71.9	69.3	63.7	67.4	73.9	61.6	60.5	66.1	85.3	65.0	64.8	65.0	591		
Zambia	56.6	71.4	64.8	57.5	56.8	60.7	62.3	64.3	65.2	60.8	56.2	62.4	64.6	49.9	73.1	54.4	42.7	64.6	76.2	58.5	67.2	61.5	681		
<b>Asia/Near East/ North Africa</b>																									
Egypt	47.9	64.3	69.3	55.8	52.0	61.2	55.4	61.6	58.1	61.8	54.3	57.3	58.9	57.9	64.6	55.1	51.3	63.6	68.6	54.9	61.3	58.6	662		
India <sup>1</sup>	65.2	72.0	72.1	65.9	65.1	73.0	63.1	76.9	67.0	66.4	59.4	73.9	68.8	58.7	77.6	66.6	64.6	75.4	77.3	64.4	76.3	66.3	2 946		
Indonesia	52.6	69.3	63.5	64.0	66.4	66.3	62.3	64.3	63.8	72.8	55.0	53.7	65.6	63.3	75.6	60.3	49.1	64.6	74.3	59.1	70.3	64.4	1 299		
Morocco	20.3	26.7	21.7	16.0	10.5	19.0	15.6	19.0	18.6	14.5	17.4	19.0	17.3	17.3	25.6	14.3	15.1	23.2	48.5	10.2	19.0	17.4	737		
Pakistan	65.2	76.8	65.9	64.8	62.5	67.5	65.1	72.7	62.4	74.7	58.8	66.1	66.9	64.5	76.4	62.5	62.8	76.8	84.4	64.7	69.1	66.3	928		
<b>Latin America/ Caribbean</b>																									
Brazil (NE)	30.5	36.7	33.8	37.9	26.2	30.0	34.4	37.9	32.2	33.6	26.7	29.0	33.1	29.0	39.5	25.2	27.6	32.2	49.0	31.3	32.9	32.1	574		
Dominican Republic	44.0	50.4	39.2	33.8	38.9	41.7	39.2	51.3	41.7	28.8	25.1	33.5	42.2	31.1	46.3	33.8	26.8	32.6	59.8	34.7	46.9	40.5	779		
Peru	36.0	38.4	36.4	29.3	29.2	33.8	31.8	37.4	37.6	27.5	24.6	28.1	34.4	29.3	41.5	21.0	19.7	26.4	43.3	23.7	35.4	32.9	1 857		

Continued

Table 5.4—Continued

Country	Child's age					Child's sex		Birth order				Mother's age					Residence		Mother's level of education			Radio present		Percentage of children with cough and rapid breathing taken to medical facility	Number of children with cough and rapid breathing
	<6	6-11	12-23	24-35	36-59	Male	Female	1	2-3	4-5	6+	15-19	20-34	35+	Urban	Rural	No education	Primary	Secondary+	No	Yes				
<b>DHS-III</b>																									
<b>Sub-Saharan Africa</b>																									
Central African Rep. <sup>2</sup>	38.9	47.3	41.6	36.6	U	43.0	39.4	45.0	43.3	46.7	29.5	45.0	42.9	30.9	51.7	33.8	32.8	45.5	61.3	31.8	47.8	41.2	726		
Cote d'Ivoire <sup>2</sup>	30.6	42.5	37.8	40.1	U	41.5	34.5	42.1	38.0	35.9	38.2	28.0	39.9	39.4	53.6	28.6	32.9	43.1	58.8	30.1	43.9	38.2	499		
Ghana <sup>2</sup>	41.7	34.5	56.9	31.1	U	46.6	37.8	43.9	45.7	37.3	44.7	35.7	39.6	57.5	62.5	38.1	38.2	48.0	37.5	35.2	53.7	42.8	208		
Kenya	45.4	59.2	53.0	49.6	50.4	52.2	51.1	55.0	53.3	49.5	48.9	50.3	52.1	50.2	66.7	49.9	47.3	50.1	59.0	45.2	56.3	51.7	1 027		
Zimbabwe <sup>2</sup>	47.2	52.3	55.7	50.9	U	51.0	53.4	46.5	58.6	53.2	47.6	28.6	55.9	48.0	63.6	50.0	52.5	48.4	58.4	48.2	58.0	52.2	564		
<b>Asia/Near East/ North Africa</b>																									
Bangladesh <sup>2</sup>	21.1	37.0	29.2	24.2	U	29.9	25.3	31.6	27.8	26.9	22.6	29.4	28.0	23.1	33.4	27.3	24.2	28.0	42.5	24.3	39.7	27.9	850		
Indonesia	51.7	71.4	63.1	58.2	64.7	65.0	60.1	66.0	65.1	57.1	58.2	36.9	65.2	60.5	77.9	57.4	47.0	60.4	77.2	58.9	66.0	62.8	1 591		
Philippines	56.5	56.0	55.0	49.6	46.1	51.9	50.6	55.3	52.0	52.5	45.4	40.9	52.2	50.2	55.8	48.0	25.2	47.1	56.7	U	U	51.3	736		
Turkey	46.6	51.2	32.2	42.5	31.2	36.1	38.7	49.8	33.5	27.3	31.5	48.2	38.2	26.6	44.3	30.3	31.7	36.3	57.3	38.9	36.4	37.3	435		
<b>Latin America/ Caribbean</b>																									
Bolivia <sup>2</sup>	37.4	41.7	40.3	38.2	U	40.7	38.4	51.5	43.4	35.9	27.0	52.7	40.0	32.7	46.5	31.4	22.4	33.2	54.3	27.1	43.1	39.7	595		
Colombia	56.0	64.8	45.9	43.6	45.7	51.6	45.7	52.1	50.8	43.6	32.9	40.3	51.2	39.3	56.1	35.4	26.5	39.3	58.3	46.3	49.1	48.7	1 187		
Haiti	24.4	33.7	33.6	28.9	19.6	29.6	25.1	32.4	31.1	26.8	16.0	30.5	27.9	25.1	38.3	22.7	19.9	28.6	60.4	24.4	32.6	27.4	659		

