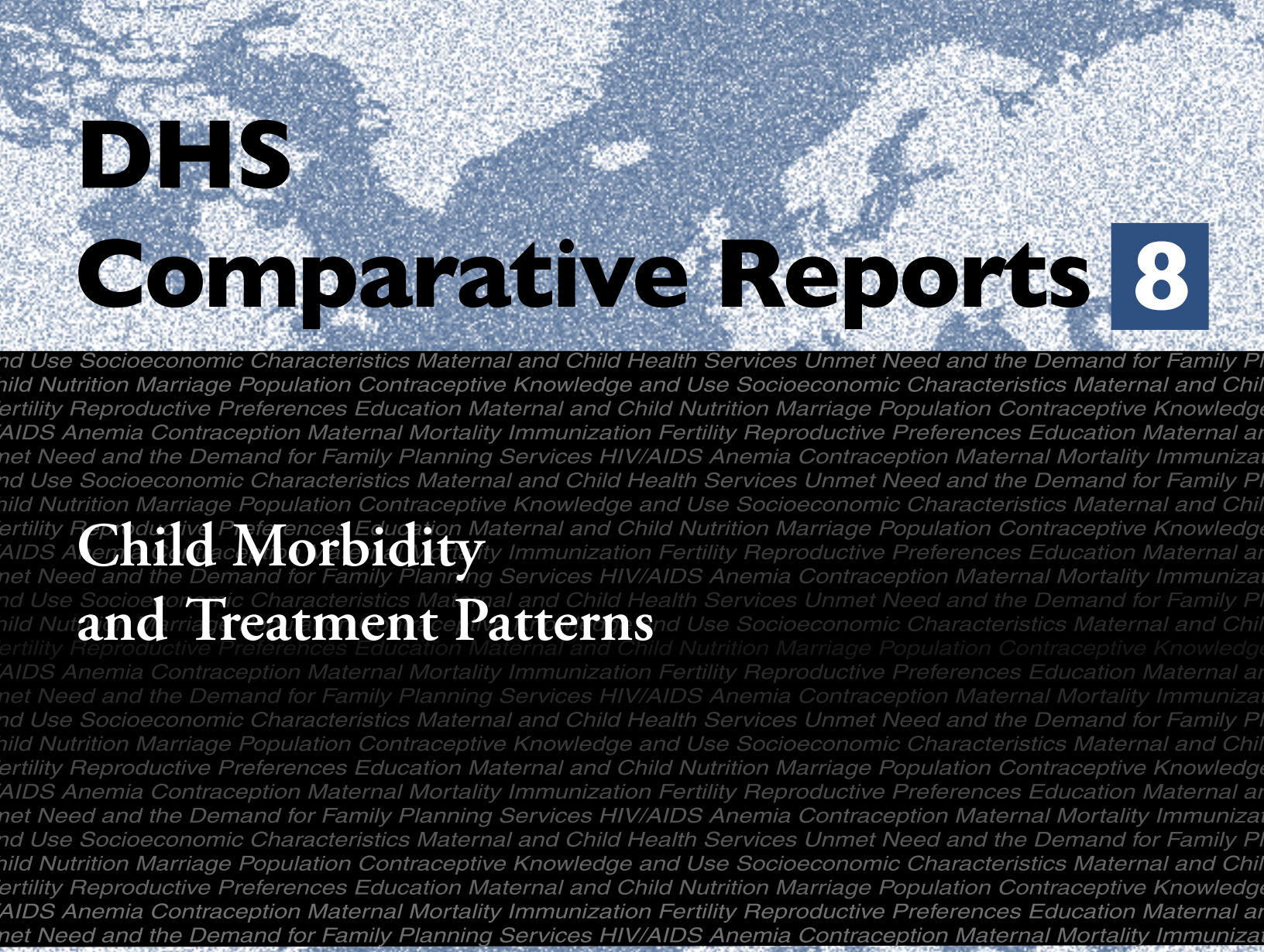
DHS Comparative Reports 8

Child Morbidity and Treatment Patterns



MEASURE *DHS+*

MEASURE *DHS*+ assists countries worldwide in the collection and use of data to monitor and evaluate population, health, and nutrition programs. Funded by the U.S. Agency for International Development (USAID), MEASURE *DHS*+ is implemented by ORC Macro in Calverton, Maryland. The opinions expressed herein are those of the authors and do not necessarily reflect the views of the U.S. Agency for International Development.

The main objectives of the MEASURE *DHS*+ project are:
1) to provide decisionmakers in survey countries with information useful for informed policy choices,
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.

Information about the MEASURE *DHS*+ project or the status of MEASURE *DHS*+ surveys is available on the Internet at http://www.measuredhs.com or by contacting:

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DHS Comparative Reports No. 8

Child Morbidity and Treatment Patterns

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December 2004

This publication was made possible through support provided by the U.S. Agency for International Development under the terms of Contract No. HRN-C-00-97-00019-00. The opinions expressed herein are those of the authors and do not necessarily reflect the views of the U.S. Agency for International Development.

Recommended citation:

Stallings, Rebecca Y. 2004. *Child Morbidity and Treatment Patterns*. DHS Comparative Reports No. 8. Calverton, Maryland: ORC Macro.

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Preface

One of the most significant contributions of the MEASURE *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 Reports* series examines these data across countries in a comparative framework. The DHS *Analytical Studies* series focuses on specific topics. The principal objectives of both series are to provide information for policy formulation at the international level and to examine individual country results in an international context. Whereas *Comparative Reports* are primarily descriptive, *Analytical Studies* take a more analytical approach.

The *Comparative Reports* series covers a variable number of countries, depending on the availability of data sets. Where possible, data from previous DHS surveys are used to evaluate trends over time. Each report provides detailed tables and graphs organized by region. Survey-related issues such as questionnaire comparability, survey procedures, data quality, and methodological approaches are addressed as needed.

The topics covered in *Comparative Reports* are selected by MEASURE *DHS*+ staff in conjunction with the MEASURE *DHS*+ Scientific Advisory Committee and USAID. Some reports are updates and expansions of reports published previously.

It is anticipated that the availability of comparable information for a large number of developing countries will enhance the understanding of important issues in the fields of international population and health by analysts and policymakers.

Martin Vaessen
Project Director

Dedication

This report is dedicated to Dr. Kenneth H. Brown and Dr. Christopher L. Kjolhede, with whom the author had the privilege of working on community-based research in the areas of early childhood diarrhea, respiratory illness, and nutrition in developing countries.

Acknowledgments

The author is very grateful to Alex Izmukhambetov of data processing for his hard work and willing spirit over the course of many table revisions. The author also thanks Dr. Alfredo Fort for his careful review of the manuscript, Dr. Michel Pacque for his comments, Katherine Senzee, Justine Faulkenburg, and Kaye Mitchell for production support, and Dr. Sidney Moore for editing.

Executive Summary

This third comparative report on childhood morbidity and treatment patterns focuses on the symptoms associated with three of the leading causes of death in early childhood (diarrhea, cough accompanied by short, rapid breathing, and fever) and treatment responses to these symptoms. The analysis is based on data collected on children under age three in 52 developing countries. The surveys were conducted between 1996 and 2002 under the DHS-III and MEASURE DHS+ programs.

The data presented in this report show wide variation both within and between world regions in the prevalence of diarrhea, fever, and the symptoms of acute lower respiratory infection (ALRI) in young children. There are also substantial differentials in maternal careseeking and other treatment responses to early childhood illness.

The symptoms of diarrhea, fever, and ALRI all peak between 6 to 17 months of age.

Overall, urban residence, higher household wealth, higher maternal education, and older maternal age are associated with a lower diarrhea prevalence, as are better child nutritional status and full breastfeeding (among infants). A household's lack of adequate sanitary facilities and finished floors in the home, and the provision of plain water or a bottle with a nipple to younger infants (under age 6 months) are associated with a higher diarrhea prevalence. Vaccination against measles is associated with a lower diarrhea prevalence throughout the second and third years of life.

Children with diarrhea living in urban areas are more likely than their rural counterparts to be taken to a health care provider. Children with diarrhea who are taken for advice or treatment to an appropriate health care provider are more likely than those not taken for care to be given oral rehydration solutions, nonrecommended treatments (including antibiotics), and to be offered more fluids and the same amount of food or more than usual, compared with children who are not taken for care. Younger infants (under age 6 months) are less likely than older children to be given oral rehydration solutions, and younger mothers (under age 20 years) are more likely than older mothers to have offered more fluids and continued feeding their child with diarrhea.

Rural children are slightly more likely than urban children to have had recent ALRI symptoms. Higher household wealth is associated with a lower prevalence of ALRI symptoms, in general, except for West/Middle Africa. Higher maternal education is associated with lower ALRI symptom prevalence in urban than in rural areas. Better nourished children are less likely to have had recent ALRI symptoms, outside of Central Asia. Children in households with natural floors, urban children in households where cooking is mainly done with biomass fuels, and children in households with 5 or more persons per sleeping room, are more likely to have had recent ALRI symptoms.

Fever is more prevalent among rural than urban children. Greater household wealth and higher maternal education are associated with lower prevalence of fever. Children born after a short birth interval (less than 24 months) and high birth order children (six or higher) are more likely than first-born children to have had fever recently, outside of Central Asia. Better nutritional status is associated with a lower prevalence of fever, except in Central Asia. Children age 12 to 23 months who have

received all recommended infant vaccinations are less likely to have had fever recently.

Information on the use of antimalarials for the treatment of fever was collected in 17 of the surveys. Overall, use of antimalarials among children reported to have had fever in the past two weeks is higher in urban than rural areas.

Urban residence, greater household wealth, and higher level of mother's education are all associated with a greater probability of seeking advice or treatment from a health care provider for a child with symptoms of ALRI and/or fever. When examined by age group, older infants (6 to 11 months) with these symptoms are most likely to be taken for care. Younger mothers (under age 20) are also somewhat more likely to seek care for these symptoms. Children born after a short birth interval (less than 24 months) are less likely than children born after a long interval (36 or more months) and high birth order children (six or higher) are less likely than first-born children to be taken for care when experiencing symptoms of ALRI and/or fever. Child's sex is not associated with differential use of care except in South/Southeast Asia where, on average, boys are more likely than girls to be taken for care.

It is anticipated that data discussed in this report will inform and guide national and international efforts to reduce the burden of childhood morbidity by highlighting those countries and/or subgroups to whom health care resources and interventions would most beneficially be directed.

1

Introduction

In 1990, the mortality rate for children under age five was 100 or more deaths per 1,000 live births in 55 countries. By the end of the decade, 50 of those countries failed to meet the target of reducing the under-five mortality rate to less than 70 deaths per 1,000 live births, a goal established at the 1990 World Summit for Children. Consequently, a new goal was set to reduce under-five mortality by two-thirds (compared with 1990) by the year 2015 as one of the United Nations Millennium Development Goals (United Nations, 2001).

One of the United Nations Millennium Development Goals was to reduce under-five mortality by two-thirds (compared with 1990) by the year 2015.

In the first of five papers published as a series on child survival by the *Lancet* in 2003, Black and colleagues used a prediction model to estimate the distribution of cause of death in the 42 countries accounting for 90 percent of all deaths among children under age five in the year 2000 (Black et al., 2003). The leading causes were, in order, neonatal conditions (33 percent), diarrhea (22 percent), pneumonia (21 percent), malaria (9 percent), AIDS (3 percent), and measles (1 percent). In the 42 countries, the proportions of deaths due to diarrhea and pneumonia were found to be fairly consistent; variability across countries was found to be largely explained by differences in deaths caused by malaria and AIDS. They concluded that the extent of variation found between major causes of death in commonly used regional groupings "highlights the need for disaggregation at regional and global levels to allow public health intervention efforts to be focused appropriately."

This document, the third comparative report[1] on childhood morbidity and treatment patterns produced under the DHS program, focuses on symptoms associated with three of the leading causes of death in early childhood: diarrhea; cough with short, rapid breathing (proxy for pneumonia and other acute lower respiratory infections); and fever (proxy for malaria and other acute illnesses warranting medical treatment). This report also examines treatment responses to these symptoms using data collected in nationally representative household surveys conducted from 1996 to 2002 in 52 developing countries.

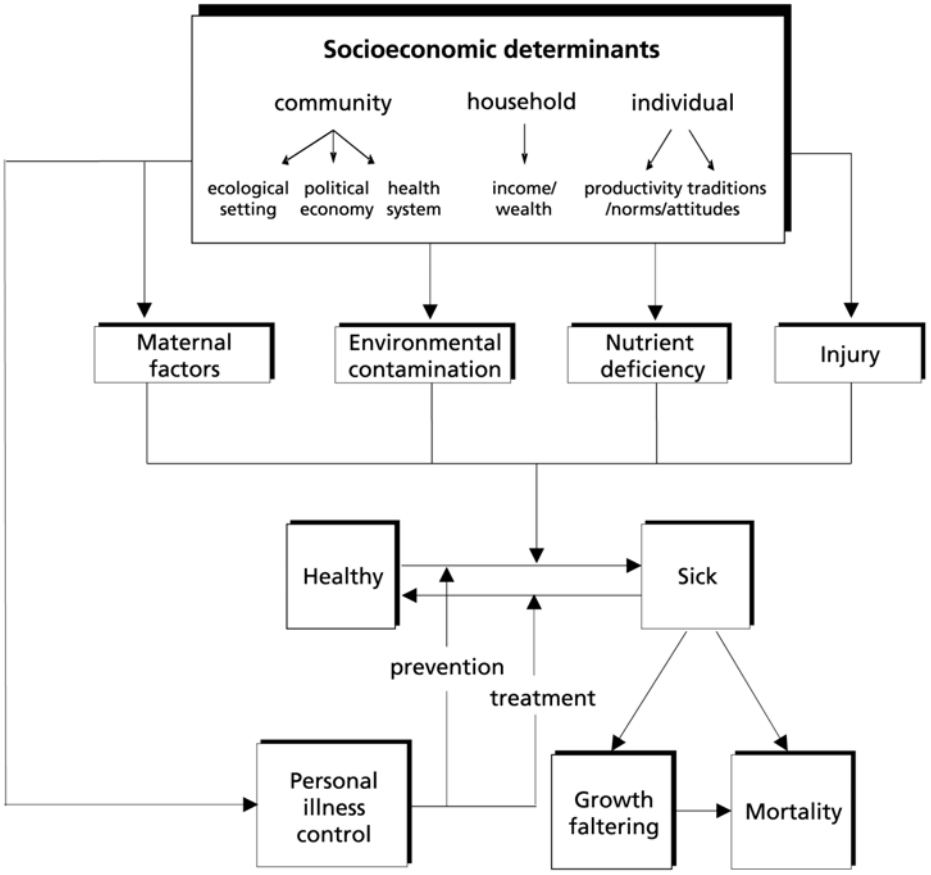
In a seminal paper, published in 1984, Mosley and Chen proposed a new analytical framework for the study of child survival in developing countries, which they referred to as a proximate determinant model (Mosley and Chen, 1984). One of the five premises upon which the framework is based is that social and economic determinants "must operate through more basic proximate determinants that in turn influence the risk of disease and the outcome of disease processes." Another premise is that "specific diseases and nutrient deficiencies observed in a surviving population may be viewed as biological indicators of the operations of the proximate determinants." A third premise is that "growth faltering and ultimately mortality in chil-

[1] Previous reports in 1991 and 1998 were published in a series called *Comparative Studies* rather than *Comparative Reports.*

dren…are the cumulative consequences of multiple disease processes, including their biosocial interactions."

Mosley and Chen identified a set of proximate determinants that they proceeded to group into five categories: maternal factors, environmental contamination, nutrient deficiency, injury, and personal illness control. Figure 1.1 illustrates the operation of these proximate determinants. The first four categories influence the rate at which healthy persons shift toward illness, while the fifth category, personal illness control, influences both the rate of illness, via the use of preventive measures like immunization, and the rate of recovery, via the use of appropriate treatments for manifest illnesses.

Figure 1.1
Model of the operation of proximate determinants



Adapted from Mosley and Chen, 1984.

Mosley and Chen further described the socioeconomic determinants as including community-, household-, and individual-level characteristics. Residence (urban-rural) is a broad, nonspecific community characteristic that is often highly correlated with the physical infrastructure, including resources for clean water and adequate sanitation (environmental contamination), the availability of health care facilities and/or providers (personal illness control), and the availability and stability of the

food supply (nutrient deficiency). Also at the community level are ecological characteristics, such as season, temperature, and rainfall, which impact food production, the water supply and sanitation, proliferation of bacteria, and transmission of vector-borne diseases.

Socioeconomic determinants at the household level are highly correlated with income or wealth. The availability and nutrient adequacy of food (nutrient deficiency), quality and quantity of water, adequacy of food storage and sanitation facilities, housing quality (such as ventilation, crowding, cleanable floors), adequacy of fuel supply to ensure proper cooking and cleaning and for warmth (environmental contamination), and the ability to access (transportation) and pay for both preventive and curative care (personal illness control) are all largely determined by income or wealth.

At the individual level are characteristics of the parents or other caretakers that operate on proximate determinants to influence the child's health and well-being. These include productivity and adherence to traditions, norms, and attitudes or beliefs. Productivity incorporates skills (commonly measured by educational attainment), demands on time for both child/family care and income generation, and personal health. Cultural traditions and societal norms can result in intrahousehold food distribution and use of resources to obtain preventive and curative health care that may be discriminatory, such as being based on a child's gender or age. Beliefs about the causes of disease or about feeding practices can result, for instance, in a reluctance to obtain recommended immunizations or to continue feeding a child who has diarrhea.

Since the late 1990s, recommended strategies for the treatment of diarrhea, acute respiratory infection (ARI), and fever in young children in developing countries have been combined by the World Health Organization (WHO), United Nations Children's Fund (UNICEF) under the umbrella of the Integrated Management of Childhood Illness (IMCI) program (Gove, 1997). A set of indicators for monitoring the effectiveness of the program at both the health facility and household levels was developed and has periodically been revised. These indicators are among those used to monitor progress toward the World Summit for Children (WSC) goals and the Millennium Development (MD) goals.

Since the late 1990s, recommended strategies for the treatment of diarrhea, acute respiratory infection, and fever in young children have been combined under the umbrella of the Integrated Management of Childhood Illness (IMCI) program.

Under the IMCI program, mothers are taught to recognize the general danger signs warranting urgent medical attention, including the inability to drink or breastfeed, vomiting, convulsions, lethargy, and loss of consciousness.

With regard to diarrhea, danger signs include blood in the stool, signs of severe dehydration, and persistent diarrhea for 14 or more days. Two indicators are available from the Demographic and Health Surveys (DHS) to monitor WSC goal 23: *reduction by 50 percent in the deaths due to diarrhea in children under the age of five years and 25 percent reduction in the diarrhea incidence rate.* These two indicators are 1) proportion of children who had diarrhea in the past two weeks and were treated with oral rehydration salts or an appropriate homemade solution and 2) proportion of children who had diarrhea in the past two weeks and received increased fluids and continued feeding during the episode.[2]

[2] Recent research studies have concluded that the volume of liquids, rather than the composition, is more important in the treatment of watery diarrhea. Hence, at a recent meeting to review child survival indicators, UNICEF, WHO, and collaborators decided to combine the two indicators for the appropriate home-based treatment of nonsevere watery

For ARI, IMCI guidelines recommend that children with a cough and rapid or difficult breathing should be taken to a health care provider for assessment. Children observed to have rapid breathing, chest indrawing, stridor, or any general danger sign should then be given a first dose of an appropriate antibiotic. If the child is not hospitalized, the mother should be instructed as to the importance of administering a full course of the antibiotic to the child at home. One indicator is available from DHS to monitor WSC goal 24, *reduction by one-third in the deaths due to acute respiratory infections in children under five years.* That indicator is the proportion of children who had ARI in the past two weeks and were taken to an appropriate health provider, where ARI is defined as a cough with short, rapid breaths.[3]

Data presented in this report will inform national and international efforts to reduce the burden of childhood morbidity in developing countries.

For fever, the IMCI recommendations differ between areas that are or are not in malaria-endemic zones. In high-transmission malaria-endemic areas, all children under five should be presumptively treated with antimalarials (Nicoll, 2000), whether at home or in a health facility. Children with a stiff neck, any general sign of danger, a persistent fever lasting more than seven days, or a recent episode of measles in the last three months warrant medical evaluation for severe febrile disease or severe complications of measles. One indicator is available from DHS in certain malaria-endemic countries to monitor MD goal 6, target 8: *(to) have halted by 2015 and begun to reverse the incidence of (malaria).* That indicator is the proportion of children who were ill with fever in the past two weeks and received antimalarial drugs.

It should be borne in mind that all of these morbidities fluctuate seasonally and that the DHS surveys are not conducted with seasonal comparability as a parameter.

For the tables in this report, the 52 countries are organized into six regions as defined by the U.S. Agency for International Development (USAID): West/Middle Africa; South/East Africa; North Africa/West Asia/Europe; Central Asia; South/Southeast Asia; and Latin America/Caribbean. Regional averages are presented in addition to national estimates of the prevalence of diarrhea, acute lower respiratory infection (ALRI), and fever and treatment responses to those illness episodes. Data in the tables are further disaggregated by various distal and proximal determinants.

Special emphasis has been given to residence in this report for three reasons. First, many important risk factors for diarrhea, ALRI, and fever tend to be more common in rural areas, such as less well developed water and sanitation systems, lower housing quality, and exposure to biomass fuels. Second, access to and availability of health care facilities or providers tend to be more limited in rural areas. And third, planning for health care programs and campaigns often requires different strategies for rural communities than for urban communities.

It is anticipated that data presented in this report will inform national and international efforts to reduce the burden of childhood morbidity in developing countries, by highlighting those countries and/or subgroups to whom health care resources and interventions would most beneficially be directed.

diarrhea to become continue feeding and provide either oral rehydration therapy (oral rehydration salts or appropriate homemade solutions) or increase fluids (UNICEF, 2004).

[3] In an effort to be more precise, UNICEF is now advocating the use of the phrase *suspected pneumonia* (UNICEF, 2004) in lieu of ARI. This report uses the acronym ALRI in lieu of ARI to emphasize lower respiratory tract involvement.

2

Data and Methods

The data presented in this report are taken from the most recent DHS surveys conducted in 52 countries between 1996 and 2002, and for which a standard recode file was available by January 2004. These surveys are designed to provide nationally representative samples of households, and they normally cover the entire country. DHS samples may be self-weighting, in which case each household has an equal overall probability of selection. However, in most surveys, stakeholders are interested in obtaining estimates with good precision for subgroups that may constitute only a small proportion of the population. In these situations, small domains are oversampled, and standardized sample weights are assigned.

Information regarding household composition and characteristics is obtained by interviewing an adult member of the household, while information about children under three years of age is obtained from their mothers. In most surveys, all women age 15-49 who are either usual members of the household or who stayed in the house the night before the interview (de facto members) are eligible to be interviewed unless they are physically or mentally incapacitated. In a few countries, eligibility is restricted to usual household members or to married women.

In most surveys, all women age 15-49 who are either usual members of the household or who stayed in the house the night before the interview are eligible to be interviewed.

During the period when the 52 surveys were conducted, revisions were made to the standard Household and Women's questionnaires as the DHS program entered its fourth phase, MEASURE *DHS+*. Thus, questionnaires for 31 of the surveys, from 1996-2000, are based on the format used in phase three (DHS-III), while the remaining 21, from 1999 to 2002, are based on the revised phase four format. In addition, each country is allowed some flexibility in the insertion or deletion of standard questions and in the wording of questions or response codes. While an effort was made to reconcile these discrepancies by creation of the standard recode files, a few household and individual items included in the tables in this report were not available for every country. Table 2.1 summarizes basic characteristics of the 52 surveys.

Table 2.1
Summary of DHS surveys included in this report, 1996-2002

Survey	DHS phase	Fieldwork Start	Fieldwork End	Female respondents	Age	Number	Number of children under 3 years
West/Middle Africa							
Benin 2001	4	Aug-01	Oct-01	AW	15-49	6,219	2,912
Burkina Faso 1998-99	3	Dec-98	Mar-99	AW	15-49	6,445	3,219
Cameroon 1998	3	Feb-98	Jun-98	AW	15-49	5,501	2,260
Chad 1996-97	3	Dec-96	Jul-97	AW	15-49	7,454	3,938
Côte d'Ivoire 1998-99	3	Sep-98	Mar-99	AW	15-49	3,040	1,221
Gabon 2000	3	Oct-00	Dec-00	AW	15-49	6,183	2,324
Ghana 1998	3	Nov-98	Feb-99	AW	15-49	4,843	1,802
Guinea 1999	3	May-99	Jun-99	AW	15-49	6,753	3,005
Mali 2001	4	Jan-01	May-01	AW	15-49	12,817	6,973
Mauritania 2000-01	3	Oct-00	Apr-01	AW	15-49	7,728	2,796
Niger 1998	3	Mar-98	Jul-98	AW	15-49	7,577	4,403
Nigeria 1999	3	Mar-99	May-99	AW	10-49	9,810	3,208
Senegal 1997	3	Jan-97	Apr-97	AW	15-49	8,593	3,868
Togo 1998	3	Feb-98	May-98	AW	15-49	8,569	3,693
South/East Africa							
Comoros 1996	3	Mar-96	May-96	AW	15-49	3,050	1,056
Eritrea 2002	4	Jan-02	Jul-02	AW	15-49	8,754	3,281
Ethiopia 2000	4	Feb-00	Apr-00	AW	15-49	15,367	6,412
Kenya 1998	3	Feb-98	Jul-98	AW	15-49	7,881	3,205
Madagascar 1997	3	Sep-97	Dec-97	AW	15-49	7,060	3,537
Malawi 2000	4	Jul-00	Nov-00	AW	15-49	13,220	6,862
Mozambique 1997	3	Mar-97	Jun-97	AW	15-49	8,779	3,803
Namibia 2000	4	Sep-00	Dec-00	AW	15-49	6,755	2,346
Rwanda 2000	4	Jun-00	Aug-00	AW	15-49	10,421	4,293
South Africa 1998	3	Feb-98	Sep-98	AW	15-49	11,735	2,912
Tanzania 1999	3	Sep-99	Nov-99	AW	15-49	4,029	1,817
Uganda 2000-01	4	Sep-00	Feb-01	AW	15-49	7,246	4,245
Zambia 2001-02	4	Jan-02	May-02	AW	15-49	7,658	3,681
Zimbabwe 1999	4	Sep-99	Dec-99	AW	15-49	5,907	2,029
North Africa/West Asia/Europe							
Armenia 2000	4	Oct-00	Dec-00	AW	15-49	6,430	880
Egypt 2000	4	Mar-00	May-00	EMW	15-49	15,573	6,741
Jordan 2002	4	Jul-02	Sep-02	EMW	15-49	6,006	3,454
Turkey 1998	3	Aug-98	Nov-98	EMW	15-49	8,576	2,013
Yemen 1997	3	Oct-97	Dec-97	EMW	15-49	10,414	7,056
Central Asia							
Kazakhstan 1999	3	Jul-99	Sep-99	AW	15-49	4,800	788
Kyrgyz Rep. 1997	3	Aug-97	Nov-97	AW	15-49	3,848	1,104
Turkmenistan 2000	4	Jul-00	Oct-00	AW	15-49	7,919	1,968
Uzbekistan 1996	3	Jun-96	Oct-96	AW	15-49	4,415	1,325
South/Southeast Asia							
Bangladesh 1999-00	3	Oct-99	Mar-00	EMW	10-49	10,544	3,927
Cambodia 2000	4	Feb-00	Jun-00	AW	15-49	15,351	4,232
India 1998-99	3	Nov-98	Jul-00	EMW	15-49	90,303	30,668
Indonesia 1997	3	Sep-97	Dec-97	EMW	15-49	28,810	9,322
Nepal 2001	4	Jan-01	Jun-01	EMW	15-49	8,726	3,840
Philippines 1998	3	Feb-98	Apr-98	AW	15-49	13,983	4,415
Vietnam 1997	3	Jul-97	Oct-97	AW	15-49	5,664	1,769
Latin America/Caribbean							
Bolivia 1998	3	Mar-98	Sep-98	AW	15-49	11,187	3,826
Brazil 1996	3	Mar-96	Jun-96	AW	15-49	12,612	2,757
Colombia 2000	4	Mar-00	Jul-00	AW	15-49	11,585	2,725
Dominican Rep. 2002	4	Jul-02	Oct-02	AW	15-49	28,000	6,395
Guatemala 1998-99	3	Nov-98	Apr-99	AW	15-49	6,021	2,618
Haiti 2000	4	Mar-00	Jul-00	AW	15-49	10,159	3,645
Nicaragua 2001	4	Sep-01	Dec-01	AW	15-49	11,328	3,807
Peru 2000	4	Aug-00	Nov-00	AW	15-49	27,843	6,790

Note: Tanzania 1999 and Guatemala 1998/99 were interim surveys
AW = All women; EMW = Ever-married women

In addition to minor differences in the survey questions, there are differences in the periods for which mothers were asked to respond to questions about illness episodes, treatment, and preventive care for individual children. While most of the surveys used *under five years* as the age criteria, others used *under three years*. For simplicity of presentation and because child morbidity rates associated with diarrhea, ALRI,

and fever are higher for children under age three than for those age three and older, the data presented in this report are restricted to children under three years of age.

In each table, countries are listed alphabetically within one of six regions. The number of surveys available in each region varies from 4 to 14. Both the median and the mean of each column of percentages by region were computed to represent the average regional value because, in those regions with few surveys available, either a very large or a very small percentage will exert undue influence on the average regional value. It is important to understand that these average regional values are not estimates of the true median and mean values, because surveys are not available from all countries within each region. They are simply rough estimates that can be used to make broad comparisons across regions.

Another statistic used to aid interpretation of the data presented in the tables is the intracountry differential, which is simply the difference between the percentages taken from two categories of a tabulated variable. For example, the two-week period prevalence of diarrhea in children under age three in Eritrea is 19.3 percent for males and 14.7 percent for females, yielding a positive differential by sex of 4.6. In Kazakhstan, diarrhea prevalence is 16.2 for males and 21.3 for females, yielding a negative differential by sex of 5.1. A mean regional differential can be computed, but again, it is a rough estimate because all countries are not represented.

In all tables, the percentages shown are based on weighted sample data.

In all tables, the percentages shown are based on weighted sample data. In individual table cells, the denominator for the percentage shown may be based on a small actual (unweighted) number of individuals. When the denominator is based on 25 to 49 individuals, the figure in the table cell is enclosed in parentheses. When the denominator is based on fewer than 25 individuals, an asterisk indicates that the figure has been suppressed.

It should be borne in mind that the use of the term 'significant,' when used to describe patters shown in tables or figures, is not meant to imply statistical significance in this report.

2.1 Diarrhea Prevalence and Treatment

2.1.1 Prevalence of Diarrhea

In both the DHS-III and MEASURE *DHS*+ individual questionnaires, mothers were asked the following:

"Has (NAME) had diarrhea in the last 2 weeks?"

In the MEASURE *DHS*+ questionnaire, mothers were not asked about blood in stools or number of bowel movements on the worst day of the most recent episode of diarrhea. Thus, diarrhea prevalence based on this single question may be underestimated or overestimated.

Increased Fluids and Continued Feeding

When a positive response was given, mothers were next asked about fluids and foods offered to the child during the diarrhea episode. In the DHS-III questionnaire, these questions were worded as follows:

"Was he/she given the same amount to drink as before the diarrhea, or more, or less?

"Was he/she given the same amount of food to eat as before the diarrhea, or more, or less?

In the MEASURE *DHS*+ questionnaire, these questions were worded as follows:

"Now I would like to know how much (NAME) was offered to drink during the diarrhea. Was he/she offered less than usual to drink, about the same amount, or more than usual to drink?"

"When (NAME) had diarrhea, was he/she offered less than usual to eat, about the same amount, more than usual, or nothing to eat?"

Mothers who gave a response of "less" were probed further. In this report, the response codes *much less, somewhat less, stopped food, and never gave food* have all been collapsed into a single category of "less."

2.1.2 Use of Oral Rehydration Solutions and Other Treatments

Because additional questions about the presence of blood in the stool or the occurrence of watery stools were not included in the MEASURE *DHS*+ questionnaire, it was not possible to distinguish the cases for which intravenous fluids, pills, syrups, or injections may have been appropriate treatment.

Mothers were next asked about their use of oral rehydration salts (ORS) and local recommended home fluids (RHF) for rehydration during the diarrhea episode, either of which is an appropriate treatment. In addition, they were asked whether anything else was given as a treatment. These responses, which most frequently included pills or syrups, injections, intravenous fluids, home remedies and herbal medicines, are generally considered to be inappropriate treatments by WHO.

Use of intravenous fluids administered by a health care provider is appropriate treatment for severe dehydration, and use of antibiotics (pills, syrups, or injections) is appropriate treatment for dysentery and cholera. Because additional questions about the presence of blood in the stool or the occurrence of watery stools were not included in the MEASURE *DHS*+ questionnaire, it was not possible to distinguish the cases for which intravenous fluids, pills, syrups, or injections may have been appropriate treatment. Hence, the prevalence of inappropriate treatment for diarrhea episodes from the DHS surveys may be overestimated.

2.1.3 Use of Appropriate Health Care Providers

Mothers were asked whether or not they sought advice or treatment for the diarrhea and, if so, where. Any public or private health care facility, doctor, or community health worker is considered an appropriate source of advice or treatment, whereas pharmacies, shops, and traditional practitioners are considered to be inappropriate sources.

2.2 Fever and Treatment

2.2.1 Prevalence of Fever

Mothers were asked—

"Has (NAME) been ill with a fever at any time in the last 2 weeks?"

Fever is a nonspecific symptom associated with many different diseases that may or may not require medical attention or medications. High or prolonged fevers are

more likely to be indicative of serious illness than are mild or short-term fevers. In a cross-sectional survey like the DHS survey, it is difficult to obtain accurate recall of the severity of recent fever episodes. In addition, children who are undernourished may also have immune suppression and, consequently, may not develop a fever in response to an infectious agent. For countries where malaria is not endemic, prevalence of fever based on this single question should be interpreted as a general indicator of morbidity in the young child population. For malaria-endemic countries, it should be borne in mind that malaria prevalence increases in rainy seasons and that the timing of fieldwork for the surveys is not comparable across countries.

2.2.2 Use of Antimalarials for Treatment of Fever

In the MEASURE *DHS+* questionnaire, the following questions were added for optional use in malaria-endemic countries when a mother reported a recent episode of fever in her child:

In a cross-sectional survey like the DHS survey, it is difficult to obtain accurate recall of the severity of recent fever episodes.

"Did (NAME) take any drugs for the fever?"

"What drugs did (NAME) take?"

Each country that included these medication questions used a country-specific list of antimalarial drugs.

2.3 Acute Lower Respiratory Infection and Treatment

2.3.1 Prevalence of ALRI Symptoms

Mothers were asked—

"Has (NAME) had an illness with a cough at any time in the last 2 weeks?"

Mothers who provided a positive response were next asked—

"When (NAME) had an illness with a cough, did he/she breathe faster than usual with short, rapid breaths?"

For purposes of estimating ALRI prevalence in DHS surveys, children whose mothers reported a recent episode of cough with rapid breathing are presumed to have experienced an episode of acute lower respiratory infection (ALRI)[1]. Technically, the diagnosis of an ALRI episode that warrants urgent medical attention, primarily pneumonia, requires observing the child for chest indrawing or stridor (high-pitched, noisy respirations) and counting the number of breaths per minute (more than 50 for infants under 12 months of age and more than 40 for children 12 months of age or older). Hence, ALRI prevalence based on mothers' responses to these two questions (i.e., cough and short, rapid breaths) may underestimate or overestimate serious respiratory illness.

[1] This report uses the acronym ALRI in lieu of ARI (used in DHS surveys) to emphasize lower respiratory tract involvement.

2.3.2 Use of Appropriate Health Care Providers

In the DHS-III questionnaire, mothers who reported a recent episode of cough were next asked whether or not they sought advice or treatment for the cough and, if so, where. Any public or private health care facility, doctor, or community health worker is considered an appropriate source of advice or treatment, whereas pharmacies, shops, and traditional practitioners are considered to be inappropriate sources. In the MEASURE *DHS*+ surveys, mothers who reported a recent episode of either cough or fever were asked these same questions. Since a child might have experienced two separate illness episodes in the past two weeks, one with a cough and rapid breathing (ALRI) and one with a fever, it is not possible to determine for children with both conditions reported whether care was sought for the ALRI. However, fever occurs at some point in the majority of cases of pneumonia. Hence, in this report, prevalence of careseeking is based on a denominator of children with symptoms of ALRI and/or fever.

2.4 Cofactors of Child Morbidity

Any public or private health care facility, doctor, or community health worker is considered an appropriate source of advice or treatment, whereas pharmacies, shops, and traditional practitioners are considered to be inappropriate sources.

2.4.1 Socioeconomic Characteristics

Wealth Index

Information collected in DHS surveys about household composition, assets, and amenities is obtained from an adult age 18 or older who is a member of the household and who is often but not always the head of the household.

In collaboration with the World Bank, ORC Macro has devised an index of wealth based on both a standard list of household assets and amenities and some additional country-specific items that are collected by the DHS Household Questionnaire. The DHS wealth index is used in a statistical analysis that divides the population into wealth quintiles. A quintile is assigned to each household as a measure of its relative socioeconomic level (Rutstein and Johnson, 2004).

Mother's Characteristics

Information about the mother, including age in years and highest level of formal education completed, is taken from the Women's Questionnaire.

2.4.2 Child's Characteristics

The child's sex, age in months, birth order, and birth interval are derived from the complete birth history collected by the Women's Questionnaire for all live births.

Nutritional Status

In the DHS-III questionnaire, height and weight measurements of children under the age of three years born to eligible interviewed women were collected in most countries. Beginning with the MEASURE *DHS*+ questionnaire, all children in the household under the age of six years are eligible for height and weight measurement. Height is measured lying down for children under two years and standing up for those two years and above. Shorr portable measuring boards are used to collect the measurements. Weight is obtained to the nearest 0.1 kilogram using UNISCALE digital scales from UNICEF. Date of birth is also ascertained. Weight-for-age, height-for-age, and weight-for-height indices are computed and expressed as stan-

dardized deviation units (Z-scores) from the median of an international reference population developed by the U.S. National Center for Health Statistics (NCHS) and endorsed by WHO and the U.S. Centers for Disease Control and Prevention (CDC).

Breastfeeding Status

Children are classified into one of three categories based on breastfeeding status: full, partial, and none. This classification is derived from the mother's responses to questions about the number of times during the preceding day or night that the child was breastfed or was given anything on a list of liquids or solids. *Full breastfeeding* is defined in this report as the receipt of breast milk alone or in addition to plain water, water-based liquids, and/or fruit juices *only* during the preceding day or night. This definition combines exclusive and predominant breastfeeding as defined in the WHO Global Databank on Breastfeeding (WHO, 1996).[2] *Partial breastfeeding* is defined as the receipt of breast milk in addition to other milk, infant formula, or solids. Children who received no breast milk during the preceding day or night are classified as *none*.

Children are classified into one of three categories based on breastfeeding status: full, partial, and none.

Receipt of Recommended Vaccines

In keeping with the recommendations of the WHO Expanded Programme on Immunization (WHO, 2002), children in developing countries should receive one BCG vaccination, three or four polio vaccinations, three DPT vaccinations, and one measles vaccination by the age of 12 months.

In DHS surveys, information is gathered from mothers to ascertain the immunization status of their young children. The preferred source of information is an individual vaccination card filled out by a health worker and kept in the household. When mothers are able to produce such an immunization record, the DHS interviewer records the dates of each vaccination. In addition, mothers are asked to report any vaccinations that were not recorded on the card, although no date is obtained. Mothers who cannot produce a vaccination card are probed to recall whether or not the child ever received the recommended number of doses of each vaccine.

In keeping with the recommendations of the WHO Expanded Programme on Immunization, children in developing countries should receive one BCG vaccination, three or four polio vaccinations, three DPT vaccinations, and one measles vaccination by the age of 12 months.

When vaccination dates are missing, children cannot be classified according to vaccines received by the age of 12 months. However, they can be classified according to vaccines received prior to the interview. Thus, these data can be used to approximate a set of indicators for World Summit for Children goal 22, the proportions of children age 12 months immunized against diphtheria, pertussis, and tetanus (DPT), poliomyelitis, tuberculosis, and measles.

2.4.3 Environmental Factors

Source of Drinking Water

The household respondent is asked—

[2] In 2001, WHO issued recommendations on the optimal duration of breastfeeding, calling for exclusive breastfeeding for the first six months of life (WHO, 2001). In this report, the introduction of solid and semisolid foods during weaning is of more interest as a vehicle for ingesting diarrheal pathogens than the introduction of nonmilk/nonformula liquids; hence, the use of ***full, partial, and none***. Receipt of plain water in the past 24 hours in relation to the prevalence of recent diarrhea is examined separately.

"What is the main source of drinking water for members of your household?"

While locally specific response codes may be included, the standard broad categories of response codes in DHS surveys include piped water, well water, surface water, rainwater, tanker truck, and bottled water. Safe drinking water is defined by UNICEF for monitoring WSC goal 4 as "water piped into the dwelling or yard, a public tap, a tubewell or borehole with pump, a protected well or spring, or rainwater" (UNICEF, 2000). In this report, response codes have been collapsed to fit the UNICEF definition.

Sanitary Means of Excreta Disposal

The household respondent is asked the following:

"What kind of toilet facilities does your household have?"

While locally specific response codes may be included, the standard broad categories of response codes in DHS surveys include flush toilet, pit toilet or latrine, and no facility or bush or field. Sanitary means of excreta disposal is defined by UNICEF as "flush toilet connected to a sewage system or septic tank, a pour flush latrine, improved pit latrine, or traditional pit latrine" (UNICEF, 2000) for monitoring WSC goal 5. In this report, response codes have been collapsed to fit the UNICEF definition.

Flooring Materials

The DHS interviewer makes the determination about the type of floor material in the dwelling. The standard broad categories for response codes in DHS surveys are natural, rudimentary, and finished floor. In this report, responses are classified as natural (including earth, sand, or dung) and improved.

The DHS interviewer makes the determination about the type of floor material in the dwelling. In this report, responses are classified as natural (including earth, sand, or dung) and improved.

Cooking Fuels

The household respondent is asked—

"What type of fuel does your household mainly use for cooking?"

In this report, responses have been collapsed into smoke- or fume-producing fuels (including charcoal, wood, straw, and dung) and clean burning fuels (including electricity, gas, and kerosene).

Crowding

Three measures of crowding are computed from information collected in the Household Questionnaire. The number of usual household members and the number of children in the household under age five years are determined from the household schedule. In addition, in the DHS-III questionnaire, a question was included to ascertain the number of rooms used for sleeping. Where asked, the average number of persons per sleeping room can then be computed.

3

Diarrhea

3.1 Prevalence Levels and Differentials

3.1.1 Residence

Residence is a multidimensional factor with respect to diarrhea risk. Sources of drinking water and sanitation facilities in rural communities are often more rudimentary than those in urban communities, although urban slum areas often lack improved amenities as well. Young children in rural areas are more likely to be around animals and their feces than are urban children. Also, health care facilities and providers may be less available and/or accessible in rural areas to treat a sick child (Legrand and Lalou, 1997).

The percentage of children under three years of age whose mothers reported that the child had diarrhea at any time in the two weeks preceding the day of interview is shown for all children and by place of residence in Table 3.1. In four regions, the total mean prevalence is around 20 percent, but is lower in Central Asia and South/Southeast Asia. Total diarrhea prevalence is less than 10 percent in only five countries (Egypt, Turkmenistan, Uzbekistan, Bangladesh, and the Philippines) and is more than 30 percent in six countries (Niger, Togo, Ethiopia, Turkey, Yemen, and Haiti).

Diarrhea prevalence is higher for rural children than urban children in most countries.

As shown in Figure 3.1, diarrhea prevalence is higher for rural children than urban children in most countries. The countries with a negative differential (urban minus rural) of five or more percentage points are Côte d'Ivoire, Mali, Niger, Togo, Ethiopia, Rwanda, South Africa, Turkey, Vietnam, Nicaragua, and Peru. Countries for which the diarrhea prevalence is higher for urban versus rural children by five or more percentage points are Mauritania, Comoros, and Mozambique.