U = Unknown (not available)

<sup>1</sup> Children under 4<sup>2</sup> Children under 3

**Table 5.5 Prevalence of one, two, or three symptoms (diarrhea, fever, cough) in children under five**

Percentage of children 0-59 months with one, two, or three symptoms (diarrhea, fever, cough) in the two weeks preceding the survey, and the percentage with no symptoms by age (according to the mother), Demographic and Health Surveys, 1990-1995

Country	Number of symptoms present			Percentage of children with no symptoms present, by age in months							Number of children
	1	2	3	<6	6-11	12-23	24-35	36-59	0-35	0-59	
<b>DHS-II</b>											
<b>Sub-Saharan Africa</b>											
Burkina Faso	28.2	13.6	3.5	58.1	38.0	41.7	50.7	66.5	47.1	54.7	5,545
Cameroon	26.7	8.1	2.0	72.6	51.4	50.6	58.9	73.4	56.9	63.2	3,189
Madagascar	25.1	11.7	2.1	66.6	46.7	50.7	58.5	71.2	55.4	61.1	5,013
Malawi	29.2	18.0	3.6	51.6	25.0	33.2	48.3	65.8	39.8	49.2	3,789
Namibia	21.8	14.2	7.4	56.9	41.4	45.3	58.0	67.4	50.8	56.5	3,601
Niger	30.7	18.6	5.0	47.0	29.0	32.1	44.8	58.0	38.6	45.7	5,717
Nigeria	23.8	12.7	2.5	69.4	52.4	50.4	56.4	68.6	56.2	61.0	7,107
Rwanda	24.3	23.0	8.3	44.2	20.7	27.8	46.0	58.2	35.6	44.4	5,042
Senegal	26.0	16.1	4.6	49.5	34.7	38.2	53.1	66.4	44.6	53.3	5,124
Tanzania	25.3	9.9	2.2	68.2	44.1	49.2	64.3	73.8	56.3	62.6	7,256
Zambia	33.1	17.1	3.7	60.8	33.3	31.6	41.4	57.2	40.4	46.1	5,396
<b>Asia/Near East/ North Africa</b>											
Egypt	18.7	8.9	2.0	70.6	54.0	58.6	70.4	79.3	63.8	70.4	8,089
India <sup>1</sup>	18.3	7.1	1.3	78.1	64.0	67.4	75.6	79.6	71.3	73.3	45,969
Indonesia	20.5	9.8	2.5	73.9	55.3	55.8	64.9	75.9	61.6	67.3	13,392
Morocco	19.8	12.6	3.2	66.3	52.9	57.1	63.4	70.8	59.8	64.4	4,853
Pakistan	22.1	13.4	3.8	61.0	47.2	53.2	58.7	70.0	55.5	60.8	5,860
<b>Latin America/ Caribbean</b>											
Brazil (NE)	27.1	10.4	2.5	60.4	44.7	50.0	60.8	67.2	54.8	60.0	3,163
Dominican Rep	24.8	14.4	3.7	58.1	38.8	48.6	59.6	66.4	51.5	57.1	3,660
<b>DHS-III</b>											
<b>Sub-Saharan Africa</b>											
Central African Rep <sup>2</sup>	28.1	18.7	6.7	61.7	32.7	40.3	51.8	U	46.5	U	2,577
Cote d'Ivoire <sup>2</sup>	31.3	17.6	4.1	60.2	36.1	42.1	49.8	U	47.0	U	3,645
Ghana <sup>2</sup>	29.1	11.1	2.1	69.3	48.6	52.5	60.7	U	57.6	U	2,056
Kenya	30.1	16.4	3.5	55.9	35.3	37.9	49.0	58.9	43.9	50.0	5,650
Zimbabwe <sup>2</sup>	24.6	21.7	6.9	57.8	33.4	41.8	53.3	U	46.9	U	2,221
<b>Asia/Near East/ North Africa</b>											
Indonesia	22.6	9.9	2.5	74.1	50.2	54.5	62.9	72.7	59.9	65.0	15,883
Philippines	22.9	8.3	1.5	74.9	53.9	58.3	66.1	74.4	62.7	67.3	8,512
Turkey	24.7	14.2	4.6	53.9	38.8	43.4	57.4	68.2	48.7	56.5	3,532
<b>Latin America/ Caribbean</b>											
Bolivia <sup>2</sup>	22.1	16.8	6.9	67.9	47.7	47.5	57.6	U	54.2	U	3,335
Colombia	25.8	14.9	4.4	57.8	43.1	45.8	53.8	62.9	49.8	54.9	4,891
Haiti	29.0	19.6	6.4	48.9	23.7	31.5	42.3	58.0	36.4	45.0	3,265

U = Unknown (not available)

<sup>1</sup> Children under 4 years

<sup>2</sup> Children under 3 years

Table 5 4 indicates there tends to be a negative relationship between increasing birth order and the proportion of children taken to a medical facility for treatment of cough with rapid breathing. Second, the mean prevalence for children whose mothers are 20 to 34 years is higher than that for children whose mothers are younger or older. Finally, there are strong positive associations with urban residence, increasing education of the mother, and the presence of a radio in the household.

### 5 3 CO-EXISTENCE OF SYMPTOMS

Table 5 5 presents the distribution of combinations of symptoms of diarrhea, fever, and cough reported by mothers for the two-week period preceding the survey. The more symptoms displayed by a child, the more serious the illness. Table 5 5 also shows the proportion of children who have no symptoms by age in months.

The vast majority of sick children age 0-59 have only one symptom, followed in order of prevalence level by children with two symptoms, and those with three. On average, 25 percent of children have one symptom, 14 percent have two, and 4 percent have three. The average proportion of children with no symptoms is 62 percent at age less than six months, 42 percent at age 6 to 11 months, 46 percent at 12 to 23 months, 57 percent at 24 to 35 months, and 68 percent at 36 to 59 months.

Comparing symptom prevalence among countries, the range of prevalence is 15 percentage points for children with one symptom and 14 percentage points for those with two. For children with three symptoms, the range of prevalence is 7 percentage points, reflecting the fact that the proportion of children with three symptoms is low for all countries.

The proportion of children with no symptoms is shown for children age 0 to 35 months and children age 0 to 59 months because, as noted above, some DHS-III surveys included only children 0 to 35 months in their samples. These countries are Ghana, Zimbabwe, the Central African Republic, Côte d'Ivoire, Bolivia, and India (which included children age 0 to 47 months in the sample).

Total prevalence of no symptoms for children age 0 to 35 months ranges from 36 percent in Rwanda and Haiti to 71 percent in India. For countries with data for children 0 to 59 months, prevalence ranges from 44 percent in Rwanda to 73 percent in India.

For children age 0 to 59 months, the upper quartile (63.2 percent or above) includes Egypt, India, Indonesia (DHS-II and DHS-III), Morocco, and the Philippines. The lower quartile (below 46.5 percent) includes Niger, Rwanda, Zambia, and Haiti. Again, it should be remembered that prevalence over a two-week period can be strongly influenced by the season in which the survey was conducted.

## 6 Summary and Conclusions

In interpreting the data presented in this report, several limitations should be kept in mind. Although the DHS-II and DHS-III surveys took every precaution to ensure the reliability and validity of questions, all cross-sectional surveys reflect variations in the ways in which questions are understood. These variations are often based on linguistic and cultural features of the countries in which surveys are conducted.

Seasonality also affects the comparability of disease prevalence data. The frequency with which diarrhea, fever, and respiratory symptoms occur is affected by rainfall and temperature, which in many countries have distinct seasonal patterns. Cross-sectional surveys—which of necessity seek to gather data as synchronously as possible—are not designed to reflect longitudinal variations in prevalence due to seasonal factors.

The strength of cross-sectional, population-based sample surveys, such as those conducted under DHS-II and DHS-III, lies in their ability to provide statistically reliable estimates of reported morbidity for entire countries and major geographical, demographic, and socioeconomic subdivisions of these countries. The DHS surveys present broad-based summaries of public health which can point to a need for targeted investigation of disease prevalence and treatment.