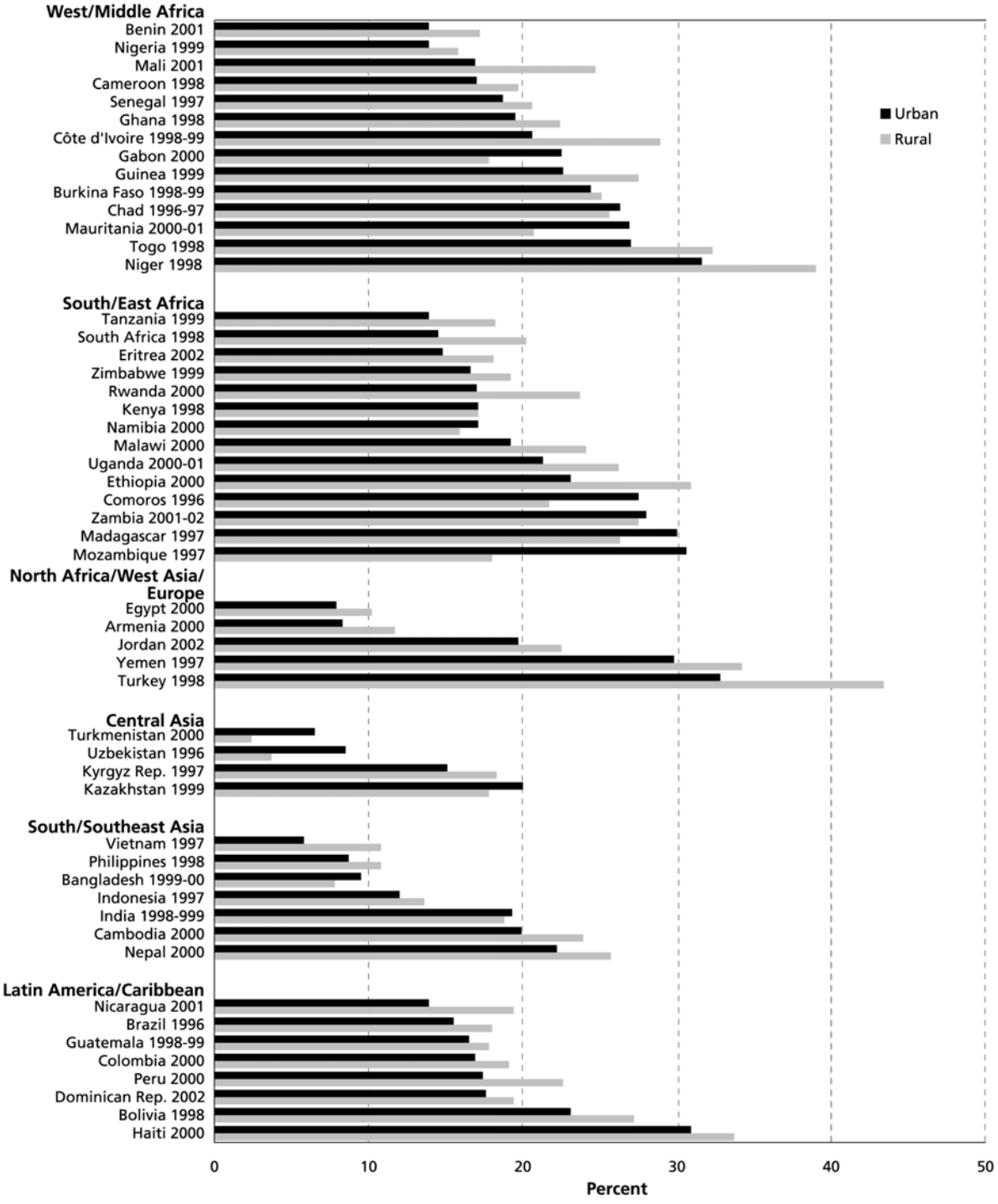
Table 3.1

Percentage of children under age three years with diarrhea in the two weeks preceding the survey, Demographic and Health Surveys 1996-2002

Survey	Residence		Age in months						Total	Number of children
	Urban	Rural	0-5	6-11	12-17	18-23	24-29	30-35		
West/Middle Africa										
Benin 2001	13.9	17.2	6.9	21.3	22.2	19.6	13.9	13.2	16.1	2,912
Burkina Faso 1998-99	24.4	25.1	14.4	28.8	32.4	29.8	24.6	21.9	25.0	3,219
Cameroon 1998	17.0	19.7	10.8	20.9	27.4	25.3	17.7	11.2	18.9	2,260
Chad 1996-97	26.3	25.6	17.6	28.7	31.3	25.9	30.5	20.3	25.7	3,938
Côte d'Ivoire 1998-99	20.6	28.9	10.3	30.3	34.8	34.3	20.4	21.8	26.1	1,221
Gabon 2000	22.5	17.8	11.0	28.4	29.6	26.3	16.6	13.9	21.2	2,324
Ghana 1998	19.5	22.4	13.6	25.4	25.0	28.0	19.5	17.0	21.7	1,802
Guinea 1999	22.6	27.5	15.7	32.2	35.2	29.9	23.9	23.9	26.2	3,005
Mali 2001	16.9	24.7	13.9	28.7	28.5	24.1	22.3	20.1	22.8	6,974
Mauritania 2000-01	26.9	20.7	17.4	29.3	28.5	28.2	19.5	14.5	23.3	2,796
Niger 1998	31.6	39.0	30.0	50.3	42.4	38.1	36.6	27.4	37.8	4,403
Nigeria 1999	13.9	15.8	8.1	18.8	18.7	17.7	15.1	11.9	15.3	3,208
Senegal 1997	18.7	20.6	15.8	25.4	23.0	24.0	18.5	13.4	19.9	3,868
Togo 1998	27.0	32.3	19.0	36.7	41.0	35.0	29.4	26.3	31.1	3,693
Median	21.6	23.6	14.2	28.7	29.1	27.2	20.0	18.6	23.1	
Mean	21.6	24.1	14.6	28.9	30.0	27.6	22.0	18.3	23.7	
South/East Africa										
Comoros 1996	27.5	21.7	22.6	37.0	23.4	20.1	18.8	12.9	23.1	1,056
Eritrea 2002	14.8	18.1	7.1	20.4	21.3	24.0	17.5	14.4	17.0	3,281
Ethiopia 2000	23.1	30.9	15.3	38.6	36.2	37.9	26.8	25.4	30.1	6,412
Kenya 1998	17.1	17.1	11.9	22.4	26.1	16.8	16.9	6.6	17.1	3,205
Madagascar 1997	30.0	26.3	15.3	32.9	35.3	29.4	27.5	21.4	27.1	3,537
Malawi 2000	19.2	24.1	13.0	35.9	37.3	25.6	16.2	11.3	23.5	6,862
Mozambique 1997	30.6	18.0	10.2	22.2	33.6	16.8	20.8	20.4	20.7	3,803
Namibia 2000	17.1	15.9	9.1	22.8	21.4	19.1	13.3	10.9	16.3	2,346
Rwanda 2000	17.0	23.7	13.5	28.5	32.2	23.9	16.3	17.5	22.6	4,293
South Africa 1998	14.5	20.2	11.1	22.1	26.8	21.2	13.8	9.0	17.4	2,912
Tanzania 1999	13.9	18.2	10.1	30.3	26.1	14.5	13.9	9.0	17.3	1,817
Uganda 2000-01	21.3	26.2	17.8	38.1	30.0	28.9	20.0	15.1	25.6	4,245
Zambia 2001-02	28.0	27.5	9.9	38.5	38.9	33.1	27.4	17.3	27.6	3,681
Zimbabwe 1999	16.6	19.2	6.1	27.7	29.0	20.6	16.5	10.4	18.4	2,029
Median	18.2	21.0	11.5	29.4	29.5	22.6	17.2	13.7	21.7	
Mean	20.8	21.9	12.4	29.8	29.8	23.7	19.0	14.4	21.7	
North Africa/West Asia/Europe										
Armenia 2000	8.3	11.7	9.9	14.1	12.5	8.5	7.7	6.4	10.0	880
Egypt 2000	7.9	10.2	8.6	14.5	12.6	7.5	7.7	4.8	9.3	6,741
Jordan 2002	19.7	22.5	18.1	26.2	29.8	19.8	12.7	14.5	20.4	3,454
Turkey 1998	32.8	43.4	26.3	44.1	46.1	40.6	34.8	27.2	36.8	2,013
Yemen 1997	29.8	34.2	26.6	38.9	38.8	36.4	31.2	27.3	33.2	7,056
Median	19.7	22.5	18.1	26.2	29.8	19.8	12.7	14.5	20.4	
Mean	19.7	24.4	17.9	27.6	28.0	22.6	18.8	16.0	21.9	
Central Asia										
Kazakhstan 1999	20.0	17.8	13.0	24.3	27.1	18.1	13.5	15.8	18.7	788
Kyrgyz Rep. 1997	15.1	18.3	11.8	21.4	25.1	24.5	11.3	11.3	17.6	1,104
Turkmenistan 2000	6.5	2.4	1.5	6.5	7.0	5.4	2.9	0.6	4.0	1,968
Uzbekistan 1996	8.5	3.7	4.7	6.0	6.3	8.3	2.9	2.4	5.2	1,325
Median	11.8	10.8	8.3	14.0	16.1	13.2	7.1	6.9	11.4	
Mean	12.5	10.6	7.8	14.6	16.4	14.1	7.7	7.5	11.4	
South/Southeast Asia										
Bangladesh 1999-00	9.5	7.8	3.4	11.9	13.5	9.5	7.1	3.5	8.1	3,927
Cambodia 2000	19.9	23.9	16.1	29.7	28.7	26.1	22.0	18.2	23.3	4,232
India 1998-99	19.3	18.8	15.9	25.0	22.9	19.3	16.2	13.9	18.9	30,668
Indonesia 1997	12.0	13.6	7.6	16.9	14.0	15.4	13.6	11.2	13.1	9,322
Nepal 2000	22.2	25.7	18.7	34.5	33.0	26.2	23.0	17.3	25.5	3,840
Philippines 1998	8.7	10.8	6.2	13.9	15.8	10.8	7.3	4.3	9.8	4,415
Vietnam 1997	5.8	10.8	8.1	16.8	15.7	7.9	5.3	7.1	10.1	1,769
Median	12.0	13.6	8.1	16.9	15.8	15.4	13.6	11.2	13.1	
Mean	13.9	15.9	10.9	21.2	20.5	16.5	13.5	10.8	15.5	
Latin America/Caribbean										
Bolivia 1998	23.1	27.2	14.6	25.4	35.0	31.6	25.3	16.0	24.8	3,826
Brazil 1996	15.5	18.0	11.2	22.0	19.3	18.3	14.6	10.8	16.1	2,757
Colombia 2000	16.9	19.1	10.7	22.7	23.9	18.2	15.8	13.5	17.6	2,725
Dominican Rep. 2002	17.6	19.4	12.7	25.8	25.7	20.7	14.3	9.6	18.2	6,395
Guatemala 1998-99	16.5	17.8	8.4	21.7	28.1	22.9	11.3	12.3	17.3	2,618
Haiti 2000	30.9	33.7	27.9	43.4	45.6	36.5	26.6	16.1	32.8	3,645
Nicaragua 2001	13.9	19.4	13.1	19.6	20.6	17.7	15.4	13.0	16.6	3,807
Peru 2000	17.4	22.6	11.8	22.7	25.7	25.4	17.7	14.1	19.7	6,790
Median	17.2	19.4	12.3	22.7	25.7	21.8	15.6	13.3	17.9	
Mean	19.0	22.2	13.8	25.4	28.0	23.9	17.6	13.2	20.4	

Figure 3.1

Percentage of Children under age three years with diarrhea in the two weeks preceding the survey, by residence



3.1.2 Child's Age

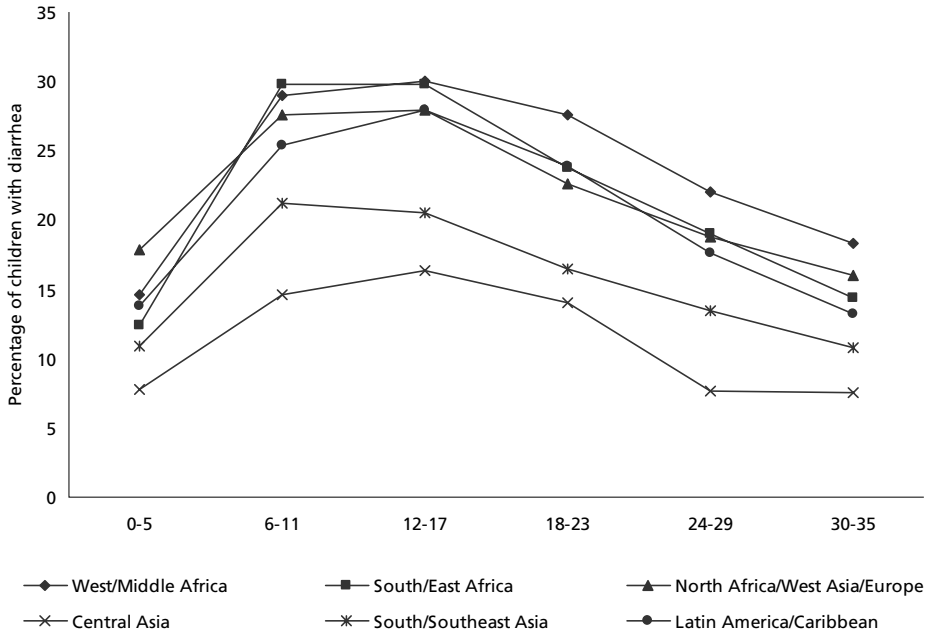
Newborn infants benefit from maternal antibodies acquired in-utero and through breast milk. By age 6-9 months, when complementary foods are recommended to be introduced, passively acquired immunity diminishes greatly. At the same time, the infant is increasingly exposed to disease-causing pathogens through contaminated foods and liquids, feeding utensils, and the indoor and outdoor environments. As the child ages, his/her own immune system matures and he/she is increasingly less vulnerable to common infectious agents.

The average prevalence of diarrhea peaks at age 6-17 months followed by a decline to levels near those for age 0-5 months by the end of the third year of life.

This age-related susceptibility is clearly demonstrated in Figure 3.2, a line graph showing the mean diarrhea prevalence for each region by six-month age groups. The patterns are similar across regions, with the average prevalence peaking at age 6-17 months followed by a decline to levels near those for age 0-5 months by the end of the third year of life.

Figure 3.2

Mean percentage of children under age three years with diarrhea in the two weeks preceding the survey, by age in months



3.1.3 Socioeconomic Characteristics

Residence and Household Wealth Index

The household wealth index used in this report is largely asset based, but it does incorporate the source of drinking water and type of sanitation facilities used by the household, as well as the type of flooring. It can reasonably be assumed that in general, wealthier households may be able to maintain a higher overall level of hygiene during food preparation and eating and for general cleanliness of the home and clothing.

In Table 3.2, diarrhea prevalence in the past two weeks is shown by household residence and three categories of household wealth, as measured by ranking in the country-specific wealth index score distribution. Figures 3.3.1 and 3.3.2 show the range, mean, and median values of the national prevalence estimates for the countries in each region by urban-rural residence and three broad wealth index categories.

Overall, these data support an association between low relative household wealth and an increased probability of recent diarrhea for both urban and rural children. For urban children, the average prevalence of diarrhea is consistently lower among those in the most affluent households compared with children from the least affluent households in each region, with the exception of Central Asia.

Overall, the data support an association between low relative household wealth and an increased probability of recent diarrhea for both urban and rural children.

Data are sparse for rural children in households in the highest wealth category in Central Asia and Latin America/Caribbean. In other regions, the average diarrhea prevalence for rural children is again consistently lower among children in the most affluent versus the least affluent households, and it decreases across the three wealth categories.

The difference in diarrhea prevalence among children in households in the lowest wealth category and the highest wealth category was computed for each country for which the numbers were sufficiently large. In both urban and rural areas, the differentials are generally positive. In eight countries (Benin, Kenya, Malawi, Mozambique, Uganda, Turkey, Brazil, and Peru), diarrhea prevalence among urban children in households in the lowest 40 percent of their country-specific wealth index score distribution is ten or more percentage points higher than the prevalence among urban children in households in the highest 20 percent.

Similarly, there are seven countries in which the diarrhea prevalence among rural children in the least affluent households is at least ten percentage points greater than the prevalence among rural children in the most affluent households: Cameroon, Mauritania, Togo, Mozambique, Uganda, Yemen, and the Kyrgyz Republic. There are no negative differentials of similar magnitude.

Table 3.2

Percentage of children under age three years with diarrhea in the two weeks preceding the survey, by residence and wealth index, Demographic and Health Surveys 1996-2002

	Urban					Rural				
	Household wealth index					Household wealth index				
Survey	Lowest 40%	Middle 40%	Highest 20%	Total	Number of children	Lowest 40%	Middle 40%	Highest 20%	Total	Number of children
West/Middle Africa										
Benin 2001	22.8	13.1	10.4	13.9	931	17.5	16.7	16.5	17.2	1,981
Burkina Faso 1998-99	*	(31.7)	24.3	24.4	346	23.0	26.8	31.0	25.1	2,872
Cameroon 1998	(12.9)	19.0	15.5	17.0	622	23.9	13.7	9.4	19.7	1,639
Chad 1996-97	19.7	32.5	24.6	26.3	865	24.4	27.1	26.9	25.6	3,073
Côte d'Ivoire 1998-99	*	19.8	19.5	19.5	362	31.3	23.0	*	28.9	729
Gabon 2000	23.6	22.1	22.0	22.5	1,697	17.9	15.6	*	17.8	627
Ghana 1988	*	25.6	11.5	19.5	459	24.8	18.6	(19.6)	22.4	1,343
Guinea 1999	*	21.4	23.8	22.6	795	27.6	27.5	(28.0)	27.5	2,210
Mali 2001	26.7	14.9	16.9	16.9	1,706	24.9	24.8	21.5	24.7	5,265
Mauritania 2000-01	32.3	26.5	26.4	26.9	1,189	21.5	20.8	(0.0)	20.7	1,606
Niger 1998	*	39.9	29.9	31.6	733	37.0	41.4	41.8	39.0	3,671
Senegal 1997	14.0	19.6	18.2	18.7	1,296	21.3	18.9	23.9	20.6	2,572
Togo 1998	26.9	33.9	22.1	27.0	865	32.8	32.6	16.3	32.3	2,828
Median	23.2	22.1	22.0	22.5		24.4	23.0	21.5	24.7	
Mean	22.4	24.6	20.4	22.1		25.2	23.7	21.4	24.7	
South/East Africa										
Comoros 1996	28.2	27.5	26.7	27.5	255	24.6	18.6	19.4	21.7	801
Eritrea 2002	(21.1)	17.8	11.4	14.8	1,097	17.3	19.5	*	18.1	2,184
Ethiopia 2000	*	25.9	22.9	23.1	649	30.9	31.0	30.4	30.9	5,762
Kenya 1998	(23.4)	23.9	12.7	17.1	600	19.0	15.2	13.8	17.1	2,606
Madagascar 1997	35.1	28.3	28.3	30.0	704	25.0	28.7	21.2	26.3	2,833
Malawi 2000	29.1	27.9	16.0	19.2	890	23.9	24.8	22.1	24.1	5,967
Mozambique 1997	37.0	36.7	25.8	30.6	806	22.3	15.7	5.1	18.0	2,996
Namibia 2000	17.6	19.9	13.8	17.1	810	17.2	14.2	10.7	15.9	1,536
Rwanda 2000	(21.9)	26.7	14.6	17.0	690	24.0	23.3	24.3	23.7	3,604
South Africa 1998	21.2	13.3	11.9	14.5	1,422	20.2	20.9	(16.5)	20.2	1,490
Tanzania 1999	(15.3)	21.2	11.0	13.9	354	17.2	20.2	11.6	18.2	1,463
Uganda 2000-01	(34.6)	26.4	19.9	21.3	486	30.4	22.5	18.8	26.2	3,759
Zambia 2001-02	*	33.1	21.0	28.0	1,124	28.4	25.8	29.0	27.5	2,556
Zimbabwe 1999	*	18.0	15.6	16.6	668	17.9	21.0	*	19.2	1,361
Median	23.4	26.2	15.8	18.2		23.1	21.0	19.1	21.0	
Mean	25.9	24.8	18.0	20.8		22.7	21.5	18.6	21.9	
North Africa/West Asia/Europe										
Armenia 2000	11.9	8.3	7.1	8.3	453	11.9	12.6	*	11.7	427
Egypt 2000	7.0	9.0	7.0	7.9	2,625	10.7	10.0	5.5	10.2	4,116
Jordan 2002	19.2	21.3	17.3	19.7	2,680	21.6	24.9	19.4	22.5	774
Turkey 1998	38.3	34.9	22.2	32.8	1,260	44.9	40.7	*	43.4	753
Yemen 1997	(32.5)	34.1	26.9	29.8	1,631	37.5	31.8	22.7	34.2	5,425
Median	19.2	21.3	17.3	19.7		21.6	24.9	19.4	22.5	
Mean	21.8	21.5	16.1	19.7		25.3	24.0	15.9	24.4	
Central Asia										
Kazakhstan 1999	*	21.5	15.6	20.0	326	18.7	15.2	*	17.8	462
Kyrgyz Rep. 1997	(19.4)	14.3	14.7	15.1	253	20.3	16.4	(10.1)	18.3	851
Turkmenistan 2000	6.8	5.5	7.0	6.3	769	2.9	1.6	*	2.4	1,192
Uzbekistan 1996	6.4	8.0	9.9	8.5	414	3.4	4.4	(2.2)	3.7	911
Median	6.8	11.2	12.3	11.8		11.1	9.8	6.2	10.8	
Mean	10.9	12.3	11.8	12.5		11.3	9.4	6.2	10.6	
South/Southeast Asia										
Bangladesh 1999-00	9.6	7.2	10.8	9.5	644	8.4	7.6	5.3	7.8	3,283
Cambodia 2000	21.4	17.0	21.2	19.9	552	25.1	23.3	18.7	23.9	3,680
India 1998-99	21.2	21.9	16.5	19.3	6,928	19.5	18.2	16.3	18.8	23,741
Indonesia 1997	15.5	13.7	9.4	12.0	2,624	14.6	13.1	8.5	13.6	6,698
Nepal 2000	(19.3)	35.0	19.9	22.2	237	27.3	25.2	19.7	25.7	3,603
Philippines 1998	10.6	8.6	6.8	8.7	2,049	11.1	11.0	4.7	10.8	2,366
Vietnam 1997	12.2	3.4	6.1	5.8	255	10.6	11.8	6.4	10.8	1,513
Median	15.5	13.7	10.8	12.0		14.6	13.1	8.5	13.6	
Mean	15.7	15.3	13.0	13.9		16.7	15.7	11.4	15.9	
Latin America/Caribbean										
Bolivia 1998	25.9	24.3	16.6	23.1	2,219	27.3	26.5	*	27.2	1,606
Brazil 1996	21.1	13.2	9.0	15.5	2,104	18.9	11.6	*	18.0	653
Colombia 2000	22.4	15.3	13.5	16.9	1,863	19.6	12.7	*	19.1	862
Guatemala 1998-99	16.4	16.1	17.1	16.5	991	19.2	15.8	(11.1)	17.8	1,627
Haiti 2000	32.2	36.4	24.1	30.9	1,203	31.5	37.9	(36.6)	33.7	2,442
Nicaragua 2001	17.9	15.4	9.3	13.9	1,931	20.5	14.9	*	19.4	1,875
Peru 2000	24.2	18.2	10.1	17.4	3,744	23.1	18.0	*	22.6	3,046
Median	22.4	16.1	13.5	16.9		20.5	15.8	23.8	19.4	
Mean	22.9	19.8	14.2	19.2		22.9	19.6	23.8	22.5	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

Figure 3.3.1

Percentage of urban children under age three years with diarrhea in the two weeks preceding the survey, by wealth index and region

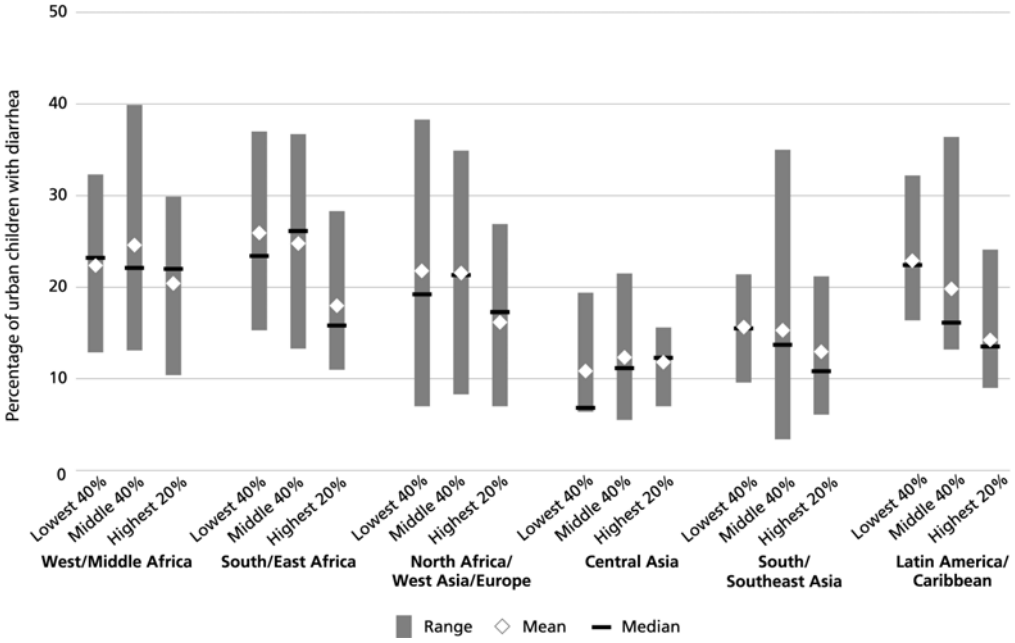
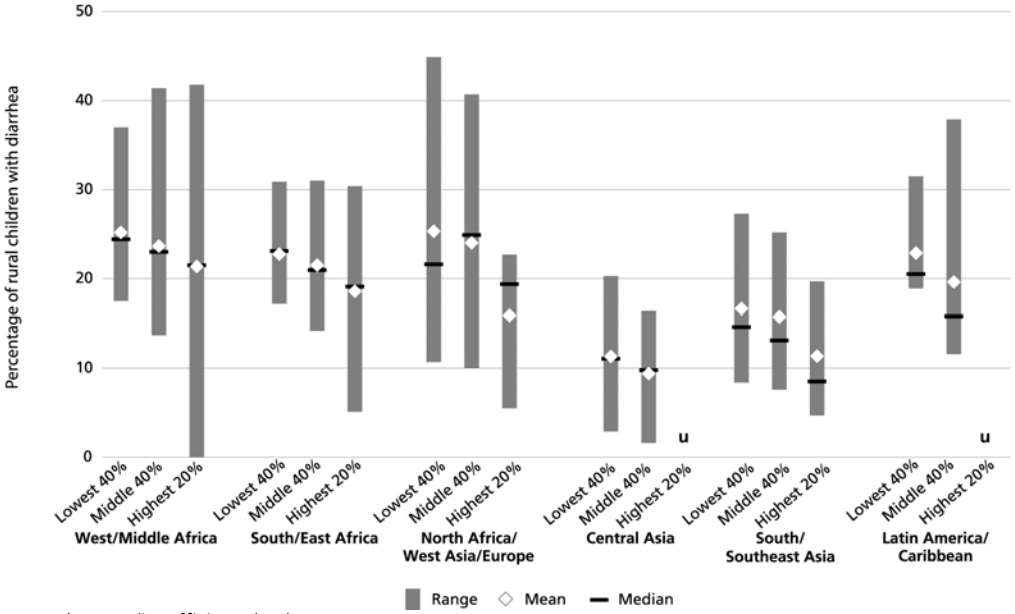


Figure 3.3.2

Percentage of rural children under age three years with diarrhea in the two weeks preceding the survey, by wealth index and region



u = Unknown (insufficient data)

Residence and Mother's Education

Mother's education has frequently been used as a proxy indicator of socioeconomic status in international surveys and studies. In this report, the wealth index serves this purpose. However, mother's education is also thought to be associated with hygiene, careseeking, and treatment of illness behaviors pertaining to early childhood morbidities.

In most regions, the average diarrhea prevalence in both urban and rural areas decreases with increasing level of mother's education.

The two-week period prevalence of diarrhea among children under three years of age is shown in Table 3.3 by residence and mother's education (highest level of formal education completed). In most regions, the average diarrhea prevalence in both urban and rural areas decreases with increasing level of mother's education. It should be noted that state-supported education is compulsory for grades one through nine in the four Central Asian countries included here and, hence, nearly all of the mothers in those countries fall into the highest education category.

For each country, the difference in diarrhea prevalence between children whose mothers have no completed years of formal education and those whose mothers completed at least one year of secondary school was computed by urban-rural residence.[1]

In urban areas, the regions of North Africa/West Asia/Europe and Latin America/Caribbean have the largest mean differences in diarrhea prevalence by mother's education (ten and eight percentage points, respectively). In ten countries, diarrhea prevalence is higher by ten percentage points or more among urban children whose mothers have the least versus the most education. These countries are Cameroon, Ghana, Comoros, Rwanda, Zambia, Jordan, Turkey, Brazil, Colombia, and Nicaragua. A negative difference of the same magnitude was observed in only one country, Gabon.

[1] Table entries marked with an asterisk indicate percentages based upon less than 25 observations. In such cases, a differential is not computed.

Table 3.3

Percentage of children under age three years with diarrhea in the two weeks preceding the survey by residence and mother's education, Demographic and Health Surveys 1996-2002

	Urban					Rural				
	Highest level of education				Number of	Highest level of education				Number of
Survey	None	Primary	Secondary+	Total	children	None	Primary	Secondary+	Total	children
West/Middle Africa										
Benin 2001	17.1	10.7	9.5	13.9	931	17.2	17.1	15.3	17.2	1,981
Burkina Faso 1998-99	24.2	28.0	21.7	24.4	346	25.0	27.8	*	25.1	2,872
Cameroon 1998	25.8	16.2	13.3	17.0	622	25.5	16.2	16.4	19.7	1,639
Chad 1996-97	24.3	28.6	29.9	26.3	865	23.9	33.9	*	25.6	3,073
Côte d'Ivoire 1998-99	19.0	22.4	22.3	20.6	412	30.0	25.0	*	28.9	809
Gabon 2000	12.2	23.9	22.9	22.5	1,697	(19.8)	18.7	15.7	17.8	627
Ghana 1988	26.6	22.2	15.9	19.5	459	25.0	27.5	16.7	22.4	1,343
Guinea 1999	21.5	28.8	20.2	22.6	795	27.0	38.8	(23.7)	27.5	2,210
Mali 2001	16.7	15.4	19.3	16.9	1,706	24.2	28.5	31.9	24.7	5,267
Mauritania 2000-01	30.1	24.3	25.0	26.9	1,189	21.2	17.8	(22.3)	20.7	1,606
Niger 1998	33.1	31.3	25.0	31.6	733	39.3	36.7	(27.8)	39.0	3,671
Nigeria 1999	18.1	13.3	11.3	13.9	896	18.0	14.0	12.5	15.8	2,312
Senegal 1997	17.9	20.3	17.7	18.7	1,296	20.4	22.6	20.6	20.6	2,572
Togo 1998	29.3	27.3	23.0	27.0	865	33.3	31.4	23.5	32.3	2,828
Median	22.9	23.2	21.0	21.6		24.6	26.3	20.6	23.6	
Mean	22.6	22.3	19.8	21.6		25.0	25.4	20.6	24.1	
South/East Africa										
Comoros 1996	33.1	20.4	22.5	27.5	255	23.0	19.8	17.9	21.7	801
Eritrea 2002	15.2	15.5	13.8	14.8	1,097	17.9	19.4	(14.4)	18.1	2,184
Ethiopia 2000	23.9	26.3	20.4	23.1	649	31.2	29.8	24.6	30.9	5,762
Kenya 1998	(11.6)	24.7	9.0	17.1	600	20.7	18.1	12.3	17.1	2,606
Madagascar 1997	20.8	33.1	29.9	30.0	704	25.0	26.7	27.0	26.3	2,833
Malawi 2000	18.7	20.1	17.6	19.2	891	24.2	24.4	18.3	24.1	5,972
Mozambique 1997	20.1	33.5	27.0	30.6	806	17.8	18.8	(3.3)	18.0	2,996
Namibia 2000	24.4	16.6	16.5	17.1	810	22.6	16.3	12.7	15.9	1,536
Rwanda 2000	32.6	18.5	10.8	17.0	690	22.6	24.5	22.2	23.7	3,604
South Africa 1998	(16.7)	18.3	13.4	14.5	1,422	18.6	20.7	20.4	20.2	1,490
Tanzania 1999	4.4	16.6	7.0	13.9	354	13.3	20.5	13.7	18.2	1,463
Uganda 2000-01	27.1	22.7	18.6	21.3	486	27.6	26.6	19.1	26.2	3,758
Zambia 2001-02	(41.7)	28.7	26.1	28.0	1,124	29.9	27.5	23.9	27.5	2,556
Zimbabwe 1999	*	30.3	12.5	16.6	668	22.2	18.8	19.1	19.2	1,361
Median	20.8	21.6	17.1	18.2		22.6	20.6	18.7	21.0	
Mean	22.3	23.2	17.5	20.8		22.6	22.3	17.8	21.9	
North Africa/West Asia/Europe										
Armenia 2000	*	*	8.3	8.3	453	*	*	11.4	11.7	427
Egypt 2000	9.0	8.6	7.4	7.9	2,625	10.7	10.1	9.7	10.2	4,116
Jordan 2002	31.9	18.5	19.6	19.7	2,680	11.5	27.0	23.1	22.5	774
Turkey 1998	42.0	34.2	24.8	32.8	1,260	45.9	43.0	39.0	43.4	753
Yemen 1997	32.2	28.6	24.5	29.8	1,631	34.4	33.8	31.0	34.2	5,425
Median	32.1	23.6	19.6	19.7		23.0	30.4	23.1	22.5	
Mean	28.8	22.5	16.9	19.7		25.6	28.5	22.8	24.4	
Central Asia										
Kazakhstan 1999	*	*	20.1	20.0	327	*	*	17.6	17.8	462
Kyrgyz Rep. 1997	*	*	15.1	15.1	253	*	*	18.3	18.3	851
Turkmenistan 2000	*	*	6.4	6.5	775	*	*	2.4	2.4	1,192
Uzbekistan 1996	*	*	8.5	8.5	414	*	*	3.7	3.7	911
Median	u	u	11.8	11.8		u	u	10.7	10.8	
Mean	u	u	12.5	12.5		u	u	10.5	10.6	
South/Southeast Asia										
Bangladesh 1999-00	7.5	13.3	8.8	9.5	644	8.8	7.0	7.0	7.8	3,283
Cambodia 2000	24.1	17.5	20.5	19.9	552	23.6	25.2	18.9	23.9	3,680
India 1998-99	21.0	21.9	17.6	19.3	6,925	19.6	20.0	16.0	18.8	23,733
Indonesia 1997	16.2	14.4	10.2	12.0	2,624	10.2	15.4	10.6	13.6	6,698
Nepal 2000	25.7	14.8	22.0	22.2	237	26.8	25.6	18.6	25.7	3,603
Philippines 1998	*	10.5	8.3	8.7	2,049	5.1	12.0	10.1	10.8	2,366
Vietnam 1997	*	9.7	4.8	5.8	255	13.4	11.8	9.9	10.8	1,513
Median	21.0	14.4	10.2	12.0		13.4	15.4	10.6	13.6	
Mean	18.9	14.6	13.2	13.9		15.4	16.7	13.0	15.9	
Latin America/Caribbean										
Bolivia 1998	22.1	27.7	20.6	23.1	2,219	22.3	28.3	29.0	27.2	1,606
Brazil 1996	34.5	17.0	13.7	15.5	2,104	29.0	17.3	13.3	18.0	653
Colombia 2000	(39.7)	21.7	14.5	16.9	1,863	29.8	19.2	16.2	19.1	862
Dominican Rep. 2002	17.2	21.0	14.6	17.6	4,192	21.8	22.0	14.4	19.4	2,204
Guatemala 1998-99	12.4	17.5	17.6	16.5	991	18.4	18.2	9.7	17.8	1,627
Haiti 2000	33.2	33.4	26.0	30.9	1,203	34.5	33.8	27.4	33.7	2,442
Nicaragua 2001	22.1	17.5	10.8	13.9	1,931	20.4	19.6	16.1	19.4	1,875
Peru 2000	17.0	24.1	15.8	17.4	3,744	19.2	24.0	20.8	22.6	3,046
Median	22.1	21.4	15.2	17.2		22.1	20.8	16.2	19.4	
Mean	24.8	22.5	16.7	19.0		24.4	22.8	18.4	22.1	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
u = Unknown (too few cases to calculate estimate)

In rural areas, the largest regional mean difference in diarrhea prevalence by mother's education is seen in Latin America/Caribbean (six percentage points), because of the large positive differentials found in Brazil and Colombia (16 and 14 percentage points, respectively). A positive differential in prevalence among rural children whose mothers have the least versus the most education exceeds ten percentage points in just two other countries: Niger and Mozambique. Rural Jordan is a notable exception, with a negative differential of 12 percentage points

3.1.4 Demographic Characteristics

While boys and girls are equally susceptible to common pathogens, gender inequities may occur with regard to expenditures of money and time to obtain care for a sick child. Inequities in careseeking may also be found between firstborn and later-born children, as financial and time resources become more constrained with additional children. A short birth interval has also been linked to a higher frequency of illness, presumably because of maternal nutrient depletion during pregnancy or simply increased competition for household resources (Bohler and Bergstrom, 1995). Older mothers generally are more experienced in child care, including care during illnesses. However, older mothers may also be less inclined than younger mothers to adopt changes in recommendations for illness treatment, preferring to maintain past practices.

Table 3.4 shows the two-week period prevalence of diarrhea by sex, birth order, birth interval, and mother's age. Differentials in diarrhea prevalence by sex are negligible in most countries. A difference of plus or minus five percentage points is observed in only one country, Kazakhstan, where male children fared better than female children (16 and 21 percent, respectively).

Differentials in diarrhea prevalence by birth order do not follow a consistent pattern. Among those countries for which a differential of at least five percentage points in diarrhea prevalence is observed between firstborn children and children of order six and higher, three are positive (that is, the prevalence for firstborn children is higher than for children of order six and higher), namely, Gabon, Zambia, and Jordan, while three are negative, namely, Ghana, Nepal, and Colombia.

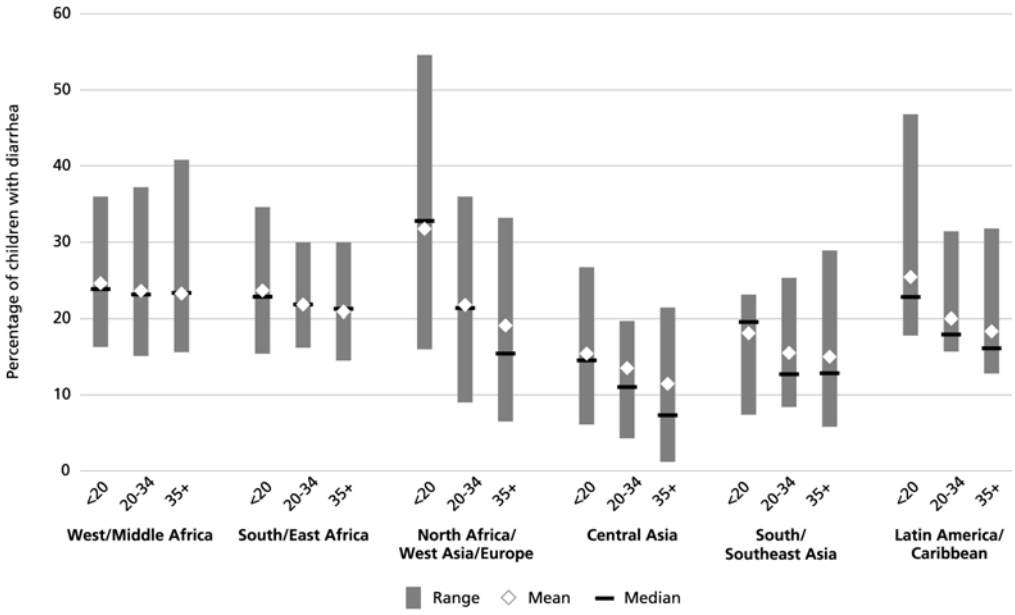
Regional average values for diarrhea prevalence are slightly higher for children born after a shorter birth interval (less than 24 months) compared with children born after a longer interval (36 or more months).

The regional average values for diarrhea prevalence are slightly higher for children born after a shorter birth interval (less than 24 months) compared with children born after a longer interval (36 or more months). However, differences in prevalence between these two categories are negligible in the majority of countries. In seven countries (Benin, Ghana, Comoros, Mozambique, South Africa, Turkey, and the Dominican Republic), diarrhea prevalence for children born after shorter intervals exceeds that for children born after longer intervals by more than five percentage points, and is lower by that amount in only one country, Tanzania.

Figure 3.4 shows the range, mean, and median diarrhea prevalence of the countries included for each region by mother's age. Generally, mother's age is not associated with diarrhea prevalence in the West/Middle Africa and South/East Africa regions. However, in six countries in these two regions, the differential in diarrhea prevalence between children of mothers age 15-19 and those of mothers age 35 or older is five percentage points or more (Gabon, Togo, Comoros, Namibia, Rwanda, and Zambia). In Tanzania, there is an equally large negative differential.

Figure 3.4

Percentage of children under age three years with diarrhea in the two weeks preceding the survey, by mother's age and region



The strongest association between diarrhea prevalence and mother's age is found in North Africa/West Asia/Europe. Four of the five countries (excluding Yemen) have significant positive differentials (range of 7 to 23 percentage points), yielding a regional mean differential of 13 percentage points between the prevalence of diarrhea in children of younger mothers (age 15-19) compared with older mothers (age 35 or older). The second largest regional mean differential is found in Latin America/Caribbean (seven percentage points), followed by Central Asia (six percentage points). Additional countries with positive differentials exceeding five percentage points (range of 5 to 15) include Kazakhstan, the Kyrgyz Republic, Turkmenistan, Indonesia, Nepal, Vietnam, Brazil, the Dominican Republic, and Haiti. There is an equally large negative differential in Nepal.

The strongest association between diarrhea prevalence and mother's age is found in North Africa/West Asia/Europe.

Table 3.4

Percentage of children under age three years with diarrhea in the two weeks preceding the survey, by child's sex, birth order, birth interval, and mother's age, Demographic and Health Surveys 1996-2002

	Child sex		Birth order				Birth interval (months)				Mother's age				Number of
Survey	Male	Female	1	2-3	4-5	6+	First	<24	24-35	36+	<20	20-34	35+	Total	children
West/Middle Africa															
Benin 2001	16.1	16.1	16.5	15.3	15.9	17.1	16.6	22.0	16.0	14.4	17.8	16.1	15.7	16.1	2,912
Burkina Faso1998-99	24.8	25.3	23.7	26.9	22.7	25.8	23.8	28.7	26.3	23.8	23.6	25.7	23.7	25.0	3,219
Cameroon 1998	19.6	18.3	20.3	17.9	17.6	20.3	20.1	15.5	19.6	18.9	24.0	17.9	19.6	18.9	2,260
Chad 1996-97	27.3	24.3	26.2	25.3	26.2	25.5	26.3	23.3	26.8	25.6	25.6	25.8	25.5	25.7	3,938
Côte d'Ivoire 1998-99	25.3	26.9	27.8	24.8	26.5	25.9	27.8	25.9	26.1	25.1	26.8	26.7	23.6	26.1	1,221
Gabon 2000	21.0	21.4	24.1	21.3	19.8	18.5	24.5	20.2	20.1	19.9	26.0	21.0	16.7	21.2	2,324
Ghana 1998	23.1	20.3	22.0	17.7	23.2	27.1	22.1	28.8	20.4	20.8	21.9	21.2	23.1	21.7	1,802
Guinea 1999	26.2	26.2	27.3	24.5	27.4	26.3	27.4	27.3	26.4	25.4	25.5	26.9	24.3	26.2	3,005
Mali 2001	23.7	21.8	25.0	22.2	21.2	23.4	25.0	23.1	22.6	21.9	22.8	22.9	22.4	22.8	6,973
Mauritania 2000-01	23.1	23.6	26.3	22.2	21.1	24.4	26.3	22.4	22.2	22.9	20.8	23.3	24.3	23.3	2,796
Niger 1998	38.7	36.7	35.0	37.3	37.8	39.5	34.8	41.4	36.2	39.3	36.0	37.2	40.8	37.8	4,403
Nigeria 1999	15.1	15.5	14.8	14.6	16.7	15.1	14.8	14.2	16.8	14.9	16.3	15.1	15.6	15.3	3,208
Senegal 1997	19.4	20.5	21.2	18.1	21.8	19.5	21.2	20.8	20.3	18.7	21.7	20.1	19.0	19.9	3,868
Togo 1998	31.0	31.1	30.8	30.9	32.3	30.3	30.5	33.7	33.3	29.4	35.8	30.8	30.6	31.1	3,693
Median	23.4	22.7	24.6	22.2	22.3	25.0	24.8	23.2	22.4	22.4	23.8	23.1	23.4	23.1	
Mean	23.9	23.4	24.4	22.8	23.6	24.2	24.4	24.8	23.8	22.9	24.6	23.6	23.2	23.7	
South/East Africa															
Comoros 1996	22.9	23.3	22.1	21.8	23.8	24.5	22.2	25.9	24.4	20.3	31.3	23.0	21.2	23.1	1,056
Eritrea 2002	19.3	14.7	17.2	16.8	15.0	19.0	17.0	17.0	18.6	15.8	17.6	17.0	16.9	17.0	3,281
Ethiopia 2000	31.7	28.5	28.6	31.8	28.9	30.3	28.7	30.8	30.0	30.6	32.1	30.0	30.0	30.1	6,412
Kenya 1998	17.8	16.4	18.0	15.8	14.4	20.9	17.8	15.2	17.1	17.5	15.4	17.4	16.8	17.1	3,205
Madagascar 1997	27.9	26.2	27.9	26.2	28.1	26.5	28.0	25.8	26.8	27.4	24.5	28.4	23.9	27.1	3,537
Malawi 2000	24.1	22.8	22.5	22.9	23.8	25.1	22.3	24.6	26.1	21.8	26.0	23.5	22.0	23.5	6,862
Mozambique 1997	21.6	19.8	17.8	19.0	25.0	21.8	17.8	31.5	23.5	17.6	20.4	20.6	21.3	20.7	3,803
Namibia 2000	16.4	16.1	17.4	14.1	19.2	16.4	17.6	17.2	14.8	16.0	21.0	16.2	14.5	16.3	2,346
Rwanda 2000	22.8	22.4	24.0	23.3	23.0	20.1	23.9	21.8	22.0	22.9	26.9	23.7	19.5	22.6	4,293
South Africa 1998	18.0	16.9	17.5	16.1	18.1	21.8	17.7	23.6	15.6	16.7	21.1	17.1	16.8	17.4	2,912
Tanzania 1999	19.1	15.5	17.7	16.2	18.1	18.0	17.7	12.8	17.8	18.1	15.9	16.6	21.3	17.3	1,817
Uganda 2000-01	27.2	24.1	24.7	27.1	24.2	25.7	24.6	26.5	24.7	26.9	27.5	25.5	25.3	25.6	4,245
Zambia 2001-02	28.5	26.8	30.9	26.7	29.1	24.5	30.9	28.9	27.6	25.1	34.6	27.4	23.6	27.6	3,681
Zimbabwe 1999	18.4	18.3	15.7	20.7	18.1	18.5	15.8	15.5	20.5	20.0	17.0	18.4	19.1	18.4	2,029
Median	22.2	21.1	20.1	21.3	23.4	21.8	20.0	24.1	22.8	20.2	22.8	21.8	21.3	21.7	
Mean	22.6	20.8	21.6	21.3	22.1	22.4	21.6	22.7	22.1	21.2	23.7	21.8	20.9	21.7	
North Africa/West Asia/ Europe															
Armenia 2000	10.8	8.9	11.9	8.4	10.0	*	11.8	10.1	8.8	7.4	20.3	9.5	6.5	10.0	880
Egypt 2000	9.6	9.1	9.6	8.3	10.8	10.1	9.6	8.3	9.4	9.6	16.0	9.0	9.2	9.3	6,741
Jordan 2002	20.0	20.8	22.6	20.3	21.0	17.3	22.3	20.8	18.3	20.1	32.8	21.3	15.4	20.4	3,454
Turkey 1998	38.6	34.7	36.9	34.3	44.2	38.2	36.5	43.3	40.6	32.9	54.6	36.0	31.4	36.8	2,013
Yemen 1997	34.5	32.0	32.3	33.6	32.7	33.6	32.4	34.3	33.0	32.8	34.9	33.0	33.2	33.2	7,056
Median	20.0	20.8	22.6	20.3	21.0	25.5	22.3	20.8	18.3	20.1	32.8	21.3	15.4	20.4	
Mean	22.7	21.1	22.7	21.0	23.7	24.8	22.5	23.4	22.0	20.6	31.7	21.8	19.1	21.9	
Central Asia															
Kazakhstan 1999	16.2	21.3	23.3	18.3	10.8	*	23.3	18.0	16.8	14.9	(20.6)	19.7	11.8	18.7	788
Kyrgyz Rep. 1997	19.5	15.6	18.6	17.1	16.0	19.9	18.6	18.6	15.9	17.2	(26.7)	16.6	21.4	17.6	1,104
Turkmenistan 2000	4.1	3.9	5.0	4.1	1.9	2.1	5.0	5.0	2.9	2.6	(8.4)	4.3	1.2	4.0	1,968
Uzbekistan 1996	4.7	5.7	6.2	4.3	5.7	5.5	6.1	4.1	4.2	5.7	6.1	5.4	2.8	5.2	1,325
Median	10.5	10.7	12.4	10.7	8.3	5.5	12.4	11.5	10.1	10.3	14.5	11.0	7.3	11.4	
Mean	13.3	13.6	15.6	13.2	9.6	11.0	15.6	13.9	11.9	11.6	15.4	13.5	11.5	11.4	
South/Southeast Asia															
Bangladesh 1999-00	8.4	7.8	8.4	7.6	8.6	8.8	8.4	5.8	9.7	7.8	7.4	8.4	7.7	8.1	3,927
Cambodia 2000	24.2	22.4	22.2	23.2	24.7	23.1	22.4	24.6	25.1	22.3	23.1	23.5	23.1	23.3	4,232
India 1998-99	19.2	18.6	18.2	18.6	20.3	20.1	18.2	18.7	19.9	19.0	21.8	18.6	17.5	18.9	30,668
Indonesia 1997	14.4	11.8	13.0	12.8	13.3	15.0	13.0	12.8	14.7	12.8	19.6	12.7	12.8	13.1	9,322
Nepal 2000	26.1	25.0	21.4	26.4	26.6	28.2	21.3	25.9	27.6	26.6	23.1	25.3	28.9	25.5	3,840
Philippines 1998	10.0	9.6	9.6	9.6	8.9	11.6	9.6	9.3	10.8	9.7	12.6	9.8	9.5	9.8	4,415
Vietnam 1997	11.7	8.4	10.1	10.3	10.9	5.8	10.0	12.4	8.9	9.9	(19.0)	10.4	5.8	10.1	1,769
Median	14.4	11.8	13.0	12.8	13.3	15.0	13.0	12.8	14.7	12.8	19.6	12.7	12.8	13.1	
Mean	16.3	14.8	14.7	15.5	16.2	16.1	14.7	15.6	16.7	15.4	18.1	15.5	15.0	15.5	
Latin America/Caribbean															
Bolivia 1998	24.9	24.7	23.8	23.2	26.6	27.2	23.7	25.7	26.6	23.6	26.4	24.8	24.3	24.8	3,826
Brazil 1996	16.0	16.2	16.3	14.3	21.7	16.6	16.4	16.3	20.6	13.9	21.0	15.9	12.8	16.1	2,757
Colombia 2000	19.1	15.9	15.9	17.6	20.2	23.1	15.8	19.1	21.0	17.5	18.3	18.1	14.4	17.6	2,725
Dominican Rep. 2002	19.1	17.2	19.4	17.9	16.1	18.1	19.5	21.8	18.8	14.5	28.3	16.9	13.2	18.2	6,395
Guatemala 1998-99	18.7	15.9	17.5	16.3	17.9	17.9	17.5	16.8	18.3	16.3	17.8	17.7	15.3	17.3	2,618
Haiti 2000	34.3	31.2	33.8	31.6	33.2	32.8	33.9	32.3	33.5	31.4	46.8	31.4	31.8	32.8	3,645
Nicaragua 2001	17.0	16.3	15.0	17.1	17.6	18.2	14.9	17.3	18.2	17.2	20.4	15.7	16.9	16.6	3,807
Peru 2000	21.0	18.4	18.1	19.1	23.2	21.7	18.1	20.0	23.4	19.3	24.5	19.6	18.2	19.7	6,790
Median	19.1	16.8	17.8	17.8	21.0	20.0	17.8	19.6	20.8	17.4	22.8	17.9	16.1	17.9	
Mean	21.3	19.5	20.0	19.6	22.1	22.0	20.0	21.2	22.5	19.2	25.4	20.0	18.4	20.4	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

3.1.5 Nutritional Factors

Nutritional Status

As shown in Figure A.5 in Appendix A, undernutrition and infection, including diarrheal diseases, have a cyclical relationship (Tomkins and Watson, 1989). Inadequate dietary intake can lead to growth faltering and low nutritional reserves. Immunity is then lowered, and protein-energy and vitamin A deficiencies in particular can damage the mucosa. With the lowered immunity and damaged mucosa, exposure to pathogens can result in increased incidence, severity, and duration of diseases. The disease process exacerbates the loss of nutrients through alterations in metabolism and malabsorption. Loss of appetite, which often accompanies illness, is then reflected by an inadequate dietary intake.