The survey results presented in this report indicate the prevalence of diarrhea among children under five varies by age. Prevalence tends to increase after age 5 months to a high at 12 to 17 months, then declines to a low at 48 to 59 months. It is highest among children of young mothers. The prevalence of diarrhea is slightly higher for male children and for children born after a short birth interval. Overall, 8 to 28 percent of children age 0-59 months had diarrhea in the two weeks preceding the survey. Among children under three, prevalence ranged from 10 to 37 percent.

Diarrhea prevalence also varies with background characteristics of the mother and child. Children whose mothers have secondary or higher education have lower prevalence than those whose mothers have primary or no education. There is a tendency for children in urban areas to have lower diarrhea prevalence than those in rural areas. On average, children in households with a radio—and, therefore, access to health education broadcasts—have slightly lower prevalence than children in households with no radio.

Household facilities indicative of domestic hygiene and socioeconomic status are also related to prevalence. As might be expected, lower prevalence coincides with the presence of piped water, toilet facilities (especially a flush toilet), and finished (versus unfinished) floors.

Measles vaccination appears to have a protective effect against diarrhea. Diarrhea prevalence is, on average, 18 percent lower among vaccinated children. The protective effect of breastfeeding is, however, stronger than that of measles vaccination, particularly at ages 0 to 2 months. In this age range, a partially breastfed child is 57 percent more likely to have had diarrhea than a child who has been fully breastfed.

Oral rehydration therapy, which includes administration of a solution prepared from ORS packets, or a homemade sugar-salt-water solution, is an important modality for managing diarrhea, particularly in young children. On average, 73 percent of mothers reported knowing of ORS. Knowledge is noticeably higher in urban areas and among educated women (especially those with at least secondary education). A mother is more likely to know of ORS if she has a health card for her child. Possession of a card is indicative of contact with health facilities, where a mother is likely to hear about ORS.

Knowledge of desirable health practices does not necessarily translate into utilization. This is the case with ORS. On average, 29 percent of children with diarrhea were treated with ORS. Among those who were not treated with ORS, 46 percent of the mothers reported knowing about the treatment. Nonuse of ORS among women who have heard of it could be due to a number of factors including lack of availability. Typically, ORS use is higher in urban areas where, in many countries, availability is greater than in rural areas. Mothers with secondary or higher education are more likely to give ORS to their sick children than less educated mothers.

Care-seeking behavior is of considerable interest in countries seeking to upgrade primary health care facilities and to provide more effective treatment for children under five. On average, only one-third of children with diarrhea are taken to a medical facility for treatment. The tendency of mothers to obtain advice or treatment for their children varies by demographic and socioeconomic characteristics. Prevalence of visits to medical facilities is highest among children age 6 to 23 months, children at lower birth orders, children in urban areas, and children of mothers with at least secondary education. If a child has fever as well as diarrhea the mother is more likely to seek medical attention than if the child has just diarrhea.

Among children with diarrhea who were treated at medical facilities, ORS was the most common form of management, followed by drugs alone, and a combination of drugs and ORS. As reported in the DHS surveys, drugs most often mean antibiotics. Use of antibiotics is widespread in the countries surveyed. As noted above, this is because mothers tend to view antibiotics as

especially effective in treating most infectious diseases, even when the administration of antibiotics is not medically appropriate. The competence of clinicians is often judged by whether or not they dispense antibiotics. Many health care providers will comply with this criterion regardless of the appropriateness of an antibiotic prescription.

The average reported prevalence of fever among children under five in the two weeks prior to the survey was 31 percent (considerably higher than the average of 16 percent reported for diarrhea). There are large variations in fever prevalence among countries. Prevalence also tends to be higher at the higher birth orders and lower among urban children and those whose mothers have secondary or higher education. Otherwise, there are no marked associations between fever prevalence and background characteristics of mother and child.

For DHS-II (but not DHS-III) information is available on mothers' recall of treatment given for fever. It is likely that a large proportion of fever prevalence in DHS surveys is due to malaria. In many countries, clinicians are encouraged to give antimalarials for fever in children. In keeping with this emphasis, the survey data indicate that about 25 percent of children are (according to their mothers) given antimalarials. Another 20 percent are given antibiotics in pill or syrup form, and 8 percent are treated with injections, many of which are probably antibiotics. A further 42 percent receive unspecified, "other" pills or syrups. Whether in pills, syrups, or injections, antibiotics are widely used to treat children with fever. Again, in interpreting these data it should be remembered that mothers' recollections of medicines received by their children are imperfect.

For both DHS-II and DHS-III mothers' reports are available on whether they took their children with fever to a medical facility. On average, just over 43 percent of children with fever were taken for consultation to a medical facility. As in the case of diarrhea, the prevalence of clinic visits is highest for children age 6 to 11 months. It is also positively associated with lower birth order, increasing level of maternal education, and urban residence.

The average prevalence of cough with rapid breathing—which could include serious cases of acute lower respiratory infection—is 16 percent. Prevalence correlates are similar to those for diarrhea and fever. Higher prevalences of respiratory symptoms are associated with the post-weaning ages 6 to 23 months, higher birth order, low maternal education, and rural residence.

DHS-II reports of treatment for cough with rapid breathing show greater reliance on cough syrup than antibiotics. The average prevalence of treatment with cough syrup is 34 percent, compared with 18 percent for antibiotics. In general, antibiotics are more appropriate for respiratory infections than for diarrhea or fever. The prevalence of injection is 9 percent, while for "other" pills or syrups (which may include antibiotics), prevalence is 18 percent.

In both DHS-II and DHS-III mothers were asked if they had obtained advice or treatment for children with cough accompanied by rapid breathing and, if so, whether they had taken their children to a medical facility. The mean prevalence of children being taken to a medical facility for treatment of cough with rapid breathing is 44 percent, higher than for any other symptom discussed in this report.

## References

- Adetunji, Jacob A 1991 Response of parents to five killer diseases among children in a Yoruba community, Nigeria *Social Science and Medicine* 32(12) 1379-1387
- Boerma, J Ties, R E Black, A Elisabeth Sommerfelt, Shea O Rutstein, and George T Bicego 1991 Accuracy and completeness of mothers' recall of diarrhoea occurrent in pre-school children in demographic and health surveys *International Journal of Epidemiology* 20(4) 1073-1080
- Boerma, J Ties, A Elisabeth Sommerfelt, and Shea O Rutstein 1991 *Childhood morbidity and treatment patterns* DHS Comparative Studies No 4 Columbia, Maryland Institute for Resource Development/Macro International
- DeClerque, Julia, Patricia Bailey, Barbara Janowitz, Rosalie Dominik, and Carlos Fiallos 1992 Management and treatment of diarrhea in Honduran children Factors associated with mothers' health care behaviors *Social Science and Medicine* 34(6) 687-695
- Foster Stanley O , Deborah A McFarland, and A Meredith John 1993 Measles In *Disease control priorities in developing countries*, ed Dean T Jamison, W Henry Moseley, Anthony R Measham, and Jose Luis Bobadilla New York Oxford University Press
- Harrison, Lee H , Salama Moursi, A H Guinena, Anne M Gadomski, K S El-Ansary, Nagwo Khallaf, and Robert E Black 1995 Maternal reporting of acute respiratory infection in Egypt *International Journal of Epidemiology* 24(5) 1058-1063
- Hart, C A 1996 Introduction to acute infective diarrhoea In *Manson's tropical diseases* ed G G Cook London W B Saunders
- Herman, Elizabeth, Robert E Black, Saneya Wahba, and Nagwo Khallaf 1994 Developing strategies to encourage appropriate care-seeking for children with acute respiratory infections An example from Egypt *International Journal of Health Planning and Management* 9 235-243
- Iyun, B Folasade and Goran Tomson 1996 Acute respiratory infections—mothers' perceptions of etiology and treatment in South-Western Nigeria *Social Science and Medicine* 42(3) 437-445
- Martines, José, Margaret Phillips, and Richard G A Feachem 1993 Diarrheal Diseases In *Disease control priorities in developing countries*, ed Dean T Jamison, W Henry Moseley, Anthony R Measham, and José Luis Bobadilla New York Oxford University Press
- Saini, N K , D R Gaur, V Saini, and Sunder Lal 1992 Acute respiratory infections in children A study of knowledge and practices of mothers in rural Haryana *Journal of Communicative Diseases* 24(2) 75-77
- Tomson, Goran and Goran Sterky 1986 Self-prescribing by way of pharmacies in three Asian developing countries *Lancet* 2 (8507) 620-622
- Widarsa, K Tanking and A A Gde Muninjaya 1994 Factors associated with the use of oral rehydration solution among mothers in West Lombok, Indonesia *Journal of Diarrhoeal Disease Research* 12(4) 261-264
- World Health Organization (WHO) 1995 *Malaria (The current situation)* Geneva World Health Organization
- World Health Organization (WHO) 1996 World health report, 1995—executive summary Geneva World Health Organization
- World Health Organization (WHO)/Republic of Zambia n d *Management of childhood illness*
- Yeneneh, H , T W Gyorkos, L Joseph, J Pickering, and S Tedla 1993 Antimalarial drug utilization by women in Ethiopia A knowledge—attitudes—practice study *Bulletin of the World Health Organization* 71(6) 763-772