Overall, these data show a strong and consistent negative association between the three measures of nutritional status and diarrhea prevalence, particularly weight-for-age and weight-for-height.

Because of this cyclical relationship and the cross-sectional design of DHS surveys, it is not possible to ascertain directionality. A child with a recent severe episode of diarrhea may have experienced rapid weight loss, reflected by a low weight-for-height measurement (wasting) on the day of interview. A child with frequent or persistent diarrheal episodes may have experienced a chronic loss of essential nutrients for growth, reflected by a low height-for-age measurement (stunting). Conversely, for the reasons described above, undernourished children may have an enhanced susceptibility to infectious agents, including enteropathogens, and thus have been more likely than better nourished children to have had diarrhea in the past two weeks.

In Table 3.5, the two-week period prevalence of diarrhea is shown by three indices of nutritional status: weight-for-age, height-for-age, and weight-for-height. The indices, based on Z-scores derived from anthropometric measurements, are presented for severely undernourished (less than -3 SD), moderately undernourished (greater than or equal to -3 SD and less than -2 SD), or better nourished (greater than or equal to -2 SD) children.

Overall, these data show a strong and consistent negative association between the three measures of nutritional status and diarrhea prevalence, particularly weight-for-age and weight-for-height.

Table 3.5

Percentage of children under age three years with diarrhea in the two weeks preceding the survey by nutritional status indices, Demographic and Health Surveys, 1996-2002

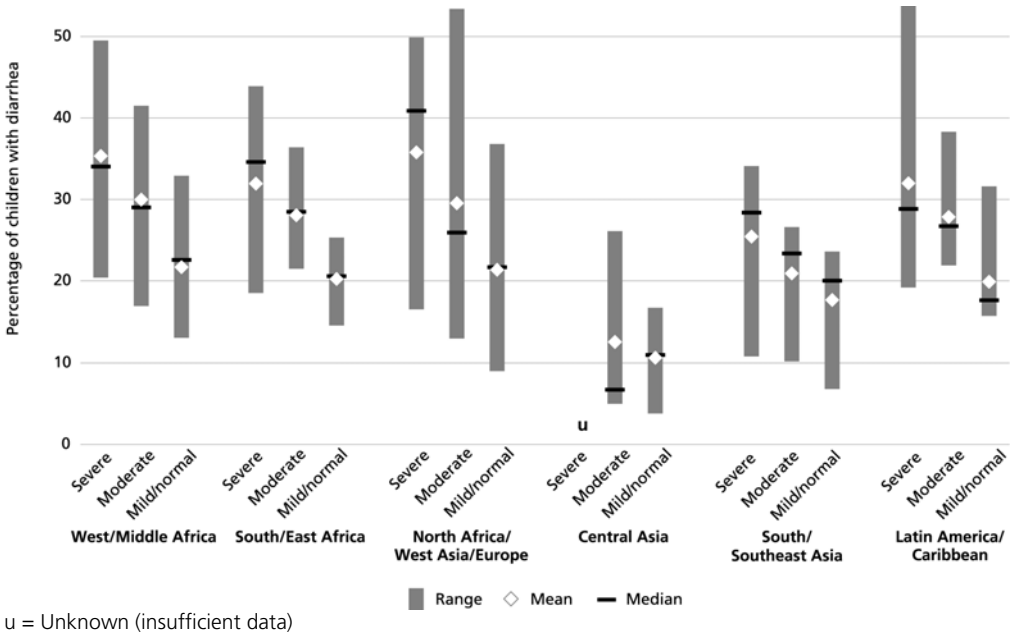
Survey	Weight-for-age Z-score			Height-for-age z-score			Weight-for-height z-score			Total	Number of Children
	≤-3.0	-3.0 to -2.01	≥ -2.0	≤-3.0	-3.0 to -2.01	≥ -2.0	≤-3.0	-3.0 to -2.01	≥ -2.0		
West/Middle Africa											
Benin 2001	20.4	19.1	14.5	17.0	19.4	14.6	25.3	20.0	15.1	15.7	2,610
Burkina Faso 1998-99	38.2	27.7	22.6	34.6	24.5	24.4	35.1	33.1	24.2	25.9	2,530
Cameroon 1998	40.9	27.9	17.4	23.5	27.1	18.1	*	35.8	19.4	20.4	1,923
Chad 1996-97	33.0	29.5	23.3	28.9	26.1	25.6	42.3	31.8	24.6	26.3	3,541
Côte d'Ivoire 1998-99	(46.0)	40.8	23.2	33.4	29.2	26.2	*	39.7	25.5	27.2	1,099
Gabon 2000	37.1	32.2	20.2	30.0	26.8	20.4	*	30.8	21.6	21.9	2,013
Ghana 1998	28.1	28.4	19.5	21.2	27.9	20.6	(40.0)	24.4	20.9	21.7	1,638
Guinea 1999	39.4	33.5	23.1	29.2	30.4	25.0	40.2	37.4	24.5	26.1	2,067
Mali 2001	30.8	29.0	19.8	27.1	29.4	20.6	35.3	29.9	22.0	23.1	6,120
Mauritania 2000-01	27.0	25.8	23.5	20.9	28.2	24.0	19.0	34.3	23.3	24.3	2,227
Niger 1998	49.5	41.5	32.9	45.2	39.0	36.5	54.1	49.0	35.9	38.8	4,022
Nigeria 1999	25.0	16.9	13.1	18.3	15.6	13.3	25.1	18.4	14.2	15.0	1,473
Togo 1998	44.1	37.8	28.4	41.0	38.7	28.9	36.8	36.9	30.4	31.2	3,260
Median	34.0	29.0	22.6	28.9	27.9	24.0	36.1	33.1	23.3	24.3	
Mean	35.3	30.0	21.7	28.5	27.9	22.9	35.3	32.4	23.2	24.4	
South/East Africa											
Comoros 1996	30.1	23.6	22.1	23.6	24.5	22.5	*	31.0	22.5	23.0	921
Eritrea 2002	19.4	21.9	15.2	16.7	21.3	16.5	26.4	20.3	16.8	17.5	2,996
Ethiopia 2000	42.2	35.9	25.3	35.1	33.4	28.5	48.9	44.7	29.0	31.0	6,011
Kenya 1998	29.7	22.5	16.5	25.9	20.7	16.2	(8.9)	24.9	18.0	18.2	2,821
Madagascar 1997	36.7	33.1	24.5	34.1	31.2	24.6	(56.6)	34.7	27.7	28.4	3,080
Malawi 2000	34.7	28.5	21.8	26.8	25.0	22.6	20.8	32.9	23.6	24.1	6,177
Mozambique 1997	41.0	26.8	19.5	30.6	21.8	21.0	(28.3)	43.0	21.2	22.7	2,837
Namibia 2000	25.2	23.9	14.6	24.2	22.1	15.1	(24.6)	20.6	16.0	16.5	2,188
Rwanda 2000	38.9	28.7	20.6	28.2	27.5	20.6	34.6	28.5	22.5	23.2	3,915
Tanzania 1999	18.5	21.5	17.1	14.7	23.4	17.0	*	18.0	18.3	18.2	1,674
Uganda 2000-01	34.6	32.7	24.0	28.9	30.2	24.4	*	37.1	25.7	26.2	3,740
Zambia 2001-02	43.9	36.4	24.0	33.9	31.4	24.9	(41.5)	39.0	27.5	28.2	3,432
Zimbabwe 1999	(20.1)	29.1	17.6	22.9	24.9	17.2	(23.2)	13.5	19.2	18.9	1,684
Median	34.6	28.5	20.6	26.8	24.9	21.0	27.4	31.0	22.5	23.0	
Mean	31.9	28.0	20.2	26.6	26.0	20.9	31.4	29.9	22.2	22.8	
North Africa/West Asia/Europe											
Armenia 2000	*	*	9.8	*	10.1	9.8	*	*	9.7	9.8	805
Egypt 2000	(16.5)	13.0	9.0	11.2	9.2	9.0	(9.9)	10.2	9.2	9.2	6,264
Jordan 2002	*	15.7	21.7	18.9	20.1	21.6	*	14.5	21.7	21.5	2,845
Turkey 1998	(49.9)	53.4	36.8	45.5	49.9	36.6	*	(38.6)	37.8	38.0	1,610
Yemen 1997	40.9	36.1	29.4	36.8	34.9	30.7	31.3	43.3	31.7	33.1	4,966
Median	40.9	25.9	21.7	27.9	20.1	21.6	20.6	26.6	21.7	21.5	
Mean	35.8	29.5	21.3	28.1	24.8	21.5	20.6	26.6	22.0	22.3	
Central Asia											
Kazakhstan 1999	*	*	16.7	*	(29.3)	16.6	*	*	17.1	17.8	354
Kyrgyz Rep. 1997	*	26.1	16.7	11.7	22.9	17.2	*	22.6	17.8	18.0	1,015
Turkmenistan 2000	(0.0)	5.0	3.8	1.8	5.1	3.9	*	2.3	4.0	3.9	1,745
Uzbekistan 1996	(3.0)	6.7	5.3	3.7	6.3	5.5	*	5.4	5.3	5.4	989
Median	1.5	6.7	11.0	3.7	14.6	11.1	u	5.4	11.2	11.6	
Mean	1.5	12.6	10.6	5.7	15.9	10.8	u	10.1	11.1	11.3	
South/Southeast Asia											
Bangladesh 1999-00	10.8	10.2	6.8	11.0	9.3	7.4	(20.6)	11.2	7.9	8.4	3,306
Cambodia 2000	34.1	26.6	22.3	26.3	30.2	22.5	32.7	24.3	23.3	23.5	4,006
India 1998-99	23.5	20.9	17.8	21.3	21.0	18.4	21.9	22.8	19.0	19.5	27,094
Nepal 2000	33.3	25.9	23.6	27.9	26.7	24.6	35.5	31.0	24.9	25.7	3,707
Median	28.4	23.4	20.1	23.8	23.9	20.5	27.3	23.6	21.2	21.5	
Mean	25.4	20.9	17.6	21.6	21.8	18.2	27.7	22.3	18.8	19.3	
Latin America/Caribbean											
Bolivia 1998	40.0	32.9	23.8	31.4	27.6	23.4	*	31.1	24.6	24.7	3,451
Brazil 1996	*	22.2	16.1	28.4	19.5	15.9	*	22.1	16.3	16.5	2,306
Colombia 2000	(34.2)	30.8	17.4	26.8	23.8	17.5	*	(22.0)	18.3	18.4	2,498
Dominican Rep. 2002	(22.5)	25.1	17.6	36.2	23.2	17.2	*	11.7	18.0	18.0	5,612
Guatemala 1998-99	19.2	21.9	17.6	20.3	21.0	16.8	*	28.1	18.2	18.5	2,149
Haiti 2000	53.7	38.3	31.6	44.9	38.9	31.5	(64.7)	40.7	32.6	33.2	3,532
Nicaragua 2001	28.8	23.5	15.7	19.1	23.5	15.5	*	18.7	16.4	16.5	3,443
Peru 2000	25.7	28.3	19.6	27.9	23.8	18.9	*	22.2	20.2	20.2	6,070
Median	28.8	26.7	17.6	28.2	23.7	17.4	u	22.2	18.3	18.5	
Mean	32.0	27.9	19.9	29.4	25.2	19.6	u	24.6	20.6	20.8	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
u = Unknown (too few cases to calculate estimate)

Figure 3.5 shows the range, mean, and median diarrhea prevalence for the countries included in each region by weight-for-age. Apart from Central Asia, there is a strong and consistent decrease in the average prevalence of diarrhea with improved nutritional status as measured by weight-for-age. Data from the countries in North Africa/West Asia/Europe and Central Asia are sparse for severely underweight (weight-for-age) children.

Figure 3.5

Percentage of children under age three years with diarrhea in the two weeks preceding the survey, by low weight-for-age status and region



u = Unknown (insufficient data)

The difference in diarrhea prevalence between the lowest and highest categories of weight-for-age was calculated for each country. In four countries (Cameroon, Côte d'Ivoire, Mozambique, and Haiti), these differentials exceed 20 percentage points. In 25 of the 42 countries with calculable differences, diarrhea prevalence among severely underweight children exceeds that of better nourished, nonunderweight children by ten or more percentage points.

In most regions, the average prevalence of diarrhea decreases with improved nutritional status as measured by height-for-age. The most dramatic decrease is found in the Latin America/Caribbean region. In three of those eight countries, the differential in diarrhea prevalence among children in the lowest versus the highest height-for-age category exceeds 10 percentage points (range of 12 to 19 percentage points). A positive differential of this size is found in only two other countries: Burkina Faso and Togo. In South/Southeast Asia, the difference in diarrhea prevalence between severely stunted and mild/nonstunted children is small. In Central Asia, the pattern across categories is irregular.

In most regions, the average prevalence of diarrhea decreases with improved nutritional status as measured by height-for-age.

In regard to weight-for-height, most of the countries have very low levels of severe wasting and, hence, sparse data for severely wasted children. Data are especially sparse in this category for the regions of North Africa/West Asia/Europe, Central Asia, and Latin America/Caribbean. In the other three regions, the average preva-

lence of diarrhea decreases consistently with improved nutritional status as measured by weight-for-height.

Differentials in diarrhea prevalence between the lowest and highest categories of weight-for-height were calculated for all countries where data allow. The largest differentials are found in Madagascar and Haiti, where the prevalence of diarrhea among severely wasted children is about 30 percentage points higher than that of better nourished, nonwasted children.[2] Of 27 calculable country differentials, an additional 13 are between 10 and 20 percentage points (Benin, Burkina Faso, Chad, Ghana, Guinea, Mali, Niger, Nigeria, Ethiopia, Rwanda, Zambia, Bangladesh, and Nepal).

Breastfeeding Status

Over the course of the first year of life, most infants in developing countries transition from full or predominant breastfeeding to partial or no breastfeeding. Human milk contains a variety of antimicrobial factors common to mucosal sites that principally protect the digestive tract and respiratory system of the breastfeeding infant. Most of these factors are secreted throughout lactation, including two key proteins, lactoferrin and lysozyme, and a key antibody, secretory IgA. The passive transfer of secretory antibodies from the mother is especially beneficial, since the child's secretory immune system matures over the course of the first several months after birth (Institute of Medicine, 1991).

The weaning process introduces increased opportunities for exposure to infectious agents through the ingestion of contaminated foods and liquids or eating and drinking utensils.

The weaning process introduces increased opportunities for exposure to infectious agents through the ingestion of contaminated foods and liquids or eating and drinking utensils.

The two-week period prevalence of diarrhea is shown in Table 3.6 by two categories of age in months (0-5 months and 6-11 months) and by breastfeeding status. In both age groups, fully breastfed infants in a majority of countries have a lower prevalence of diarrhea than their same-age counterparts who are partially breastfed.

[2] In Madagascar and Haiti, the number of children in the severely wasted category is less than 50.

Table 3.6

Percentage of infants age 0-5 months and 6-11 months with diarrhea in the two weeks preceding the survey by breastfeeding status, Demographic and Health Surveys 1996-2002

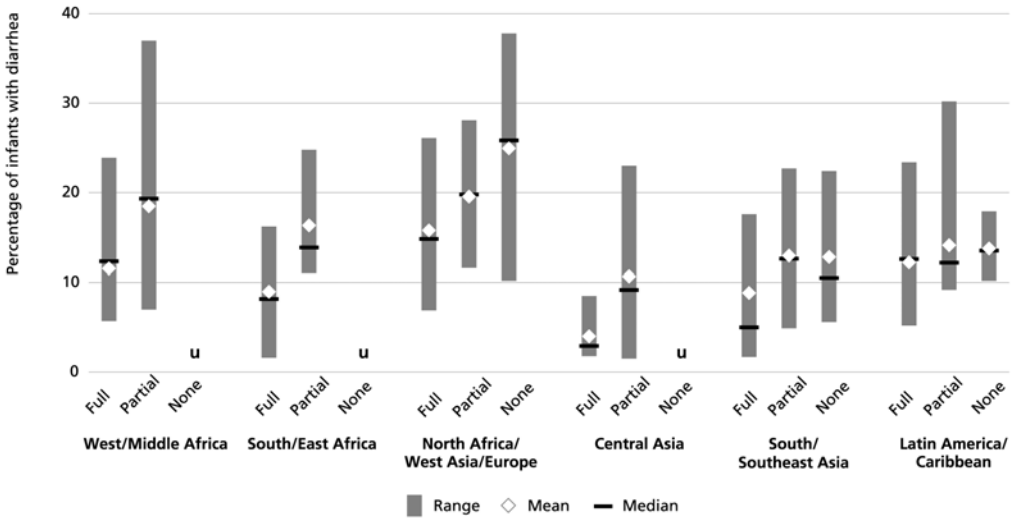
Survey	Breastfeeding status of infants age 0-5 months			Breastfeeding status of infants age 6-11 months			Total	Number of infants
	Full	Partial	None	Full	Partial	None		
West/Middle Africa								
Benin 2001	7.0	7.0	*	25.1	20.7	*	14.1	1,064
Burkina Faso 1998-99	12.7	15.4	*	21.4	30.8	*	21.0	1,189
Cameroon 1998	7.4	13.8	*	(18.8)	21.3	*	15.6	817
Chad 1996-97	13.4	22.7	*	15.9	31.0	*	22.6	1,508
Côte d'Ivoire 1998-99	6.4	13.0	*	(8.1)	33.7	*	21.7	411
Gabon 2000	8.0	11.7	(14.4)	(35.0)	28.5	26.8	19.5	795
Ghana 1988	10.0	20.9	*	28.9	25.5	*	19.7	610
Guinea 1999	13.1	21.0	*	26.6	35.7	*	22.1	1,099
Mali 2001	13.2	18.8	*	27.5	30.3	*	20.7	2,750
Mauritania 2000-01	14.3	21.6	*	18.8	31.1	(41.9)	23.4	1,024
Niger 1998	23.9	37.0	*	42.0	51.3	*	39.6	1,647
Nigeria 1999	5.7	12.2	(0.0)	22.3	17.4	(24.1)	13.3	1,109
Senegal 1997	14.2	19.9	*	24.0	27.1	*	19.9	1,368
Togo 1998	12.0	23.3	*	(42.3)	36.2	*	28.1	1,368
Median	12.4	19.3	7.2	24.6	30.6	26.8	20.9	
Mean	11.5	18.5	7.2	25.5	30.0	30.9	21.5	
South/East Africa								
Comoros 1996	(17.0)	24.8	*	*	37.6	*	29.8	382
Eritrea 2002	5.7	13.3	*	15.9	22.7	*	13.6	1,281
Ethiopia 2000	11.9	23.1	*	32.5	40.3	*	27.1	2,186
Kenya 1998	7.9	13.0	*	*	22.6	(5.9)	17.3	1,087
Madagascar 1997	10.3	21.7	*	(30.1)	32.5	*	23.7	1,280
Malawi 2000	5.9	22.3	*	36.0	36.1	*	24.3	2,517
Mozambique 1997	6.1	16.9	*	26.1	21.2	(38.0)	15.8	1,440
Namibia 2000	7.4	11.0	*	*	23.1	16.6	15.8	817
Rwanda 2000	13.3	14.4	*	30.9	28.4	*	21.7	1,731
South Africa 1998	5.0	11.1	16.1	*	23.0	21.0	16.6	1,005
Tanzania 1999	9.2	11.5	*	*	30.5	*	19.9	636
Uganda 2000-01	16.2	21.2	*	39.1	38.5	(28.4)	28.3	1,485
Zambia 2001-02	8.4	13.3	*	46.6	37.7	*	23.9	1,238
Zimbabwe 1999	1.6	11.3	*	*	26.3	*	16.2	661
Median	8.1	13.9	u	31.7	29.5	21.0	20.8	
Mean	9.0	16.4	u	32.2	30.0	22.0	21.0	
North Africa/West Asia/ Europe								
Armenia 2000	8.3	12.0	*	*	17.2	12.2	12.1	299
Egypt 2000	6.9	11.6	(10.2)	16.8	13.3	19.6	11.5	2,362
Jordan 2002	14.8	19.8	(24.7)	*	27.0	25.6	22.8	1,166
Turkey 1998	26.1	26.2	(27.0)	*	45.2	43.4	35.0	712
Yemen 1997	22.9	28.1	38.7	41.5	38.1	41.6	32.9	2,544
Median	14.8	19.8	25.9	29.2	27.0	25.6	22.8	
Mean	15.8	19.5	24.9	29.2	28.2	28.5	22.9	
Central Asia								
Kazakhstan 1999	3.7	(23.0)	*	*	27.8	(13.4)	19.0	244
Kyrgyz Rep. 1997	8.5	14.4	*	*	21.6	(22.2)	16.4	366
Turkmenistan 2000	1.8	1.5	*	*	6.2	(10.4)	3.9	692
Uzbekistan 1996	(2.1)	3.9	*	*	3.8	(18.7)	5.5	416
Median	2.9	9.1	u	u	13.9	16.0	11.0	
Mean	4.0	10.7	u	u	14.9	16.2	11.2	
South/Southeast Asia								
Bangladesh 1999-00	2.4	4.9	*	10.2	12.6	*	6.9	1,312
Cambodia 2000	15.3	18.3	*	25.9	30.3	(34.8)	22.8	1,600
India 1998-99	15.1	17.5	22.4	25.0	25.1	23.8	20.2	10,544
Indonesia 1997	5.0	10.0	5.6	11.4	18.3	6.7	12.3	3,213
Nepal 2000	17.6	22.7	*	39.4	33.8	*	26.5	1,282
Philippines 1998	4.9	4.9	10.5	*	12.3	17.0	10.1	1,494
Vietnam 1997	1.7	12.6	*	*	17.3	*	12.8	529
Median	5.0	12.6	10.5	25.0	18.3	20.4	12.8	
Mean	8.9	13.0	12.8	22.4	21.4	20.6	15.9	
Latin America/Caribbean								
Bolivia 1998	15.0	14.2	*	15.5	26.9	21.6	20.4	13,16
Brazil 1996	5.5	11.9	17.9	(12.1)	21.9	23.8	16.8	905
Colombia 2000	13.0	9.2	(10.7)	*	21.7	24.3	17.2	942
Dominican Rep. 2002	10.1	12.4	16.3	(32.0)	25.8	25.6	19.5	2,011
Guatemala 1998-99	5.2	10.9	*	25.1	23.4	(5.3)	14.8	901
Haiti 2000	23.4	30.2	*	39.1	44.9	(32.1)	36.4	1,195
Nicaragua 2001	13.2	13.4	(10.2)	(27.4)	18.6	20.6	16.5	1,140
Peru 2000	12.2	10.9	*	22.9	23.5	15.4	17.4	2,111
Median	12.6	12.1	13.5	25.1	23.5	22.7	17.3	
Mean	12.2	14.1	13.8	24.9	25.8	21.1	19.9	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
u = Unknown (too few cases to calculate estimate)

Figure 3.6.1 shows the range, mean and median diarrhea prevalence estimates for those countries included in each region by breastfeeding status for infants under six months of age. The regional average percentage of fully breastfed infants age 0-5 months with recent diarrhea is distinctly lower than the comparable statistic for partially breastfed infants in each region, with the exception of Latin America/Caribbean. At the country level, the differential in diarrhea prevalence among fully breastfed versus partially breastfed infants age 0-5 months is negative by five or more percentage points in three-fifths (32 of 52) of the countries, including 11 in which diarrhea prevalence is lower by more than ten percentage points for fully breastfed infants compared with partially breastfed infants.

Figure 3.6.1

Percentage of infants age 0-5 months with diarrhea in the two weeks preceding the survey, by breastfeeding status and region



u = Unknown (insufficient data)

Data for infants under six months of age who are receiving no breast milk are sparse in most regions. On the basis of those countries with adequate denominators (25 or more), the average regional prevalence of diarrhea is higher among children receiving no breast milk compared with partially breastfed children in the region of North Africa/West Asia/Europe, but is the same in South/Southeast Asia and Latin America/Caribbean (Figure 3.6.1).

At age 6-11 months, fully breastfed infants continue to have a lower diarrhea prevalence than their partially breastfed counterparts in most of the West/Middle African countries shown. The largest differentials, ranging from negative 10 to negative 26, are found in Chad, Côte d'Ivoire, Mauritania, Bolivia, and Brazil.

The number of infants who are receiving no breast milk remains small at age 6-11 months in most sub-Saharan African countries and in some countries in South/Southeast Asia. On the basis of those countries with adequate denominators (25 or more), the regional average prevalence of diarrhea is about the same or lower among children receiving no breast milk compared with partially breastfed children.

Other Weaning Factors

Giving water to infants is not recommended in developing countries, primarily for two reasons. First, the water may be contaminated and thus expose the child to infectious agents, resulting in a higher likelihood of diarrhea. Second, an infant who is consuming a significant amount of water, which has no nutritional value, may in turn consume less of other, nutritious liquids because he/she feels full. Breast milk production, which is influenced by the frequency and duration of suckling, may also decrease if the infant feels full. Giving a bottle with a nipple to a child at any age is also not recommended in developing countries because of the risk of contamination of the nipple.

In Table 3.7, the percentage of infants age 0-5 months and 6-11 months with diarrhea in the past two weeks is shown by receipt/nonreceipt of plain water and use/nonuse of a bottle with a nipple during the preceding 24 hours. For each country, the difference in diarrhea period prevalence between recipients and nonrecipients and between users and nonusers was calculated.

Overall, the provision of plain water appears to be the most detrimental factor with regard to recent diarrhea among infants age 0-5 months. Figure 3.6.2 shows the range, mean, and median diarrhea period prevalence estimates for those countries in each region by receipt/nonreceipt of plain water during the preceding 24 hours for infants age 0-5 months. The regional average prevalence of diarrhea among younger infants who were given plain water is consistently higher than that of infants who were not given plain water.

Overall, the provision of plain water appears to be the most detrimental factor with regard to recent diarrhea among infants age 0-5 months.

For infants age 0-5 months, the differential in diarrhea period prevalence between recipients and nonrecipients of plain water is positive by more than ten percentage points in six countries (Ghana, Malawi, Uganda, Jordan, Kazakhstan, and Haiti) and by more than five percentage points in one-third of countries (16 of 47). No negative differentials are of this magnitude.

For infants age 6-11 months, differentials in diarrhea period prevalence between recipients and nonrecipients of plain water are more inconsistent in direction. Out of 37 differentials, just 1 is positive by ten or more percentage points (Mali), and 3 are negative by the same amount (Kenya, Kazakhstan, and Cambodia).

Table 3.7

Percentage of infants age 0-5 months and 6-11 months with diarrhea in the two weeks preceding the survey, by receipt of plain water and use of bottle with nipple in the past 24 hours, Demographic and Health Surveys 1996-2002

	Infants age 0-5 months				Infants age 6-11 months					
	Plain water in past 24 hours		Bottle with nipple in past 24 hours		Plain water in past 24 hours		Bottle with nipple in past 24 hours			
Survey	Yes	No	Yes	No	Yes	No	Yes	No	Total	Number of infants
West/Middle Africa										
Benin 2001	7.8	6.3	(1.6)	7.5	21.3	21.5	*	21.6	14.1	1,064
Burkina Faso 1998-99	14.0	16.8	*	14.6	29.4	(22.1)	*	28.6	21.0	1,189
Cameroon 1998	11.6	7.0	11.7	10.5	20.6	*	21.8	20.8	15.6	817
Chad 1996-97	17.5	(20.1)	20.3	17.5	28.7	*	(29.7)	28.6	22.6	1,508
Côte d'Ivoire 1998-99	11.2	*	*	10.5	30.4	*	*	31.5	21.7	411
Gabon 2000	11.8	6.9	13.8	8.8	28.9	(24.2)	27.8	28.7	19.5	795
Ghana 1998	18.7	4.4	20.8	11.5	26.8	*	21.8	26.3	19.7	610
Guinea 1999	16.4	11.7	19.4	15.5	33.2	(20.9)	(39.8)	31.6	22.1	1,099
Mali 2001	15.2	10.5	8.6	14.1	29.2	26.1	22.0	29.0	20.7	2,751
Mauritania 2000-01	19.4	12.4	20.5	17.1	29.1	31.0	(43.2)	28.1	23.4	1,024
Niger 1998	30.1	*	(43.6)	29.4	50.3	*	(46.5)	50.5	39.6	1,647
Nigeria 1999	9.2	5.0	6.2	9.1	18.1	22.5	16.0	19.0	13.3	1,109
Senegal 1997	*	15.8	*	15.7	*	25.4	*	25.2	19.9	1,368
Togo 1998	19.6	16.3	(19.9)	19.0	36.7	*	(40.6)	36.4	28.1	1,368
Median	15.2	11.1	19.4	14.4	29.1	23.4	28.8	28.6	20.9	
Mean	15.6	11.1	16.9	14.3	29.4	24.2	30.9	29.0	21.5	
South/East Africa										
Comoros 1996	24.7	*	(21.7)	22.9	37.4	*	(33.3)	38.1	29.8	382
Eritrea 2002	9.6	5.3	(5.2)	7.2	20.6	19.4	33.2	19.2	13.6	1,281
Ethiopia 2000	20.5	13.4	19.9	14.4	40.8	33.7	27.2	40.6	27.1	2,184
Kenya 1998	10.2	14.7	10.0	12.6	20.2	30.0	19.0	23.3	17.3	1,087
Madagascar 1997	15.7	15.1	(11.1)	15.4	33.2	31.5	(33.3)	32.7	23.7	1,280
Malawi 2000	20.1	7.1	(13.9)	13.0	36.1	33.6	(24.9)	36.3	24.3	2,517
Mozambique 1997	12.0	7.1	*	*	22.9	17.7	*	*	15.8	1,440
Namibia 2000	11.7	4.5	9.6	8.8	23.2	(18.8)	21.0	24.2	15.8	817
Rwanda 2000	(11.5)	13.6	16.6	13.4	27.4	29.0	31.6	28.1	21.7	1,731
South Africa 1998	9.1	14.6	11.4	10.5	21.5	24.1	23.0	21.2	16.6	1,005
Tanzania 1999	9.5	10.8	19.5	9.1	31.8	*	(27.7)	30.5	19.9	636
Uganda 2000-01	33.3	15.1	(13.6)	18.0	39.8	35.0	28.1	38.7	28.3	1,485
Zambia 2001-02	14.1	5.4	*	10.1	37.8	45.2	(30.8)	38.9	23.9	1,238
Zimbabwe 1999	9.2	0.5	*	5.9	27.9	(24.8)	(19.6)	28.8	16.2	661
Median	11.9	10.8	13.6	12.6	29.8	29.5	27.7	30.5	20.8	
Mean	15.1	9.8	13.9	12.4	30.0	28.6	27.1	30.8	21.0	
North Africa/West Asia/ Europe										
Armenia 2000	11.2	7.8	10.5	9.5	14.1	*	9.2	18.1	12.1	299
Egypt 2000	10.5	8.0	12.7	7.6	14.7	12.9	15.8	14.1	11.5	2,362
Jordan 2002	22.4	11.8	19.1	17.5	26.3	*	28.5	24.3	22.8	1,166
Turkey 1998	27.8	18.5	28.3	24.6	44.2	*	45.6	42.3	35.0	712
Yemen 1997	27.4	24.7	31.8	23.1	38.6	42.5	39.4	38.3	32.9	2,544
Median	22.4	11.8	19.1	17.5	26.3	27.7	28.5	24.3	22.8	
Mean	19.9	14.2	20.5	16.5	27.6	27.7	27.7	27.4	22.9	
Central Asia										
Kazakhstan 1999	18.2	(7.0)	(24.3)	7.8	21.6	(32.0)	27.4	21.0	19.0	244
Kyrgyz Rep. 1997	11.8	11.7	6.9	13.7	22.1	20.3	23.8	20.4	16.4	366
Turkmenistan 2000	1.9	0.0	2.3	1.1	6.2	*	12.2	4.4	3.9	692
Uzbekistan 1996	5.5	*	6.5	3.6	6.1	*	11.3	3.6	5.5	416
Median	8.6	7.0	6.7	5.7	13.9	26.1	18.0	12.4	10.9	
Mean	9.4	6.2	10.0	6.6	14.0	26.1	18.7	12.4	11.2	
South/Southeast Asia										
Bangladesh 1999-00	6.1	2.3	7.7	2.4	11.6	13.6	10.4	12.2	6.9	1,312
Cambodia 2000	16.3	14.6	23.6	15.0	29.4	(39.2)	33.0	29.0	22.8	1,600
India 1998-99	17.6	14.7	18.6	15.5	25.2	24.2	24.2	25.2	20.2	10,544
Indonesia 1997	10.9	5.9	11.3	6.9	17.0	16.4	14.1	17.4	12.3	3,213
Nepal 2000	21.5	17.8	*	18.5	34.9	32.6	*	35.6	26.5	1,282
Philippines 1998	7.8	4.3	7.1	5.5	14.2	(8.4)	13.4	14.7	10.1	1,494
Vietnam 1997	9.3	(3.3)	(12.5)	7.3	15.2	*	15.9	16.9	12.8	529
Median	10.9	5.9	11.9	7.3	17.0	20.3	15.0	17.4	12.8	
Mean	12.8	9.0	13.5	10.2	21.1	22.4	18.5	21.6	15.9	
Latin America/Caribbean										
Bolivia 1998	12.8	15.1	10.0	16.8	28.3	21.4	23.6	26.6	20.4	1,316
Brazil 1996	14.8	6.9	13.3	8.4	23.2	15.5	23.6	18.0	16.8	905
Colombia 2000	10.3	11.1	8.7	13.0	20.5	26.1	22.2	23.1	17.2	942
Dominican Rep. 2002	14.6	8.4	14.3	7.1	26.3	19.2	24.5	33.3	19.5	2,011
Guatemala 1998-99	7.1	8.9	11.5	6.3	17.6	25.8	18.7	24.0	14.8	901
Haiti 2000	31.8	19.6	26.2	28.7	43.5	42.2	36.9	45.7	36.4	1,195
Nicaragua 2001	14.9	11.3	12.4	13.8	19.6	19.0	16.5	24.7	16.5	1,140
Peru 2000	8.8	12.1	8.6	12.8	22.1	23.1	18.6	25.3	17.4	2,111
Median	13.7	11.2	11.9	12.9	22.7	22.3	22.9	25.0	17.3	
Mean	14.4	11.7	13.1	13.4	25.1	24.0	23.1	27.6	19.9	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

Figure 3.6.2

Percentage of infants age 0-5 months with diarrhea in the two weeks preceding the survey, by plain water intake in the past 24 hours and region

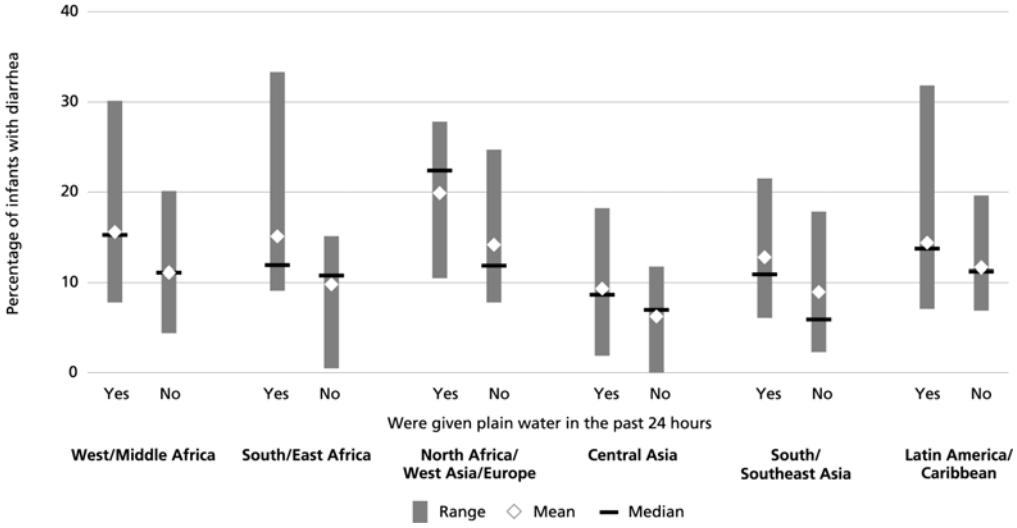
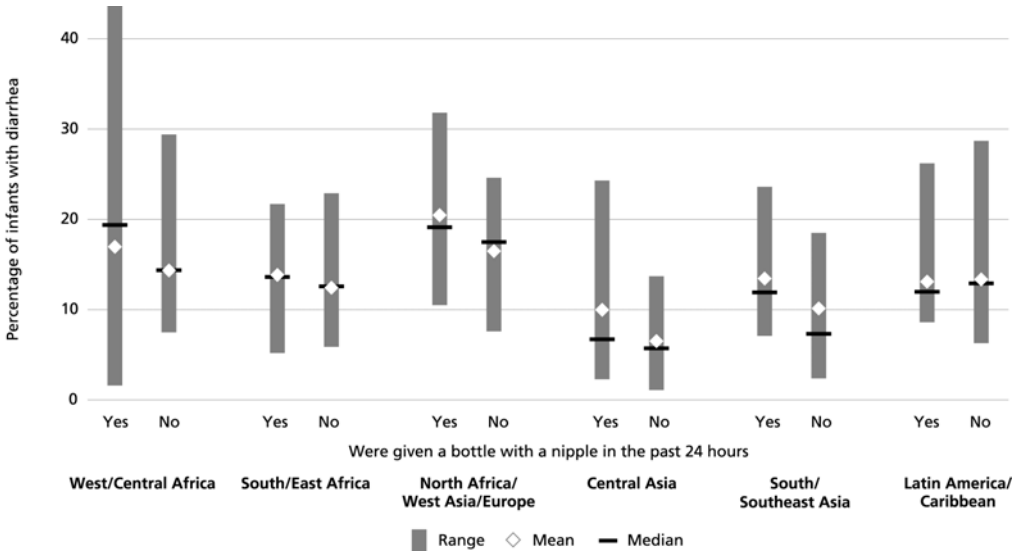


Figure 3.6.3

Percentage of infants age 0-5 months with diarrhea in the two weeks preceding the survey, by use of bottle with nipple in the past 24 hours and region



In general, the use of a bottle with a nipple is strongly associated with higher recent occurrence of diarrhea in younger (under six months) but not older infants. The range, mean, and median diarrhea period prevalence estimates for those countries included in each region by use/nonuse of a bottle with a nipple during the preceding 24 hours for infants under six months of age is shown in Figure 3.6.3. The regional average prevalence of diarrhea for bottle users in this age group is higher than that for nonusers in every region except Latin America/Caribbean.

The use of a bottle with a nipple is strongly associated with higher recent occurrence of diarrhea in younger (under six months) infants.

The difference in diarrhea period prevalence between users and nonusers of a bottle with a nipple among infants age 0-5 months was computed for each country. Out of 45 differentials, 14 are positive by five or more percentage points. The largest positive differentials in percentage points are found in Niger (14), Tanzania (10), and Kazakhstan (16). While 14 differentials are negative, only 4 are greater than five percentage points.

For infants age 6-11 months, differentials in diarrhea period prevalence between users and nonusers of a bottle with a nipple are more likely to be negative than positive (27 of 46). Large negative differentials, in excess of ten percentage points, are found in Ethiopia, Malawi, and Uganda, while positive differentials of the same magnitude are seen in Mauritania and Eritrea.

3.1.6 Measles Immunization Status

A byproduct of measles vaccination is a potential reduction in diarrhea incidence and related mortality.

Diarrhea is a frequent complication of other infectious illnesses, including measles, in developing countries. A byproduct of measles vaccination, which is recommended in most countries to be administered to infants at nine months of age, is a potential reduction in diarrhea incidence and related mortality.

Measles Immunization Coverage

Figure A.1 in Appendix A shows by country and residence the percentage of children age 12-23 months[3] who received a measles vaccination at any time preceding the interview, according to the vaccination card or mother's report. The data in Figure A.1 are derived from Table A.1, also included in Appendix A.

The WSC goal 22 for the end of the decade (year 2000) was the maintenance of a high level of measles immunization coverage, specifically, greater than 90 percent of infants by 12 months of age. (In this report, completion of recommended vaccinations is based on the date of interview rather than on the first birthday). Only Jordan and Egypt met this goal in the year of each country's last full survey (2002 and 2000, respectively) for both urban and rural children. Ninety percent coverage was achieved in urban areas in nine additional countries (Rwanda 2000, Tanzania 1999, Malawi 2000, Kenya 1998, Mozambique 1997, Eritrea 2002, the Dominican Republic 2002, Nicaragua 2001, and Brazil 1996) and in rural areas in two additional countries (Turkmenistan 2000 and Uzbekistan 1996). On the basis of regional averages, West/Midd le Africa had the lowest percentages of both urban and rural children age 12-23 months who were immunized against measles, according to the last available surveys.

Urban-rural differentials in the percentage of children age 12-23 months immunized against measles were computed for each country. Three-fourths (38 of 51) of these differentials are in excess of positive 5 percentage points; 13 exceed positive 20 percentage points. In West/Middle Africa, the regional mean urban-rural differential is the highest, at 23 percentage points. The largest urban-rural differentials are found in Burkina Faso, Niger, Ethiopia, Mozambique, and Yemen, ranging from 33 to 46 percentage points.

[3] For Peru and Nicaragua, this age range is 18 to 29 months because the recommended age for measles vaccination in those countries is 15 rather than 9 months.

Diarrhea and Measles Immunization

The percentage of children age 12-23 and 24-35 months[1] experiencing a diarrhea episode in the past two weeks is shown by measles immunization status in Table 3.8. These data support a strong and consistent negative association between immunization against measles and diarrhea prevalence.

On the basis of regional average prevalence, vaccinated children are less likely to have had a recent diarrhea episode than their unvaccinated counterparts in both their second and third years of life.

For each country, the difference in prevalence among vaccinated versus unvaccinated children was calculated. The regional mean differentials by age group are all negative, consistent with the regional average prevalence pattern observed. For children age 12-23 months, negative differentials exceeding 5 percentage points are found in 13 countries, with the largest in Togo (11 percentage points) and Kenya (17 percentage points). For children age 24-35 months, negative differentials exceed 5 percentage points in 10 countries, with the largest found in Ghana (12 percentage points) and Turkey (11 percentage points). In only two instances are comparably large positive differences observed (Côte d'Ivoire, at 12 to 23 months, and Jordan at 24 to 35 months).

On the basis of regional average prevalence, vaccinated children are less likely to have had a recent diarrhea episode than their unvaccinated counterparts in both their second and third years of life.

[1] For Peru and Nicaragua, the age groups are 18 to 29 and 30 to 35 months because the recommended age for measles vaccination in those countries is 15 rather than 9 months.

Table 3.8

Percentage of children age 12-23 months and 24-35 months with diarrhea in the two weeks preceding the survey, by measles immunization status, Demographic and Health Surveys 1996-2004

Survey	Children age 12-23 months vaccinated against measles		Children age 24-35 months vaccinated against measles		Total	Number of children
	Yes	No	Yes	No		
West/Middle Africa						
Benin 2001	18.2	26.8	12.5	16.0	17.3	1,848
Burkina Faso 1998-99	31.9	30.7	22.2	25.0	27.4	2,030
Cameroon 1998	25.0	28.2	13.4	17.2	20.8	1,443
Chad 1996-97	33.7	28.0	29.9	24.7	27.7	2,431
Côte d'Ivoire 1998-99	38.2	27.4	19.9	23.9	28.3	810
Gabon 2000	27.3	29.2	16.8	12.8	22.1	1,529
Ghana 1988	24.4	31.9	16.0	27.5	22.7	1,193
Guinea 1999	33.4	33.9	22.2	26.1	28.6	1,906
Mali 2001	25.7	27.9	19.6	23.2	24.1	4,223
Mauritania 2000-01	26.6	31.1	17.4	17.5	23.3	1,771
Niger 1998	39.4	41.1	30.5	34.0	36.7	2,757
Nigeria 1999	17.0	19.3	12.5	15.1	16.3	2,099
Togo 1998	31.8	42.6	24.1	31.9	32.8	2,324
Median	27.3	29.2	19.6	23.9	24.1	
Mean	28.7	30.6	19.8	22.7	25.2	
South/East Africa						
Comoros 1996	22.2	21.5	16.0	16.3	19.3	674
Eritrea 2002	22.5	22.8	15.9	17.4	19.2	2,000
Ethiopia 2000	37.9	36.8	25.5	26.5	31.7	4,226
Kenya 1998	18.0	35.1	11.2	16.8	17.0	2,118
Madagascar 1997	33.4	32.0	24.6	25.0	29.0	2,257
Malawi 2000	30.5	36.4	14.0	12.8	22.9	4,345
Mozambique 1997	27.9	24.4	17.0	26.2	23.7	2,362
Namibia 2000	20.1	21.2	12.5	10.8	16.5	1,529
Rwanda 2000	28.0	36.3	16.4	21.8	23.2	2,562
South Africa 1998	24.9	19.6	11.8	9.9	17.9	1,906
Tanzania 1999	22.5	13.1	12.7	6.0	15.9	1,181
Uganda 2000-01	28.1	31.2	16.2	22.1	24.2	2,760
Zambia 2001-02	36.1	35.6	21.4	27.9	29.6	2,442
Zimbabwe 1999	24.8	25.8	13.4	14.1	19.4	1,368
Median	26.4	28.5	16.0	17.1	21.2	
Mean	26.9	28.0	16.3	18.1	22.1	
North Africa/West Asia/Europe						
Armenia 2000	11.3	8.5	6.3	(13.0)	8.9	581
Egypt 2000	10.0	12.9	6.2	10.3	8.2	4,379
Jordan 2002	24.8	24.5	13.8	(3.1)	19.1	2,289
Turkey 1998	41.8	50.6	28.9	39.8	37.8	1,301
Yemen 1997	33.6	40.8	27.0	31.4	33.4	4,512
Median	24.8	24.5	13.8	13.0	19.1	
Mean	24.3	27.5	16.4	19.5	21.5	
Central Asia						
Kazakhstan 1999	21.9	25.9	14.6	(14.3)	18.6	545
Kyrgyz Rep. 1997	25.7	20.2	11.2	(13.9)	18.2	738
Turkmenistan 2000	5.5	11.4	1.5	4.9	4.1	1,275
Uzbekistan 1996	7.5	(4.9)	2.6	*	5.0	909
Median	14.7	15.8	6.9	13.9	11.6	
Mean	15.1	15.6	7.5	11.0	11.5	
South/Southeast Asia						
Bangladesh 1999-00	10.0	16.1	5.2	7.0	8.7	2,615
Cambodia 2000	28.9	25.8	18.9	21.9	23.7	2,632
India 1998-99	19.5	23.2	14.0	16.5	18.3	20,125
Indonesia 1997	14.4	15.4	11.9	14.1	13.6	6,109
Nepal 2000	27.2	35.2	19.3	22.9	25.0	2,558
Philippines 1998	12.5	16.9	5.8	6.1	9.7	2,921
Vietnam 1997	9.9	16.5	6.4	5.3	8.9	1,240
Median	14.4	16.9	11.9	14.1	13.6	
Mean	17.5	21.3	11.6	13.4	15.4	
Latin America/Caribbean						
Bolivia 1998	31.9	34.8	20.2	21.8	27.1	2,510
Brazil 1996	17.9	24.8	13.0	9.3	15.8	1,853
Colombia 2000	20.2	23.0	14.4	15.3	17.8	1,784
Dominican Rep. 2002	22.5	27.5	11.9	13.7	17.6	4,384
Guatemala 1998-99	26.3	22.6	11.4	13.7	18.6	1,716
Haiti 2000	40.2	41.5	22.4	18.9	31.0	2,450
Nicaragua 2001	16.5	17.1	12.4	17.9	15.4	2,012
Peru 2000	20.3	28.6	14.3	12.9	19.2	3,500
Median	21.4	26.2	13.7	14.5	18.2	
Mean	24.5	27.5	15.0	15.4	20.3	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

3.1.7 Environmental Factors

Regardless of the etiologic agent—bacterial, viral, or parasitic—diarrheal diseases are almost always transmitted "by direct contact with feces or by contact with water, food, utensils, fingers, flies, or soil that has been contaminated with feces" (Black and Lanata, 1995). A safe supply of drinking water and an adequately hygienic means of excreta disposal are key determinants of the risk of diarrheal diseases.