# Appendix A

## Summary of DHS-I, DHS-II, and DHS-III Surveys, 1985-1997

Region and Country	Date of Fieldwork	Implementing Organization	Respondents	Sample Size	Male/Husband Survey	Supplemental Studies Modules and Additional Questions
<b>SUB SAHARAN AFRICA</b>						
<b>DHS I</b>						
Botswana	Aug Dec 1988	Central Statistics Office	AW 15-49	4 368		AIDS PC adolescent fertility
Burundi	Apr Jul 1987	Département de la Population Ministère de l Intérieur	AW 15-49	3 970	542 Husbands	CA SAI adult mortality
Ghana	Feb May 1988	Ghana Statistical Service	AW 15-49	4 488	943 Husbands	CA SM WE
Kenya	Dec May 1988/89	National Council for Population and Development	AW 15-49	7 150	1 133 Husbands	
Liberia	Feb Jul 1986	Bureau of Statistics Ministry of Planning and Economic Affairs	AW 15-49	5 239		TBH employment status
Mali	Mar Aug 1987	Institut du Sahel USED/CERPOD	AW 15-49	3 200	970 Men 20-55	CA VC childhood physical handicaps
Ondo State Nigeria	Sep Jan 1986/87	Ministry of Health Ondo State	AW 15-49	4 213		CA TBH
Senegal	Apr Jul 1986	Direction de la Statistique Ministère de l Economie et des Finances	AW 15-49	4 415		CA, CD
Sudan	Nov May 1989/90	Department of Statistics Ministry of Economic and National Planning	EMW 15-49	5 860		FC M MM
Togo	Jun Nov 1988	Unité de Recherche Démographique Université du Bénin	AW 15-49	3 360		CA SAI marriage history
Uganda	Sep Feb 1988/89	Ministry of Health	AW 15-49	4 730		CA SAI
Zimbabwe	Sep Jan 1988/89	Central Statistical Office	AW 15-49	4 201		AIDS CA PC SAI WE
<b>DHS II</b>						
Burkina Faso	Dec Mar 1992/93	Institut National de la Statistique et de la Démographie	AW 15-49	6 354	1 845 Men 18+	AIDS CA MA SAI
Cameroon	Apr-Sep 1991	Direction Nationale du Deuxieme Recensement Général de la Population et de l Habitat	AW 15-49	3 871	814 Husbands	CA CD SAI
Madagascar	May Nov 1992	Centre National de Recherches sur l Environnement	AW 15-49	6 260		CA MM SAI
Malawi	Sep Nov 1992	National Statistical Office	AW 15-49	4 850	1 151 Men 20-54	AIDS CA MA MM SAI
Namibia	Jul Nov 1992	Ministry of Health and Social Services Central Statistical Office	AW 15-49	5 421		CA CD MA MM
Niger	Mar Jun 1992	Direction de la Statistique et des Comptes Nationaux	AW 15-49	6 503	1 570 Husbands	CA, MA MM SAI
Nigeria	Apr Oct 1990	Federal Office of Statistics	AW 15-49	8 781		CA SAI
Rwanda	Jun Oct 1992	Office National de la Population	AW 15-49	6 551	598 Husbands	CA
Senegal	Nov Aug 1992/93	Direction de la Prevision et de la Statistique	AW 15-49	6 310	1 436 Men 20+	AIDS CA, MA MM SAI
Tanzania	Oct Mar 1991/92	Bureau of Statistics Planning Commission	AW 15-49	9 238	2 114 Men 15-60	AIDS CA MA SAI
Zambia	Jan May 1992	University of Zambia	AW 15-49	7 060		AIDS, CA, MA