Unfinished floors (earth, sand, or dung) in the main areas of a dwelling pose a risk, particularly to crawling infants and young toddlers, who are more likely than older children to put contaminated objects found on the floor or dirty hands into their mouths. Crowding has also been shown to be associated with an increased risk of diarrheal diseases (Stanton and Clemens, 1987).

A safe supply of drinking water and an adequately hygienic means of excreta disposal are key determinants of the risk of diarrheal diseases.

3.1.7.1 Household Access to Safe Drinking Water

Figure A.3 in Appendix A shows the percentage of urban and rural households in each country with access to safe drinking water. In only three countries (Chad, Bangladesh, and Indonesia) do less than half of urban households have access to safe drinking water, ranging from 25 percent in Chad to 100 percent in Jordan. In contrast, less than half of rural households have access to safe drinking water in 22 of the 50 countries shown, ranging from 4 percent in Bangladesh to 99 percent in Jordan.

Within countries, the differential in percentage of urban versus rural households with a safe water supply was computed. The following countries have disparities exceeding 50 percentage points between urban and rural households: Burkina Faso, Mauritania, Niger, Senegal, Zambia, Zimbabwe, Kazakhstan, Turkmenistan, and Brazil. Rural households have higher access than urban households to a safe water supply in just three countries: Turkey, Nepal, and Guatemala.

3.1.7.2 Household Means of Excreta Disposal

Figure A.4 in Appendix A shows the percentage of households in each country with sanitary means of excreta disposal by residence. More than half of urban households have adequate sanitation facilities in all countries, exceeding 90 percent in 33 of the 50 countries shown. In comparison, in 20 of the 50 countries, less than half of rural households have adequate sanitation facilities, falling as low as 4 percent in rural Eritrea.

Because of the wide disparities in water, sanitation, and housing between urban and rural areas observed in these surveys, separate tables (Tables 3.9.1 and 3.9.2, respectively) are presented to show diarrhea prevalence in each area by four household-level environmental factors: access to safe drinking water; sanitary means of excreta disposal; natural flooring materials; and the number of children under the age of five years living in the household.

3.1.7.3 Diarrhea and Environmental Factors in Urban Households

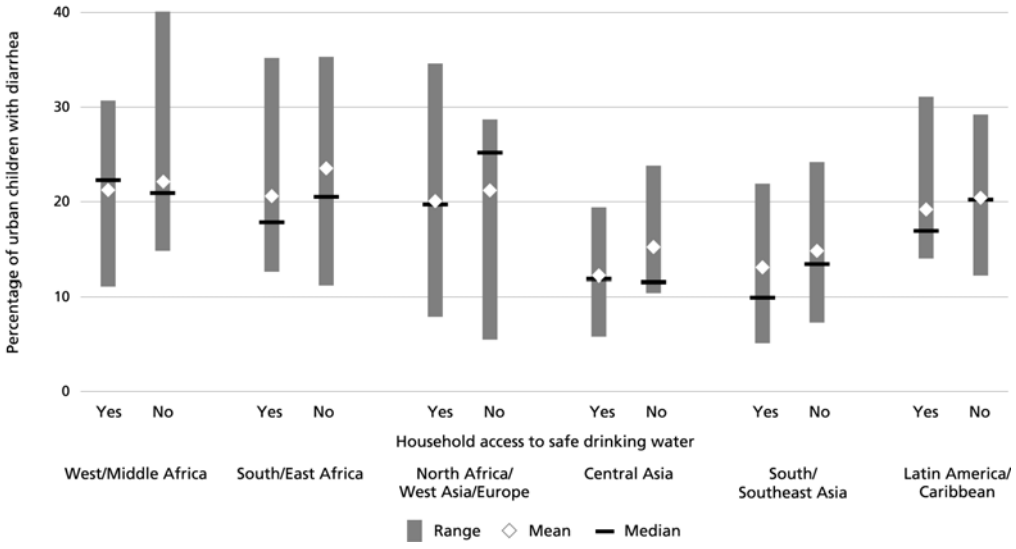
Access to Safe Drinking Water

Overall, lack of access to a safe supply of drinking water is not consistently associated with a higher probability of recent diarrhea among young children in urban areas on the basis of these data, although some substantial and moderate differentials are observed in some countries, particularly those in sub-Saharan Africa.

However, the regional average diarrhea prevalence among children under age three years in urban households lacking a source of safe drinking water is higher than among children in urban households with safe drinking water (Figure 3.7.1), apart from West/Middle Africa.

Lack of access to a safe supply of drinking water is not consistently associated with a higher probability of recent diarrhea among young children in urban areas.

Figure 3.7.1
Percentage of urban children under age three years with diarrhea in the two weeks preceding the survey, by access to safe drinking water and region



For each country, the difference in diarrhea prevalence among children with and without a source of safe drinking water was calculated. In three countries (Ethiopia, Kenya, and Malawi), all in South/East Africa, the diarrhea prevalence among children from urban households without a source of safe drinking water is more than ten percentage points higher, and is higher by more than five percentage points in an additional six countries. However, differentials in most countries are small. In four countries, Côte d'Ivoire, Madagascar, Turkey, and the Dominican Republic, the opposite association is observed: the prevalence is higher by five or more percentage points among urban children with a safe water supply, compared with those without (range 7 to 24).

Table 3.9.1

Percentage of urban children under age three years with diarrhea in the two weeks preceding the survey, by housing characteristics, Demographic and Health Surveys 1996-2002

Survey	Safe drinking water		Sanitary excreta disposal		Natural floor		Number of children under age 5 living in household			Total	Number of children
	Yes	No	Yes	No	Yes	No	1	2	3+		
West/Middle Africa											
Benin 2001	11.1	18.7	10.9	17.6	19.9	12.3	14.1	9.6	22.1	13.9	931
Burkina Faso 1998-99	24.8	23.5	24.3	24.8	(19.4)	24.9	25.7	23.2	22.6	24.4	346
Cameroon 1998	17.3	15.1	17.1	*	19.8	16.3	13.5	19.0	19.7	17.0	622
Chad 1996-97	24.8	26.9	26.0	27.5	27.6	20.3	27.0	27.1	24.3	26.3	865
Côte d'Ivoire 1998-99	22.5	15.0	20.1	*	*	20.3	18.7	21.7	22.8	20.6	412
Gabon 2000	22.5	20.3	22.5	(20.7)	20.9	22.7	19.5	25.4	23.0	22.5	1,697
Ghana 1998	19.3	(21.5)	18.9	(24.9)	*	19.5	22.3	18.6	(2.9)	19.5	459
Guinea 1999	22.1	23.3	23.2	21.8	15.6	23.3	22.0	25.1	19.8	22.6	795
Mali 2001	16.6	17.6	16.7	(27.0)	18.2	16.0	20.8	15.4	13.2	16.9	1,706
Mauritania 2000-01	26.9	27.0	25.9	29.9	28.0	26.0	30.1	23.2	27.8	26.9	1,189
Niger 1998	30.7	40.1	29.8	39.0	40.2	28.1	33.1	30.2	31.3	31.6	733
Nigeria 1999	13.2	14.8	14.6	9.3	16.4	13.5	10.9	13.9	22.8	13.9	896
Senegal 1997	19.3	15.8	19.0	14.1	8.6	19.4	17.6	21.4	17.1	18.7	1,296
Togo 1998	26.0	30.4	25.6	29.9	33.7	26.5	29.1	25.1	21.7	27.0	865
Median	22.3	20.9	21.3	24.8	19.9	20.3	21.4	22.5	22.4	21.6	
Mean	21.2	22.1	21.0	23.9	22.4	20.6	21.7	21.4	20.8	21.6	
South/East Africa											
Comoros 1996	28.3	24.0	26.7	*	30.8	25.2	26.4	26.2	(34.2)	27.5	255
Eritrea 2002	12.6	19.5	13.9	16.3	16.9	13.8	16.0	15.7	4.1	14.8	1,097
Ethiopia 2000	21.7	34.8	23.6	22.2	25.6	17.5	22.2	24.7	21.3	23.1	649
Kenya 1998	15.7	26.9	16.0	(42.9)	28.3	13.8	17.3	17.5	14.8	17.1	600
Madagascar 1997	35.2	11.2	29.8	30.4	29.1	30.2	29.8	26.4	43.3	30.0	704
Malawi 2000	18.4	32.2	19.1	(22.1)	23.6	17.0	19.2	18.0	24.5	19.2	891
Mozambique 1997	29.3	34.3	29.9	32.3	33.6	28.7	31.2	27.8	36.1	30.6	806
Namibia 2000	17.0	(19.4)	17.1	16.9	16.0	17.3	13.6	28.3	14.2	17.1	810
Rwanda 2000	17.2	16.3	17.1	*	24.6	12.6	20.1	15.6	14.3	17.0	690
South Africa 1998	14.5	(17.0)	14.3	(20.9)	24.6	14.0	14.2	14.9	15.9	14.5	1,422
Tanzania 1999	13.7	14.7	13.8	*	17.1	11.9	13.8	12.4	(23.7)	13.9	354
Uganda 2000-01	21.4	20.5	21.0	(33.9)	23.6	20.6	21.4	20.7	23.0	21.3	486
Zambia 2001-02	27.1	35.3	27.3	(44.5)	38.0	25.9	27.0	28.7	29.6	28.0	1,124
Zimbabwe 1999	16.4	*	16.7	*	*	16.5	16.8	15.9	(19.0)	16.6	668
Median	17.8	20.5	18.1	26.3	24.6	17.2	19.7	19.4	22.2	18.2	
Mean	20.6	23.5	20.5	28.2	25.5	18.9	20.6	20.9	22.7	20.8	
North Africa/West Asia/ Europe											
Armenia 2000	8.1	*	8.3	*	*	8.3	8.6	9.4	(0.0)	8.3	453
Egypt 2000	7.9	(5.5)	7.9	*	12.5	7.7	8.8	7.2	5.8	7.9	2,625
Jordan 2002	19.7	(23.6)	19.7	*	*	19.8	19.3	20.4	19.1	19.7	2,680
Turkey 1998	34.6	26.9	32.8	(32.7)	49.0	32.2	31.6	35.4	33.4	32.8	1,260
Yemen 1997	30.1	28.7	29.8	(31.1)	38.6	28.1	26.9	31.6	29.9	29.8	1,631
Median	19.7	25.2	19.7	31.9	38.6	19.8	19.3	20.4	19.1	19.7	
Mean	20.1	21.2	19.7	31.9	33.4	19.2	19.0	20.8	17.6	19.7	
Central Asia											
Kazakhstan 1999	19.4	(23.8)	20.0	*	*	19.8	19.6	24.2	*	20.0	327
Kyrgyz Rep. 1997	15.5	*	15.1	*	*	15.2	16.4	9.2	*	15.1	253
Turkmenistan 2000	5.8	10.4	6.4	*	*	6.2	7.3	5.8	3.9	6.5	775
Uzbekistan 1996	8.2	(11.5)	8.5	*	*	8.4	10.4	8.8	3.3	8.5	414
Median	11.9	11.5	11.8	u	u	11.8	13.4	9.0	3.6	11.8	
Mean	12.2	15.2	12.5	u	u	12.4	13.4	12.0	3.6	12.5	
South/Southeast Asia											
Bangladesh 1999-00	8.3	10.0	9.4	(13.2)	7.4	11.6	8.9	11.2	8.5	9.5	644
Cambodia 2000	18.0	21.6	21.5	18.7	(17.1)	20.2	18.9	20.3	25.1	19.9	552
India 1998-99	20.0	17.6	18.1	23.3	17.0	23.0	18.7	20.2	19.2	19.3	6,928
Indonesia 1997	9.9	13.4	11.5	15.1	15.1	11.9	13.5	9.0	8.6	12.0	2,624
Nepal 2000	21.9	24.2	22.2	22.3	25.1	20.2	23.8	19.5	(23.8)	22.2	237
Philippines 1998	8.3	9.7	8.2	14.7	17.5	8.3	9.4	8.1	8.3	8.7	2,049
Vietnam 1997	5.1	7.3	4.9	(13.3)	(8.3)	5.5	5.9	6.5	*	5.8	255
Median	9.9	13.4	11.5	15.1	17.0	11.9	13.5	11.2	13.9	12.0	
Mean	13.1	14.8	13.7	17.2	15.4	14.4	14.2	13.5	15.6	13.9	
Latin America/Caribbean											
Bolivia 1998	22.9	25.7	22.3	26.0	24.1	22.9	20.5	26.7	22.3	23.1	2,219
Brazil 1996	14.7	19.8	14.4	26.8	26.4	14.9	14.6	14.6	24.5	15.5	2,104
Colombia 2000	16.8	(20.4)	16.8	18.1	29.5	16.3	14.2	18.7	26.9	16.9	1,863
Dominican Rep. 2002	22.6	15.2	17.4	21.4	18.8	17.5	16.5	17.1	26.4	17.6	4,192
Guatemala 1998-99	14.4	21.0	16.9	(6.7)	18.9	15.5	19.9	13.9	14.5	16.5	991
Haiti 2000	31.1	29.2	28.9	44.4	30.0	31.0	32.6	27.4	36.6	30.9	1,203
Nicaragua 2001	14.0	(12.2)	13.3	25.9	15.7	13.1	13.0	12.0	23.1	13.9	1,931
Peru 2000	17.0	19.9	17.1	20.2	22.9	15.1	16.5	18.2	23.4	17.4	3,744
Median	16.9	20.2	17.0	23.7	23.5	15.9	16.5	17.7	24.0	17.2	
Mean	19.2	20.4	18.4	23.7	23.3	18.3	18.5	18.6	24.7	19.0	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
u = Unknown (too few cases to calculate estimate)

Table 3.9.2

Percentage of rural children under age three years with diarrhea in the two weeks preceding the survey, by housing characteristics, Demographic and Health Surveys 1996-2002

Survey	Safe drinking water		Sanitary excreta disposal		Natural floor		Number of children under age 5 living in household			Total	Number of children
	Yes	No	Yes	No	Yes	No	1	2	3+		
West/Middle Africa											
Benin 2001	14.6	18.7	11.6	18.1	16.8	17.6	18.0	15.9	17.8	17.2	1,981
Burkina Faso 1998-99	29.4	24.8	32.1	24.2	25.0	25.8	24.2	25.2	25.7	25.1	2,872
Cameroon 1998	18.7	21.2	18.3	27.6	22.6	11.0	20.6	20.4	18.0	19.7	1,639
Chad 1996-97	24.0	26.0	25.8	25.5	25.4	*	26.1	24.3	27.2	25.6	3,073
Côte d'Ivoire 1998-99	34.7	24.4	24.9	32.1	28.4	29.2	31.6	28.3	27.2	28.9	809
Gabon 2000	17.3	19.5	16.9	(40.3)	20.4	14.5	16.0	17.1	20.3	17.8	627
Ghana 1998	22.9	21.9	19.3	29.2	27.0	21.1	24.8	19.3	23.5	22.4	1,343
Guinea 1999	28.4	26.7	27.7	27.5	27.5	27.8	28.9	24.2	29.9	27.5	2,210
Mali 2001	21.1	26.4	23.6	27.6	24.9	21.3	25.9	24.1	23.9	24.7	5,267
Mauritania 2000-01	17.2	22.2	21.7	20.3	22.0	16.2	20.0	20.5	22.6	20.7	1,606
Niger 1998	39.3	39.0	37.4	39.1	39.0	38.2	40.2	37.2	40.1	39.0	3,671
Nigeria 1999	15.0	16.5	16.7	14.1	16.3	15.3	16.1	15.5	16.0	15.8	2,312
Senegal 1997	22.3	20.0	21.3	19.9	21.5	19.0	20.6	18.5	21.6	20.6	2,572
Togo 1998	31.7	33.0	30.0	32.7	33.0	31.9	31.7	34.5	30.5	32.3	2,828
Median	22.6	23.3	22.7	27.6	25.0	21.1	24.5	22.3	23.7	23.6	
Mean	24.0	24.3	23.4	27.0	25.0	22.2	24.6	23.2	24.6	24.1	
South/East Africa											
Comoros 1996	25.9	17.4	21.9	*	24.3	17.6	19.1	23.1	22.8	21.7	801
Eritrea 2002	15.5	20.1	17.6	18.1	17.6	22.2	16.7	19.5	16.7	18.1	2,184
Ethiopia 2000	32.5	29.8	32.2	30.8	30.7	41.9	32.6	30.0	26.6	30.9	5,762
Kenya 1998	17.4	16.3	16.2	20.3	17.7	14.7	16.1	18.4	16.2	17.1	2,606
Madagascar 1997	27.6	22.1	30.6	24.6	24.7	26.5	28.1	27.1	19.0	26.3	2,833
Malawi 2000	23.2	25.4	23.9	24.8	24.6	19.9	23.9	23.7	27.2	24.1	5,972
Mozambique 1997	20.7	15.4	11.2	21.3	20.2	7.3	19.9	16.7	14.7	18.0	2,996
South Africa 1998	20.8	15.2	20.9	18.7	19.6	20.6	19.0	21.0	23.0	20.2	1,490
Namibia 2000	14.6	18.5	14.6	16.2	15.6	17.2	17.2	14.9	15.2	15.9	1,536
Rwanda 2000	22.4	24.3	23.6	26.5	23.7	22.5	26.1	23.5	12.6	23.7	3,604
Tanzania 1999	16.8	19.6	19.3	13.7	18.3	16.0	20.1	17.8	15.8	18.2	1,463
Uganda 2000-01	26.5	25.9	24.1	34.9	26.7	21.0	28.4	26.7	21.4	26.2	3,759
Zambia 2001-02	27.6	27.4	26.0	29.5	27.6	26.6	29.1	25.6	29.2	27.5	2,556
Zimbabwe 1999	20.9	18.6	20.3	17.8	19.2	19.2	18.3	20.5	19.7	19.2	1,361
Median	21.7	19.9	21.4	21.3	22.0	20.3	20.0	22.1	19.4	21.0	
Mean	22.3	21.1	21.6	22.9	22.2	20.9	22.5	22.0	20.0	21.9	
North Africa/West Asia/Europe											
Armenia 2000	12.4	8.4	11.7	*	*	12.0	14.1	8.8	13.4	11.7	427
Egypt 2000	10.3	9.6	10.1	13.1	12.6	8.9	10.6	9.9	10.3	10.2	4,116
Jordan 2002	22.1	(31.7)	22.5	*	*	22.5	26.8	20.8	19.3	22.5	774
Turkey 1998	43.7	41.1	42.2	(61.3)	51.3	41.6	42.3	42.9	47.5	43.4	753
Yemen 1997	33.4	35.0	32.8	36.5	35.2	33.3	36.4	35.7	30.6	34.2	5,425
Median	22.1	31.7	22.5	36.5	35.2	22.5	26.8	20.8	19.3	22.5	
Mean	24.4	25.2	23.9	37.0	33.0	23.7	26.0	23.6	24.2	24.4	
Central Asia											
Kazakhstan 1999	17.8	17.8	17.4	*	*	17.7	17.7	19.1	*	17.8	462
Kyrgyz Rep.1997	18.5	16.8	18.4	*	21.1	18.0	17.4	17.2	25.0	18.3	851
Turkmenistan 2000	1.6	2.9	2.5	*	(0.0)	2.5	2.4	2.1	3.7	2.4	1,192
Uzbekistan 1996	3.5	4.2	3.7	*	3.9	3.6	4.1	3.3	4.0	3.7	911
Median	10.7	10.5	10.6	u	3.9	10.7	10.8	10.3	4.0	10.8	
Mean	10.4	10.4	10.5	u	8.3	10.4	10.4	10.4	10.9	10.6	
South/Southeast Asia											
Bangladesh 1999-00	6.3	7.9	7.5	8.9	8.0	4.7	7.7	8.0	8.7	7.8	3,283
Cambodia 2000	23.7	23.9	24.3	23.8	25.9	23.6	23.9	23.9	23.4	23.9	3,680
India 1998-99	18.6	18.9	16.1	19.4	16.1	19.4	18.1	19.4	19.4	18.8	23,741
Indonesia 1997	14.3	13.2	12.3	15.1	12.9	13.9	13.5	14.2	10.6	13.6	6,698
Nepal 2000	27.1	21.9	20.6	26.9	26.2	17.5	25.3	26.7	23.7	25.7	3,603
Philippines 1998	10.6	10.9	10.2	12.6	10.5	10.9	11.4	11.2	8.7	10.8	2,366
Vietnam 1997	9.7	11.1	9.6	13.3	10.2	11.3	11.1	10.0	12.0	10.8	1,513
Median	14.3	13.2	12.3	15.1	12.9	13.9	13.5	14.2	12.0	13.6	
Mean	15.8	15.4	14.4	17.1	15.7	14.5	15.9	16.2	15.2	15.9	
Latin America/Caribbean											
Bolivia 1998	28.5	23.3	27.4	27.1	28.2	24.6	31.3	25.2	24.3	27.2	1,606
Brazil 1996	19.6	17.5	16.8	19.5	18.7	17.8	17.9	16.5	22.1	18.0	653
Colombia 2000	18.2	20.2	20.5	16.2	20.5	18.5	19.1	16.4	26.2	19.1	862
Dominican Rep. 2002	19.5	19.3	18.0	28.2	27.8	18.0	17.9	21.2	19.1	19.4	2,204
Guatemala 1998-99	16.4	21.4	16.4	21.8	18.2	16.9	15.5	20.9	14.6	17.8	1,627
Haiti 2000	32.0	35.1	35.3	32.7	31.7	38.1	31.5	35.7	33.2	33.7	2,442
Nicaragua 2001	19.1	20.0	17.4	22.5	19.4	19.5	18.8	18.8	22.1	19.4	1,875
Peru 2000	22.1	22.9	24.3	21.0	22.3	23.8	22.9	23.5	18.0	22.6	3,046
Median	19.6	20.8	19.3	22.2	21.4	19.0	19.0	21.1	22.1	19.4	
Mean	21.9	22.5	22.0	23.6	23.4	22.1	21.9	22.3	22.5	22.1	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
u = Unknown (too few cases to calculate estimate)

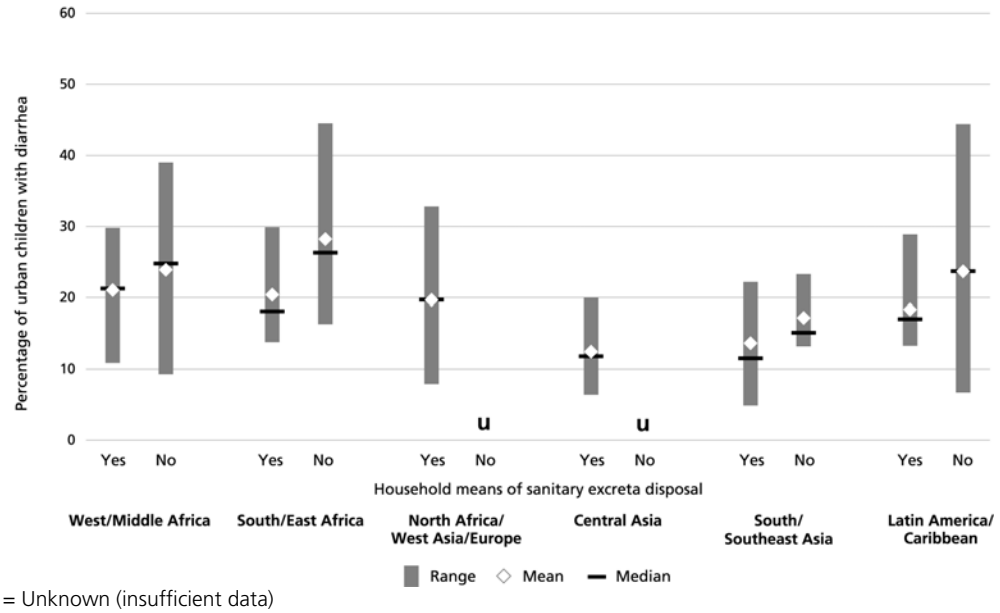
Sanitary Means of Excreta Disposal

Poor sanitation, in general, is associated with a higher probability of recent diarrhea among young urban children on the basis of these data. Substantial differentials are observed in some South/East African and Latin American/Caribbean countries.

Poor sanitation is associated with a higher probability of recent diarrhea among young urban children.

In two regions, North Africa/West Asia/Europe and Central Asia, data for urban children under age three years living in households without adequate sanitation are very sparse. Elsewhere, the regional average diarrhea prevalence is consistently higher among children in urban households lacking a sanitary means of excreta disposal than among children in urban households with adequate sanitation (Figure 3.7.2).

Figure 3.7.2
Percentage of urban children under age three years with diarrhea in the two weeks preceding the survey, by presence of household means of sanitary excreta disposal and region



u = Unknown (insufficient data)

For each country with sufficient data, the difference in diarrhea prevalence among urban children with and without a sanitary means of excreta disposal was calculated. There are seven countries with large negative differentials exceeding ten percentage points: Mali, Kenya, Uganda, Zambia, Brazil, Haiti, and Nicaragua. In only one country, Guatemala, is an equally large positive differential found. The largest mean differentials by region are found in South/East Africa (seven percentage points) and Latin America/Caribbean (five percentage points).

Main Flooring Material

Overall, these data support a strong association between unimproved floors in urban homes and an increased probability of recent diarrhea among young children.

These data support a strong association between unimproved floors in urban homes and an increased probability of recent diarrhea among young children.

In Central Asia, there are too few children in urban households with natural floors (earth, sand, or dung) to provide valid prevalence estimates in that category. Elsewhere, the regional average diarrhea prevalence is higher among children in urban households with floors of mainly natural materials than among children in urban households with mainly finished floors.

The difference in diarrhea prevalence among urban children in households with and without a natural floor was calculated for each country with sufficient data. In most countries, the differential is positive. The mean differential is five or more percentage points in three regions: South/East Africa, North Africa/West Asia/Europe, and Latin America/Caribbean. The diarrhea prevalence among urban children from households with a natural floor is higher by more than ten percentage points in ten countries (Niger, Kenya, Rwanda, South Africa, Zambia, Turkey, Yemen, Brazil, and Colombia) and by more than five percentage points in eight more. In contrast, only four differentials are negative by this amount (Burkina Faso, Guinea, Senegal, and India).

Number of Children under Age Five

The last environmental indicator examined in Table 3.9.1 is the number of children under the age of five years living in the household, including the index child, who is under the age of three years. While a consistent association between more young urban children and a higher probability of recent diarrhea is not observed, there are substantial differentials in a number of countries in both directions.

The regional average diarrhea prevalence among index children in urban households with three or more children under five years of age is not consistently higher than among index children in urban households in which the index child is the only child under five years of age.

For each country, the difference in diarrhea prevalence among urban index children in households with no additional children under age five versus three or more children under age five was calculated. In four countries (Nigeria, Madagascar, Colombia, and Nicaragua), the diarrhea prevalence is lower by more than ten percentage points among urban index children in households with no additional children under five, but is higher by the same amount in two countries, Ghana and Eritrea. The largest mean differential by region is that of Latin America/Caribbean, at negative six percentage points, wherein seven of the eight differentials computed are negative.

3.1.7.4 Diarrhea and Environmental Factors in Rural Households

The four household-level environmental indicators are repeated in Table 3.9.2 for rural children under age three years.

Access to Safe Drinking Water

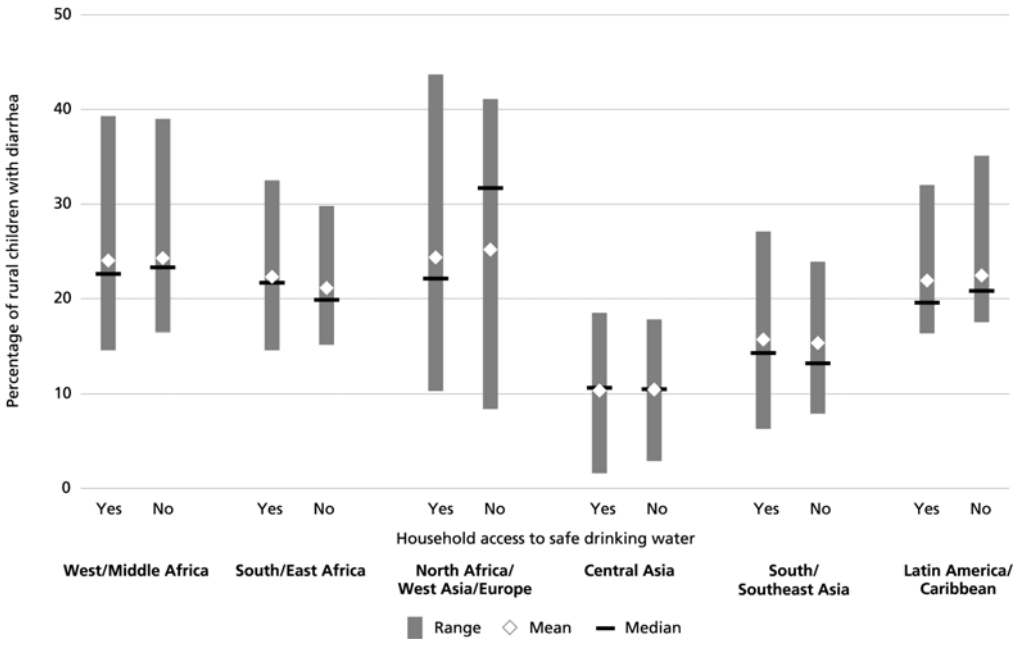
A consistent association between unsafe drinking water and an increased probability of recent diarrhea is not indicated for young rural children by these data.

A consistent association between unsafe drinking water and an increased probability of recent diarrhea is not indicated for young rural children.

Unlike that for same-age children from urban households, the regional average diarrhea prevalence among children from rural households without a source of safe drinking water is not consistently higher than the corresponding average prevalence among children from other rural households with safe drinking water (Figure 3.8.1).

For each country, the difference in diarrhea prevalence among children with and without a source of safe drinking water was calculated. Most of the differentials are small (less than five percentage points). The three largest differentials include two positive, Côte d'Ivoire (ten percentage points) and Comoros (eight percentage points), and one negative, Jordan (ten percentage points).

Figure 3.8.1
Percentage of rural children under age three years with diarrhea in the two weeks preceding the survey, by access to safe drinking water and region



Sanitary Means of Excreta Disposal

There is a consistent association between poor sanitation and a higher probability of recent diarrhea for young rural children.

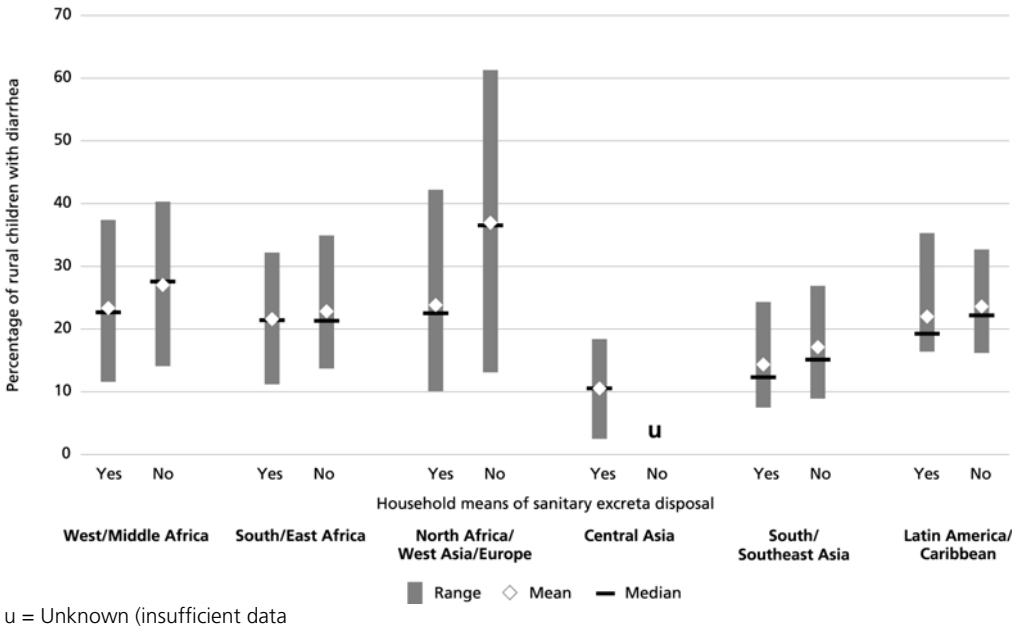
These data reveal a largely consistent and significant association between poor sanitation and a higher probability of recent diarrhea for young rural children.

With respect to a sanitary means of excreta disposal, the number of children from rural households without sanitary disposal available in these surveys in Central Asian countries is too small to provide valid prevalence estimates in that category. Elsewhere, the regional average diarrhea prevalence is consistently higher among children from rural households without a sanitary means of excreta disposal than the corre-

sponding average prevalence among children from other rural households with adequate sanitation (Figure 3.8.2), most notably in North Africa/West Asia/Europe.

For each country with sufficient data, the difference in diarrhea prevalence among rural children with and without a sanitary means of excreta disposal was calculated. A majority of the differentials are negative (29 of 45), and in five countries (Gabon, Mozambique, Uganda, Turkey, and the Dominican Republic), the diarrhea prevalence among rural children from households without sanitary disposal is more than ten percentage points higher than for children with sanitary disposal facilities.

Figure 3.8.2
Percentage of rural children under age three years with diarrhea in the two weeks preceding the survey, by presence of household means of sanitary excreta disposal and region



u = Unknown (insufficient data

Main Flooring Material

A largely consistent association between natural flooring materials and an increased probability of recent diarrhea is observed for young rural children.

A largely consistent association between natural flooring materials and an increased probability of recent diarrhea is observed for young rural children.

As shown in Table 3.9.2, apart from Central Asia, the regional average diarrhea prevalence is higher among children from rural households with a floor of mainly natural materials than the corresponding average prevalence among children from other rural households.

The difference in diarrhea prevalence among rural children from households with and without a natural floor was calculated for each country with sufficient data. In most countries, the differential is positive (30 of 48), with the 4 largest found in Cameroon (12 percentage points), Mozambique (13 percentage points), Turkey (10 percentage points), and the Dominican Republic (10 percentage points). There is just one equally large negative differential, found in Ethiopia (11 percentage points).

Number of Children under Age Five

The fourth environmental indicator examined is the number of children under the age of five years living in the household, including the index child, who is under three. Overall, rural children living in households with multiple (three or more) young children under age five years do not appear to have an increased likelihood of recent diarrhea, as compared with rural children from households with just one or two young children, although there are some significant exceptions, particularly in South/East Africa.

With the exception of the region of Latin America/Caribbean, the regional average diarrhea prevalence among index children from rural households with three or more children under five years of age is the same or lower than the corresponding average prevalence among index children from rural households with no additional children under five years of age.

For each country, the difference in diarrhea prevalence among index children from rural households with no additional children under age five versus three or more children under age five was calculated. Most of the differentials are small, but eight are positive by more than five percentage points, including for five countries in South/East Africa. The largest positive differential is found in Rwanda, where diarrhea prevalence is higher by 14 percentage points among index children from rural households with no additional children under five compared with households with three or more children under five.

3.2 Diarrhea Treatment and Careseeking Behaviors

This section examines the ways by which diarrhea is treated, including feeding practices during illness, and the seeking of care from a health provider in response to a child's recent episode of diarrhea.

Most diarrhea episodes are not severe and are self-limiting and can be successfully managed by the mother or caretaker at home by following the WHO/UNICEF (2004) recommendations: administer an oral rehydration salts solution, if on hand, or appropriate fluids available in the home early on to prevent dehydration; continue feeding or increase breastfeeding during the episode; and increase all feeding following the episode.[2] In cases where the child becomes severely dehydrated, cholera is suspected, blood is present in the stool, the diarrheal episode is persistent, or if general danger signs develop, it is appropriate for the mother/caretaker to seek advice from a health care provider.

When a child with diarrhea is seen by a health care provider, he/she should be assessed for dehydration, the possibility of cholera or dysentery, and danger signs indicating the need for urgent referral to a hospital. If the child is severely dehydrated, it is recommended that the child be given a rehydration solution intravenously or with a naso-gastric tube, if possible. In cases of dysentery, which is estimated to occur in about 10 percent of diarrhea episodes among children under age five (USAID, 2004), endemic cholera, or certain other serious illnesses with a bacterial etiology, it is recommended to initiate antibiotic treatment. Otherwise, in the majority of cases, the

When a child with diarrhea is seen by a health care provider, he/she should be assessed for dehydration, the possibility of cholera or dysentery, and danger signs indicating the need for urgent referral to a hospital.

[2] This recently published joint statement also encourages families to maintain a supply of zinc syrup or tablets at home for ready use.

provider should initiate the use of an oral rehydration salts solution in the office and instruct the mother to continue at home. In addition, the provider should counsel the mother to treat this and future non-severe diarrheal episodes as described above.[3]

3.2.1 Diarrhea Treatment by Careseeking Behavior

Figure 3.9 shows the estimated percentage of children in each country for whom advice or treatment for a recent diarrheal episode was sought from an appropriate health care provider by urban-rural residence and region. Careseeking for diarrhea varies widely within regions. The regions with the widest ranges of careseeking estimates are South/East Africa (from 15 percent in urban and rural Rwanda to 59 percent and over in urban and rural South African and Tanzania) and South/Southeast Asia (from 27 and 22 percent in urban and rural Nepal to 77 and 62 percent in urban and rural India, respectively). In most countries, urban children with diarrhea are more likely to be taken for care than their rural counterparts. Two notable exceptions are Kazakhstan and Turkmenistan in Central Asia, although the relevant estimated percentages are based on small denominators.

Tables 3.10.1 and 3.10.2 show the percentage of children under the age of three years with diarrhea in the past 2 weeks by use of oral rehydration solutions,[4] feeding practices, and the use of non-recommended treatments for children for whom advice or treatment was or was not sought from an appropriate health care provider (i.e., excludes pharmacies, shops, and traditional practitioners).[5]

The countries with the lowest prevalence of ORS use are Jordan and Turkey, at about 30 percent, while four countries in South/East Africa have the highest prevalence of ORS use, over 80 percent: Malawi, Mozambique, Namibia, and Zambia.

Treatment of Children with Diarrhea Taken to a Health Provider

Turning first to Table 3.10.1, for children with diarrhea in the past two weeks for whom treatment was sought at any time during that episode, the regional mean likelihood of use of an oral rehydration salts (ORS) packet ranges from 49 (North Africa/West Asia/Europe) to 68 (Central Asia) percent, but there is a fair amount of variability within regions. The countries with the lowest prevalence of ORS use are Jordan and Turkey, at about 30 percent, while four countries in South/East Africa have the highest prevalence of ORS use, over 80 percent: Malawi, Mozambique, Namibia, and Zambia.

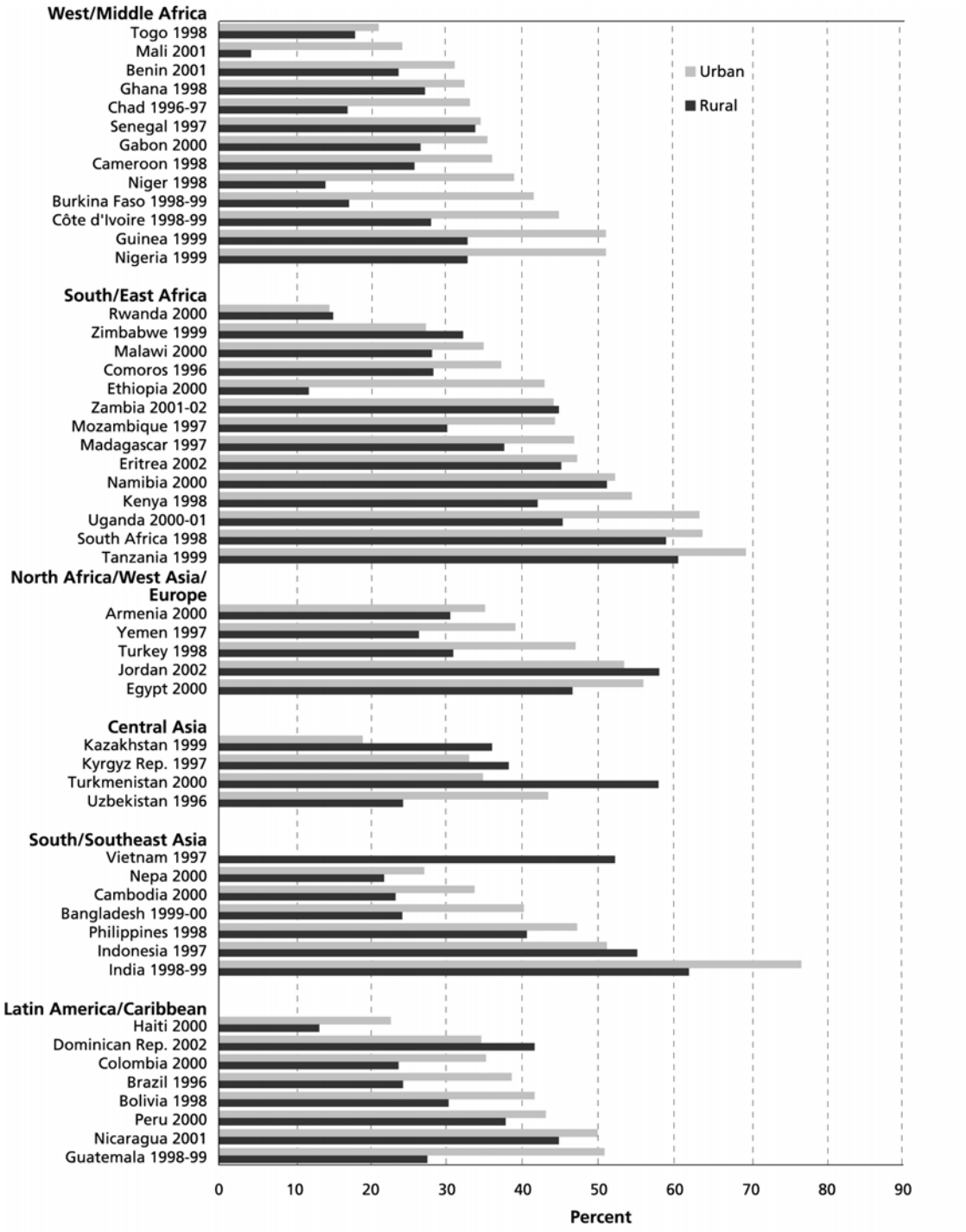
[3] The recently published joint statement also recommends that the health care provider supply the mother/caretaker with a 10 to 14 day supply of zinc supplements.

[4] In this report, the term *oral rehydration solutions* refers to a fluid made from oral rehydration salts or a government-recommended homemade fluid. We have chosen not to use the term *oral rehydration therapy* in order to clearly distinguish the act of providing these solutions from that of increasing fluids.

[5] It should be borne in mind that treatments reported for those children who were taken to a health care provider were not necessarily administered by or prescribed by the practitioner. The mother may have acted independently to initiate those treatments.

Figure 3.9

Percentage of children under age three years with diarrhea in the two weeks preceding the survey for whom advice or treatment was sought from an appropriate health care provider



Note: the percentage for urban children in Vietnam is not shown because the denomination was too small.