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<b>DHS III</b>							
Benn	Jun Aug 1996	Institut National de la Statistique	AW 15-49	5,491	1 535 Men 20 64	AIDS, CA, MA MM SAI	
Central African Republic	Sep Mar 1994/95	Direction des Statistiques Démographiques et Sociales	AW 15-49	5,884	1 729 Men 15 59	AIDS, CA CD MA MM, SAI	
Comoros	Mar May 1996	Centre National de Documentation et de la Recherche Scientifique	AW 15-49	3 050	795 Men 15 64	CA MA	
Cote d'Ivoire	Jun Nov 1994	Institut National de la Statistique	AW 15-49	8 099	2 552 Men 12-49	CA MA SAI	
Eritrea	Sep Jan 1995/96	National Statistics Office	AW 15 49	5 054	1 114 Men 15 59	AIDS CA, MA MM SAI	
Ghana	Sep Dec 1993	Ghana Statistical Service	AW 15-49	4 562	1 302 Men 15-59	CA MA	
Kenya	Feb Aug 1993	National Council for Population and Development	AW 15-49	7 540	2 336 Men 15 54	AIDS CA MA SAI	
Madagascar	Sep-Dec 1997	Institut National de la Statistique Direction de la Démographie et des Statistiques Sociales	AW 15-49	7 060		AIDS CA MA	
Malawi (KAP) <sup>a</sup>	Jun Oct 1996	National Statistical Office	AW 15-49	2 683	2 658 Men 15 54	AIDS	
Mali	Nov Apr 1995/96	CPS/MSSPA et DNSI	AW 15 49	9 704	2 474 Men 15 59	AIDS CA MA, MM SAI	
Mozambique	Mar-Jul 1997	Instituto Nacional de Estatistical Ministério de Saude	AW 15 49	8 779	2 335 Men 15 64	CA MA MM SAI	
Senegal (Interim)	Jan Apr 1997	Division de Statistiques Démographiques Direction de la Prévision et de la Statistique	AW 15 49	8 593	4 306 Men 20+	AIDS	
Tanzania (KAP) <sup>a</sup>	Jul-Sep 1994	Bureau of Statistics Planning Commission	AW 15 49	4 225	2 097 Men 15 59	AIDS PC	
Tanzania (In depth)	Jun Oct 1995	Bureau of Statistics Planning Commission	AW 15 49	2 130		Adult and childhood mortality estimation	
Tanzania	Jul Nov 1996	Bureau of Statistics Planning Commission	AW 15 49	8 120	2 256 Men 15 59	AIDS CA MA MM	
Uganda	Mar Aug 1995	Statistics Department Ministry of Finance and Economic Planning	AW 15 49	7 070	1 996 Men 15 59	AIDS CA MA MM SAI	
Uganda (In depth)	Oct Jan 1995/96	Institute of Statistics and Applied Economics Makerere University	AW 20-44	1 750	1,356 Partners	Negotiating reproductive outcomes	
Zambia	Jul Jan 1996/97	Central Statistics Office	AW 15 49	8 021	1 849 Men 15 59	AIDS CA MA MM	
Zimbabwe	Jul Nov 1994	Central Statistical Office	AW 15-49	6 128	2 141 Men 15 54	AIDS CA MA MM PC SAI	

#### NEAR EAST/NORTH AFRICA

<b>DHS I</b>						
Egypt	Oct Jan 1988/89	National Population Council	EMW 15-49	8 911		CA CD MM PC SAI WE WS
Morocco	May Jul 1987	Ministère de la Santé Publique	EMW 15 49	5 982		CA CD S
Tunisia	Jun Oct 1988	Office National de la Famille et de la Population	EMW 15-49	4 184		CA S SAI
<b>DHS II</b>						
Egypt	Nov-Dec 1992	National Population Council	EMW 15-49	9 864	2 466 Husbands	CA MA PC SM
Jordan	Oct Dec 1990	Department of Statistics Ministry of Health	EMW 15-49	6 461		CA SAI
Morocco	Jan Apr 1992	Ministère de la Santé Publique	AW 15-49	9 256	1 336 Men 20 70	CA, MA MM SAI
Yemen	Nov Jan 1991/92	Central Statistical Organization	EMW 15-49	5 687		CA CD SAI

<b>DHS-III</b>						
Egypt	Nov Jan 1995/96	National Population Council	EMW 15-49	14 779		CA FC MA WS
Jordan	Jun Oct 1997	Department of Statistics	EMW 15-49	5 548		AIDS CA MA, MM
Morocco (Panel)	Apr May 1995	Ministère de la Santé Publique	AW 15-49	4 753		
<b>ASIA</b>						
<b>DHS I</b>						
Indonesia	Sep Dec 1987	Central Bureau of Statistics National Family Planning Coordinating Board	EMW 15-49	11 884		PC SM
Nepal (In depth)	Feb Apr 1987	New Era	CMW 15-49	1 623		KAP gap survey
Sri Lanka	Jan Mar 1987	Department of Census and Statistics Ministry of Plan Implementation	EMW 15-49	5 865		CA NFP
Thailand	Mar Jun 1987	Institute of Population Studies Chulalongkorn University	EMW 15-49	6 775		CA S SAI
<b>DHS II</b>						
Indonesia	May Jul 1991	Central Bureau of Statistics NFPCB/MOH	EMW 15-49	22 909		PC SM
Pakistan	Dec May 1990/91	National Institute of Population Studies	EMW 15-49	6 611	1 354 Husbands	CA
<b>DHS-III</b>						
Bangladesh	Nov Mar 1993/94	Mitra & Associates/NIPORT	EMW 10-49	9 640	3 284 Husbands	PC SAI SM
Bangladesh	Nov Mar 1996/97	Mitra & Associates/NIPORT	EMW 10-49	9 127	3 346 EMM	CA MA SM
Indonesia	Jul Nov 1994	Central Bureau of Statistics/ NFPCB/MOH	EMW 15-49	28 168		MM PC SAI SM
Kazakhstan	May Aug 1995	Institute of Nutrition National Academy of Sciences	AW 15-49	3 771		CA MA
Kyrgyz Republic	Aug Nov 1997	Institute of Obstetrics and Pediatrics	AW 15-49	3 848		CA MA, anemia testing
Nepal	Jan Jun 1996	Ministry of Health/New ERA	EMW 15-49	8 429		CA MA MM
Philippines	Apr Jun 1993	National Statistics Office	AW 15-49	15 029		MM SAI
Turkey	Aug Oct 1993	General Directorate of MCH/FP Ministry of Health	EMW <50	6 519		CA MA
Uzbekistan	Jun Oct 1996	Research Institute of Obstetrics and Gynecology	AW 15-49	4 415		CA MA
<b>LATIN AMERICA/CARIBBEAN</b>						
<b>DHS-I</b>						
Bolivia	Feb Jul 1989	Instituto Nacional de Estadística	AW 15-49	7 923		CA CD MM PC S WE
Bolivia (In depth)	Feb-Jul 1989	Instituto Nacional de Estadística	AW 15-49	7 923		Health
Brazil	May Aug 1986	Sociedade Civil Bem Estar Familiar no Brasil	AW 15-44	5 892		CA S SM abortion young adult use of contraception
Colombia	Oct-Dec 1986	Corporación Centro Regional de Población Ministerio de Salud	AW 15-49	5 329		CA PC S SAI SM
Dominican Republic	Sep Dec 1986	Consejo Nacional de Población y Familia	AW 15-49	7 649		CA NFP S SAI family planning communication