Table 3.10.1

Among children under age three years with diarrhea in the two weeks preceding the survey who were taken to a health provider, percentage receiving treatment by type of treatment, Demographic and Health Surveys 1996-2002

	Oral rehydration therapy					Diarrhea-specific feeding practices		Nonrecommended treatments			
Survey	ORS packet	Recommended home fluid (RHF)	Either ORS or RHF	Increased fluids	ORS, RHF, or increased fluids	Continued feeding	Increased fluids and continued feeding	Pills or syrups/ injections/ IV fluids	Home remedies or herbal medicines	No treatment	Number of children
West/Middle Africa											
Benin 2001	59.3	15.4	67.4	52.5	82.6	42.0	23.1	61.3	8.9	2.3	120
Burkina Faso 1998-99	58.0	19.0	64.0	47.6	82.2	-	-	2.2	7.6	15.6	159
Cameroon 1998	52.5	30.8	64.9	61.6	84.7	38.5	24.6	66.8	17.2	0.7	121
Chad 1996-97	63.9	17.7	70.1	69.4	87.6	33.0	20.0	76.0	29.0	2.1	208
Côte d'Ivoire 1998-99	47.3	24.7	57.2	55.3	80.0	45.9	17.6	58.5	22.0	9.2	103
Gabon 2000	47.4	26.8	61.3	70.4	85.3	53.8	37.5	53.6	2.6	4.0	164
Ghana 1998	55.1	3.5	55.6	62.1	77.9	38.3	24.0	54.2	3.2	3.2	111
Guinea 1999	65.7	17.1	69.9	59.1	86.8	40.5	20.4	79.5	13.8	0.7	290
Mali 2001	43.2	35.4	60.6	57.6	80.7	39.4	23.3	64.6	20.3	1.4	277
Mauritania 2000-01	53.2	22.7	61.3	19.2	68.4	59.7	19.2	1.4	15.2	26.7	177
Niger 1998	61.5	34.0	72.0	62.7	89.6	40.3	25.1	48.4	9.8	2.7	291
Nigeria 1999	60.0	58.9	81.5	61.6	90.5	45.2	31.2	75.2	6.0	2.6	183
Senegal 1997	37.3	46.1	67.8	62.5	84.4	-	-	24.8	8.0	9.4	262
Togo 1998	43.0	21.1	52.4	69.1	81.1	43.1	31.9	68.9	24.8	0.6	212
Median	54.2	23.7	64.5	61.6	83.5	41.3	23.7	59.9	11.8	2.7	
Mean	53.4	26.7	64.7	57.9	83.0	43.3	24.8	52.5	13.5	5.8	
South/East Africa											
Comoros 1996	60.0	4.0	60.0	84.0	86.7	25.3	17.3	58.7	20.0	4.0	75
Eritrea 2002	76.0	34.2	79.9	42.7	83.5	23.8	12.5	36.5	1.5	9.8	255
Ethiopia 2000	63.0	10.8	64.5	37.1	74.6	5.3	1.7	57.6	4.1	6.1	274
Kenya 1998	61.1	63.8	83.6	52.4	91.9	48.7	28.0	66.9	7.6	0.9	243
Madagascar 1997	46.3	1.1	46.6	78.0	82.8	24.0	19.3	69.5	5.9	2.4	378
Malawi 2000	84.3	-	84.3	43.7	89.8	60.4	30.9	48.2	6.5	2.1	462
Mozambique 1997	80.6	16.7	83.6	51.5	89.2	46.8	31.6	63.0	10.1	2.0	271
Namibia 2000	87.4	-	87.4	20.9	90.3	39.9	9.4	28.6	13.1	6.5	196
Rwanda 2000	55.8	24.1	64.0	30.0	70.2	42.9	9.3	53.1	9.6	6.7	141
South Africa 1998	62.8	76.9	91.4	57.7	95.8	41.0	20.4	37.9	4.7	1.5	308
Tanzania 1999	71.7	-	71.7	34.6	82.9	48.5	20.6	-	-	17.1	195
Uganda 2000-01	53.8	15.9	61.2	35.9	70.6	29.2	11.4	77.3	5.0	2.4	511
Zambia 2001-02	82.8	-	82.8	49.9	87.7	43.1	19.6	25.9	9.5	7.2	453
Zimbabwe 1999	-	84.9	84.9	57.2	90.9	29.9	21.8	51.8	2.8	4.6	114
Median	63.0	20.4	81.4	46.8	87.2	40.5	19.5	53.1	6.5	4.3	
Mean	68.1	33.2	74.7	48.3	84.8	36.3	18.1	51.9	7.7	5.2	
North Africa/West Asia/Europe											
Armenia 2000	(74.7)	-	(74.7)	(73.6)	(91.0)	(36.8)	(24.9)	(27.6)	(19.3)	(8.1)	28
Egypt 2000	48.3	5.1	49.9	17.8	55.9	24.4	4.1	49.9	7.4	16.5	312
Jordan 2002	29.7	8.6	35.4	55.4	71.3	25.7	11.7	76.6	9.4	9.1	383
Turkey 1998	28.8	17.2	41.2	64.8	78.4	26.6	15.4	69.2	0.5	9.0	295
Yemen 1997	63.7	12.3	66.6	51.4	82.7	28.2	12.2	94.5	5.2	1.0	678
Median	48.3	10.5	49.9	55.4	78.4	26.6	12.2	69.2	7.4	9.0	
Mean	49.0	10.8	53.6	52.6	75.9	28.3	13.7	63.6	8.4	8.7	
Central Asia											
Kazakhstan 1999	(54.7)	-	(54.7)	(62.8)	(74.5)	(24.1)	(14.7)	(62.2)	(7.9)	(7.8)	42
Kyrgyz Rep. 1997	73.7	17.6	78.0	77.2	95.0	16.2	8.4	73.2	9.8	1.9	72
Turkmenistan 2000	(76.8)	-	(76.8)	(67.3)	(86.8)	(33.0)	(21.6)	(93.8)	(6.3)	(0.0)	34
Uzbekistan 1996	(63.6)	(8.2)	(63.6)	(81.4)	(93.5)	(22.2)	(14.1)	(67.4)	(20.2)	(0.0)	23
Median	68.6	12.9	70.2	72.2	90.2	19.2	14.4	70.3	8.8	1.0	
Mean	67.2	12.9	68.3	72.2	87.4	23.9	14.7	74.2	11.1	2.4	
South/Southeast Asia											
Bangladesh 1999-00	76.3	26.3	85.6	56.8	89.0	48.2	29.3	78.5	5.1	0.7	87
Cambodia 2000	36.4	4.2	39.8	59.1	74.1	29.0	12.6	72.3	5.3	6.6	241
India 1998-99	36.1	3.6	38.3	23.7	50.9	50.2	13.8	73.1	2.5	11.1	3,782
Indonesia 1997	65.4	-	65.4	59.1	83.9	45.8	27.9	-	-	16.1	662
Nepal 2000	64.4	-	64.4	40.1	76.8	35.3	17.8	73.8	4.7	1.1	215
Philippines 1998	70.8	15.3	73.0	66.7	91.4	50.6	29.4	43.9	11.9	2.3	188
Vietnam 1997	52.8	21.1	62.3	54.4	78.5	47.3	16.6	52.2	14.5	9.6	90
Median	64.4	15.3	64.4	56.8	78.5	47.3	17.8	72.7	5.2	6.6	
Mean	57.5	14.1	61.3	51.4	77.8	43.8	21.1	65.6	7.3	6.8	
Latin America/Caribbean											
Bolivia 1998	55.1	33.9	70.6	72.6	89.5	40.6	28.2	65.5	5.9	3.0	344
Brazil 1996	62.9	14.8	67.4	67.1	87.2	38.5	17.6	24.6	11.9	6.7	154
Colombia 2000	35.3	18.5	42.9	44.2	64.8	39.9	14.9	26.9	19.0	19.5	149
Dominican Rep. 2002	52.8	8.8	57.8	41.0	75.3	40.2	17.4	42.6	13.3	12.3	431
Guatemala 1998-99	62.3	8.4	64.0	41.3	77.6	36.0	10.1	81.6	1.8	1.2	162
Haiti 2000	77.6	5.9	79.0	39.3	84.7	20.2	6.7	51.9	6.0	2.3	193
Nicaragua 2001	72.4	14.4	76.0	41.0	82.7	39.9	19.0	55.6	6.2	6.1	297
Peru 2000	38.8	29.6	55.0	58.3	80.3	26.7	14.4	35.8	19.1	11.0	540
Median	58.7	14.6	65.7	42.8	81.5	39.2	16.2	47.3	9.1	6.4	
Mean	57.2	16.8	64.1	50.6	80.3	35.3	16.0	48.1	10.4	7.8	

Note: Figures in parentheses are based on 25-49 unweighted cases. A dash indicates that information was not collected about this treatment.

Table 3.10.2

Among children under age three years with diarrhea in the two weeks preceding the survey who were not taken to a health provider, percentage receiving treatment by type of treatment, Demographic and Health Surveys 1996-2002

	Oral rehydration therapy					Feeding practices		Nonrecommended treatments			
Survey	ORS packet	Recommended home fluid (RHF)	Either ORS or RHF	Increased fluids	ORS, RHF,or increased fluids	Continued feeding	Increased fluids and continued feeding	Pills or syrups/ injections/ IV fluids	Home remedies or herbal medicines	No treatment	Number of children
West/Middle Africa											
Benin 2001	13.0	11.6	22.5	32.6	45.9	45.1	14.5	19.7	26.8	28.7	349
Burkina Faso 1998-99	4.6	4.0	7.3	34.1	38.1	-	-	1.6	40.9	34.9	647
Cameroon 1998	9.8	14.2	21.6	64.9	68.5	40.9	26.9	33.8	18.1	17.2	307
Chad 1996-97	12.9	7.2	17.8	54.9	61.3	40.9	17.8	33.4	24.9	20.7	806
Côte d'Ivoire 1998-99	10.9	7.3	15.4	53.3	57.4	47.2	24.7	20.0	30.7	23.8	216
Gabon 2000	15.1	14.9	25.9	60.5	67.9	66.0	41.5	27.9	11.5	19.3	329
Ghana 1998	21.2	3.0	23.4	53.7	62.5	39.6	19.9	46.7	15.7	11.8	280
Guinea 1999	18.0	9.7	23.9	48.7	58.8	49.2	20.8	40.0	20.1	20.5	498
Mali 2001	6.4	19.7	23.8	52.3	61.9	39.1	20.2	18.9	31.5	22.9	1,312
Mauritania 2000-01	12.2	18.9	26.2	21.8	37.8	66.7	21.8	0.0	20.1	51.0	475
Niger 1998	10.7	10.1	17.3	54.5	62.2	43.9	20.7	24.3	15.1	25.4	1,372
Nigeria 1999	18.8	25.9	33.0	48.7	63.9	40.7	19.3	31.5	12.6	23.9	307
Senegal 1997	3.7	12.6	14.7	48.1	54.3	-	-	8.8	14.6	37.9	510
Togo 1998	11.2	7.8	16.1	59.5	63.5	34.6	20.9	44.6	29.0	12.5	935
Median	11.7	10.9	22.1	52.8	61.6	42.4	20.8	26.1	20.1	23.4	
Mean	12.0	11.9	20.6	49.1	57.4	46.2	22.4	25.1	22.3	25.0	
South/East Africa											
Comoros 1996	15.4	4.7	18.9	67.5	72.2	39.6	25.4	6.5	24.9	20.7	169
Eritrea 2002	22.0	19.7	34.6	34.2	52.8	26.6	12.3	8.2	1.8	44.0	303
Ethiopia 2000	5.8	7.3	11.6	32.2	38.4	13.0	3.5	23.0	9.6	44.3	1,658
Kenya 1998	17.8	50.7	56.9	56.0	74.2	55.2	31.3	19.2	12.4	17.8	306
Madagascar 1997	8.0	0.8	8.3	52.3	54.6	35.1	16.6	32.1	14.4	25.6	579
Malawi 2000	34.5	-	34.5	32.3	51.5	58.2	23.8	20.0	15.4	33.2	1,148
Mozambique 1997	21.5	13.7	30.2	36.5	47.6	52.0	23.9	16.9	21.4	29.8	516
Namibia 2000	32.8	-	32.8	9.4	39.6	56.7	5.3	5.1	8.8	51.3	186
Rwanda 2000	7.7	6.8	12.7	15.7	24.8	49.6	7.8	7.9	30.4	47.2	829
South Africa 1998	37.1	60.8	70.4	54.9	81.6	51.5	24.4	14.5	3.5	15.7	200
Tanzania 1999	29.9	-	29.9	28.3	48.4	56.5	19.2	-	-	51.6	120
Uganda 2000-01	16.9	15.1	27.7	19.0	37.6	35.7	7.8	27.3	18.5	35.5	578
Zambia 2001-02	31.9	-	31.9	35.1	51.8	47.4	15.2	8.7	21.6	33.2	565
Zimbabwe 1999	-	60.5	60.5	48.1	73.8	47.3	20.0	5.7	3.4	23.0	258
Median	21.5	14.4	31.1	34.7	51.7	48.5	17.9	14.5	14.4	33.2	
Mean	21.6	24.0	32.9	37.3	53.5	44.6	16.9	15.0	14.3	33.8	
North Africa/West Asia/Europe											
Armenia 2000	25.3	-	25.3	37.7	43.5	44.5	15.5	23.8	7.4	37.8	59
Egypt 2000	21.0	4.8	25.5	15.1	37.6	30.5	4.8	23.9	5.8	44.2	318
Jordan 2002	4.6	2.3	6.6	52.2	55.6	43.9	20.5	16.9	5.5	35.4	320
Turkey 1998	7.4	14.2	20.6	57.5	65.0	38.3	18.1	22.6	0.3	27.3	446
Yemen 1997	21.2	6.1	24.4	45.0	57.7	30.3	10.7	27.7	2.7	33.5	1,665
Median	21.0	5.5	24.4	45.0	55.6	38.3	15.5	23.8	5.5	35.4	
Mean	15.9	6.8	20.5	41.5	51.9	37.5	13.9	23.0	4.3	35.6	
Central Asia											
Kazakhstan 1999	21.6	-	21.6	57.6	59.3	54.3	22.2	39.9	10.1	29.1	106
Kyrgyz Rep. 1997	20.8	7.7	23.8	56.5	60.8	44.6	16.3	56.5	11.6	16.7	122
Turkmenistan 2000	(36.4)	-	(36.4)	(51.0)	(66.2)	(36.4)	(14.8)	(54.2)	(1.1)	(18.8)	45
Uzbekistan 1996	(14.7)	(8.7)	(23.4)	(74.9)	(83.3)	(32.1)	(20.6)	(40.3)	(23.8)	(9.1)	45
Median	21.2	8.2	23.6	57.0	63.5	40.5	18.4	47.2	10.8	17.8	
Mean	23.4	8.2	26.3	60.0	67.4	41.8	18.5	47.7	11.6	18.4	
South/Southeast Asia											
Bangladesh 1999-00	55.5	21.1	67.7	46.8	77.3	42.3	19.5	35.8	6.0	15.7	232
Cambodia 2000	15.5	2.5	17.1	47.1	56.8	45.3	15.1	53.1	6.8	21.0	747
India 1998-99	9.4	2.6	11.7	19.2	27.1	58.1	11.3	22.7	6.0	52.1	2,020
Indonesia 1997	21.8	-	21.8	48.7	59.1	51.4	25.0	-	-	40.9	564
Nepal 2000	21.2	-	21.2	24.3	37.6	34.1	10.0	30.1	6.5	45.0	764
Philippines 1998	20.6	2.7	21.8	49.5	56.7	48.8	24.4	18.5	15.0	30.9	246
Vietnam 1997	26.4	21.0	39.2	54.2	65.7	44.9	23.2	19.9	18.6	21.8	88
Median	21.2	2.7	21.8	47.1	56.8	45.3	19.5	26.4	6.7	30.9	
Mean	24.3	10.0	28.6	41.4	54.3	46.4	18.4	30.0	9.8	32.5	
Latin America/Caribbean											
Bolivia 1998	15.6	23.5	34.5	57.0	68.3	51.0	27.2	21.1	8.5	27.1	604
Brazil 1996	34.7	17.7	47.3	49.9	67.3	49.5	20.6	10.2	11.0	26.2	290
Colombia 2000	14.9	15.2	27.5	25.9	45.4	52.6	10.4	10.6	29.5	34.0	330
Dominican Rep. 2002	15.7	5.5	18.8	30.7	43.2	54.1	13.1	17.0	17.0	39.6	732
Guatemala 1998-99	16.4	3.0	19.3	38.4	49.7	39.9	16.0	57.0	7.1	22.8	290
Haiti 2000	28.7	6.9	35.0	33.3	49.3	38.4	9.2	16.7	15.2	36.5	1,001
Nicaragua 2001	33.3	10.0	37.9	34.3	53.1	43.5	16.4	37.6	9.0	24.9	337
Peru 2000	11.0	15.1	22.3	47.9	57.8	36.9	13.5	8.8	32.6	27.8	800
Median	16.1	12.6	31.0	36.4	51.4	46.5	14.8	16.9	13.1	27.5	
Mean	21.3	12.1	30.3	39.7	54.3	45.7	15.8	22.4	16.2	29.9	

Note: Figures in parentheses are based on 25-49 unweighted cases. A dash indicates that information was not collected about this treatment..

The regional mean likelihood of use of recommended home fluids (RHF) ranges from 11 (North Africa/West Asia/Europe) to 33 (South/East Africa) percent, and is less than 30 percent in the majority of countries. RHF use is below 5 percent in Ghana, Comoros, Madagascar, Cambodia, and India.[1] RHF use exceeds 50 percent in only four countries: Nigeria, Kenya, South Africa, and Zimbabwe.

With respect to increasing fluids in response to diarrhea, the regional mean likelihood ranges from 48 percent in South/East Africa to 72 percent in Central Asia. Increasing fluids is reported the least often by mothers in Mauritania, Namibia, Egypt, and India, all under 30 percent. Continuing to feed the child who has diarrhea is reported less often than increasing fluids, in nearly every country. The regional mean likelihood of continued feeding ranges from 24 to 44 percent and is markedly low in two countries, Ethiopia (5 percent) and Kyrgyz Republic (16 percent).

The use of pills, syrups, injections, or intravenous (IV) fluids for treatment of diarrhea is 50 percent or more in a majority (36 of 50) of countries.

The use of pills, syrups, injections, or intravenous (IV) fluids is 50 percent or more in a majority (36 of 50) of countries. Hence, the regional mean likelihoods of use are all relatively high, ranging from 48 percent in Latin America/Caribbean to 74 percent in Central Asia. The likelihood of use of these generally nonrecommended treatments for diarrhea among children taken to a health provider is less than 25 percent in just two countries, Burkina Faso (2 percent) and Mauritania (1 percent).

Treatment of Children with Diarrhea Not Taken to a Health Provider

Table 3.10.2 is based on children with diarrhea in the past two weeks for whom treatment was not sought at any time during that episode. The regional mean likelihood of use of an ORS packet ranges fairly narrowly, from 12 to 24 percent, with a considerable amount of variability within regions. In nine countries, less than 10 percent of children with a recent diarrheal episode who were not taken to a health provider received ORS: Burkina Faso, Mali, Senegal, Ethiopia, Madagascar, Rwanda, Jordan, Turkey, and India. The only country in which ORS packet use exceeds 50 percent is Bangladesh.

The regional mean likelihood of use of an ORS packet to treat diarrhea ranges from 12 to 24 percent.

The regional mean likelihood of use of RHF ranges from 7 to 24 percent. There is high variability in RHF use within regions. RHF use exceeds 50 percent in just three countries: Kenya, South Africa, and Zimbabwe.

With respect to increasing fluids in response to diarrhea, the regional mean likelihood ranges from 37 percent in South/East Africa to 60 percent in Central Asia. Increasing fluids is reported least often by mothers in Namibia, Rwanda, Uganda, Egypt, and India, all less than 20 percent. The regional mean likelihood of continued feeding ranges narrowly from 38 to 46 percent, and falls below 20 percent in just one country, Ethiopia.

There is wide variability in the use of pills, syrups, injections, or IV fluids for children with recent diarrhea who were not taken to a health provider. In 10 of 50 countries, use is less than 10 percent, while in another 9 countries, use exceeds 40 percent. The regional mean likelihood of use of these nonrecommended treatments ranges from 15 percent in South/East Africa to 48 percent in Central Asia.

[1] This information is not available from some surveys, as denoted by a single dash.

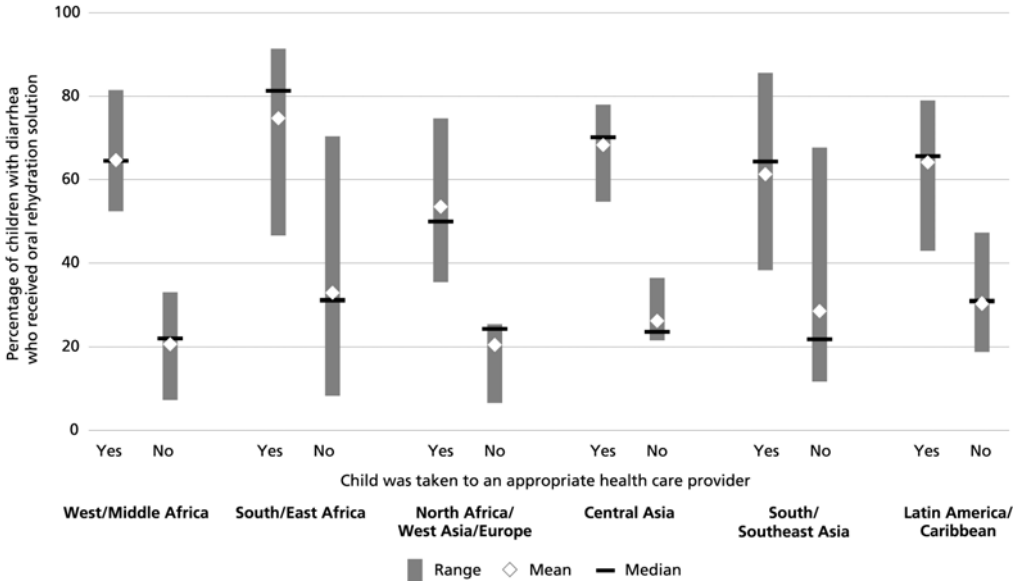
Use of Oral Rehydration Solutions by Careseeking

Treatment with oral rehydration solutions (ORS or RHF) differs consistently and substantially between children with diarrhea for whom advice or treatment was or was not sought from an appropriate provider.

In each region, the average percentage of children who were given an oral rehydration solution is at least twice as large for those who were taken to an appropriate provider as for those who were not (Figure 3.10.1). The regional mean percentage of children with diarrhea who were taken to an appropriate provider and received, at any point in the diarrhea episode, an oral rehydration solution ranges from 54 percent in North Africa/West Asia/Europe to 75 percent in South/East Africa. The comparable statistics for children who were not taken to an appropriate provider are more similar, ranging from 20 to 33 percent.

In each region, the average percentage of children who were given an oral rehydration solution is at least twice as large for those taken to an appropriate provider as for those who were not.

Figure 3.10.1
Percentage of children under age three years with diarrhea in the two weeks preceding the survey who received oral rehydration solutions (ORS or RHF), by contact with health care provider and region



Within each country, the difference in the percentage of children who received an oral rehydration solution among those children with diarrhea taken and not taken to an appropriate provider was calculated. All of these differentials are large and positive, ranging from 15 percentage points in Colombia to 57 in Burkina Faso. The regional mean differentials range from 33 to 44 percentage points.

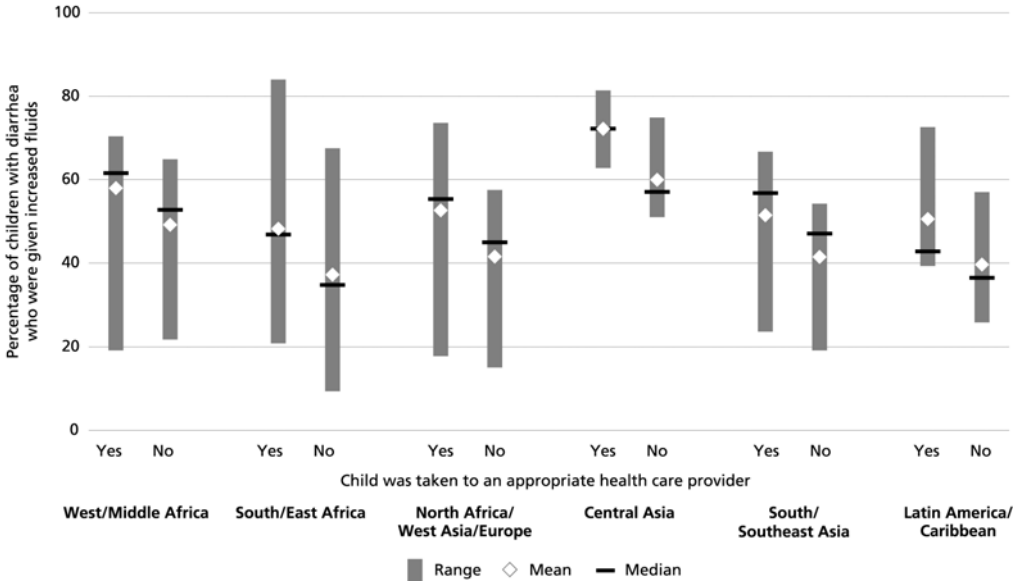
Increasing Fluids by Careseeking

Overall, there is a strong positive association between careseeking and following the recommended practice of increasing fluids during a diarrhea episode.

There is a strong positive association between careseeking and following the recommended practice of increasing fluids during a diarrhea episode.

The regional average percentage of children with diarrhea who were given more fluids than usual at any time during the illness episode is again consistently higher among children who were taken to an appropriate provider, compared with children who were not taken (Figure 3.10.2).

Figure 3.10.2
Percentage of children under age three years with diarrhea in the two weeks preceding the survey who received increased fluids, by contact with health care provider and region



For each country, the difference in the percentage of children who were given increased fluids among those children with diarrhea taken and not taken to an appropriate provider was computed. All but 3 of these differentials are positive, and more than half (29 of 52) are ten or more percentage points. Three differentials exceed positive 20 percentage points: Madagascar (26), Armenia (36), and Kyrgyz Republic (21). The regional mean differentials vary narrowly, from 9 to 12 percentage points.

Continuing to Feed by Careseeking

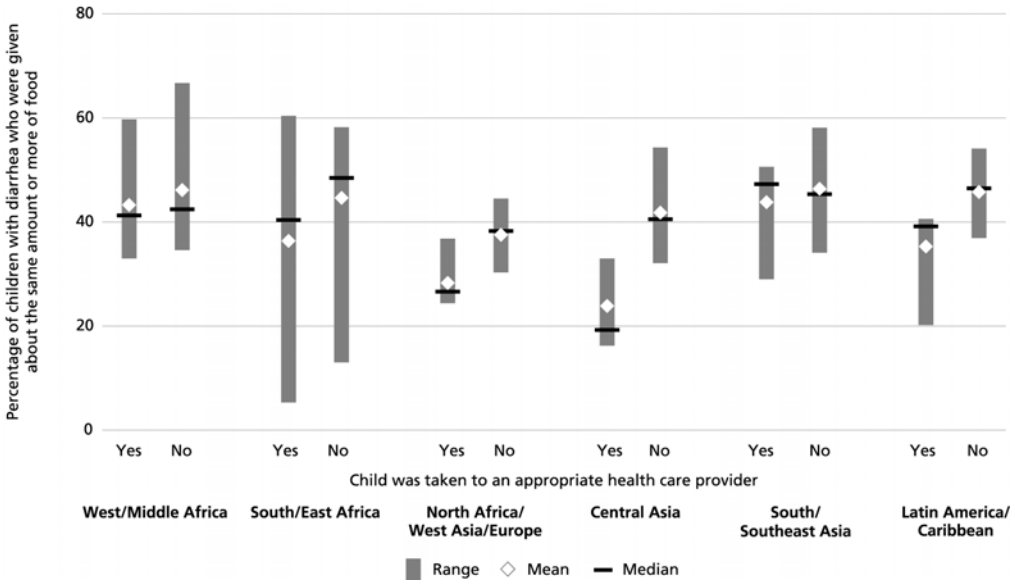
There is a strong negative association between careseeking and following the recommended practice of continued feeding during a diarrhea episode.

A consistent and strong negative association between careseeking and following the recommended practice of continuing to feed a child with diarrhea is observed.

In this report, *continuing to feed* is defined as offering the same/about the same/more food than usual. Adherence to this treatment recommendation is very different from that of administering oral rehydration solutions or increasing fluids.

As seen in Figure 3.10.3, in each region, the average percentage of children with diarrhea who continued to feed is about the same or lower among children who were taken to an appropriate provider compared with children who were not taken. The largest discrepancy is seen in Central Asia, where a regional mean of 24 percent of sick children who were taken to an appropriate provider continued to feed, compared with a regional mean of 42 percent of children who were not taken.

Figure 3.10.3
Percentage of children under age three years with diarrhea in the two weeks preceding the survey who received enough food, by contact with health care provider and region

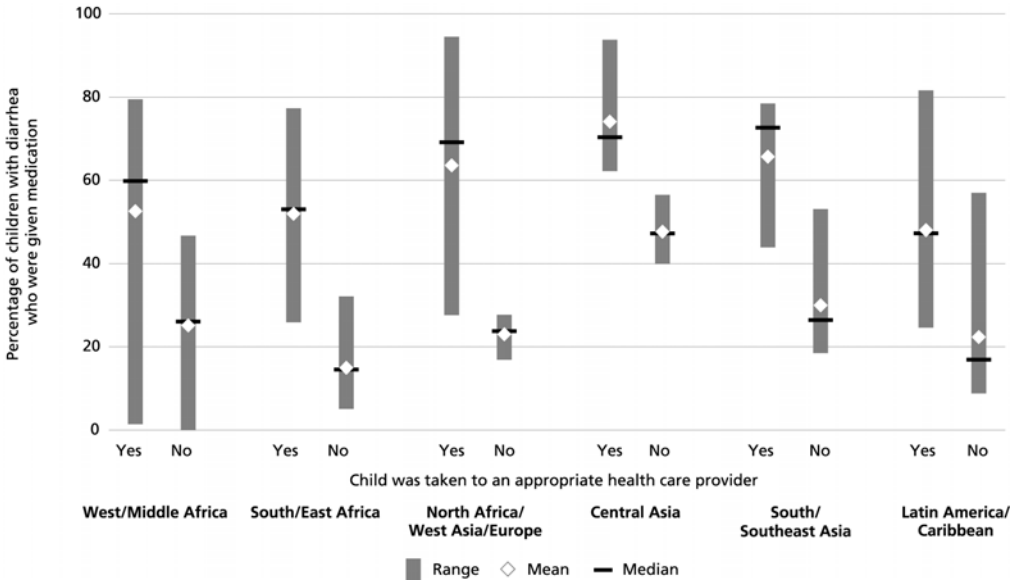


The difference in the percentage of children who continued to feed among those children with diarrhea who were taken and not taken to an appropriate provider was computed for each country. The majority of these differentials are negative, meaning that children with diarrhea for whom advice or treatment was sought from an appropriate health provider were less likely to be offered the same/about the same/more food than usual than their counterparts for whom care was not sought. In 17 of 50 countries, the magnitude of the negative differentials exceeds ten percentage points

Use of Nonrecommended Treatments by Careseeking

As evidenced in Figure 3.10.4, children for whom advice or treatment was sought for diarrhea are consistently more likely than children for whom care was not sought to have been given pills, syrups, injections, or IV, none of which is recommended in the absence of blood in the stool, suspected cholera, or other signs and/or symptoms of certain severe disease, which typically comprise a small proportion of all diarrheal episodes.

Figure 3.10.4
Percentage of children under age three years with diarrhea in the two weeks preceding the survey who received medication (pills, syrups, injections, or IV fluids), by contact with health care provider and region



Among children with diarrhea for whom care was sought, the regional mean percentage who received, at any time during the illness, one of the nonrecommended treatments ranges from 48 percent in Latin America/Caribbean to 74 percent in Central Asia.

Among children with diarrhea for whom care was sought, the regional mean percentage who received, at any time during the illness, one of these nonrecommended treatments ranges from 48 percent in Latin America/Caribbean to 74 percent in Central Asia. In only two countries does this percentage fall below 25 percent: Burkina Faso, at just 2 percent, and Mauritania at 1 percent.

In contrast, among children for whom care was not sought, the regional mean percentage of children who received one of these nonrecommended treatments ranges from 15 percent in South/East Africa to 48 percent in Central Asia. At the country level, this percentage falls below 10 in just ten countries, nine of which are in sub-Saharan Africa, and falls at or above 40 in nine countries, including the four countries included from Central Asia.

For each country, the difference in the percentage of sick children who received any of these nonrecommended treatments between those taken and not taken to an appropriate provider was calculated. These differentials are all positive and are less than ten percentage points in only four countries (Burkina Faso, Ghana, Mauritania, and Armenia). The regional mean differentials are large, ranging from 26 to 41 percentage points.

3.2.2 Diarrhea Treatment by Residence and Maternal Education

While mother's education can be used as a measure of individual productivity and hence contributes to the household's economic status, it is also assumed that better educated women are more likely than less educated women to both understand and adopt practices for preventive and curative child health care as promoted through health education outreach programs or by health care providers that may at times be at odds with customary practices.

Use of Oral Rehydration Solutions

A largely consistent and strong positive association is observed between mother's education and the administration of oral rehydration solutions to young children with diarrhea, in both urban and rural areas and in most countries and regions.

In Table 3.11, the percentage of sick children who were given oral rehydration solutions is shown by residence and mother's education (highest level completed). Data are sparse in some categories, particularly for rural children of mothers with secondary or higher education in West/Middle African countries, and both urban and rural children of mothers with less than secondary education in Central Asian countries.

A largely consistent and strong positive association is observed between mother's education and the administration of oral rehydration solutions to young children with diarrhea, in both urban and rural areas and in most countries and regions.

As shown in Figure 3.11.1, the regional average prevalence of use of oral rehydration solutions with urban sick children increases consistently with increasing maternal education in West/Middle Africa, South/East Africa, and South/Southeast Asia. This pattern of use is repeated in all regions, apart from Central Asia, with rural sick children, as seen in Figure 3.11.2.

The difference between the percentage of sick children receiving oral rehydration solutions whose mothers have no formal education versus a secondary or higher education was computed, where possible, by urban and rural residence. The majority of these differentials, both urban and rural, are negative.

In urban areas, sick children of mothers with no formal education are less likely than sick children of mothers with a secondary or higher education to receive oral rehydration solutions by more than 20 percentage points in five countries (Ghana, Nigeria, Rwanda, Uganda, and Cambodia). In only one country, Guatemala, is an equally large positive differential observed. In rural areas, a large negative differential of 20 or more percentage points is observed in nine countries (Cameroon, Nigeria, Rwanda, Zambia, Zimbabwe, Turkey, Cambodia, Nepal, and Haiti).

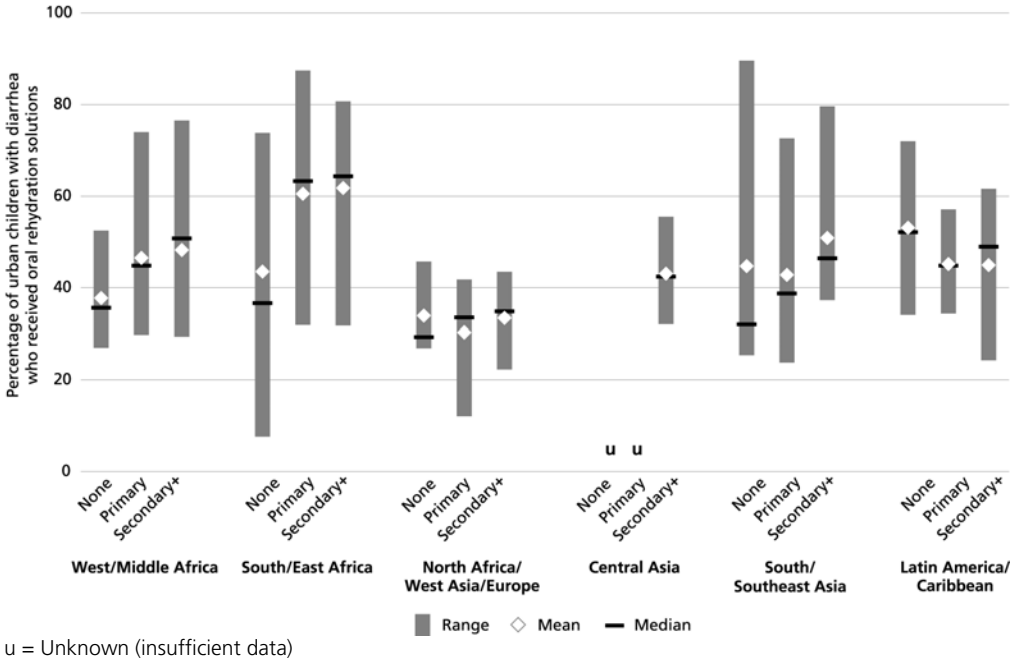
Table 3.11

Percentage of children under age three with diarrhea in the two weeks preceding the survey who received oral rehydration solutions (ORS or RHF), by residence and mother's education, Demographic and Health Surveys 1996-2002

	Urban					Rural				
	Highest level of education				Number of children	Highest level of education				Number of children
Survey	None	Primary	Secondary +	Total		None	Primary	Secondary +	Total	
West/Middle Africa										
Benin 2001	33.6	(29.8)	*	36.7	129	29.8	44.4	*	33.0	340
Burkina Faso 1998-99	39.8	(42.2)	(54.5)	43.3	84	14.4	(31.6)	*	15.5	721
Cameroon 1998	(31.7)	(49.6)	50.8	44.1	106	13.9	47.2	(42.9)	30.4	323
Chad 1996-97	38.2	44.8	54.0	42.5	228	18.9	41.4	*	24.5	786
Côte d'Ivoire 1998-99	33.6	(47.9)	(43.5)	40.2	85	21.9	(31.0)	*	24.8	234
Gabon 2000	*	40.6	34.9	37.2	381	*	38.0	(42.1)	39.4	112
Ghana 1998	(27.0)	*	(51.4)	38.9	90	30.0	25.4	36.1	30.6	302
Guinea 1999	52.0	(39.1)	(54.3)	49.3	179	37.1	(51.6)	*	38.4	609
Mali 2001	49.2	72.9	61.1	55.3	288	24.8	19.8	*	24.6	1,301
Mauritania 2000-01	35.6	48.9	29.5	39.1	320	31.8	(33.6)	*	32.6	333
Niger 1998	52.5	49.2	(46.7)	51.2	231	22.3	29.9	*	22.9	1,432
Nigeria 1999	38.8	(74.0)	(76.5)	60.8	124	36.6	56.5	77.6	47.8	366
Senegal 1997	29.1	35.6	(29.4)	31.5	242	31.1	46.9	*	33.3	529
Togo 1998	30.2	33.4	(40.2)	33.5	234	18.5	22.3	(33.0)	20.0	914
Median	35.6	44.8	50.8	41.4		24.8	35.8	42.1	30.5	
Mean	37.8	46.8	48.2	43.1		25.5	37.1	46.3	29.8	
South/East Africa										
Comoros 1996	(34.9)	*	*	35.7	70	26.8	(33.3)	*	29.9	174
Eritrea 2002	(59.3)	75.2	(72.2)	69.6	162	47.4	56.8	*	49.4	396
Ethiopia 2000	58.5	(63.3)	61.4	60.6	150	14.0	22.3	*	15.6	1,782
Kenya 1998	*	86.5	*	81.9	103	66.7	66.2	62.5	65.7	446
Madagascar 1997	*	31.9	54.7	42.3	212	14.5	16.6	28.3	18.0	746
Malawi 2000	(36.6)	52.5	(51.6)	50.0	171	44.3	50.2	(62.6)	48.6	1,439
Mozambique 1997	(73.8)	64.1	*	66.8	247	31.4	48.0	*	40.3	540
Namibia 2000	*	(67.5)	64.2	65.5	138	65.7	44.5	70.0	58.2	244
Rwanda 2000	(7.6)	35.0	(31.8)	29.0	117	16.2	18.7	(39.5)	19.0	853
South Africa 1998	*	(87.4)	80.7	82.2	207	93.0	79.4	84.6	83.8	301
Tanzania 1999	*	(55.7)	*	55.7	49	63.6	53.6	*	55.7	266
Uganda 2000-01	(34.4)	47.4	65.5	52.6	104	44.6	41.5	(43.1)	42.5	985
Zambia 2001-02	*	54.4	64.6	58.6	315	38.3	55.0	67.2	52.8	702
Zimbabwe 1999	*	(65.5)	(70.8)	68.0	111	55.4	65.2	75.3	67.9	261
Median	36.6	63.3	64.4	59.6		44.5	49.1	62.6	49.0	
Mean	43.6	60.5	61.8	58.5		44.4	46.5	59.2	46.2	
North Africa/West Asia/Europe										
Armenia 2000	*	*	(41.6)	(41.6)	38	*	*	42.5	41.0	50
Egypt 2000	(29.3)	(32.7)	24.7	27.0	208	42.8	47.6	40.8	42.8	422
Jordan 2002	*	(12.1)	22.3	22.2	529	*	(26.0)	20.9	22.6	174
Turkey 1998	26.9	34.6	34.9	33.0	414	17.9	23.9	(37.9)	23.4	327
Yemen 1997	45.7	41.8	43.5	44.5	486	33.3	43.1	(43.5)	34.6	1,858
Median	29.3	33.6	34.9	33.0		33.3	34.6	40.8	34.6	
Mean	34.0	30.3	33.4	33.7		31.3	35.2	37.1	32.9	
Central Asia										
Kazakhstan 1999	*	*	41.6	41.6	65	*	*	21.3	22.6	82
Kyrgyz Rep. 1997	*	*	(32.1)	(32.1)	38	*	*	46.8	46.8	156
Turkmenistan 2000	*	*	(55.5)	(56.0)	50	*	*	(49.0)	(50.1)	29
Uzbekistan 1996	*	*	(43.3)	(43.3)	35	*	*	(30.5)	(30.5)	33
Median	u	u	42.4	42.4		u	u	38.6	38.6	
Mean	u	u	43.1	43.3		u	u	36.9	37.5	
South/Southeast Asia										
Bangladesh 1999-00	(89.6)	(72.6)	(79.6)	79.7	61	69.5	69.4	(76.1)	70.8	258
Cambodia 2000	(25.4)	23.8	(53.8)	33.9	110	11.9	23.2	41.0	21.2	878
India 1998-99	28.4	34.7	42.1	36.3	1,338	24.0	27.9	34.7	26.8	4,464
Indonesia 1997	*	44.4	43.9	42.8	315	50.1	45.3	48.2	46.2	911
Nepal 2000	(35.6)	*	(37.3)	37.7	53	27.0	37.0	50.2	30.3	926
Philippines 1998	*	(38.7)	48.8	46.7	178	*	36.4	47.9	42.0	255
Vietnam 1997	*	*	*	*	15	*	(35.7)	56.5	48.2	163
Median	32.0	38.7	46.4	40.3		27.0	36.4	48.2	42.0	
Mean	44.8	42.8	50.9	46.2		36.5	39.3	50.7	40.8	
Latin America/Caribbean										
Bolivia 1998	*	55.2	53.4	54.1	512	40.8	38.7	43.9	39.9	437
Brazil 1996	(51.4)	57.1	53.2	54.5	326	(38.9)	53.2	*	53.7	118
Colombia 2000	*	38.2	30.8	33.7	314	*	26.5	(34.4)	29.6	165
Dominican Rep. 2002	(34.1)	34.4	24.3	30.1	736	43.5	40.4	32.7	38.7	427
Guatemala 1998-99	(72.0)	35.8	(45.2)	44.4	163	33.2	29.0	*	30.1	289
Haiti 2000	52.1	52.3	52.7	52.4	371	34.5	37.3	(64.2)	37.5	823
Nicaragua 2001	(56.0)	51.4	61.6	56.5	269	53.7	56.1	(55.6)	55.2	364
Peru 2000	*	37.4	38.0	38.0	653	36.2	34.6	26.9	33.1	687
Median	52.1	44.8	49.0	48.4		38.9	38.0	39.2	38.1	
Mean	53.1	45.2	44.9	45.5		40.1	39.5	43.0	39.7	

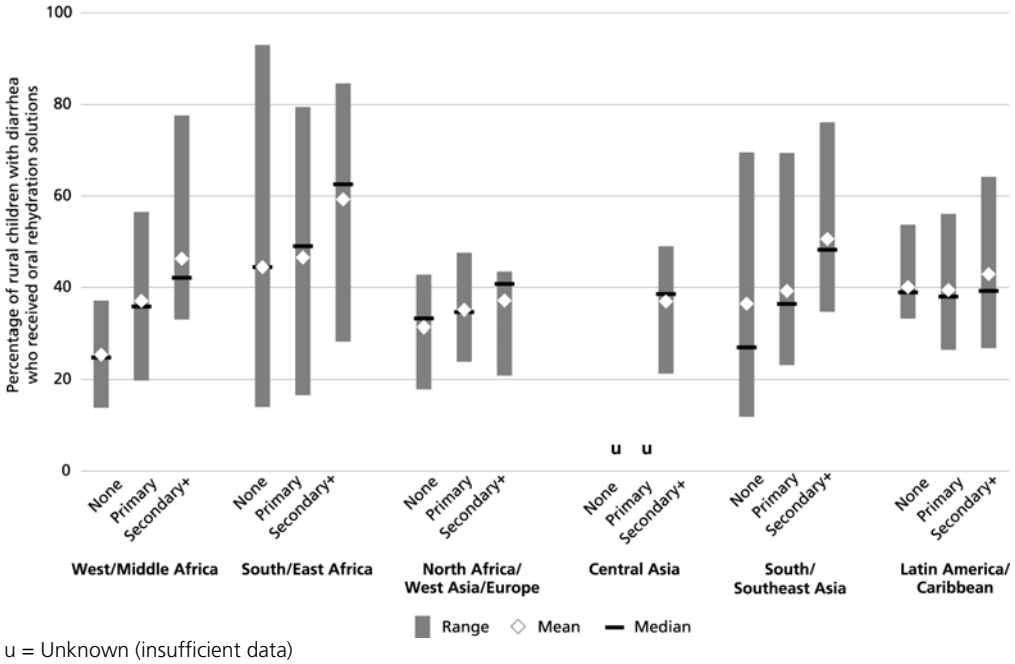
Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
u = Unknown (too few cases to calculate estimate)

Figure 3.11.1
Percentage of urban children under age three years with diarrhea in the two weeks preceding the survey who received oral rehydration solutions (ORS or RHF), by mother's education and region



u = Unknown (insufficient data)

Figure 3.11.2
Percentage of rural children under age three years with diarrhea in the two weeks preceding the survey who received oral rehydration solutions (ORS or RHF), by mother's education and region



u = Unknown (insufficient data)

Increasing Fluids and Continuing to Feed

Overall, these data support a positive association between maternal education and the recommended practice of increasing fluids and continuing to feed a child who has diarrhea in both urban and rural areas in most countries and regions.

The data support a positive association between maternal education and the recommended practice of increasing fluids and continuing to feed a child who has diarrhea.

Table 3.12 shows the percentage of sick children who were given both increased fluids and the same/about the same/more food than usual by residence and categories of mother's highest completed level of education. Data are again sparse in some categories, particularly for rural children of mothers with secondary or higher education in sub-Saharan African countries, and both urban and rural children of mothers with less than secondary education in Central Asian countries.

On the basis of available data for urban children, excluding entirely the Central Asia region, the regional average percentage of sick children who were given both more fluids and the same amount or more of food increases consistently with increasing level of mother's education in West/Middle Africa, South/Southeast Asia, and Latin America/Caribbean, as seen in Figure 3.12.1. On the basis of the available data for rural children, again excluding Central Asia, this same pattern is shown consistently in each of the remaining five regions (Figure 3.12.2).

The difference between the percentage of children offered both more fluids and the same amount or more food whose mothers have no formal education versus a secondary or higher education was computed, where possible, by urban and rural residence. In urban areas, sick children of mothers with no formal education are less likely than sick children of mothers with a secondary or higher education to be offered both more fluids and the same amount or more food by more than 20 percentage points in four countries (Chad, Côte d'Ivoire, Togo, and Haiti). A positive differential of equally large magnitude is observed in only one country, Rwanda (23 percentage points). In rural areas, a large negative differential exceeding 20 percentage points is observed in four countries (Cameroon, Malawi, Zimbabwe, and the Dominican Republic).

Table 3.12

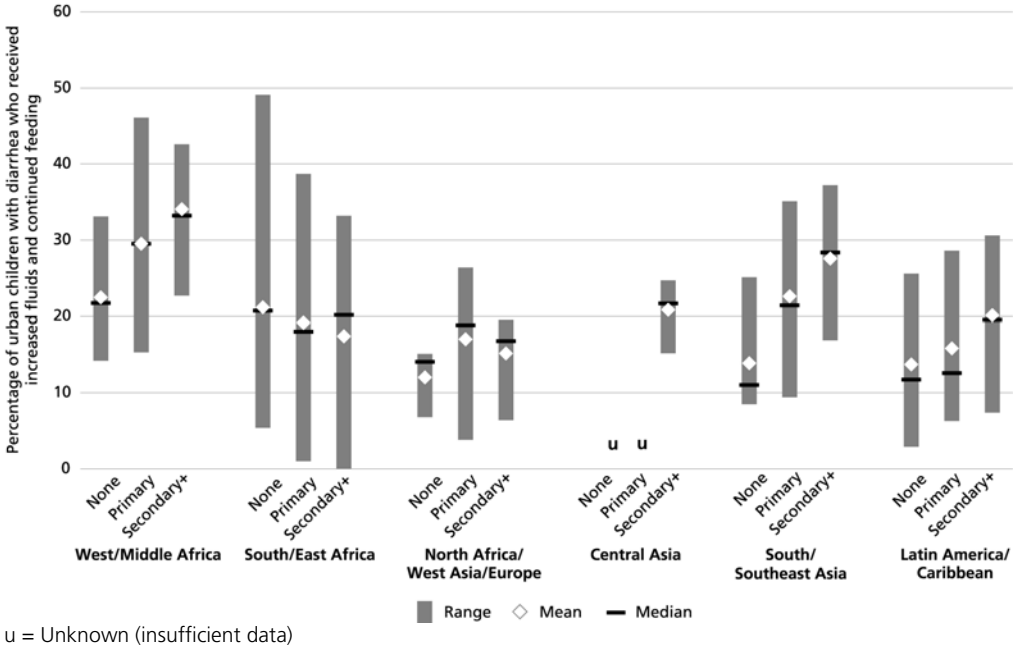
Percentage of children under age three with diarrhea in the two weeks preceding the survey who received both increased fluids and continued feeding, by residence and mother's education, Demographic and Health Surveys 1996-2002

	Urban					Rural				
	Highest level of education				Number of	Highest level of education				Number of
Survey	None	Primary	Secondary+	Total	children	None	Primary	Secondary+	Total	children
West/Middle Africa										
Benin 2001	19.4	(15.3)	*	17.5	129	16.4	16.1	*	16.5	340
Cameroon 1998	(25.8)	(35.7)	33.2	31.5	106	16.4	28.1	(40.5)	24.5	323
Chad 1996-97	19.7	35.6	42.4	28.1	228	15.1	16.5	*	15.4	786
Côte d'Ivoire 1998-99	21.7	(30.3)	(42.6)	28.6	85	14.6	(37.9)	*	20.2	234
Gabon 2000	*	46.1	40.0	43.2	381	*	30.3	(23.1)	29.7	112
Ghana 1998	(14.2)	*	(30.8)	27.9	90	19.4	16.6	20.6	19.0	302
Guinea 1999	23.7	(30.6)	(31.7)	26.6	179	18.3	(28.9)	*	18.9	609
Mali 2001	25.9	23.5	24.4	25.2	288	18.9	25.0	*	19.7	1,301
Mauritania 2000-01	21.2	29.6	22.7	24.4	320	18.1	(22.3)	*	18.0	333
Niger 1998	33.1	29.0	(35.1)	32.5	231	20.0	14.8	*	19.7	1,432
Nigeria 1999	24.0	(23.5)	(31.3)	26.6	124	24.3	18.2	23.1	22.8	366
Togo 1998	18.8	25.2	(40.7)	25.8	234	22.4	20.2	(35.0)	22.2	914
Median	21.7	29.6	33.2	27.3		18.3	21.2	23.1	19.7	
Mean	22.5	29.5	34.1	28.2		18.5	22.9	28.5	20.5	
South/East Africa										
Comoros 1996	(20.9)	*	*	20.0	70	23.6	(30.6)	*	24.1	174
Eritrea 2002	(13.1)	13.5	(22.1)	16.2	162	10.7	11.0	*	10.8	396
Ethiopia 2000	5.4	(1.0)	0.0	2.6	150	3.3	2.6	*	3.2	1,782
Kenya 1998	*	38.7	*	37.0	103	25.6	28.2	30.5	28.2	446
Madagascar 1997	*	15.2	33.2	23.0	212	19.5	13.4	20.8	16.1	746
Malawi 2000	(20.7)	22.2	(20.6)	21.6	171	21.3	27.6	(51.8)	26.3	1,439
Mozambique 1997	(49.1)	28.5	*	29.9	247	19.7	29.3	*	25.0	540
Namibia 2000	*	(15.1)	8.6	11.3	138	3.3	4.5	7.3	5.1	244
Rwanda 2000	(31.2)	8.4	(8.1)	12.7	117	5.5	8.8	(3.0)	7.3	853
South Africa 1998	*	(35.4)	23.2	26.5	207	28.1	18.0	17.3	18.9	301
Tanzania 1999	*	(21.0)	*	21.9	49	3.9	24.0	*	19.7	266
Uganda 2000-01	(7.9)	7.4	12.3	9.2	104	8.6	9.2	(16.3)	9.5	985
Zambia 2001-02	*	18.0	26.1	21.1	315	14.2	14.9	21.1	15.4	702
Zimbabwe 1999	*	(25.2)	(19.7)	21.4	111	6.8	17.6	27.7	20.1	261
Median	20.7	18.0	20.2	21.3		12.5	14.9	20.8	17.5	
Mean	21.2	19.2	17.4	19.6		13.9	17.1	21.8	16.4	
North Africa/West Asia/Europe										
Armenia 2000	*	*	(16.8)	(16.8)	38	*	*	20.6	19.9	50
Egypt 2000	(6.8)	(3.8)	6.4	6.1	208	3.3	5.3	3.3	3.6	422
Jordan 2002	*	(26.4)	15.8	16.5	529	*	(5.9)	14.6	13.3	174
Turkey 1998	15.1	16.4	17.3	16.3	414	15.7	19.7	(10.9)	17.9	327
Yemen 1997	14.1	21.4	19.5	16.6	486	9.2	11.8	(19.0)	9.7	1,858
Median	14.1	18.9	16.8	16.5		9.2	8.8	14.6	13.3	
Mean	12.0	17.0	15.2	14.5		9.4	10.7	13.7	12.9	
Central Asia										
Kazakhstan 1999	*	*	24.7	24.7	65	*	*	16.7	16.4	82
Kyrgyz Rep. 1997	*	*	(23.8)	(23.8)	38	*	*	10.8	10.8	156
Turkmenistan 2000	*	*	(19.6)	(20.6)	50	*	*	(13.1)	(12.9)	29
Uzbekistan 1996	*	*	(15.2)	(15.2)	35	*	*	(21.8)	(21.8)	33
Median	u	u	21.7	22.2		u	u	14.9	14.6	
Mean	u	u	20.8	21.1		u	u	15.6	15.5	
South/Southeast Asia										
Bangladesh 1999-00	(25.1)	(32.1)	(34.8)	31.2	61	15.0	20.8	(32.0)	20.0	258
Cambodia 2000	(10.3)	15.2	(29.1)	18.3	110	16.9	13.0	10.1	14.0	878
India 1998-99	11.7	9.4	19.7	15.2	1,338	11.1	11.4	16.7	12.3	4,464
Indonesia 1997	*	21.4	37.2	29.8	315	21.2	22.4	38.0	25.5	911
Nepal 2000	8.5	*	(16.9)	13.6	53	8.9	18.8	25.1	11.6	926
Philippines 1998	*	(35.1)	27.6	29.0	178	*	21.8	28.0	24.9	255
Vietnam 1997	*	*	*	*	15	*	11.9	26.5	20.2	163
Median	11.0	21.4	28.4	23.7		15.0	18.8	26.5	20.0	
Mean	13.9	22.6	27.5	22.9		14.6	17.2	25.2	18.4	
Latin America/Caribbean										
Bolivia 1998	*	28.6	30.6	30.5	512	23.4	23.8	26.5	24.2	437
Brazil 1996	(25.6)	23.3	20.5	21.9	326	(14.2)	9.1	*	12.9	118
Colombia 2000	*	7.7	17.1	13.2	314	*	9.7	(11.5)	9.2	165
Dominican Rep. 2002	(5.7)	12.2	18.5	14.7	736	2.6	10.1	29.7	14.6	427
Guatemala 1998-99	(11.7)	25.5	(7.4)	17.3	163	7.6	13.2	*	12.0	289
Haiti 2000	2.9	6.3	23.6	10.6	371	3.1	13.2	(1.7)	8.0	823
Nicaragua 2001	(22.9)	12.9	28.3	20.9	269	13.3	15.7	(18.8)	15.2	364
Peru 2000	*	10.4	15.2	14.0	653	10.5	14.0	15.0	13.8	687
Median	11.7	12.6	19.5	16.0		10.5	13.2	16.9	13.4	
Mean	13.8	15.9	20.1	17.9		10.7	13.6	17.2	13.7	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
u = Unknown (too few cases to calculate estimate)

Figure 3.12.1

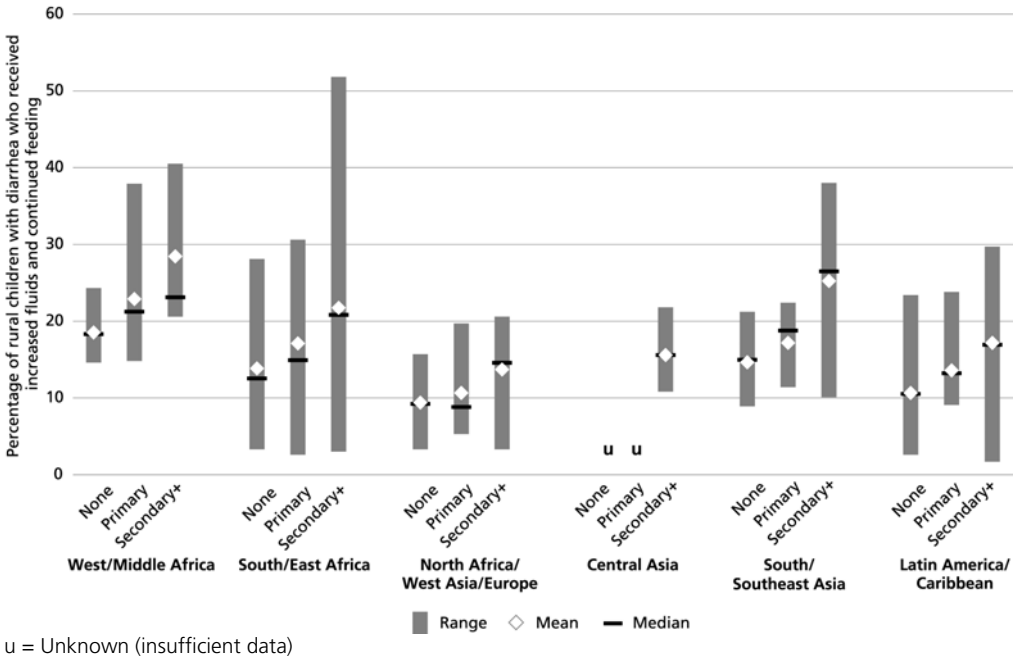
Percentage of urban children under age three years with diarrhea in the two weeks preceding the survey who received increased fluids and continued feeding, by mother's education and region



u = Unknown (insufficient data)

Figure 3.12.2

Percentage of rural children under age three years with diarrhea in the two weeks preceding the survey who received increased fluids and continued feeding, by mother's education and region



u = Unknown (insufficient data)

3.2.3 Diarrhea Treatment by Demographic Characteristics

3.2.3.1 Use of Oral Rehydration Solutions

Table 3.13 shows the percentage of children with diarrhea in the past two weeks who received oral rehydration solutions by child's sex, age in months, birth order, and mother's age.

Child's Sex

The regional average prevalence of use of oral rehydration solutions does not differ substantially by child's sex except in Central Asia. Intracountry differentials in the use of oral rehydration solutions for male versus female children with diarrhea are relatively small, with the exception of three countries. In Turkmenistan and Uzbekistan, males are more likely to receive the solutions by 10 and 17 percentage points, respectively, but the denominators are small for those estimates. In Haiti, females are more likely to receive the solutions by 10 percentage points.

The regional average prevalence of use of oral rehydration solutions does not differ substantially by child's sex except in Central Asia.

Child's Age

In Table 3.13, child's age in months is grouped into four categories: 0-5, 6-11, 12-23, and 24-35. With few exceptions, oral rehydration solutions are substantially less likely to be administered to infants age 0-5 months than older children.

In Central Asian countries, the data available for children with diarrhea by age categories are too sparse to compute acceptable regional prevalence estimates of use of oral rehydration solutions. Elsewhere, a consistent pattern emerges in which the prevalence of use of these solutions is lower at age 0-5 months than at older ages (Figure 3.13). In each region other than South/East Africa, the prevalence of use of these solutions declines in the third year of life.

Intracountry differentials in the use of oral rehydration solutions for sick children age 0-5 months versus those age 24-35 months are all negative with four exceptions. Three of the four positive differentials exceed 10 percentage points: Gabon (24), South Africa (12), and Haiti (12). Elsewhere, sick children age 0-5 months are less likely than sick children age 24-35 months to receive oral rehydration solutions by more than ten percentage points in 25 countries. The greatest differences are found in Eritrea, Bangladesh, and Indonesia.

With few exceptions, oral rehydration solutions are substantially less likely to be administered to infants age 0-5 months than older children.

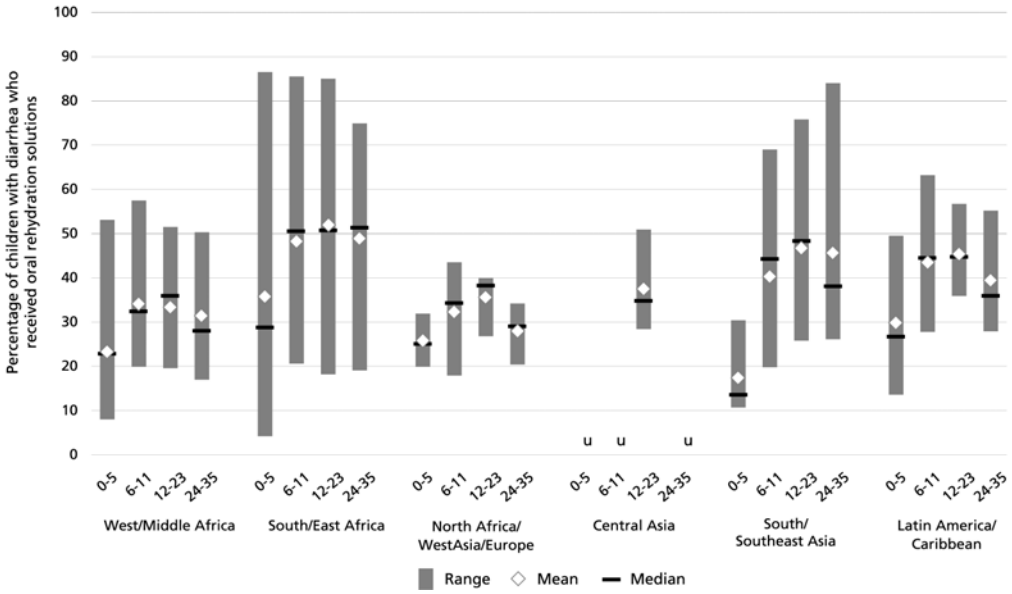
Table 3.13

Percentage of children under age three with diarrhea in the two weeks preceding the survey who received oral rehydration solutions (ORS or RHF), by child's sex, age, birth order, and mother's age, Demographic and Health Surveys 1996-2002

Survey	Child's sex		Child's age in months				Birth order				Mother's age			Total	Number of children
	Male	Female	0-5	6-11	12-23	24-35	1	2-3	4-5	6+	<20	20-34	35+		
West/Middle Africa															
Benin 2001	34.2	33.8	(8.0)	38.5	36.4	33.8	39.2	32.9	25.7	38.1	(26.8)	33.6	37.9	34.0	469
Burkina Faso 1998-99	19.2	17.7	15.5	19.9	19.6	17.0	21.8	19.0	20.5	14.6	18.0	19.3	15.9	18.5	806
Cameroon 1998	37.4	30.0	(21.6)	37.1	39.7	25.3	34.2	34.3	26.8	38.4	26.2	35.2	35.6	33.8	428
Chad 1996-97	29.0	28.0	17.0	25.9	33.1	30.3	29.6	26.3	25.3	33.2	23.9	27.9	34.3	28.5	1,014
Côte d'Ivoire 1998-99	30.1	27.8	*	28.4	34.5	20.3	27.3	35.3	35.4	15.3	(17.7)	34.6	(14.6)	28.9	319
Gabon 2000	39.2	36.2	(53.1)	38.6	38.6	28.7	35.6	39.9	43.8	30.2	33.0	39.9	33.6	37.7	493
Ghana 1998	33.3	31.5	(23.8)	31.2	38.5	26.7	30.1	38.6	33.2	27.0	*	33.0	28.4	32.5	391
Guinea 1999	42.0	39.7	22.9	47.8	43.9	41.0	45.9	36.2	42.1	41.3	41.1	41.2	39.5	40.9	788
Mali 2001	30.4	29.9	27.1	33.6	30.7	28.1	32.9	30.4	31.1	28.0	31.2	30.6	28.5	30.2	1,589
Mauritania 2000-01	37.3	34.2	26.6	28.5	37.9	45.2	36.6	39.2	35.0	32.0	(35.8)	37.5	30.7	35.8	653
Niger 1998	26.0	27.8	14.0	29.2	30.9	27.1	22.3	24.6	27.5	30.1	20.4	27.7	28.2	26.8	1,663
Nigeria 1999	47.7	54.6	(37.8)	57.5	51.5	50.3	53.4	52.7	44.9	54.0	(36.5)	52.5	52.9	51.1	490
Senegal 1997	33.6	31.9	23.1	33.8	30.5	42.1	23.4	32.1	38.1	34.8	18.0	34.0	34.9	32.7	771
Togo 1998	21.1	24.4	10.5	26.9	23.3	23.8	20.2	25.7	22.5	21.3	21.6	24.0	19.3	22.8	1,147
Median	33.5	30.8	22.9	32.4	35.5	28.4	31.5	33.6	32.2	31.1	25.0	33.8	32.2	32.6	
Mean	32.9	32.0	23.2	34.1	34.9	31.4	32.3	33.4	32.3	31.3	26.9	33.6	31.0	32.4	
South/East Africa															
Comoros 1996	33.3	29.8	(14.0)	31.0	43.2	(28.6)	(33.3)	33.8	41.5	21.8	*	31.2	29.4	31.6	244
Eritrea 2002	55.2	55.3	(24.0)	49.0	63.6	57.9	56.1	61.1	43.3	56.2	(68.2)	54.9	53.0	55.3	558
Ethiopia 2000	18.3	19.9	17.7	20.6	18.2	19.6	24.6	19.5	18.6	15.7	30.7	18.6	16.8	19.1	1,932
Kenya 1998	69.4	68.0	56.3	63.2	71.8	74.8	65.9	65.9	74.2	71.9	49.9	69.5	75.5	68.7	549
Madagascar 1997	23.5	23.3	9.6	22.5	25.2	26.8	25.9	24.9	16.9	25.0	15.5	22.7	32.7	23.4	957
Malawi 2000	48.3	49.2	35.1	50.6	52.5	44.9	52.3	49.6	52.2	40.8	46.3	50.8	41.1	48.8	1610
Mozambique 1997	44.6	53.3	34.3	59.8	47.9	47.4	39.9	50.9	54.9	44.2	40.3	51.5	43.7	48.6	787
Namibia 2000	62.3	59.4	(53.0)	49.8	66.4	65.3	60.0	60.5	70.3	48.3	(60.5)	60.5	62.2	60.9	382
Rwanda 2000	17.7	22.8	4.2	23.4	22.9	19.1	23.8	18.6	22.1	17.7	(15.0)	20.5	19.9	20.2	970
South Africa 1998	85.5	80.7	86.5	85.5	85.0	74.9	84.4	82.4	81.7	84.1	88.1	82.3	83.4	83.1	508
Tanzania 1999	55.9	55.5	(57.8)	63.8	49.5	54.6	50.3	49.3	62.8	63.5	(37.2)	53.2	72.0	55.7	315
Uganda 2000-01	46.1	40.4	23.0	44.8	48.5	43.2	35.2	47.1	42.7	44.3	30.9	45.7	40.8	43.4	1,088
Zambia 2001-02	55.2	54.0	48.1	50.3	57.7	54.4	52.8	58.4	52.4	52.7	50.2	57.4	44.7	54.6	1,018
Zimbabwe 1999	64.9	71.2	*	62.0	73.0	71.7	60.7	70.8	76.7	64.8	(55.5)	68.2	75.0	67.9	372
Median	51.8	53.7	29.2	50.1	51.0	50.9	51.3	50.3	52.3	46.3	46.3	52.4	44.2	51.7	
Mean	48.6	48.8	35.7	48.3	51.8	48.8	47.5	49.5	50.7	46.5	45.3	49.1	49.3	48.7	
North Africa/West Asia/ Europe															
Armenia 2000	38.7	(45.5)	*	*	(37.8)	*	(36.3)	(44.9)	*	*	*	44.3	*	41.3	88
Egypt 2000	38.3	36.8	31.9	41.5	39.5	34.2	35.6	39.1	39.4	34.8	(32.2)	38.4	36.6	37.6	630
Jordan 2002	23.9	20.7	19.9	17.9	26.8	20.4	19.4	26.0	15.7	27.7	(34.3)	21.4	23.7	22.3	703
Turkey 1998	26.6	31.5	23.8	26.3	34.0	25.0	28.8	30.5	29.2	19.9	26.4	30.0	20.6	28.8	740
Yemen 1997	37.9	35.3	27.3	43.5	39.9	32.1	39.2	35.0	37.5	36.3	36.8	36.7	36.3	36.6	2,344
Median	37.9	35.3	25.6	33.9	37.8	28.6		35.6	33.4	31.3	33.2	36.7	30.0	36.6	
Mean	33.1	34.0	25.7	32.3	35.6	27.9	31.9	35.1	30.5	29.7	32.4	34.2	29.3	33.3	
Central Asia															
Kazakhstan 1999	33.7	29.0	*	(37.2)	28.4	(33.0)	34.6	31.1	*	*	*	30.1	*	31.0	148
Kyrgyz Rep. 1997	44.1	43.6	*	(63.3)	38.8	(38.5)	37.0	46.2	(54.7)	*	*	43.5	(48.2)	43.9	194
Turkmenistan 2000	(58.5)	(48.8)	*	*	(50.9)	*	(37.3)	(65.1)	*	*	*	54.1	*	53.9	79
Uzbekistan 1996	(46.4)	(29.1)	*	*	(31.7)	*	(32.0)	(33.3)	*	*	*	35.3	*	37.1	69
Median	45.2	36.4	u	50.2	35.2	35.8	35.8	39.8	u	u	u	39.4	u	40.5	
Mean	45.7	37.6	u	50.2	37.5	35.8	35.2	43.9	u	u	u	40.8	u	41.5	
South/Southeast Asia															
Bangladesh 1999-00	69.8	75.6	(30.4)	69.0	75.8	84.0	72.3	74.0	66.7	(77.3)	78.3	71.1	(71.0)	72.5	319
Cambodia 2000	21.4	24.0	12.0	19.8	25.8	26.1	23.3	24.7	20.7	20.9	(25.0)	22.6	22.4	22.6	988
India 1998-99	29.2	28.9	16.0	28.1	33.9	30.4	30.9	30.6	25.5	23.9	25.1	30.1	24.4	29.0	5,802
Indonesia 1997	44.6	46.3	10.7	48.3	49.6	48.9	49.0	45.1	43.0	38.6	41.8	47.3	39.0	45.4	1,226
Nepal 2000	32.7	28.7	11.2	23.8	39.2	32.9	35.3	32.8	26.4	24.9	31.1	30.4	32.0	30.7	979
Philippines 1998	41.8	46.3	(23.9)	49.6	47.9	38.5	42.4	50.1	36.5	41.1	*	44.8	42.7	43.9	434
Vietnam 1997	54.6	45.3	*	43.8	54.8	(58.1)	55.3	48.0	*	*	*	52.1	*	50.8	178
Median	41.8	45.3	14.0	43.8	47.9	38.5	42.4	45.1	31.5	31.8	31.1	44.8	35.5	43.9	
Mean	42.0	42.2	17.4	40.3	46.7	45.6	44.1	43.6	36.5	37.8	40.3	42.6	38.6	42.1	
Latin America/Caribbean															
Bolivia 1998	49.6	45.5	26.3	45.7	53.1	47.1	48.1	45.9	51.5	45.8	43.0	47.9	48.3	47.6	948
Brazil 1996	50.8	57.7	49.5	62.8	53.0	50.7	56.6	53.6	49.1	57.1	65.2	53.7	41.1	54.3	444
Colombia 2000	33.1	31.2	14.9	29.5	36.2	35.3	28.1	31.2	44.9	(33.0)	28.1	31.7	40.3	32.3	479
Dominican Rep. 2002	35.6	30.5	27.8	31.2	37.1	30.4	29.1	34.0	41.6	34.6	36.7	32.6	28.7	33.2	1,163
Guatemala 1998-99	35.1	35.5	25.7	42.6	35.9	31.0	40.4	36.7	29.4	33.9	35.6	35.6	33.4	35.3	452
Haiti 2000	37.2	47.6	39.4	45.3	48.5	27.9	44.9	37.6	47.7	40.5	55.3	40.9	38.7	42.1	1,194
Nicaragua 2001	59.0	52.1	41.3	63.2	56.7	55.2	58.4	54.3	55.4	54.7	54.6	56.7	52.5	55.7	633
Peru 2000	35.6	35.3	13.6	27.8	41.9	37.3	33.1	34.4	41.3	35.8	29.4	37.2	32.4	35.5	1,340
Median	36.4	40.5	27.1	44.0	45.2	36.3	42.7	37.2	46.3	38.2	39.9	39.1	39.5	38.8	
Mean	42.0	41.9	29.8	43.5	45.3	39.4	42.3	41.0	45.1	41.9	43.5	42.0	39.4	42.0	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
u = Unknown (too few cases to calculate estimate)

Figure 3.13
Percentage of children under age three years with diarrhea in the two weeks preceding the survey who received oral rehydration solutions, by age in months and region



Birth Order

The regional average prevalence of use of oral rehydration solutions does not vary consistently with increasing birth order. Data is sparse in Central Asian countries for children with diarrhea who are of higher birth orders. Intracountry differentials in the prevalence of use of these solutions for sick children of birth order one versus birth order six and higher were computed where possible. The majority of these differentials are relatively small.

Mother's Age

For countries in Central Asia, there are insufficient data available for sick children whose mothers are either under 20 or over 34 years of age. Elsewhere, the regional average prevalence of use of oral rehydration solutions is higher among mothers age 20-34, except in Latin America/Caribbean, where regional averages are similar across age groups. However, a closer examination of the percentages across age groups within countries reveals a lot of inconsistency.

3.2.3.2 Increasing Fluids and Continuing to Feed

In Table 3.14, the percentage of children under three years of age who had diarrhea in the past two weeks and were given both more fluids than usual and the same amount or more food is tabulated by categories of child's sex, age in months, and birth order, and by mother's age. Differentials based on these percentages were computed for each country between males and females, children ages 6-11 months and 24-35 months, children of birth order one and birth order six or more, and children born to mothers under 20 and 35 or more years of age.

The regional average prevalence of following the recommendation to increase fluids and continue feeding does not differ substantially between male and female children with diarrhea.

Child's Sex

The regional average prevalence of following the recommendation to increase fluids and continue feeding does not differ substantially between male and female children with diarrhea. The differential between sexes reaches ten percentage points in only two countries. In Mauritania, the recommendation is followed for 26 percent of males and 16 percent of females with diarrhea, while in Guatemala, 9 percent of males and 19 percent of females are treated in this manner.

Child's Age

Similar to the findings regarding the use of oral rehydration solutions by child's age, the interpretation of treatment estimates for those age 0-5 months is problematic because of the ambiguity of asking the mother of an infant who is primarily breast- or bottlefed questions about increasing fluids and continuing to feed. An examination of Table 3.14 shows that, aside from this youngest age group, there is no consistent pattern of treatment by increasing age in the regional average prevalence of this combined recommended practice. In four countries (Ghana, Madagascar, Kyrgyz Republic, and Bolivia), children age 24-35 months are more likely by more than ten percentage points than children age 6-11 months to be offered more fluids and the same amount or more food during the diarrhea episode, while an equally large difference in the opposite direction is seen in only one country, Kazakhstan.

Birth Order

Likewise, the regional average prevalence of this recommended treatment does not reveal a consistent pattern associated with birth order. There are only four countries in which the percentage of sick children given more fluids and the same amount or more food is substantially larger (at least ten percentage points) for children of birth order one, compared with those of birth order six or higher: Eritrea, Mozambique, Tanzania, and Nepal.

Table 3.14

Percentage of children under age three with diarrhea in the two weeks preceding the survey who received both increased fluids and continued feeding, by child's sex, age, birth order, and mother's age, Demographic and Health Surveys 1996-2002

	Child's sex		Child's age in months				Birth order				Mother's age				Number of
Survey	Male	Female	0-5	6-11	12-23	24-35	1	2-3	4-5	6+	<20	20-34	35+	Total	children
West/Middle Africa															
Benin 2001	21.1	12.5	(10.5)	19.9	17.2	15.0	17.8	14.9	16.9	17.9	(19.0)	16.0	19.0	16.7	469
Cameroon 1998	28.2	24.2	(16.0)	31.1	25.0	29.4	28.3	26.4	26.2	24.1	26.7	25.7	28.2	26.2	428
Chad 1996-97	19.7	16.7	23.1	17.2	18.5	16.5	17.4	16.6	20.4	18.9	15.0	18.0	21.7	18.3	1,014
Côte d'Ivoire 1998-99	23.0	21.9	*	13.8	24.0	23.0	21.2	23.7	23.5	20.8	(21.6)	23.8	(17.1)	22.4	319
Gabon 2000	40.2	40.2	(40.7)	38.9	42.2	37.2	39.6	41.9	34.6	43.5	40.2	39.9	41.4	40.2	493
Ghana 1998	19.7	22.5	(17.4)	8.0	23.3	28.9	15.8	21.6	26.2	20.6	*	18.9	29.1	21.0	391
Guinea 1999	19.1	22.3	20.6	22.9	19.0	21.5	22.0	19.8	17.5	24.1	19.3	19.8	24.6	20.6	788
Mali 2001	18.6	23.1	15.2	23.3	18.7	24.0	19.4	18.1	27.6	19.3	15.8	21.9	19.4	20.7	1,589
Mauritania 2000-01	26.2	16.1	12.9	22.9	19.3	27.6	23.8	20.6	20.5	19.9	(32.9)	21.0	18.4	21.1	653
Niger 1998	24.1	18.5	21.7	20.6	21.2	22.6	22.6	21.1	21.7	21.1	20.6	22.2	19.7	21.5	1,663
Nigeria 1999	23.4	24.1	(24.1)	24.0	20.4	29.0	18.4	25.3	22.8	27.5	(20.2)	24.8	21.6	23.7	490
Togo 1998	22.9	23.0	16.4	24.9	20.6	27.0	24.2	19.1	25.2	24.5	17.7	23.5	22.8	22.9	1,147
Median	23.0	22.4	17.4	22.9	20.5	25.5	21.6	20.9	23.2	21.0	20.2	22.1	21.7	21.3	
Mean	23.9	22.1	19.9	22.3	22.5	25.1	22.5	22.4	23.6	23.5	22.6	23.0	23.6	22.9	
South/East Africa															
Comoros 1996	26.0	19.8	(27.9)	25.4	17.3	(24.5)	(21.4)	25.4	22.6	21.8	*	21.4	27.5	23.0	244
Eritrea 2002	14.6	9.5	(3.4)	11.2	12.6	15.4	19.8	13.9	7.3	8.9	(22.2)	12.8	9.1	12.4	558
Ethiopia 2000	3.2	3.2	1.7	2.5	2.5	5.3	3.9	4.3	2.1	2.3	3.2	3.2	3.3	3.2	1,932
Kenya 1998	29.6	30.1	26.9	28.7	27.0	38.0	34.3	32.3	20.5	27.9	37.6	27.4	37.6	29.8	549
Madagascar 1997	18.0	17.2	14.1	11.6	18.4	22.6	22.0	14.9	15.3	19.1	17.6	17.3	19.1	17.6	957
Malawi 2000	24.0	27.7	20.8	25.2	28.0	24.5	30.6	26.0	22.7	23.8	32.8	24.4	27.7	25.8	1,610
Mozambique 1997	29.8	22.9	14.7	27.0	29.9	25.5	34.7	24.2	27.7	21.6	15.3	29.8	22.1	26.6	787
Namibia 2000	8.0	6.7	(0.7)	3.1	12.3	5.4	5.2	8.3	8.7	7.6	(6.0)	8.7	3.5	7.4	382
Rwanda 2000	7.2	8.8	0.3	5.2	9.5	12.7	6.4	8.2	7.8	9.2	(6.1)	7.3	10.3	8.0	970
South Africa 1998	25.5	18.3	28.9	19.3	22.1	21.0	15.4	28.6	22.8	18.8	15.6	21.6	27.0	22.0	508
Tanzania 1999	23.3	15.9	(11.3)	20.1	17.5	29.0	21.6	22.7	23.5	11.1	(19.2)	19.9	21.2	20.1	315
Uganda 2000-01	7.4	11.8	0.5	8.8	10.4	13.5	9.9	7.3	9.8	11.7	7.9	9.2	12.0	9.5	1,088
Zambia 2001-02	18.7	15.6	4.3	18.5	15.2	22.9	16.2	16.5	15.7	21.3	15.9	16.7	21.1	17.2	1,018
Zimbabwe 1999	16.4	24.9	*	14.5	19.8	24.0	18.7	26.5	9.6	16.2	(15.7)	22.1	16.3	20.5	372
Median	18.4	16.6	17.6	16.5	17.4	22.8	19.3	19.6	15.5	17.5	15.7	18.6	20.1	18.9	
Mean	18.0	16.6	12.0	15.8	17.3	20.3	18.6	18.5	15.4	15.8	16.5	17.3	18.4	17.4	
North Africa/West Asia/Europe															
Armenia 2000	19.3	(17.5)	*	*	(16.1)	*	(12.7)	(24.0)	*	*	*	18.3	*	18.6	88
Egypt 2000	5.0	3.8	4.1	3.3	5.1	5.0	4.1	4.7	3.4	5.9	(2.2)	4.2	6.6	4.4	630
Jordan 2002	15.6	15.9	8.9	13.3	20.8	13.2	13.3	17.0	16.6	15.1	(15.0)	16.7	10.7	15.7	703
Turkey 1998	17.9	15.9	23.4	19.1	15.1	15.0	18.3	17.6	14.8	12.1	25.0	16.5	12.5	17.0	740
Yemen 1997	12.0	10.2	9.4	9.5	10.4	14.1	12.7	13.6	9.3	9.8	7.4	12.1	9.6	11.1	2,344
Median	15.6	15.9	9.2	11.4	15.1	13.7	12.7	17.0	12.1	11.0	11.2	16.5	10.2	15.7	
Mean	14.0	12.7	11.4	11.3	13.5	11.8	12.2	15.4	11.0	10.7	12.4	13.6	9.9	13.4	
Central Asia															
Kazakhstan 1999	21.6	18.9	*	(37.7)	14.5	(12.3)	14.8	27.6	*	*	*	21.8	*	20.1	148
Kyrgyz Rep. 1997	14.1	12.4	*	(2.3)	15.0	(20.3)	9.8	16.3	(13.7)	*	*	14.2	(13.5)	13.4	194
Turkmenistan 2000	(19.6)	(15.7)	*	*	(11.6)	*	(16.2)	(22.4)	*	*	*	17.5	*	17.7	79
Uzbekistan 1996	(26.9)	(11.2)	*	*	(24.4)	*	(14.4)	(27.0)	*	*	*	19.6	*	18.4	69
Median	20.6	14.0	u	20.0	14.8	16.3	14.6	24.7	u	u	u	18.6	u	18.1	
Mean	20.5	14.6	u	20.0	16.4	16.3	13.8	23.3	u	u	u	18.3	u	17.4	
South/Southeast Asia															
Bangladesh 1999-00	22.4	21.8	(6.0)	23.3	22.8	25.6	21.8	21.4	19.6	(29.7)	19.4	22.3	(27.8)	22.1	319
Cambodia 2000	14.5	14.6	10.1	15.9	12.7	17.6	20.0	12.8	16.6	10.6	(4.2)	16.0	12.3	14.5	988
India 1998-99	13.0	12.9	10.8	10.3	13.5	15.5	13.1	13.2	13.2	10.9	10.4	13.4	12.5	12.9	5,802
Indonesia 1997	25.9	27.4	16.4	26.7	26.1	30.2	23.1	31.4	21.4	26.6	18.0	27.4	27.8	26.6	1,226
Nepal 2000	14.4	9.2	1.3	9.9	14.0	14.9	19.3	11.7	9.6	5.2	12.7	12.1	9.2	11.7	979
Philippines 1998	26.0	27.3	(14.3)	27.6	27.9	28.9	19.7	31.6	23.1	29.1	*	25.5	32.0	26.6	434
Vietnam 1997	17.8	23.0	*	21.2	16.7	(17.0)	18.3	25.7	*	*	*	20.2	*	19.9	178
Median	17.8	21.8	10.4	21.2	16.7	17.6	19.7	21.4	18.1	18.8	12.7	20.2	20.2	19.9	
Mean	19.1	19.5	9.8	19.3	19.1	21.4	19.3	21.1	17.3	18.7	12.9	19.6	20.3	19.2	
Latin America/Caribbean															
Bolivia 1998	25.2	30.0	7.3	20.3	28.9	37.5	25.6	30.7	30.1	22.3	14.1	30.0	24.3	27.6	948
Brazil 1996	22.1	16.9	18.0	19.0	23.1	15.2	19.3	24.1	10.9	16.9	23.2	19.1	16.7	19.5	444
Colombia 2000	12.0	11.6	5.8	12.4	12.7	12.2	13.8	10.0	12.8	(11.1)	7.9	12.2	13.7	11.8	479
Dominican Rep. 2002	13.3	16.3	11.0	10.3	17.0	16.5	17.3	13.5	13.3	12.1	14.1	15.6	6.6	14.7	1,163
Guatemala 1998-99	9.3	19.4	8.6	13.4	15.2	13.8	7.6	18.6	13.4	14.0	11.2	13.7	16.7	13.9	452
Haiti 2000	9.3	8.3	3.0	8.4	11.1	8.2	10.3	7.2	10.1	8.4	7.9	8.8	9.3	8.8	1,194
Nicaragua 2001	20.3	14.7	6.5	22.6	17.9	18.3	14.7	18.9	19.5	18.2	12.8	19.2	17.3	17.6	633
Peru 2000	14.0	13.7	2.3	13.5	13.7	18.2	13.0	15.0	13.9	12.9	10.1	14.3	14.2	13.9	1,340
Median	13.7	15.5	6.9	13.5	16.1	15.9	14.3	16.8	13.4	13.5	12.0	15.0	15.5	14.3	
Mean	15.7	16.4	7.8	15.0	17.5	17.5	15.2	17.3	15.5	14.5	12.7	16.6	14.9	16.0	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
u = Unknown (too few cases to calculate estimate)

Mother's Age

There is an association between lower maternal age and lower adherence to the recommended treatment of giving more fluids and the same amount or more food to a young child with diarrhea.

There is an association between lower maternal age and lower adherence to the treatments recommended for young children with diarrhea.

Data are too sparse for countries in Central Asia to estimate the prevalence of this recommended treatment for children with diarrhea whose mothers are younger than 20 or older than 34 years old. Elsewhere, in every region except North Africa/West Asia/Europe, younger mothers under age 20 are less likely, on average, than mothers age 20 and above to follow this recommendation.

Within countries, most of the differentials in treatment prevalence between sick children with younger (<20) versus older (>34) mothers are negative. There are just three countries in which younger mothers are significantly more likely (by more than ten percentage points) than older mothers to follow these recommendations: Mauritania, Eritrea, and Turkey.

4

Acute Lower Respiratory Infection

4.1 Prevalence Levels and Differentials of ALRI Symptoms

4.1.1 Residence

Table 4.1 shows the percentage of children under age three years who, in the two weeks preceding the survey, experienced a cough accompanied by short, rapid breaths by place of residence and in total. While not a definitive diagnosis, these combined symptoms are associated with episodes of acute lower respiratory infection (ALRI), generally pneumonia or bronchiolitis.

The highest regional average prevalences of ALRI symptoms are found in Latin America/Caribbean, with a mean of 25 percent (range 11 to 43 percent), and in South/East Africa, with a mean of 22 percent (range 12 to 29 percent). Total prevalence of ALRI symptoms is lowest in countries of Central Asia, ranging from 1 to 4 percent. In all other countries except Jordan, at 7 percent, the total prevalence is 10 percent or higher.

The highest regional average prevalences of ALRI symptoms are found in Latin America/ Caribbean, with a mean of 25 percent, and in South/East Africa, with a mean of 22 percent.

Overall, young children in rural areas are slightly more likely than their urban counterparts to experience ALRI symptoms. Figure 4.1 shows the percentage of children with symptoms of ALRI by country and residence, arranged by region. The difference in prevalence of ALRI symptoms between urban and rural children within each country was computed. The majority of these differentials are negative, and most are small (less than five percentage points). ALRI symptoms are lower by ten or more percentage points in urban children in only three countries: Eritrea, Malawi, and Haiti.

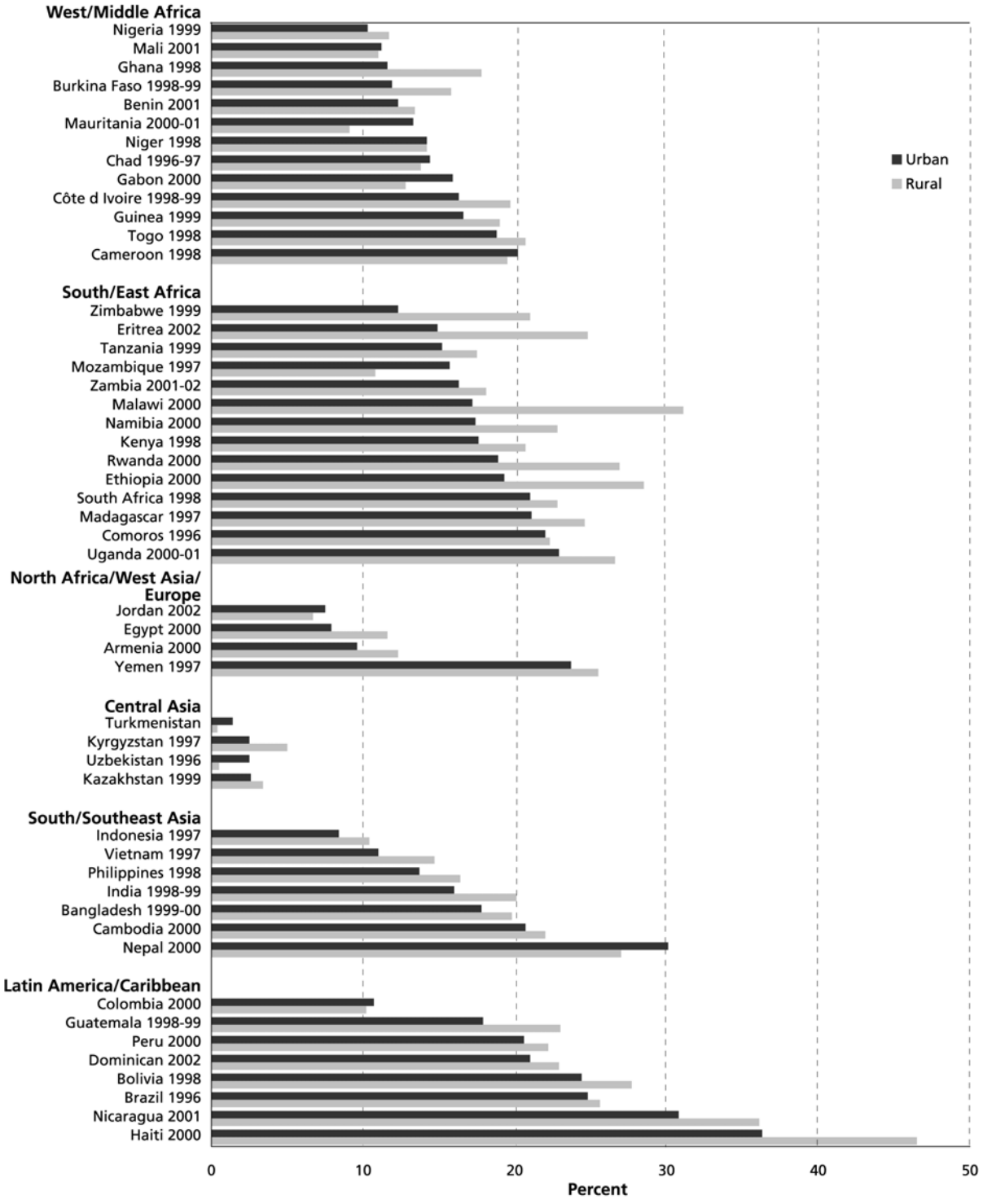
Table 4.1

Children under age three with symptoms of acute lower respiratory infection (ALRI) in the two weeks preceding the survey, by residence and age, Demographic and Health Surveys 1996-2002

Survey	Residence		Age in months						Total	Number of children
	Urban	Rural	0-5	6-11	12-17	18-23	24-29	30-35		
West/Middle Africa										
Benin 2001	12.3	13.4	10.8	15.9	15.2	14.8	11.4	10.0	13.0	2,912
Burkina Faso1998-99	11.9	15.8	13.7	17.4	19.7	18.0	12.5	10.9	15.4	3,219
Cameroon 1998	20.2	19.5	19.0	28.3	20.6	18.7	13.2	17.5	19.7	2,260
Chad 1996-97	14.4	13.8	13.2	14.4	16.2	14.5	10.8	14.9	13.9	3,938
Côte d'Ivoire 1998-99	16.3	19.7	9.1	22.2	22.2	20.6	16.2	18.9	18.6	1,221
Gabon 2000	15.9	12.8	14.6	17.5	15.8	16.4	13.8	11.8	15.1	2,324
Ghana 1998	11.6	17.8	12.4	20.6	15.3	18.5	14.2	16.0	16.2	1,802
Guinea 1999	16.6	19.0	17.5	25.4	20.9	19.0	12.7	17.0	18.3	3,005
Mali 2001	11.2	11.0	9.1	13.1	12.4	11.1	12.0	8.2	11.0	6,973
Mauritania 2000-01	13.3	9.1	10.2	17.0	9.3	10.7	10.3	6.2	10.9	2,796
Niger 1998	14.2	14.2	16.7	17.6	14.9	11.8	11.9	10.2	14.2	4,403
Nigeria 1999	10.3	11.7	7.5	13.0	13.2	13.3	11.3	9.2	11.3	3,208
Togo 1998	18.8	20.7	19.4	24.6	24.2	22.3	15.0	15.5	20.2	3,693
Median	14.2	14.2	13.2	17.5	15.8	16.4	12.5	11.8	15.1	
Mean	14.4	15.3	13.3	19.0	16.9	16.1	12.7	12.8	15.2	
South/East Africa										
Comoros 1996	22.0	22.3	19.5	24.5	26.3	18.3	26.7	16.4	22.3	1,056
Eritrea 2002	14.9	24.8	17.3	24.4	24.7	21.5	20.3	21.4	21.5	3,281
Ethiopia 2000	19.3	28.5	23.3	33.1	29.3	28.3	27.8	22.9	27.6	6,412
Kenya 1998	17.6	20.7	15.5	21.3	23.2	20.7	20.4	18.9	20.1	3,205
Madagascar 1997	21.1	24.6	22.3	28.9	29.4	19.5	22.3	18.9	23.9	3,537
Malawi 2000	17.2	31.1	29.2	34.8	30.2	28.1	27.7	25.0	29.3	6,862
Mozambique 1997	15.7	10.8	10.7	11.2	13.6	9.7	15.4	9.5	11.8	3,803
Namibia 2000	17.4	22.8	15.8	26.0	28.5	18.8	17.2	18.2	20.9	2,346
Rwanda 2000	18.9	26.9	25.8	33.2	28.0	21.4	19.5	20.6	25.7	4,293
South Africa 1998	21.0	22.8	20.8	24.9	24.8	22.7	18.7	19.2	21.9	2,912
Tanzania 1999	15.2	17.5	12.3	26.1	22.3	16.9	13.0	11.6	17.1	1,817
Uganda 2000-01	22.9	26.6	22.1	32.8	29.4	27.5	23.6	19.4	26.2	4,245
Zambia 2001-02	16.3	18.1	16.5	21.4	18.5	17.5	16.8	14.2	17.5	3,681
Zimbabwe 1999	12.3	21.0	13.8	20.6	20.4	20.8	22.4	11.0	18.1	2,029
Median	17.5	22.8	18.4	25.5	25.6	20.8	20.4	18.9	21.7	
Mean	18.0	22.8	18.9	25.9	24.9	20.8	20.8	17.7	21.7	
North Africa/West Asia/Europe										
Armenia 2000	9.6	12.3	6.4	10.7	9.6	10.4	14.3	14.5	10.9	880
Egypt 2000	7.9	11.6	8.3	12.5	11.6	10.3	9.2	9.2	10.2	6,741
Jordan 2002	7.5	6.7	4.9	10.2	8.8	7.1	6.7	5.6	7.4	3,454
Yemen 1997	23.7	25.5	22.6	28.5	28.4	24.3	24.1	21.9	25.1	7,056
Median	8.8	12.0	7.4	11.6	10.6	10.4	11.8	11.9	10.6	
Mean	12.2	14.0	10.6	15.5	14.6	13.0	13.6	12.8	13.4	
Central Asia										
Kazakhstan 1999	2.6	3.4	0.9	1.9	4.1	5.2	4.0	1.7	3.1	788
Kyrgyz Rep. 1997	2.5	5.0	2.2	10.7	5.6	1.5	1.8	4.6	4.4	1,104
Turkmenistan 2000	1.4	0.4	0.5	0.3	1.6	0.0	0.8	1.5	0.8	1,968
Uzbekistan 1996	2.5	0.5	0.3	1.9	2.0	1.1	1.0	0.2	1.2	1,325
Median	2.5	2.0	0.7	1.9	3.1	1.3	1.4	1.6	2.2	
Mean	2.3	2.3	1.0	3.7	3.3	2.0	1.9	2.0	2.4	
South/Southeast Asia										
Bangladesh 1999-00	17.8	19.8	21.8	20.6	22.5	19.4	18.0	12.9	19.5	3,927
Cambodia 2000	20.7	22.0	14.6	27.3	24.3	23.6	21.2	20.6	21.8	4,232
India 1998-99	16.0	20.1	16.4	23.7	21.9	17.7	19.0	15.9	19.1	30,668
Indonesia 1997	8.4	10.4	6.7	12.2	11.1	11.2	7.9	10.0	9.9	9,322
Nepal 2000	30.1	27.0	28.1	36.3	30.9	24.6	23.0	20.1	27.2	3,840
Philippines 1998	13.7	16.4	10.8	14.2	17.4	18.8	17.5	12.0	15.2	4,415
Vietnam 1997	11.0	14.7	8.9	11.8	19.2	15.4	11.0	17.4	14.2	1,769
Median	16.0	19.8	14.6	20.6	21.9	18.8	18.0	15.9	19.1	
Mean	16.8	18.6	15.3	20.9	21.0	18.7	16.8	15.6	18.1	
Latin America/Caribbean										
Bolivia 1998	24.4	27.7	17.9	29.7	27.5	26.6	25.5	26.5	25.8	3,826
Brazil 1996	24.8	25.6	16.5	27.0	28.0	27.2	25.1	25.6	25.0	2,757
Colombia 2000	10.7	10.2	8.5	12.2	12.0	11.3	8.8	10.4	10.6	2,725
Dominican Rep. 2002	21.0	22.9	20.0	24.8	20.8	24.6	20.5	19.1	21.7	6,395
Guatemala 1998-99	17.9	23.0	20.7	24.5	25.6	19.7	18.2	17.5	21.1	2,618
Haiti 2000	36.3	46.5	37.1	50.1	43.9	46.7	39.1	40.7	43.2	3,645
Nicaragua 2001	30.8	36.1	22.6	36.0	40.9	34.2	34.4	30.8	33.4	3,807
Peru 2000	20.6	22.2	16.5	24.3	22.4	23.6	21.8	19.0	21.3	6,790
Median	22.7	24.3	19.0	25.9	26.6	25.6	23.5	22.4	23.4	
Mean	23.3	26.8	20.0	28.6	27.6	26.7	24.2	23.7	25.3	

Figure 4.1

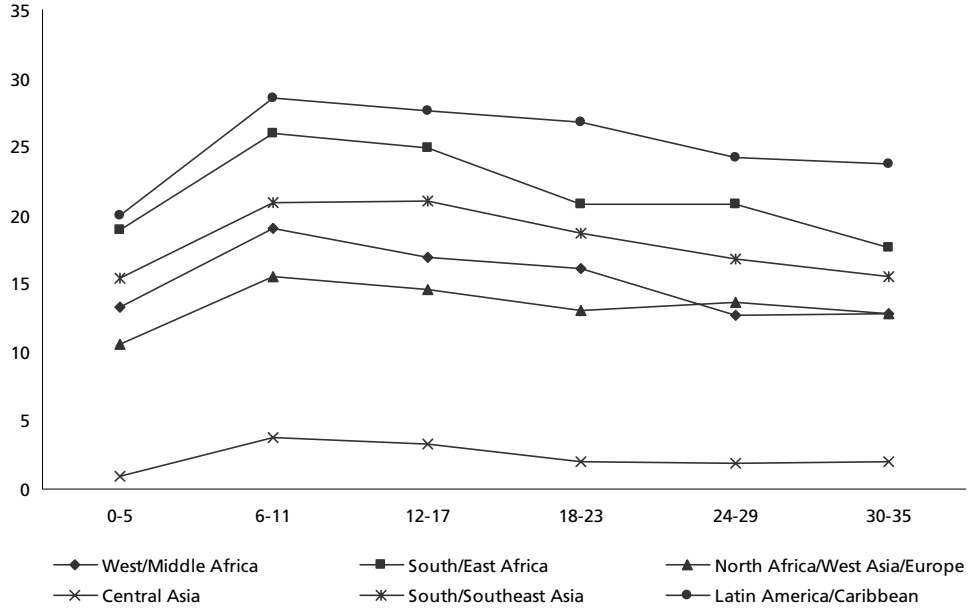
Percentage of children under age three years with symptoms of ALRI in the two weeks preceding the survey, by residence



4.1.2 Child's Age

The two-week period prevalence of ALRI symptoms by six-month age groups is also tabulated in Table 4.1. The regional mean prevalences by age are displayed graphically in Figure 4.2. In each region, the mean prevalence is lowest in the youngest infants (age 0-5 months), peaks from age 6-17 months, then begins to decline. The mean prevalence by age 30-35 months is about the same or slightly higher than at age 0-5 months.