Dominican Republic (Experimental)	Sep Dec 1986	Consejo Nacional de Población y Familia	AW 15-49	3 885		S SAI
Ecuador	Jan Mar 1987	Centro de Estudios de Población y Paternidad Responsable	AW 15 49	4 713		CD SAI employment
El Salvador	May Jun 1985	Asociación Demográfica Salvadoreña	AW 15 49	5 207		CA S TBH
Guatemala	Oct Dec 1987	Instituto de Nutrición de Centro América y Panamá	AW 15-44	5 160		CA S SAI
Mexico	Feb May 1987	Dirección General de Planificación Familiar Secretaria de Salud	AW 15 49	9 310		NFP S employment
Peru	Sep Dec 1986	Instituto Nacional de Estadística	AW 15 49	4 999		NFP employment
Peru (Experimental)	Sep Dec 1986	Instituto Nacional de Estadística	AW 15-49	2 534		
Trinidad and Tobago	May Aug 1987	Family Planning Association of Trinidad and Tobago	AW 15 49	3 806		CA NFP breastfeeding
<b>DHS-II</b>						
Brazil (NE)	Sep Dec 1991	Sociedade Civil Bem Estar Familiar no Brasil	AW 15 49	6 222	1 266 Husbands	AIDS PC
Colombia	May Aug 1990	PROFAMILIA	AW 15 49	8 644		AIDS
Dominican Republic	Jul Nov 1991	Instituto de Estudios de Población y Desarrollo (PROFAMILIA) Oficina Nacional de Planificación	AW 15 49	7 320		CA MA S SAI
Paraguay	May-Aug 1990	Centro Paraguayo de Estudios de Población	AW 15-49	5 827		CA SAI
Peru	Oct-Mar 1991/92	Instituto Nacional de Estadística e Informática	AW 15 49	15 882		CA MA MM SAI
<b>DHS III</b>						
Bolivia	Nov May 1993/94	Instituto Nacional de Estadística	AW 15 49	8 603 <sup>b</sup>		AIDS CA CD MA MM S SAI
Brazil	Mar Jun 1996	Sociedade Civil Bem Estar Familiar no Brasil	AW 15 49	12 612	2 949 Men 15 59	AIDS CA MA, MM PC S
Colombia	Mar Jun 1995	PROFAMILIA	AW 15 49	11 140		AIDS CA MA PC
Dominican Republic	Aug Dec 1996	CESDEM/PROFAMILIA	AW 15 49	8 422	2 279 Men 15 64	CA MA
Guatemala	Jun Dec 1995	Instituto Nacional de Estadística	AW 15-49	12 403		AIDS CA MA MM S
Haiti	Jul Jan 1994/95	Institut Haïtien de l'Enfance	AW 15 49	5 356	1 610 Men 15 59	AIDS CA, CD MA SAI
Peru	Aug-Nov 1996	Instituto Nacional de Estadística e Informática	AW 15 49	28 951	2 487 Men 15 59	CA MA, MM

<sup>a</sup> No health or birth history section in questionnaire

<sup>b</sup> Household questionnaire was administered in 26 144 households

AIDS	acquired immune deficiency syndrome	FC	female circumcision	S	sterilization
AW	all women	M	migration	SAI	service availability information
CA	child anthropometry	MA	maternal anthropometry	SM	social marketing
CD	causes of death (verbal reports of symptoms)	MM	maternal mortality	TBH	truncated birth history
CMW	currently married women	NFP	natural family planning	VC	value of children
EMW	ever married women	PC	pill compliance	WE	women s employment
				WS	women s status

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