Figure 4.2
Mean percentage of children under age three years with symptoms of ALRI in the two weeks preceding the survey, by age in months



4.1.3 Socioeconomic Characteristics

Residence and Wealth Index

There is a negative association between household wealth and the probability of recent ALRI symptoms in young children in both urban and rural settings.

A largely consistent and significant negative association is demonstrated between household wealth and the probability of recent ALRI symptoms in young children in both urban and rural settings.

Table 4.2 summarizes the period prevalence of ALRI symptoms by residence and three categories of the country-specific household wealth index distribution. Data are sparse for countries in Central Asia in the category of urban children in the lowest 40 percent and in both Central Asia and Latin America/Caribbean in the category of rural children in the highest 20 percent of the household wealth index distribution. Otherwise, with the exception of West/Middle Africa, there is a consistent pattern of decreasing regional average prevalence of ALRI symptoms by increasing household wealth for both urban and rural children.

Table 4.2

Percentage of children under age three with symptoms of acute lower respiratory infection (ALRI) in the two weeks preceding the survey, by residence and wealth index, Demographic and Health Surveys 1996-2002

	Urban					Rural				
	Household wealth index				Number	Household wealth index				Number
Survey	Lowest 40%	Middle 40%	Highest 20%	Total	of children	Lowest 40%	Middle 40%	Highest 20%	Total	of children
West/Middle Africa										
Benin 2001	11.2	13.8	11.4	12.3	931	12.8	14.5	10.2	13.4	1,981
Burkina Faso 1998-99	*	(25.3)	11.3	11.9	346	17.1	14.1	17.5	15.8	2,872
Cameroon 1998	(12.0)	23.8	17.7	20.2	622	19.1	21.4	10.9	19.5	1,639
Chad 1996-97	7.6	13.3	15.2	14.4	865	11.8	15.9	21.0	13.8	3,073
Côte d'Ivoire 1998-99	*	15.9	14.9	15.5	362	22.6	14.8	*	18.7	729
Gabon 2000	16.5	16.9	12.6	15.9	1,697	13.2	10.1	*	12.8	627
Ghana 1988	*	11.8	10.8	11.6	459	17.6	17.0	(29.0)	17.8	1,343
Guinea 1999	*	17.6	16.1	16.6	795	18.8	19.2	(19.0)	19.0	2,210
Mali 2001	18.7	7.7	12.1	11.2	1,706	10.7	11.1	14.2	11.0	5,265
Mauritania 2000-01	10.1	13.8	13.2	13.3	1,189	8.2	12.0	(0.0)	9.1	1,606
Niger 1998	*	15.2	14.2	14.2	733	14.1	14.7	10.1	14.2	3,671
Togo 1998	14.6	20.7	17.9	18.8	865	21.0	20.2	19.1	20.7	2,828
Median	12.0	15.6	13.7	14.3		15.6	14.8	15.8	15.0	
Mean	13.0	16.3	13.9	14.7		15.6	15.4	15.1	15.5	
South/East Africa										
Comoros 1996	20.5	24.2	20.9	22.0	255	25.8	18.9	18.1	22.3	801
Eritrea 2002	(13.3)	18.5	11.5	14.9	1,097	24.8	24.6	*	24.8	2,184
Ethiopia 2000	*	13.0	19.9	19.3	649	26.2	30.8	28.9	28.5	5,762
Kenya 1998	(12.1)	26.1	13.5	17.6	600	22.4	18.8	18.0	20.7	2,606
Madagascar 1997	28.0	23.9	15.7	21.1	704	26.4	23.1	16.5	24.6	2,833
Malawi 2000	22.6	24.7	14.6	17.2	890	29.9	33.4	28.4	31.2	5,967
Mozambique 1997	*	16.4	15.7	15.7	806	11.7	8.7	16.7	10.8	2,996
Namibia 2000	30.1	17.7	15.4	17.4	810	23.8	22.3	10.6	22.8	1,536
Rwanda 2000	(28.9)	22.3	17.6	18.9	690	28.4	26.5	22.9	26.9	3,604
South Africa 1998	21.5	21.5	19.5	21.0	1,422	23.5	19.5	(30.1)	22.8	1,490
Tanzania 1999	(10.6)	17.9	14.6	15.2	354	16.3	18.6	20.1	17.5	1,463
Uganda 2000-01	(13.2)	23.5	23.1	22.9	486	27.9	26.0	21.6	26.6	3,759
Zambia 2001-02	*	21.7	9.8	16.3	1,124	18.7	17.1	16.5	18.1	2,556
Zimbabwe 1999	*	12.0	12.2	12.3	668	21.4	20.5	*	21.0	1,361
Median	21.0	21.6	15.6	17.5		24.3	21.4	19.1	22.8	
Mean	20.1	20.2	16.0	18.0		23.4	22.1	20.7	22.8	
North Africa/West Asia/Europe										
Armenia 2000	6.5	9.7	10.4	9.6	453	13.1	8.5	*	12.3	427
Egypt 2000	12.3	7.9	6.9	7.9	2,625	13.0	9.8	6.0	11.6	4,116
Jordan 2002	8.7	6.7	5.9	7.5	2,680	6.9	6.6	4.8	6.7	774
Yemen 1997	(23.1)	25.7	22.5	23.7	1,631	27.6	24.3	14.8	25.5	5,425
Median	10.5	8.8	8.7	8.8		13.1	9.2	6.0	12.0	
Mean	12.6	12.5	11.4	12.2		15.1	12.3	8.5	14.0	
Central Asia										
Kazakhstan 1999	*	2.2	1.9	2.6	326	3.7	2.5	*	3.4	462
Kyrgyz Rep. 1997	(2.8)	2.8	2.1	2.5	253	5.7	3.9	(4.3)	5.0	851
Turkmenistan 2000	0.0	1.6	1.7	1.4	769	0.4	0.3	*	0.4	1,192
Uzbekistan 1996	0.0	1.3	5.0	2.5	414	0.6	0.5	(0.0)	0.5	911
Median	0.0	1.9	2.0	2.5		2.2	1.5	2.2	2.0	
Mean	0.9	2.0	2.7	2.3		2.6	1.8	2.2	2.3	
South/Southeast Asia										
Bangladesh 1999-00	26.5	18.8	14.2	17.8	644	21.5	18.1	16.5	19.8	3,283
Cambodia 2000	18.1	20.7	22.0	20.7	552	22.3	22.4	18.0	22.0	3,680
India 1998-99	20.7	18.3	13.0	16.0	6,928	21.1	19.2	15.7	20.1	23,741
Indonesia 1997	8.3	10.2	6.3	8.4	2,624	10.6	10.4	9.1	10.4	6,698
Nepal 2000	(20.7)	34.3	30.1	30.1	237	26.3	28.2	25.1	27.0	3,603
Philippines 1998	15.8	14.2	10.4	13.7	2,049	16.7	17.0	8.2	16.4	2,366
Vietnam 1997	*	9.8	10.6	11.0	255	16.0	13.5	9.1	14.7	1,513
Median	19.4	18.3	13.0	16.0		21.1	18.1	15.7	19.8	
Mean	18.4	18.0	15.2	16.8		19.2	18.4	14.5	18.6	
Latin America/Caribbean										
Bolivia 1998	28.4	23.4	23.5	24.4	2,219	28.3	24.0	*	27.7	1,606
Brazil 1996	30.4	22.1	19.0	24.8	2,104	25.4	27.6	*	25.6	653
Colombia 2000	15.3	9.9	7.0	10.7	1,863	10.2	9.3	*	10.2	862
Guatemala 1998-99	19.8	18.4	15.6	17.9	991	23.5	22.5	(19.9)	23.0	1,627
Haiti 2000	54.1	38.8	32.5	36.3	1203	49.5	42.1	(23.5)	46.5	2,442
Nicaragua 2001	40.0	32.2	23.6	30.8	1931	37.6	30.4	*	36.1	1,875
Peru 2000	23.2	21.1	17.1	20.6	3744	22.6	19.1	*	22.2	3,046
Median	28.4	22.1	19.0	24.4		25.4	24.0	21.7	25.6	
Mean	30.2	23.7	19.8	23.6		28.2	25.0	21.7	27.3	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

These patterns are supported by the differentials in prevalence between children in the lowest versus the highest categories of wealth index by residence. Among urban children, 14 of the 37 differentials are positive by more than five percentage points, 7 of which are positive by more than ten percentage points. There are four notable exceptions for which urban children from households in the lowest 40 percent of the wealth index distribution are less likely to experience ALRI symptoms than their wealthier counterparts by five to ten percentage points: Cameroon, Chad, Uganda, and Nepal. [1]

Similarly, among rural children, 13 of the 36 differentials by wealth category are positive by more than five percentage points. The largest such difference is seen in Haiti, where the period prevalence of ALRI symptoms is 50 percent versus 24 percent among children from the lowest versus the highest wealth categories.

Residence and Mother's Education

The period prevalence of symptoms of ALRI by residence and mother's education (highest level completed) is shown in Table 4.3. In Central Asia, very few mothers have not completed at least one year of secondary school, resulting in sparse data in the first two education categories.

Lower mother's education is more consistently associated with an increased probability of recent ALRI symptoms in young children in urban areas than in rural areas.

Lower mother's education is more consistently associated with an increased probability of recent ALRI symptoms in young children in urban areas than in rural areas.

Looking at regional average prevalence by level of education, prevalence of ALRI symptoms among urban children decreases with increasing maternal education in South/East Africa, South/Southeast Asia, and Latin America/Caribbean. Seventeen of the 42 intracountry differentials computed for urban children whose mothers have no completed years of education versus one or more completed years of secondary education are positive values exceeding five percentage points, in comparison with six negative values of the same magnitude found in Burkina Faso, Côte d'Ivoire, and Gabon in West/Middle Africa, and in Ethiopia, Kenya, and Tanzania in South/East Africa.[2]

In rural areas, the average prevalence decreases most strongly in the Latin America/Caribbean region. The intracountry differences in ALRI symptom prevalence between rural children with mothers in the lowest versus the highest education categories were computed. These differentials exceed positive five percentage points in just 8 out of 42 countries, 4 of which are in Latin America/Caribbean (Brazil, the Dominican Republic, Guatemala, and Nicaragua).

[1] In Cameroon, Uganda, and Nepal, the number of urban children in these samples from households in the lowest wealth category is less than 50.

[2] In Kenya, the number of urban children whose mothers fall within the lowest category of maternal education is less than 50.

Table 4.3

Percentage of children under age three with symptoms of acute lower respiratory infection (ALRI) in the two weeks preceding the survey, by residence and mother's education, Demographic and Health Surveys 1996-2002

	Urban					Rural				
	Highest level of education					Highest level of education				
Survey	None	Primary	Secondary+	Total	Number of children	None	Primary	Secondary+	Total	Number of children
West/Middle Africa										
Benin 2001	14.0	12.4	7.0	12.3	931	13.0	14.7	16.2	13.4	1,981
Burkina Faso 1998-99	10.4	10.4	17.2	11.9	346	15.8	16.3	*	15.8	2,872
Cameroon 1998	27.6	19.4	17.2	20.2	622	19.0	19.6	19.9	19.5	1,639
Chad 1996-97	14.0	14.0	17.1	14.4	865	13.0	16.8	*	13.8	3,073
Côte d'Ivoire 1998-99	13.3	17.9	22.4	16.3	412	20.0	19.8	*	19.7	809
Gabon 2000	6.3	15.2	17.5	15.9	1,697	(13.1)	14.3	9.7	12.8	627
Ghana 1988	17.8	8.6	10.5	11.6	459	17.7	18.2	17.7	17.8	1,343
Guinea 1999	17.6	15.0	14.4	16.6	795	19.0	17.7	(21.1)	19.0	2,210
Mali 2001	10.8	10.0	14.4	11.2	1,706	11.0	10.7	10.2	11.0	5,267
Mauritania 2000-01	13.2	13.3	13.4	13.3	1,189	9.6	7.1	(8.0)	9.1	1,606
Niger 1998	13.5	16.7	13.7	14.2	733	14.6	10.4	(2.6)	14.2	3,671
Nigeria 1999	10.1	8.5	11.4	10.3	896	11.8	12.0	11.2	11.7	2,312
Togo 1998	19.6	21.0	13.3	18.8	865	20.7	20.6	20.1	20.7	2,828
Median	13.5	14.0	14.4	14.2		14.6	16.3	13.7	14.2	
Mean	14.5	14.0	14.6	14.4		15.3	15.2	13.7	15.3	
South/East Africa										
Comoros 1996	22.3	18.5	23.9	22.0	255	23.2	19.8	22.6	22.3	801
Eritrea 2002	18.5	16.4	10.7	14.9	1,097	24.6	25.0	(29.4)	24.8	2,184
Ethiopia 2000	17.4	17.2	22.8	19.3	649	28.6	28.2	27.0	28.5	5,762
Kenya 1998	(5.6)	21.5	14.5	17.6	600	20.7	21.1	19.5	20.7	2,606
Madagascar 1997	18.6	25.4	17.5	21.1	704	28.3	23.9	21.2	24.6	2,833
Malawi 2000	12.4	18.8	16.3	17.2	891	28.2	32.6	33.2	31.1	5,972
Mozambique 1997	20.3	16.0	4.1	15.7	806	10.2	11.7	(0.5)	10.8	2,996
Namibia 2000	23.9	22.8	14.7	17.4	810	19.0	26.4	20.8	22.8	1,536
Rwanda 2000	27.5	20.5	14.5	18.9	690	25.8	28.4	19.4	26.9	3,604
South Africa 1998	(19.8)	23.3	20.4	21.0	1,422	20.8	21.6	24.0	22.8	1,490
Tanzania 1999	12.7	15.1	17.9	15.2	354	17.0	17.8	16.7	17.5	1,463
Uganda 2000-01	17.4	26.6	19.3	22.9	486	27.0	26.7	24.9	26.6	3,758
Zambia 2001-02	(27.2)	18.7	12.5	16.3	1,124	19.9	18.0	15.8	18.1	2,556
Zimbabwe 1999	*	9.0	13.4	12.3	668	24.6	20.0	21.6	21.0	1,361
Median	18.6	18.8	15.5	17.5		23.9	22.8	21.4	22.8	
Mean	18.7	19.3	15.9	18.0		22.7	22.9	21.2	22.8	
North Africa/West Asia/Europe										
Armenia 2000	*	*	9.6	9.6	453		*	12.2	12.3	427
Egypt 2000	9.0	9.2	7.3	7.9	2,625	13.8	8.9	9.7	11.6	4,116
Jordan 2002	4.4	8.8	7.5	7.5	2,680	10.4	9.1	5.8	6.7	774
Yemen 1997	25.4	25.7	17.3	23.7	1,631	25.3	27.7	22.9	25.5	5,425
Median	9.0	9.2	8.6	8.8		13.8	9.1	11.0	12.0	
Mean	12.9	14.6	10.4	12.2		16.5	15.2	12.6	14.0	
Central Asia										
Kazakhstan 1999	*	*	2.6	2.6	327	*	*	3.4	3.4	462
Kyrgyz Rep. 1997	*	*	2.5	2.5	253	*	*	5.0	5.0	851
Turkmenistan 2000	*	*	1.3	1.4	775	*	*	0.4	0.4	1,192
Uzbekistan 1996	*	*	2.5	2.5	414	*	*	0.5	0.5	911
Median	u	u	2.5	2.5		u	u	2.0	2.0	
Mean	u	u	2.2	2.3		u	u	2.3	2.3	
South/Southeast Asia										
Bangladesh 1999-00	20.7	19.1	14.6	17.8	644	21.2	19.3	17.5	19.8	3,283
Cambodia 2000	25.0	19.7	18.9	20.7	552	21.9	22.1	21.5	22.0	3,680
India 1998-99	19.2	17.0	14.0	16.0	6,925	20.8	19.8	18.4	20.1	23,733
Indonesia 1997	9.4	7.4	8.9	8.4	2,624	8.9	11.2	9.3	10.4	6,698
Nepal 2000	30.5	41.5	25.6	30.1	237	26.7	29.9	25.0	27.0	3,603
Philippines 1998	*	13.3	13.6	13.7	2,049	10.8	19.4	14.3	16.4	2,366
Vietnam 1997	*	12.3	10.6	11.0	255	10.7	16.5	14.3	14.7	1,513
Median	20.7	17.0	14.0	16.0		20.8	19.4	17.5	19.8	
Mean	21.0	18.6	15.2	16.8		17.3	19.7	17.2	18.6	
Latin America/Caribbean										
Bolivia 1998	33.6	24.6	23.7	24.4	2,219	28.1	27.9	26.2	27.7	1,606
Brazil 1996	29.9	29.1	22.3	24.8	2,104	29.4	26.9	20.5	25.6	653
Colombia 2000	(19.5)	12.4	9.9	10.7	1,863	9.3	11.5	6.9	10.2	862
Dominican Rep. 2002	15.5	23.2	19.5	21.0	4,192	29.2	24.0	19.7	22.9	2,204
Guatemala 1998-99	17.4	18.1	17.9	17.9	991	23.1	24.3	11.3	23.0	1,627
Haiti 2000	31.8	39.7	34.2	36.3	1,203	47.6	45.8	45.0	46.5	2,442
Nicaragua 2001	38.4	35.1	27.3	30.8	1,931	40.3	35.4	28.4	36.1	1,875
Peru 2000	24.6	23.2	19.9	20.6	3,744	21.9	23.1	20.1	22.2	3,046
Median	27.3	23.9	21.1	22.7		28.7	25.6	20.3	24.3	
Mean	26.3	25.7	21.8	23.3		28.6	27.4	22.3	26.8	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
u = Unknown (too few cases to calculate estimate)

4.1.4 Demographic Characteristics

In Table 4.4, the percentage of children with recent symptoms of ALRI is tabulated by categories of child's sex, birth order (one, two to three, four to five, six or higher), birth interval (first birth, <24 months, 24-35 months, 36 or more months), and mother's age (<20, 20-34, 35 or more years). Differences in ALRI symptom prevalence by sex are negligible in nearly all countries. The largest difference by sex is found in Vietnam, where the period prevalence is 17 percent for boys and 11 percent for girls under three years of age.

Differences in ALRI symptom prevalence by sex are negligible in nearly all countries.

In general, the two-week period prevalence of ALRI symptoms does not vary markedly by birth order or by birth interval. Within countries, the difference in prevalence among children of birth order one versus six or more and among children of birth intervals less than 24 versus 36 or more months were computed. These differentials exceed five percentage points in only three and six countries, respectively, and are all less than ten percentage points.

For the most part, children of mothers in the lowest age category (less than 20 years) do not differ consistently or significantly from children of mothers in the highest age category (35 or more years) with respect to ALRI symptoms period prevalence. The two largest differentials are observed in Armenia and the Kyrgyz Republic, with differentials of 9 and 11 percentage points, respectively, in favor of children with older mothers.

Table 4.4

Percentage of children under age three with symptoms of acute lower respiratory infection (ALRI) in the two weeks preceding the survey, by child's sex, birth order, birth interval, and mother's age, Demographic and Health Surveys 1996-2002

	Child's sex		Birth order				Birth interval (months)				Mother's age				Number
Survey	Male	Female	1	2-3	4-5	6+	First birth	<24	24-35	36+	<20	20-34	35+	Total	of children
West/Middle Africa															
Benin 2001	12.7	13.4	13.0	12.6	13.1	13.8	13.0	14.4	13.1	12.7	9.6	13.1	14.0	13.0	2,912
Burkina Faso 1999	15.7	15.1	12.3	14.9	16.9	16.6	12.3	16.3	15.7	16.2	15.4	15.2	16.1	15.4	3,219
Cameroon 1998	20.3	19.0	20.9	19.1	19.1	19.8	21.1	19.8	20.1	18.2	18.6	19.9	19.5	19.7	2,260
Chad 1997	13.7	14.2	14.0	12.1	14.4	15.6	14.0	14.5	14.3	13.3	12.9	13.4	17.1	13.9	3,938
Côte d'Ivoire 1998	17.8	19.4	20.5	17.9	17.5	18.6	20.5	18.5	16.6	18.8	21.2	16.9	22.7	18.6	1,221
Gabon 2000	14.9	15.2	16.3	16.2	10.9	15.4	16.1	17.8	12.1	14.9	15.3	15.0	14.9	15.1	2,324
Ghana 1988	15.7	16.8	17.9	16.2	17.6	13.0	18.0	14.1	14.5	16.6	12.6	17.9	12.1	16.2	1,802
Guinea 1999	18.5	18.1	15.4	19.0	18.7	19.2	15.5	14.4	17.0	21.2	17.1	18.3	19.0	18.3	3,005
Mali 2001	11.1	11.0	12.3	10.6	10.0	11.6	12.3	10.8	12.2	9.7	10.8	10.6	12.6	11.0	6,973
Mauritania 2000	10.9	10.9	11.8	10.4	10.2	11.5	11.8	10.9	11.8	10.0	14.2	11.0	9.5	10.9	2,796
Niger 1998	15.8	12.5	13.7	12.5	14.9	15.3	13.7	15.2	13.1	15.1	13.8	14.3	14.1	14.2	4,403
Nigeria 1999	11.8	10.9	13.3	10.0	11.5	11.4	13.2	12.8	11.5	9.4	15.2	11.0	10.8	11.3	3,208
Togo 1998	20.5	19.9	21.2	19.3	17.9	23.0	21.3	22.0	18.8	20.3	19.7	20.5	19.4	20.2	3,693
Median	15.7	15.1	14.0	14.9	14.9	15.4	14.0	14.5	14.3	15.1	15.2	15.0	14.9	15.1	
Mean	15.3	15.1	15.6	14.7	14.8	15.8	15.6	15.5	14.7	15.1	15.1	15.2	15.5	15.2	
South/East Africa															
Comoros 1996	22.6	21.9	18.9	24.0	26.9	19.2	19.6	22.2	24.0	22.2	26.6	22.6	19.9	22.3	1,056
Eritrea 2002	22.5	20.5	21.4	19.9	20.3	25.0	21.2	20.0	24.7	19.6	21.5	20.9	22.7	21.5	3,281
Ethiopia 2000	27.9	27.2	29.2	27.4	29.4	25.3	29.5	26.5	26.6	27.8	30.5	27.1	28.0	27.6	6,412
Kenya 1998	20.3	19.9	18.4	18.8	24.7	20.1	18.4	22.5	20.7	19.7	24.5	19.9	18.4	20.1	3,205
Madagascar 1997	23.9	23.9	22.9	23.6	25.3	23.9	23.0	23.7	26.0	22.5	28.0	23.9	20.7	23.9	3,537
Malawi 2000	29.0	29.6	28.3	29.3	28.6	31.2	28.3	29.8	30.1	29.3	28.8	29.1	30.5	29.3	6,862
Mozambique 1997	12.0	11.7	9.2	11.3	13.7	13.3	9.4	19.4	12.8	10.6	11.4	11.9	11.9	11.8	3,803
Namibia 2000	20.2	21.6	22.2	18.8	21.9	23.2	22.1	17.0	24.8	19.0	25.4	20.0	21.9	20.9	2,346
Rwanda 2000	27.5	23.8	26.4	26.4	25.9	23.9	26.3	25.1	26.7	24.7	27.1	26.3	23.8	25.7	4,293
South Africa 1998	21.9	21.9	21.7	23.2	19.2	21.9	21.7	20.2	19.9	22.8	23.9	22.4	19.1	21.9	2,912
Tanzania 1999	18.7	15.3	18.2	16.2	17.3	16.9	18.2	15.2	17.2	16.8	15.9	17.0	18.0	17.1	1,817
Uganda 2000	26.4	25.9	24.6	25.1	26.8	28.0	24.4	23.8	28.1	26.8	24.5	26.2	27.4	26.2	4,245
Zambia 2001	17.8	17.2	17.8	17.5	17.9	16.9	17.6	21.7	16.4	17.3	19.4	17.5	16.0	17.5	3,681
Zimbabwe 1999	17.9	18.4	15.3	21.2	19.7	14.5	15.2	18.7	20.1	19.6	14.7	19.3	15.1	18.1	2,029
Median	22.2	21.8	21.6	22.2	23.3	22.6	21.5	22.0	24.4	21.0	24.5	21.7	20.3	21.7	
Mean	22.0	21.3	21.0	21.6	22.7	21.7	21.1	21.8	22.7	21.3	23.0	21.7	21.0	21.7	
North Africa/West Asia/Europe															
Armenia 2000	9.5	12.8	8.7	13.1	10.3	*	8.6	14.5	13.3	10.6	21.7	9.9	12.6	10.9	880
Egypt 2000	10.8	9.5	9.9	9.4	11.4	11.2	9.9	10.0	11.0	9.9	12.1	10.3	8.8	10.2	6,741
Jordan 2002	8.6	6.1	8.1	7.4	7.2	6.6	8.0	8.6	6.0	6.9	3.2	8.3	4.2	7.4	3,454
Yemen 1997	26.1	24.0	24.0	23.5	26.0	26.1	24.1	25.2	24.2	26.3	29.1	24.5	25.6	25.1	7,056
Median	10.2	11.2	9.3	11.3	10.9	11.2	9.3	12.3	12.2	10.3	16.9	10.1	10.7	10.6	
Mean	13.8	13.1	12.7	13.4	13.7	14.6	12.6	14.6	13.6	13.4	16.5	13.3	12.8	13.4	
Central Asia															
Kazakhstan 1999	2.8	3.3	3.3	3.5	0.8	*	3.3	2.1	4.1	2.9	(1.3)	3.2	2.6	3.1	788
Kyrgyz Rep. 1997	4.7	4.1	5.1	4.2	2.9	5.7	5.1	4.2	3.3	4.5	(13.5)	4.2	2.1	4.4	1,104
Turkmenistan 2000	1.2	0.3	0.5	1.1	0.7	0.0	0.5	0.7	1.1	1.0	(0.0)	0.8	0.6	0.8	1,968
Uzbekistan 1996	1.5	0.8	2.0	0.9	0.7	0.0	2.0	0.4	0.5	1.4	3.0	1.2	0.0	1.2	1,325
Median	2.2	2.1	2.7	2.3	0.8	0.0	2.7	1.4	2.2	2.2	2.2	2.2	1.4	2.2	
Mean	2.5	2.1	2.7	2.4	1.3	1.9	2.7	1.9	2.3	2.5	4.4	2.3	1.3	2.4	
South/Southeast Asia															
Bangladesh 2000	20.0	18.9	18.2	18.6	22.5	21.5	18.3	19.3	19.4	20.4	20.4	18.8	22.5	19.5	3,927
Cambodia 2000	22.2	21.4	21.6	20.0	24.9	21.8	21.7	25.8	22.1	20.4	21.2	21.6	22.4	21.8	4,232
India 1999	20.5	17.7	19.5	18.5	19.9	19.7	19.5	17.7	19.3	19.4	22.0	18.7	18.8	19.1	30,668
Indonesia 1997	10.2	9.5	9.6	10.4	9.1	9.7	10.0	10.2	10.4	9.5	13.1	10.0	8.1	9.9	9,322
Nepal 2000	28.5	25.9	28.1	26.2	26.8	28.8	28.0	24.8	27.3	27.6	29.5	26.4	30.5	27.2	3,840
Philippines 1998	15.5	14.7	12.9	14.4	15.3	20.2	12.9	14.6	16.4	16.9	15.0	14.6	17.1	15.2	4,415
Vietnam 1997	16.9	11.3	15.9	12.5	17.1	7.9	15.9	8.3	14.8	13.8	(17.7)	14.3	12.7	14.2	1,769
Median	20.0	17.7	18.2	18.5	19.9	20.2	18.3	17.7	19.3	19.4	20.4	18.7	18.8	19.1	
Mean	19.1	17.1	18.0	17.2	19.4	18.5	18.0	17.2	18.5	18.3	19.8	17.8	18.9	18.1	
Latin America/Caribbean															
Bolivia 1998	26.7	24.8	25.9	24.8	25.0	28.1	25.9	28.5	26.0	23.7	34.6	24.7	26.2	25.8	3,826
Brazil 1996	26.9	23.1	24.0	24.2	28.1	29.0	24.1	27.0	26.1	24.5	29.6	24.4	24.0	25.0	2,757
Colombia 2000	11.0	10.1	9.2	10.8	13.9	10.6	9.1	11.4	14.3	10.4	14.4	9.7	11.6	10.6	2,725
Dominican Rep. 2002	22.7	20.6	19.8	21.8	22.7	28.5	19.8	26.2	23.5	19.9	24.1	21.4	20.3	21.7	6,395
Guatemala 1999	22.8	19.3	20.8	19.3	23.4	21.9	20.8	19.9	20.3	23.2	18.5	20.9	23.2	21.1	2,618
Haiti 2000	42.9	43.4	39.3	44.3	47.1	42.4	39.3	47.7	45.2	41.2	42.4	44.4	39.8	43.2	3,645
Nicaragua 2001	34.3	32.6	32.0	32.4	36.7	35.9	32.0	32.9	37.2	33.0	36.2	32.4	35.3	33.4	3,807
Peru 2000	22.8	19.8	19.1	22.0	22.6	23.3	19.2	22.9	24.8	21.0	20.5	21.6	20.9	21.3	6,790
Median	24.8	21.9	22.4	23.1	24.2	28.3	22.5	26.6	25.4	23.5	26.9	23.0	23.6	23.4	
Mean	26.3	24.2	23.8	25.0	27.4	27.5	23.8	27.1	27.2	24.6	27.5	24.9	25.2	25.3	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

4.1.5 Nutritional Status

The percentage of children with ALRI symptoms in the past two weeks is tabulated in Table 4.5 by severe (≤-3.0), moderate (-3.0 to -2.01), and mild/normal categories (≥-2.0) of three indicators of nutritional status: underweight (low weight-for- age), stunting (low height-for-age), and wasting (low weight-for-height).

Overall, these data support an association between undernutrition and a higher probability of recent ALRI symptoms, particularly with respect to underweight.

Overall, these data support an association between undernutrition and a higher probability of recent ALRI symptoms, particularly with respect to underweight.

Figure 4.3 shows the range, mean, and median prevalence of ALRI symptoms for the countries included in the report by region and categories of underweight. Data are too sparse to be displayed for severe underweight in the North Africa/West Asia/Europe and Central Asia regions. Elsewhere, though, a consistent pattern is demonstrated by which the average prevalence of ALRI symptoms decreases with increasing weight-for-age.

The regional mean ALRI symptom prevalence by categories of stunting also decreases with increasing height-for-age, with the exception of the Central Asia region, where the pattern is irregular.[3] However, the decrements in ALRI symptom prevalence by height-for-age categories are noticeably smaller than those by weight-for-age categories.

In most of the countries, the prevalence of severe wasting is low. Data are especially sparse in this category for the regions of North Africa/West Asia/Europe, Central Asia, and Latin America/Caribbean. On the basis of regional averages, children classified as mild or normal with respect to wasting are less likely to have experienced recent ALRI symptoms, compared with their more wasted counterparts.

Differentials were computed between the prevalence of ALRI symptoms in children classified as severe versus mild/normal for each of the three indicators. In 9 of 41 countries, the period prevalence of ALRI symptoms is more than ten percentage points higher for children who are severely underweight versus mildly underweight children or those of normal weight-for-age. These countries include Burkina Faso, Côte d'Ivoire, Guinea, Comoros, Namibia, Egypt, Colombia, Haiti, and Nicaragua. A difference of this same magnitude in the opposite direction is seen in only one country: the Dominican Republic.

Fewer large differentials are observed when the nutritional indicator is either stunting or wasting. In Côte d'Ivoire and Brazil, the period prevalence of ALRI symptoms is higher by more than ten percentage points for children who are severely stunted versus mildly stunted children or those of normal height-for-age. In six countries (Benin, Burkina Faso, Ethiopia, Zimbabwe, Egypt, and Haiti), ALRI symptom prevalence for children who are severely wasted exceeds that for children who are mildly wasted or of normal weight-for-age by more than ten percentage points.

[3] In the Central Asian countries included here, the prevalence of ALRI symptoms is also very low, less than 5 percent.

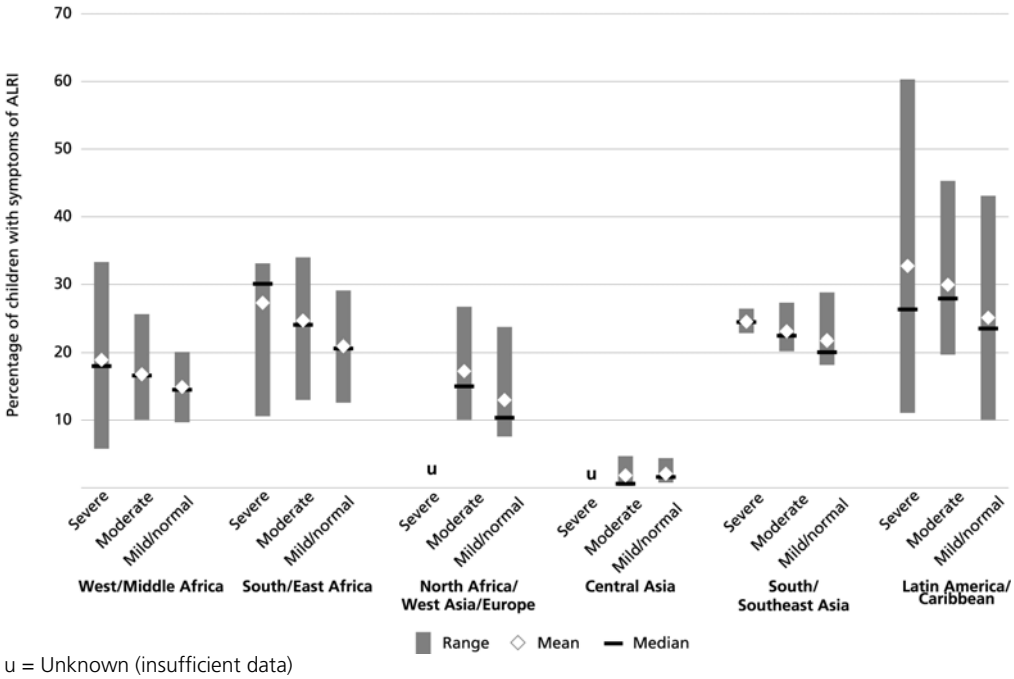
Table 4.5

Percentage of children under age three with symptoms of acute lower respiratory infection (ALRI) in the two weeks preceding the survey, by nutritional status indices, Demographic and Health Surveys 1996-2002

Survey	Weight-for-age Z-score			Height-for-age Z-score			Weight-for-height Z-score			Total	Number of children
	≤-3.0	-3.0 to-2.01	≥-2.0	≤-3.0	-3.0 to-2.01	≥-2.0	≤-3.0	-3.0 to-2.01	≥-2.0		
West/Middle Africa											
Benin 2001	13.7	14.0	12.9	12.8	13.6	13.1	29.2	16.3	12.5	13.2	2,610
Burkina Faso 1998-99	23.5	16.6	13.3	17.8	13.4	15.4	27.3	22.3	13.7	15.4	2,530
Cameroon 1998	25.9	22.5	19.7	22.2	21.4	19.9	*	19.5	20.5	20.5	1,923
Chad 1996-97	15.9	13.0	14.5	11.6	12.9	15.5	17.8	14.6	14.2	14.4	3,541
Côte d'Ivoire 1998-99	(33.3)	25.6	17.2	31.0	23.8	17.3	*	17.8	19.5	19.3	1,099
Gabon 2000	5.8	18.0	15.1	18.8	17.0	14.5	*	7.1	15.3	15.1	2,013
Ghana 1988	19.1	19.1	16.0	14.4	20.5	16.3	(16.1)	19.9	16.4	16.8	1,638
Guinea 1999	31.3	19.1	18.5	26.2	20.4	18.4	23.1	22.9	18.9	19.4	2,067
Mali 2001	11.8	14.1	10.4	10.1	13.2	11.2	12.1	13.0	11.2	11.4	6,120
Mauritania 2000-01	12.5	10.1	12.3	9.6	12.4	12.1	11.7	13.6	11.6	11.8	2,227
Niger 1998	15.1	13.8	14.4	15.0	13.6	14.5	18.6	14.7	14.1	14.4	4,022
Nigeria 1999	18.0	11.4	9.7	13.6	13.7	8.5	13.6	14.3	10.4	10.8	1,473
Togo 1998	20.3	21.2	20.1	18.1	19.1	20.7	27.0	19.2	20.3	20.3	3,260
Median	18.0	16.6	14.5	15.0	13.7	15.4	18.2	16.3	14.2	15.1	
Mean	18.9	16.8	14.9	17.0	16.5	15.2	19.6	16.6	15.3	15.6	
South/East Africa											
Comoros 1996	31.5	23.0	20.8	26.8	22.9	20.8	*	24.1	21.7	22.0	921
Eritrea 2002	26.1	23.0	20.6	22.3	24.4	21.1	28.7	20.7	21.9	21.9	2,996
Ethiopia 2000	33.1	30.5	25.4	31.5	29.8	26.1	41.4	27.2	28.0	28.1	6,011
Kenya 1998	26.9	22.5	20.2	22.5	19.7	21.0	(12.1)	23.2	20.9	20.9	2,821
Madagascar 1997	32.5	24.0	23.2	25.4	22.2	25.5	(28.3)	30.8	24.2	24.6	3,080
Malawi 2000	30.5	31.4	29.1	30.1	28.5	30.0	29.0	29.4	29.7	29.7	6,177
Mozambique 1997	10.6	13.0	12.6	10.9	15.1	12.0	(6.5)	13.6	12.5	12.5	2,837
Namibia 2000	30.1	27.0	19.7	29.6	25.4	20.1	(25.2)	29.4	20.5	21.3	2,188
Rwanda 2000	31.5	31.1	24.7	28.8	25.6	25.9	27.1	27.1	26.2	26.3	3,915
Tanzania 1999	23.3	17.2	17.2	22.0	18.2	16.4	*	17.9	17.4	17.6	1,674
Uganda 2000-01	33.1	34.0	24.3	30.3	29.8	24.7	*	36.6	26.1	26.5	3,740
Zambia 2001-02	24.8	18.9	16.7	18.7	19.9	16.8	(11.0)	20.4	17.8	17.9	3,432
Zimbabwe 1999	(20.3)	25.0	17.9	15.9	19.2	19.0	(31.3)	23.1	18.2	18.7	1,684
Median	30.1	24.0	20.6	25.4	22.9	21.0	27.7	24.1	21.7	21.9	
Mean	27.3	24.7	21.0	24.2	23.1	21.5	24.1	24.9	21.9	22.2	
North Africa/West Asia/Europe											
Armenia 2000	*	*	10.9	*	13.1	10.4	*	*	11.1	10.8	805
Egypt 2000	(20.6)	15.0	9.8	14.6	12.2	9.3	(25.6)	7.9	10.0	10.0	6,264
Jordan 2002	*	10.1	7.6	8.8	10.9	7.6	*	14.8	7.6	7.8	2,845
Yemen 1997	31.2	26.7	23.7	27.2	25.7	25.1	29.7	29.8	25.0	25.7	4,966
Median	25.9	15.0	10.4	14.6	12.7	9.9	27.6	14.8	10.6	10.4	
Mean	25.9	17.3	13.0	16.9	15.5	13.1	27.6	17.5	13.4	13.6	
Central Asia											
Kazakhstan 1999	*	*	1.9	*	(11.7)	1.2	*	*	1.9	1.8	354
Kyrgyz Rep. 1997	*	4.7	4.4	2.5	8.0	3.6	*	(9.5)	4.2	4.3	1,015
Turkmenistan 2000	(0.0)	0.6	0.8	0.0	0.0	1.0	*	2.1	0.7	0.8	1,745
Uzbekistan 1996	(0.0)	0.3	1.3	0.3	0.9	1.3	*	3.7	0.9	1.1	989
Median	0.0	0.6	1.6	0.3	4.4	1.3	u	3.7	1.4	1.5	
Mean	0.0	1.9	2.1	0.9	5.2	1.8	u	5.1	1.9	2.0	
South/Southeast Asia											
Bangladesh 1999-00	25.5	20.2	18.6	25.7	19.1	19.0	(22.0)	24.2	19.5	20.0	3,306
Cambodia 2000	26.4	24.2	21.5	24.1	19.0	22.3	19.5	22.8	22.1	22.1	4,006
India 1998-99	22.8	20.6	18.2	20.9	20.7	18.8	23.1	20.9	19.3	19.6	27,094
Nepal 2000	23.3	27.3	28.8	22.9	28.2	28.5	28.4	30.6	27.2	27.5	3,707
Median	24.4	22.4	20.1	23.5	19.9	20.7	22.6	23.5	20.8	21.1	
Mean	24.5	23.1	21.8	23.4	21.8	22.1	23.3	24.6	22.0	22.3	
Latin America/Caribbean											
Bolivia 1998	29.4	34.2	25.6	29.0	26.0	26.0	*	28.5	26.2	26.3	3,451
Brazil 1996	*	29.3	24.7	43.4	29.9	24.1	*	33.8	24.8	25.0	2,306
Colombia 2000	(23.2)	19.7	10.1	19.1	13.9	10.2	*	(10.4)	10.8	10.8	2,498
Dominican Rep. 2002	(11.1)	24.0	22.2	19.9	24.7	22.1	*	14.1	22.3	22.2	5,612
Guatemala 1998-99	26.3	23.6	20.8	21.6	18.6	22.9	*	28.7	21.4	21.6	2,149
Haiti 2000	55.5	45.3	43.1	46.0	48.8	42.9	(61.0)	37.4	44.0	43.8	3,532
Nicaragua 2001	60.3	37.0	32.9	35.3	41.0	32.6	*	46.2	33.4	33.7	3,443
Peru 2000	23.4	26.5	21.3	25.2	23.1	21.1	*	21.0	21.7	21.7	6,070
Median	26.3	27.9	23.5	27.1	25.4	23.5	u	28.6	23.6	23.6	
Mean	32.7	30.0	25.1	29.9	28.3	25.2	u	27.5	25.6	25.6	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
u = Unknown

Figure 4.3
Percentage of children under age three years with ALRI symptoms in the two weeks preceding the survey, by low weight-for-tage status and region



u = Unknown (insufficient data)

4.1.6 Immunization Status

Measles and pertussis are diseases that are often complicated by pneumonia. Lanata and Black (2001) conjecture that "increasing immunization coverage with measles vaccine and with diphtheria-pertussis-tetanus vaccine would be expected to lower the deaths from these two vaccine-preventable causes of acute respiratory infections."

On the other hand, most episodes of both ALRI morbidity and mortality are not a complication of measles or pertussis, but rather are attributable to a myriad of both viral (primarily respiratory syncytial virus [RSV], adenovirus, parainfluenza virus and influenza virus) and bacterial (primarily *Streptococcus pneumoniae* and *Haemophilus influenzae*) agents[4] (Lanata and Black, 2001).

Full Immunization Coverage

Figure A.2 in Appendix A shows, by country and residence, the percentage of children age 12-23 months[5] who received all recommended infant vaccinations at any time preceding the date of interview, according to either a vaccination card or mother's recall. The data in Figure A.2 are derived from Table A.1 included in Appendix A.

[4] *Haemophilus influenzae* type b (Hib) is another etiological agent of pneumonia for which an effective vaccine is available, although it is not included as a routine childhood vaccination to date in most developing countries.

[5] For Peru and Nicaragua, this age range is 18 to 29 months because the recommended age for measles vaccination in those countries is 15 rather than 9 months.

The WSC goal 22 for the end of the decade (year 2000) was the maintenance of a high level of full immunization coverage, specifically, greater than 90 percent of infants by 12 months of age. (In this report, completion is based on the date of interview rather than on the first birthday.) Only one country, Egypt, had met this goal in the year of its last full survey (2000), where full immunization was achieved among both urban and rural children in excess of 90 percent. Eighty percent coverage was achieved in urban areas in four countries (Tanzania, Mozambique, Eritrea, and Turkmenistan) and in rural areas in two countries (Uzbekistan and Turkmenistan). On the basis of regional averages, West/Middle Africa had the lowest percentages and Central Asia had the highest percentages of both urban and rural children age 12-23 months who were fully immunized, according to the most recent surveys available.

Urban-rural differentials in the percentage of children age 12-23 months fully immunized were computed for each country. Three-fourths (38 of 51) of these differentials are in excess of positive five percentage points; 12 exceed positive 20 percentage points. In West/Middle Africa, the regional mean urban-rural differential is the highest, at 21 percentage points. The largest urban-rural differentials are found in Burkina Faso, Niger, Ethiopia, Mozambique, and Yemen, ranging from 31 to 49 percentage points.

ALRI Symptoms and Full Immunization

The percentage of children age 12-35 months with symptoms of ALRI in the two weeks preceding the survey is shown in Table 4.6 by age group and receipt or nonreceipt of all commonly recommended infant vaccines at any time prior to the date of interview. There is no evidence of a consistent significant association between receipt of all recommended infant vaccines and a lower probability of recent ALRI symptoms.

There is no evidence of a consistent association between receipt of all recommended infant vaccines and a lower probability of recent ALRI symptoms.

The regional average prevalence values within age groupings do not differ appreciably by full immunization status. For each country, the difference in prevalence between fully immunized and not fully immunized children within each age group was computed. For age group 12 to 23 months, 13 differentials exceed an absolute value of five percentage points: 9 are negative and 4 are positive. The largest differential is found in Haiti, where ALRI symptoms were reported for 35 percent of fully immunized children versus 51 percent of not fully immunized children age 12-23 months.

For the age group 24 to 35 months, only six differentials exceed an absolute value of five percentage points, the largest of which is in Armenia, where 12 percent of fully immunized versus 28 percent of not fully immunized children experienced recent ALRI symptoms.[6]

[6] The number of fully immunized children age 24-35 months in the Armenian sample is less than 50.

Table 4.6

Percentage of children age 12-23 months and 24-35 months with symptoms of acute lower respiratory infection (ALRI) in the two weeks preceding the survey, by immunization status, Demographic and Health Surveys 1996-2002

Survey	Children age 12-23 months fully vaccinated		Children age 24-35 months fully vaccinated		Total	Number of children
	Yes	No	Yes	No		
West/Middle Africa						
Benin 2001	13.0	18.0	9.7	12.1	12.9	1,848
Burkina Faso 1998-99	19.2	18.8	12.1	11.6	15.4	2,030
Cameroon 1998	14.2	22.9	14.7	15.4	17.5	1,443
Chad 1996-97	22.7	14.7	16.1	12.0	14.1	2,431
Côte d'Ivoire 1998-99	20.9	22.0	16.4	18.4	19.6	810
Gabon 2000	22.7	14.9	10.0	13.3	14.5	1,529
Ghana 1988	16.8	17.0	16.6	12.6	16.0	1,193
Guinea 1999	19.9	20.6	16.0	13.2	17.1	1,906
Mali 2001	11.9	11.9	11.2	9.7	11.1	4,223
Mauritania 2000-01	9.2	10.2	10.5	7.8	9.3	1,771
Niger 1998	13.6	13.5	10.8	11.3	12.4	2,757
Nigeria 1999	13.1	13.2	9.9	10.6	12.0	2,099
Togo 1998	17.7	25.8	16.8	14.4	19.2	2,324
Median	16.8	17.0	12.1	12.1	14.5	
Mean	16.5	17.2	13.1	12.5	14.7	
South/East Africa						
Comoros 1996	24.4	20.8	24.1	18.4	22.4	674
Eritrea 2002	22.5	25.4	21.1	19.9	21.9	2,000
Ethiopia 2000	26.4	29.2	23.7	25.9	27.2	4,226
Kenya 1998	21.4	22.9	19.3	20.2	20.9	2,118
Madagascar 1997	21.0	27.2	17.1	23.2	23.0	2,257
Malawi 2000	28.2	31.4	25.9	28.0	27.8	4,345
Mozambique 1997	9.0	14.6	13.9	12.0	12.4	2,362
Namibia 2000	25.0	21.7	19.7	14.9	21.0	1,529
Rwanda 2000	24.8	27.6	20.9	17.6	22.9	2,562
South Africa 1998	26.5	19.0	22.1	13.6	21.4	1,906
Tanzania 1999	21.7	15.3	13.5	9.5	16.0	1,181
Uganda 2000-01	24.2	31.0	21.8	21.7	25.4	2,760
Zambia 2001-02	17.7	18.6	14.4	18.5	16.8	2,442
Zimbabwe 1999	20.1	21.5	16.6	17.1	18.7	1,368
Median	23.4	22.3	20.3	18.5	21.7	
Mean	22.4	23.3	19.6	18.6	21.3	
North Africa/West Asia/Europe						
Armenia 2000	8.4	13.9	12.0	(28.5)	12.1	581
Egypt 2000	10.9	11.3	9.0	12.3	10.1	4,379
Jordan 2002	9.1	7.5	7.8	5.5	7.0	2,289
Yemen 1997	25.3	27.1	23.8	22.7	24.8	4,512
Median	10.0	12.6	10.5	17.5	11.1	
Mean	13.4	14.9	13.1	17.3	13.5	
Central Asia						
Kazakhstan 1999	3.9	6.6	3.1	2.3	3.8	545
Kyrgyz Rep. 1997	2.3	6.5	4.1	1.6	3.4	738
Turkmenistan 2000	0.7	1.6	1.0	2.6	1.0	1,275
Uzbekistan 1996	1.1	3.4	0.6	0.6	1.1	909
Median	1.7	5.0	2.1	2.0	2.3	
Mean	2.0	4.5	2.2	1.8	2.3	
South/Southeast Asia						
Bangladesh 1999-01	20.7	21.9	13.8	19.3	18.5	2,615
Cambodia 2000	22.6	24.9	21.5	20.7	22.4	2,632
India 1998-99	17.2	22.1	14.2	19.8	18.8	20,125
Indonesia 1997	10.7	11.7	8.3	9.6	10.0	6,109
Nepal 2000	27.1	28.9	20.9	23.2	24.7	2,558
Philippines 1998	18.0	18.4	14.9	14.8	16.5	2,921
Vietnam 1997	17.5	16.7	13.6	15.3	15.7	1,240
Median	18.0	21.9	14.2	19.3	18.5	
Mean	19.1	20.7	15.3	17.5	18.1	
Latin America/Caribbean						
Bolivia 1998	28.3	26.6	28.9	24.1	26.5	2,510
Brazil 1996	28.0	26.4	25.0	26.9	26.5	1,853
Colombia 2000	11.7	11.5	8.8	11.0	10.6	1,784
Dominican Rep. 2002	23.4	22.4	18.8	20.3	21.3	4,384
Guatemala 1998-99	20.8	25.6	17.9	18.0	20.3	1,716
Haiti 2000	34.9	50.6	42.1	38.4	42.7	2,450
Nicaragua 2001	32.8	38.1	32.0	27.4	33.2	2,012
Peru 2000	22.1	23.8	18.8	19.3	21.5	3,500
Median	25.7	26.0	21.9	22.2	24.0	
Mean	25.3	28.1	24.0	23.2	25.3	

Note: Figures in parentheses are based on 25-49 unweighted cases.

4.1.7 Environmental Factors

Environmental risk factors for respiratory illnesses are well documented. Poor housing quality may result in the spread of molds and other allergens throughout the living quarters. The burning of biomass fuels in inefficient stoves or poorly ventilated living spaces increases the level of inhalation of suspended particulates, while crowding increases the spread of airborne infectious agents from person to person.

In Tables 4.7.1 and 4.7.2, the percentage of urban or rural children, respectively, with recent symptoms of ALRI is shown by categories of several potential risk factors at the household level: natural floors (earth, sand, or dung) versus improved floors; smoke- or fume-producing cooking fuel versus clean-burning fuel; many (five or more) versus few (one to two) persons, on average, sharing sleeping rooms; and a larger (six or more) versus a smaller (one to five) number of household members. (The number of household members is included because many countries did not collect information on the number of sleeping rooms).

Natural floors (earth, sand, or dung) are associated with a higher probability of recent ALRI symptoms among young urban children, particularly in South/East Africa and Latin America/Caribbean.

4.1.7.1 Urban Residence

Main Flooring Material

Natural floors (earth, sand, or dung) are associated with a higher probability of recent ALRI symptoms among urban young children in many countries, particularly in South/East Africa and Latin America/Caribbean.

Data for urban children in homes with primarily natural floors are too sparse to permit comparisons in the Central Asia region. Elsewhere, with the exception of West/Middle Africa, the regional average prevalence of ALRI symptoms is higher for urban children from homes with primarily natural floors in comparison with other urban children.

The intracountry differentials in prevalence by natural versus improved flooring were computed. Fourteen of the 41 differentials exceed positive five percentage points, including 6 of 13 countries in South/East Africa and 4 of 8 countries in Latin America/Caribbean. The two largest positive differentials are found in Zambia and Brazil, where urban children in homes with primarily natural floors have a much higher period prevalence of ALRI symptoms than other urban children (28 versus 14 percent and 40 versus 24 percent, respectively).

Main Cooking Fuel

There is a strong association between exposure to biomass fuels and ALRI symptoms in young urban children.

On the basis of a limited number of surveys, there is a strong association between exposure to biomass fuels and ALRI symptoms in young urban children.

Few of the surveys included in this report contained a household question about the main type of cooking fuel. However, where available, intracountry differentials in ALRI symptom prevalence were computed between children in urban homes using mainly smoke- or fume-producing cooking fuels and children in urban homes using mainly clean-burning cooking fuels. Twelve of the 14 computed differentials are positive, indicating a higher prevalence of ALRI symptoms among urban children exposed to greater amounts of smoke or fumes from cooking fuels. The largest positive difference is found in Haiti, where 38 percent of exposed children versus 16 percent of nonexposed children had recently experienced ALRI symptoms.

Table 4.7.1

Percentage of urban children under age three with symptoms of acute lower respiratory infection (ALRI) in the two weeks preceding the survey, by potential environmental risk factors, Demographic and Health Surveys 1996-2002

Survey	Main floor material		Main cooking fuel		Persons per sleeping room			Number in household		Total	Number of children
	Natural	Improved	Smoke or fume producing	Clean burning	1-2	3-4	5+	1-5	6+		
West/Middle Africa											
Benin 2001	9.1	13.1	12.6	9.0	*	*	*	13.2	11.6	12.3	931
Burkina Faso 1999	(17.5)	11.4	-	-	11.7	10.1	(19.8)	11.4	12.2	11.9	346
Cameroon 1998	21.8	19.8	-	-	18.6	22.0	(26.5)	16.6	21.3	20.2	622
Chad 1997	13.9	16.7	-	-	14.1	13.7	15.9	16.2	13.5	14.4	865
Côte d'Ivoire 1998	*	15.7	-	-	13.2	15.5	20.2	16.8	16.1	16.3	412
Gabon 2000	15.4	15.9	-	-	15.0	15.1	23.1	14.5	16.4	15.9	1,697
Ghana 1998	*	11.5	-	-	7.2	14.8	9.6	11.9	11.1	11.6	459
Guinea 1999	13.3	16.9	-	-	14.1	16.3	25.1	15.0	17.0	16.6	795
Mali 2001	10.2	11.9	11.2	*	-	-	-	13.0	10.2	11.2	1,706
Mauritania 2000	12.9	13.6	-	-	11.6	17.1	11.2	13.8	13.1	13.3	1,189
Niger 1998	13.1	14.6	-	-	16.9	13.7	10.5	15.2	13.8	14.2	733
Nigeria 1999	9.5	10.5	-	-	7.5	11.7	11.8	7.6	12.9	10.3	896
Togo 1998	20.0	18.7	-	-	15.1	20.2	25.9	20.7	17.5	18.8	865
Median	13.3	14.6	11.9	u	14.1	15.1	19.8	14.5	13.5	14.2	
Mean	14.2	14.6	11.9	u	13.2	15.5	18.1	14.3	14.4	14.4	
South/East Africa											
Comoros 1996	22.1	21.9	-	-	26.4	22.9	9.1	18.2	23.6	22.0	255
Eritrea 2002	19.2	13.0	16.9	14.1	-	-	-	15.7	14.3	14.9	1,097
Ethiopia 2000	20.2	16.9	21.6	10.4	-	-	-	18.4	20.3	19.3	649
Kenya 1998	25.3	15.3	-	-	17.3	17.8	17.7	18.2	16.4	17.6	600
Madagascar 1997	17.5	21.6	-	-	19.7	19.1	24.2	17.3	24.7	21.1	704
Malawi 2000	20.8	15.3	18.7	7.0	-	-	-	14.5	20.4	17.2	891
Mozambique 1997	16.1	15.4	-	-	13.8	18.4	12.5	12.8	16.8	15.7	806
Namibia 2000	18.2	17.2	17.8	17.3	-	-	-	13.7	20.4	17.4	810
Rwanda 2000	23.5	16.3	19.1	*	-	-	-	18.3	19.4	18.9	690
South Africa 1998	15.3	21.3	-	-	18.0	22.8	27.8	21.3	20.5	21.0	1,422
Tanzania 1999	14.4	15.7	-	-	-	-	-	13.4	17.1	15.2	354
Uganda 2000	26.7	21.6	23.2	17.9	-	-	-	23.7	21.7	22.9	486
Zambia 2001	27.5	13.9	19.3	10.9	-	-	-	15.3	16.8	16.3	1,124
Zimbabwe 1999	*	12.5	*	12.0	-	-	-	14.1	8.3	12.3	668
Median	20.2	16.0	19.1	12.0	18.0	19.1	17.7	16.5	19.8	17.5	
Mean	20.5	17.0	19.5	12.8	19.0	20.2	18.3	16.8	18.6	18.0	
North Africa/West Asia/Europe											
Armenia 2000	8.1	10.4	(7.2)	9.8	-	-	-	7.3	11.3	9.6	453
Egypt 2000	16.9	7.5	*	7.9	-	-	-	8.0	7.8	7.9	2,625
Jordan 2002	*	7.5	*	7.5	-	-	-	7.2	7.8	7.5	2,680
Yemen 1997	27.4	23.0	-	-	23.8	24.7	21.5	24.3	23.5	23.7	1,631
Median	16.9	8.9	u	7.9	u	u	u	7.7	9.6	8.8	
Mean	17.5	12.1	u	8.4	u	u	u	11.7	12.6	12.2	
Central Asia											
Kazakhstan 1999	*	2.6	-	-	-	-	-	2.4	2.9	2.6	327
Kyrgyz Rep. 1997	*	2.5	-	-	1.6	6.7	(0.0)	3.7	0.8	2.5	253
Turkmenistan 2000	1.3	1.7	*	1.4	-	-	-	0.9	1.9	1.4	775
Uzbekistan 1996	*	2.6	-	-	3.1	1.9	*	4.2	1.6	2.5	414
Median	u	2.5	u	u	2.3	4.3	u	3.1	1.8	2.5	
Mean	u	2.3	u	u	2.3	4.3	u	2.8	1.8	2.3	
South/Southeast Asia											
Bangladesh 2000	21.5	14.2	-	-	-	-	-	17.2	18.3	17.8	644
Cambodia 2000	20.6	20.9	20.5	(22.2)	-	-	-	17.1	22.6	20.7	552
India 1999	-	-	-	-	-	-	-	14.8	16.7	16.0	6,928
Indonesia 1997	4.1	8.6	-	-	-	-	-	8.5	8.2	8.4	2,624
Nepal 2000	34.3	26.7	31.3	29.0	-	-	-	29.0	30.7	30.1	237
Philippines 1998	11.1	13.8	-	-	11.9	13.4	16.8	14.3	13.3	13.7	2,049
Vietnam 1997	(14.2)	10.6	-	-	10.4	11.7	10.6	9.7	12.7	11.0	255
Median	17.4	14.0	25.9	25.6	11.1	12.5	13.7	14.8	16.7	16.0	
Mean	17.6	15.8	25.9	25.6	11.1	12.6	13.7	15.8	17.5	16.8	
Latin America/Caribbean											
Bolivia 1998	29.4	23.4	-	-	23.9	20.6	26.7	23.0	26.0	24.4	2,219
Brazil 1996	39.8	24.0	-	-	22.9	26.5	28.2	24.0	26.2	24.8	2,104
Dominican Rep. 2002	28.3	20.7	22.6	21.0	-	-	-	19.9	22.9	21.0	4,192
Guatemala 1999	18.9	17.5	-	-	8.4	20.5	21.7	17.5	18.2	17.9	991
Haiti 2000	38.8	35.8	37.5	16.4	-	-	-	41.0	31.0	36.3	1,203
Nicaragua 2001	35.6	27.9	36.0	26.3	-	-	-	29.7	31.5	30.8	1,931
Peru 2000	23.2	19.3	22.1	20.4	-	-	-	18.2	22.8	20.6	3,744
Median	29.4	23.4	29.3	20.7	22.9	20.6	26.7	23.0	26.0	24.4	
Mean	30.6	24.1	29.5	21.0	18.4	22.5	25.5	24.8	25.5	25.1	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed. A dash indicates that information was not collected about this household factor.
u = Unknown (too few cases to calculate estimate)

Table 4.7.2

Percentage of rural children under age three with symptoms of acute lower respiratory infection (ALRI) in the two weeks preceding the survey, by potential environmental risk factors, Demographic and Health Surveys 1996-2002

Survey	Main floor material		Main cooking fuel		Persons per sleeping room			Number in household		Total	Number of children
	Natural	Improved	Smoke or fume producing	Clean burning	1-2	3-4	5+	1-5	6+		
West/Middle Africa											
Benin 2001	12.9	14.0	13.5	*	-	-	-	12.3	14.0	13.4	1,981
Burkina Faso 1999	16.1	14.6	-	-	15.8	16.2	15.2	15.1	16.1	15.8	2,872
Cameroon 1998	19.3	19.9	-	-	16.4	22.6	30.4	19.4	19.5	19.5	1,639
Chad 1997	13.7	*	-	-	18.0	12.9	10.2	11.5	15.1	13.8	3,073
Côte d'Ivoire 1998	24.5	17.2	-	-	24.7	16.7	17.5	20.0	19.7	19.7	809
Gabon 2000	14.2	11.0	-	-	11.7	14.1	16.0	10.2	13.4	12.8	627
Ghana 1998	21.1	16.8	-	-	19.5	17.9	15.8	18.0	17.5	17.8	1,343
Guinea 1999	18.1	21.5	-	-	19.7	19.7	13.2	21.1	18.4	19.0	2,210
Mali 2001	10.9	12.8	11.0	*	-	-	-	10.2	11.5	11.0	5,269
Mauritania 2000	8.9	9.8	-	-	10.3	5.9	9.9	8.0	9.7	9.1	1,606
Niger 1998	14.2	12.9	-	-	15.9	13.8	11.7	13.3	14.6	14.2	3,671
Nigeria 1999	11.4	12.1	-	-	11.7	11.7	12.9	11.8	11.7	11.7	2,312
Togo 1998	23.4	19.0	-	-	19.8	20.3	25.5	22.4	20.0	20.7	2,828
Median	14.2	14.3	12.3	u	16.4	16.2	15.2	13.3	15.1	14.2	
Mean	16.1	15.1	12.3	u	16.7	15.6	16.2	14.9	15.5	15.3	
South/East Africa											
Comoros 1996	26.2	16.3	-	-	19.2	22.7	27.9	23.2	22.1	22.3	801
Eritrea 2002	24.6	26.2	25.0	22.3	-	-	-	23.7	25.5	24.8	2,184
Ethiopia 2000	28.3	39.1	28.5	*	-	-	-	30.5	26.9	28.5	5,762
Kenya 1998	20.9	19.8	-	-	16.9	22.0	22.6	21.0	20.4	20.7	2,606
Madagascar 1997	26.5	24.4	-	-	25.8	23.5	25.1	23.6	25.4	24.6	2,833
Malawi 2000	31.8	24.8	31.2	*	-	-	-	31.2	31.1	31.1	5,972
Mozambique 1997	10.8	10.8	-	-	11.0	10.0	12.3	11.7	10.0	10.8	2,996
Namibia 2000	24.8	13.9	23.6	16.0	-	-	-	21.0	23.5	22.8	1,536
Rwanda 2000	27.0	25.5	26.9	*	-	-	-	29.5	23.5	26.9	3,604
South Africa 1998	24.2	22.0	-	-	23.1	23.8	19.4	24.6	21.7	22.8	1,490
Tanzania 1999	17.2	23.8	-	-	-	-	-	20.5	16.0	17.5	1,463
Uganda 2000	26.9	23.5	26.6	28.0	-	-	-	26.1	27.0	26.6	3,759
Zambia 2001	18.3	16.5	18.0	(21.0)	-	-	-	18.2	17.9	18.1	2,556
Zimbabwe 1999	21.9	20.1	21.1	(18.6)	-	-	-	23.1	19.3	21.0	1,361
Median	24.7	22.8	25.8	21.0	19.2	22.7	22.6	23.4	22.8	22.8	
Mean	23.5	21.9	25.1	21.2	19.2	20.4	21.5	23.4	22.2	22.8	
North Africa/West Asia/Europe											
Armenia 2000	13.5	8.1	12.5	12.0	-	-	-	9.4	13.6	12.3	427
Egypt 2000	14.9	9.6	15.9	11.4	-	-	-	10.6	12.0	11.6	4,116
Jordan 2002	*	6.7	*	6.7	-	-	-	6.7	6.7	6.7	774
Yemen 1997	26.5	24.4	-	-	24.7	26.5	24.8	26.8	25.1	25.5	5,425
Median	14.9	8.9	14.2	11.4	u	u	u	10.0	12.8	12.0	
Mean	18.3	12.2	14.2	10.0	u	u	u	13.4	14.4	14.0	
Central Asia											
Kazakhstan 1999	*	3.6	-	-	-	-	-	3.5	3.3	3.4	462
Kyrgyz Rep. 1997	4.1	5.0	-	-	5.2	2.8	3.8	4.1	5.3	5.0	851
Turkmenistan 2000	0.4	0.0	*	0.4	-	-	-	0.6	0.2	0.4	1,192
Uzbekistan 1996	0.0	0.8	-	-	0.5	0.7	0.0	0.8	0.4	0.5	911
Median	0.4	2.2	u	u	2.8	1.8	1.9	2.2	1.9	2.0	
Mean	1.5	2.3	u	u	2.8	1.8	1.9	2.3	2.3	2.3	
South/Southeast Asia											
Bangladesh 2000	19.9	18.0	-	-	-	-	-	21.2	18.7	19.8	3,283
Cambodia 2000	22.1	18.8	22.0	*	-	-	-	22.4	21.7	22.0	3,680
India 1999	*	*	-	-	-	-	-	20.7	19.8	20.1	23,741
Indonesia 1997	10.0	10.6	-	-	-	-	-	9.6	11.7	10.4	6,698
Nepal 2000	27.2	22.5	26.8	30.2	-	-	-	28.6	26.1	27.0	3,603
Philippines 1998	18.5	16.0	-	-	14.7	15.6	18.3	14.9	17.5	16.4	2,366
Vietnam 1997	15.3	14.2	-	-	15.2	13.6	15.7	16.0	12.9	14.7	1,513
Median	19.2	17.0	24.4	u	14.9	14.6	17.0	20.7	18.7	19.8	
Mean	18.9	16.7	24.4	u	14.9	14.6	17.0	19.3	18.4	18.8	
Latin America/Caribbean											
Bolivia 1998	28.3	26.0	-	-	22.5	25.1	29.2	27.8	27.6	27.7	1,606
Brazil 1996	25.7	25.6	-	-	21.7	27.1	36.5	23.7	28.0	25.6	653
Dominican Rep. 2002	25.9	22.4	23.9	22.5	-	-	-	21.6	24.8	22.9	2,204
Guatemala 1999	22.7	23.6	-	-	23.6	23.5	22.9	21.3	23.8	23.0	1,627
Haiti 2000	47.1	45.3	46.6	*	-	-	-	46.9	46.3	46.5	2,442
Nicaragua 2001	37.2	31.7	36.7	27.7	-	-	-	34.6	37.0	36.1	1,875
Peru 2000	22.8	18.0	22.1	23.1	-	-	-	22.5	22.0	22.2	3,046
Median	25.9	25.6	30.3	23.1	22.5	25.1	29.2	23.7	27.6	25.6	
Mean	30.0	27.5	32.3	24.4	22.6	25.2	29.5	28.3	29.9	29.1	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed. A dash indicates that information was not collected about this household factor.
u = Unknown (too few cases to calculate estimate)

Crowding

On the basis of a limited number of surveys, crowding as measured by average number of persons per sleeping room is positively associated with an increased prevalence of ALRI symptoms in young urban children, but not crowding as measured by number of household members.

Crowding as measured by average number of persons per sleeping room is positively associated with an increased prevalence of ALRI symptoms in young urban children.

Less than half of the surveys collected the number of rooms in the home used for sleeping. For those that did, the average number of persons per sleeping room can be used as a measure of crowding. Intracountry differentials in the period prevalence of ALRI symptoms between urban children in less crowded homes (one to two persons per sleeping room) and more crowded homes (five or more persons per sleeping room) were computed where possible. Seventeen of the 23 differentials are negative, indicating a lower prevalence of ALRI symptoms among urban children in less crowded homes; 8 of these are in excess of five percentage points. The largest negative difference is found in Guatemala (8 versus 21 percent). In contrast, just one equally large positive difference is found, in Comoros (26 versus 9 percent).

The number of household members is a second, but broader, measure of crowding that is available from every survey. The regional average period prevalence of ALRI symptoms is not appreciably different for urban children in smaller (one to five) households compared with larger (six or more) households. The corresponding intracountry differentials were computed. Three-fifths of these 49 differentials are negative, but most are relatively small. Of the eight differentials with an absolute value in excess of five percentage points, two are positive, the largest being that of Haiti (41 versus 31 percent).

4.1.7.2 Rural Residence

Main Flooring Material

In general, natural floor materials (earth, sand, or dung) are associated with a higher probability of recent ALRI symptoms in young rural children.

Natural floor materials (earth, sand, or dung) are associated with a higher probability of recent ALRI symptoms in young rural children.

With the exception of Central Asia, for which the country-specific prevalences of ALRI symptoms are all under 5 percent, the regional average prevalence of ALRI symptoms is higher for rural children in homes with primarily natural floors compared with other rural children. The intracountry differentials in prevalence by natural versus improved flooring were computed. Three-fourths of these 45 differentials are positive, but only 7 exceed positive five percentage points. The largest positive difference is found in Namibia, where rural children in homes with primarily natural floors have a substantially higher period prevalence of ALRI symptoms than other rural children (25 versus 14 percent). However, in Ethiopia, an equally large negative difference is found (28 versus 39 percent).

Main Cooking Fuel

Only 11 intracountry differentials in the period prevalence of ALRI symptoms could be computed between children in rural homes using mainly smoke- or fume-producing cooking fuels and children in rural homes using mainly clean- burning cooking fuels. Of these, only two were larger than positive five percentage points (Namibia and Nicaragua).

Crowding

In rural areas, crowding as measured by either persons per sleeping room or household members is not significantly associated with ALRI symptom prevalence in young children.

Intracountry differentials in the period prevalence of ALRI symptoms between rural children in less crowded homes (one to two persons per sleeping room) and more crowded homes (five or more persons per sleeping room) were computed where possible. Just half of the 24 differentials are negative. The largest negative differences are those from Cameroon (16 versus 30 percent) and Brazil (22 versus 36 percent).

In rural areas, crowding is not significantly associated with ALRI symptom prevalence in young children.

Turning to the second measure of crowding, the regional average period prevalence of ALRI symptoms is not appreciably different for rural children in smaller households (one to five) compared with larger (six or more) households. The corresponding intracountry differentials were computed. All but 1 of these 49 differentials is relatively small, with an absolute value of less than five percentage points; less than half are negative.

5

Fever

5.1 Prevalence Levels and Differentials

Fever is the most common symptom[1] of illness in young children, and it is associated with a wide range of causes in different regions of the world. Thus, differential diagnosis by a health care practitioner of a child presenting with fever requires knowledge of locally endemic and epidemic diseases that may or may not be seasonal.

Fever is a common symptom of both non-life-threatening illnesses, which do not require medical attention, like most viral-based acute upper respiratory illnesses, and extremely life-threatening illnesses which do require urgent medical attention, like cerebral malaria, meningitis, septicemia, and typhoid. In surveys such as DHS surveys, it is not possible to either validate or determine the cause of any recent fever that the mother reports for her child, and thus whether or not particular types of treatments, such as antimalarials or antibiotics, might have been appropriate.

The highest regional average prevalence of fever is found in South/Southeast Africa, with a mean of 39 percent.

5.1.1 Residence

The percentage of children under age three years whose mothers reported that the child had experienced a fever at any time in the two weeks preceding the survey is shown in Table 5.1 by place of residence. The highest regional average prevalence of fever is found in South/Southeast Africa, with a mean of 39 percent (range 22 to 50 percentage points). In every country included in sub-Saharan Africa, South/Southeast Asia, and Latin America/Caribbean, the two-week period prevalence of fever exceeds 20 percent. The lowest regional average prevalence is found in Central Asia, with a mean of 10 percent (range 5 to 14 percentage points). In North Africa/West Asia/Europe, however, the only country among the four included for which the prevalence of fever exceeds 20 percent is Yemen, at 43 percent.

Overall, young children in rural areas are somewhat more likely than their urban counterparts to have experienced recent fever symptoms.

Young children in rural areas are somewhat more likely than their urban counterparts to have experienced recent fever symptoms.

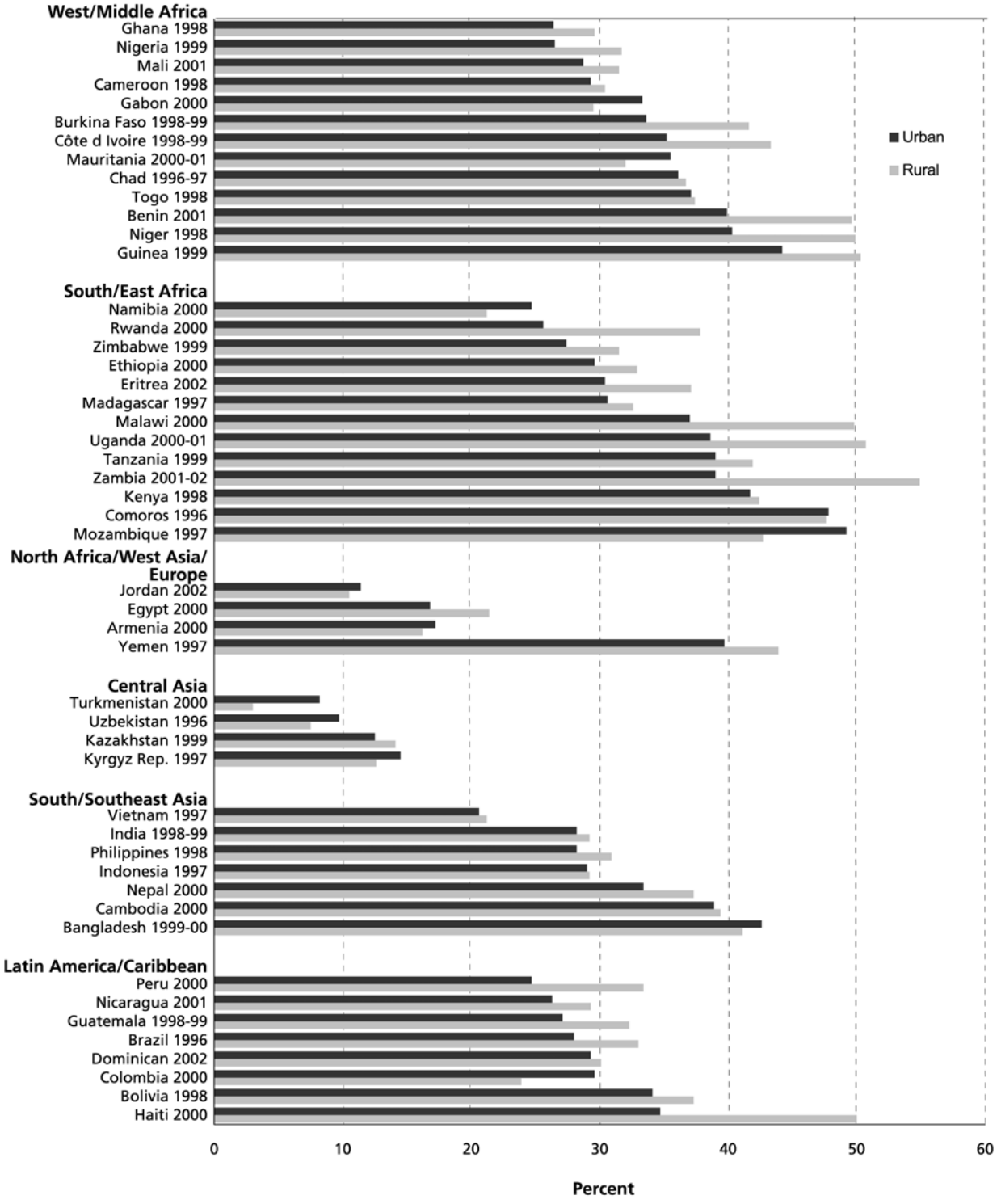
Figure 5.1 shows the percentage of children with fever by country and residence, arranged by region. The difference in prevalence of fever between urban and rural children within each country was computed. The majority of these differentials are negative. In 14 countries, fever prevalence among rural children exceeds that among same-age urban children by more than five percentage points, while a positive differential of the same magnitude is found in only one country, Turkmenistan.

[1] Technically speaking, fever refers to a measured elevation in body temperature, which is considered a *sign*, whereas feverishness refers to a subjective sensation of abnormal warmth, which is considered a *symptom*.

Table 5.1
Percentage of children under age three with a fever in the two weeks preceding the survey, by residence and age, Demographic and Health Surveys 1996-2002

Survey	Residence		Age in months						Total	Number of children
	Urban	Rural	0-5	6-11	12-17	18-23	24-29	30-35		
West/Middle Africa										
Benin 2001	39.9	49.6	29.1	53.4	54.3	52.8	45.2	45.9	46.5	2,912
Burkina Faso1998-99	33.6	41.6	27.3	50.7	49.7	48.6	38.1	31.9	40.8	3,219
Cameroon 1998	29.3	30.4	18.0	37.6	39.4	30.1	30.8	24.7	30.1	2,260
Chad 1996-97	36.1	36.7	28.6	42.4	42.5	36.1	37.1	32.3	36.5	3,938
Côte d'Ivoire 1998-99	35.2	43.3	23.0	48.5	46.1	42.7	42.7	35.1	40.5	1,221
Gabon 2000	33.3	29.5	21.9	34.4	41.5	31.1	34.5	28.7	32.3	2,324
Ghana 1998	26.4	29.6	11.2	31.2	32.3	34.2	28.6	35.0	28.8	1,802
Guinea 1999	44.2	50.3	41.2	57.3	56.2	53.3	44.4	42.8	48.7	3,005
Mali 2001	28.7	31.5	22.2	35.3	35.9	35.8	31.0	26.7	30.8	6,973
Mauritania 2000-01	35.5	32.0	29.1	38.5	36.0	36.4	30.3	29.1	33.5	2,796
Niger 1998	40.3	49.9	43.2	57.7	55.0	46.5	46.2	39.1	48.3	4,403
Nigeria 1999	26.5	31.7	21.6	35.7	34.3	34.8	27.9	26.0	30.2	3,208
Togo 1998	37.1	37.4	24.9	45.1	47.2	42.5	34.6	30.3	37.3	3,693
Median	35.2	36.7	24.9	42.4	42.5	36.4	34.6	31.9	36.5	
Mean	34.3	38.0	26.3	43.7	43.9	40.4	36.3	32.9	37.3	
South/East Africa										
Comoros 1996	47.8	47.6	39.5	55.2	55.6	51.8	41.2	39.3	47.6	1,056
Eritrea 2002	30.4	37.1	19.3	44.8	45.9	39.6	34.2	27.8	34.9	3,281
Ethiopia 2000	29.6	32.9	25.7	39.5	38.1	32.4	32.0	26.3	32.5	6,412
Kenya 1998	41.7	42.4	31.6	46.4	47.8	45.5	44.3	36.8	42.3	3,205
Madagascar 1997	30.6	32.6	25.7	36.2	38.2	34.0	29.2	29.0	32.2	3,537
Malawi 2000	37.0	49.8	37.2	56.2	55.6	51.8	47.6	40.1	48.1	6,862
Mozambique 1997	49.2	42.7	36.6	46.8	54.2	39.2	47.1	38.2	44.0	3,803
Namibia 2000	24.7	21.2	19.7	28.0	25.0	25.3	16.3	19.3	22.4	2,346
Rwanda 2000	25.6	37.8	30.9	44.2	40.4	35.7	30.6	28.9	36.9	4,293
Tanzania 1999	39.0	41.9	32.1	50.7	57.3	44.0	31.3	32.8	41.3	1,817
Uganda 2000-01	38.6	50.7	32.3	56.6	57.2	57.8	47.7	40.4	49.3	4,245
Zambia 2001-02	39.0	54.9	34.4	59.0	57.1	54.7	51.0	43.7	50.0	3,681
Zimbabwe 1999	27.4	31.5	18.1	39.0	38.6	34.2	31.7	19.7	30.2	2,029
Median	37.0	41.9	31.6	46.4	47.8	39.6	34.2	32.8	41.3	
Mean	35.4	40.2	29.5	46.4	47.0	42.0	37.2	32.5	39.4	
North Africa/West Asia/Europe										
Armenia 2000	17.2	16.2	2.8	17.8	19.1	17.3	18.5	25.0	16.7	880
Egypt 2000	16.8	21.4	15.3	25.7	21.3	20.4	19.4	15.5	19.6	6,741
Jordan 2002	11.4	10.5	6.8	13.6	17.5	12.3	9.3	7.0	11.2	3,454
Yemen 1997	39.7	43.9	34.9	47.0	49.4	45.8	41.8	39.1	43.0	7,056
Median	17.0	18.8	11.1	21.8	20.2	18.9	19.0	20.3	18.2	
Mean	21.3	23.0	15.0	26.0	26.8	24.0	22.3	21.7	22.6	
Central Asia										
Kazakhstan 1999	12.5	14.1	7.4	15.2	26.9	15.0	10.9	4.0	13.5	788
Kyrgyz Rep. 1997	14.5	12.6	8.4	16.0	16.4	19.0	7.6	11.0	13.1	1,104
Turkmenistan 2000	8.2	3.0	2.1	7.5	6.5	4.1	6.0	4.3	5.1	1,968
Uzbekistan 1996	9.7	7.5	7.8	7.8	9.6	8.4	7.8	7.6	8.2	1,325
Median	11.1	10.1	7.6	11.5	13.0	11.7	7.7	6.0	10.7	
Mean	11.2	9.3	6.4	11.6	14.9	11.6	8.1	6.7	10.0	
South/Southeast Asia										
Bangladesh 1999-00	42.6	41.1	34.4	49.6	48.4	39.0	39.6	38.2	41.4	3,927
Cambodia 2000	38.9	39.4	27.7	47.7	43.5	43.7	40.0	34.8	39.4	4,232
India 1998-99	28.2	29.2	19.7	33.6	34.0	32.1	29.0	25.8	29.0	30,668
Indonesia 1997	29.0	29.2	15.1	38.9	34.1	32.2	27.0	26.7	29.1	9,322
Nepal 2000	33.4	37.3	27.9	47.8	41.7	40.2	34.9	29.9	37.1	3,840
Philippines 1998	28.2	30.9	20.8	39.7	35.7	31.9	28.3	20.5	29.7	4,415
Vietnam 1997	20.6	21.2	14.8	26.4	30.5	21.7	15.8	17.0	21.1	1,769
Median	29.0	30.9	20.8	39.7	35.7	32.2	29.0	26.7	29.7	
Mean	31.6	32.6	22.9	40.5	38.3	34.4	30.7	27.6	32.4	
Latin America/Caribbean										
Bolivia 1998	34.1	37.3	25.0	43.4	41.3	36.8	33.5	31.2	35.5	3,826
Brazil 1996	28.0	33.0	21.7	36.6	33.4	29.8	26.0	26.7	29.2	2,757
Colombia 2000	29.6	23.9	16.1	31.0	34.0	29.1	26.7	28.8	27.8	2,725
Dominican Rep. 2002	29.3	30.1	20.2	35.3	35.0	33.3	26.1	26.8	29.6	6,395
Guatemala 1998-99	27.1	32.3	24.8	38.2	34.6	34.5	27.9	21.8	30.3	2,618
Haiti 2000	34.7	50.0	27.4	55.2	48.5	51.5	41.1	43.2	45.0	3,645
Nicaragua 2001	26.3	29.3	15.7	31.9	32.3	31.8	26.8	26.1	27.8	3,807
Peru 2000	24.7	33.4	21.1	32.0	32.4	31.5	28.3	25.5	28.6	6,790
Median	28.7	32.7	21.4	36.0	34.3	32.6	27.4	26.8	29.4	
Mean	29.2	33.7	21.5	38.0	36.4	34.8	29.6	28.8	31.7	

Figure 5.1
Percentage of children under age three years with fever in the two weeks preceding the survey, by residence

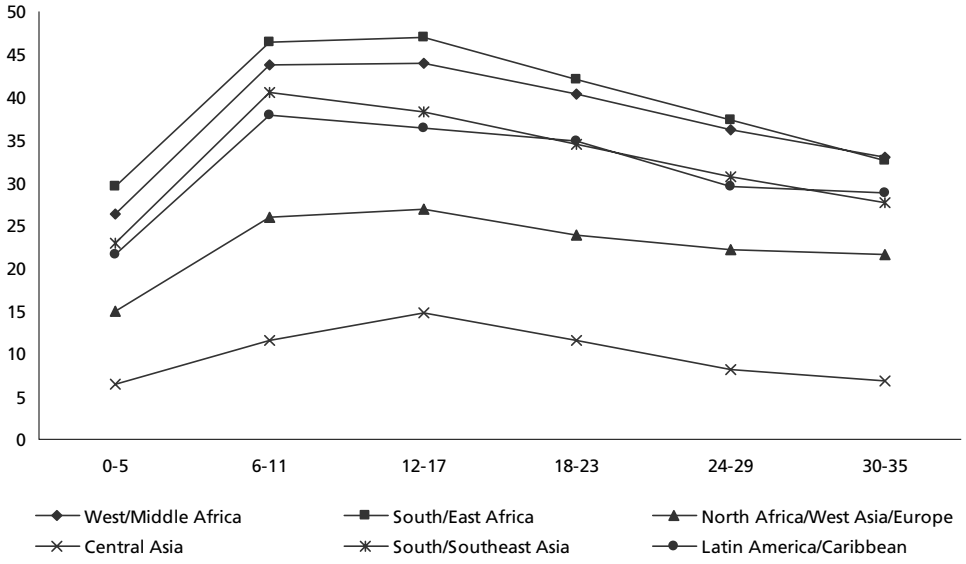


5.1.2 Child's Age

As a child ages, his/her immune system matures. Simultaneously, however, the child becomes exposed to increasing opportunities for infection as his/her social network expands.

Table 5.1 shows the prevalence of fever by child's age in months. The regional mean prevalence by age is shown in Figure 5.2. The trajectories are fairly similar for all regions. In each region, the mean prevalence of fever is lowest for the youngest infants (age 0-5 months), peaks at age 6-17 months, and then declines. At age 30-35 months, however, the mean prevalence of fever is still higher than at age 0-5 months, outside of Central Asia.

Figure 5.2
Mean percentage of children under age three years with fever in the two weeks preceding the survey, by age in months



5.1.3 Socioeconomic Characteristics

Residence and Wealth Index

Table 5.2 shows the prevalence of fever by residence and three categories of the country-specific household wealth index distribution. A strong negative association between household wealth and the probability of recent fever in young children is observed in both urban and rural areas, with few exceptions.

Table 5.2

Percentage of children under age three with a fever in the two weeks preceding the survey, by residence and wealth index, Demographic and Health Surveys 1996-2002

Survey	Urban					Rural				
	Household wealth index				Number of children	Household wealth index				Number of children
	Lowest 40%	Middle 40%	Highest 20%	Total		Lowest 40%	Middle 40%	Highest 20%	Total	
West/Middle Africa										
Benin 2001	51.5	42.5	32.2	39.9	931	51.5	48.7	28.9	49.6	1,981
Burkina Faso 1998-99	*	(44.6)	33.2	33.6	346	40.8	42.0	45.8	41.6	2,872
Cameroon 1998	(35.3)	33.1	25.2	29.3	622	29.3	33.3	25.0	30.4	1,639
Chad 1996-97	30.3	35.6	36.6	36.1	865	35.0	39.2	37.0	36.7	3,073
Côte d'Ivoire 1998-99	*	38.8	28.9	35.0	362	49.4	34.1	*	43.5	729
Gabon 2000	32.0	35.5	29.9	33.3	1,697	30.2	23.3	*	29.5	627
Ghana 1988	*	26.1	26.7	26.4	459	31.9	25.4	(29.9)	29.6	1,343
Guinea 1999	*	39.9	47.3	44.2	795	49.8	50.9	(54.6)	50.3	2,210
Mali 2001	50.3	24.3	28.8	28.7	1,706	32.1	31.5	22.8	31.6	5,265
Mauritania 2000-01	45.4	35.2	33.9	35.5	1,189	31.7	34.2	(13.2)	32.0	1,606
Niger 1998	*	44.3	39.2	40.3	733	49.9	50.5	45.1	49.9	3,671
Togo 1998	45.0	38.2	35.5	37.1	865	38.6	35.5	35.0	37.4	2,828
Median	45.0	36.9	32.7	35.3		36.8	34.9	32.4	37.1	
Mean	41.4	36.5	33.1	35.0		39.2	37.4	33.7	38.5	
South/East Africa										
Comoros 1996	42.3	50.5	50.0	47.8	255	47.2	48.1	47.2	47.6	801
Eritrea 2002	(34.4)	36.0	24.6	30.4	1,097	38.7	34.9	*	37.1	2,184
Ethiopia 2000	*	28.9	29.8	29.6	649	31.2	34.6	32.7	32.9	5,762
Kenya 1998	(37.9)	48.4	38.4	41.7	600	44.6	40.4	37.3	42.4	2,606
Madagascar 1997	32.0	32.0	28.9	30.6	704	32.7	32.4	32.3	32.6	2,833
Malawi 2000	50.7	43.2	34.4	37.0	890	50.2	48.9	51.4	49.8	5,967
Mozambique 1997	*	52.9	46.4	49.2	806	44.7	42.3	33.0	42.7	2,996
Namibia 2000	34.5	26.9	21.0	24.7	810	21.7	19.7	28.1	21.2	1,536
Rwanda 2000	(36.7)	42.2	24.2	27.8	690	40.9	37.1	36.7	38.6	3,604
Tanzania 1999	(52.3)	42.4	36.6	39.0	354	42.4	41.3	41.7	41.9	1,463
Uganda 2000-01	(31.1)	44.2	37.7	38.6	486	54.1	46.8	48.8	50.7	3,759
Zambia 2001-02	*	45.8	30.8	39.0	1,124	55.8	54.7	29.0	54.9	2,556
Zimbabwe 1999	*	27.9	27.1	27.4	668	31.4	32.0	*	31.5	1,361
Median	36.7	42.4	30.8	37.0		42.4	40.4	36.7	41.9	
Mean	39.1	40.1	33.1	35.6		41.2	39.5	38.0	40.3	
North Africa/West Asia/Europe										
Armenia 2000	21.2	19.2	13.0	17.2	453	16.9	15.2	*	16.2	427
Egypt 2000	19.2	19.3	13.5	16.8	2,625	21.5	21.2	20.5	21.4	4,116
Jordan 2002	12.2	11.5	8.1	11.4	2,680	10.3	11.7	4.9	10.5	774
Yemen 1997	(29.2)	39.4	40.6	39.7	1,631	49.1	39.8	27.8	43.9	5,425
Median	20.2	19.3	13.3	17.0		19.2	18.2	20.5	18.8	
Mean	20.5	22.4	18.8	21.3		24.5	22.0	17.7	23.0	
Central Asia										
Kazakhstan 1999	*	13.3	10.4	12.5	326	14.4	13.5	*	14.1	462
Kyrgyz Rep. 1997	(3.7)	17.9	14.1	14.5	253	14.1	11.6	(3.1)	12.6	851
Turkmenistan 2000	8.1	7.9	8.0	7.9	769	2.7	3.5	*	3.0	1,192
Uzbekistan 1996	1.6	10.0	12.0	9.7	414	7.5	8.1	(0.0)	7.5	911
Median	3.7	11.7	11.2	11.1		10.8	9.9	1.6	10.1	
Mean	4.5	12.3	11.1	11.1		9.7	9.2	1.6	9.3	
South/Southeast Asia										
Bangladesh 1999-00	47.7	42.9	40.6	42.6	644	43.8	38.6	36.1	41.1	3,283
Cambodia 2000	34.9	35.5	43.2	38.9	552	39.1	40.4	37.0	39.4	3,680
India 1998-99	25.7	30.9	26.1	28.2	6,928	29.5	29.0	27.5	29.2	23,741
Indonesia 1997	25.3	32.1	26.2	29.0	2,624	29.3	29.9	24.1	29.2	6,698
Nepal 2000	(25.6)	45.0	31.7	33.4	237	36.7	38.8	34.2	37.3	3,603
Philippines 1998	34.0	28.8	21.0	28.2	2,049	31.1	32.2	20.3	30.9	2,366
Vietnam 1997	*	25.8	17.6	20.6	255	20.1	25.1	10.1	21.2	1,513
Median	29.8	32.1	26.2	29.0		31.1	32.2	27.5	30.9	
Mean	32.2	34.4	29.5	31.6		32.8	33.4	27.0	32.6	
Latin America/Caribbean										
Bolivia 1998	35.3	33.9	33.8	34.1	2,219	37.2	38.1	*	37.3	1,606
Brazil 1996	32.7	25.5	23.4	28.0	2,104	33.1	32.6	*	33.0	653
Colombia 2000	33.5	27.8	28.7	29.6	1,863	23.7	27.1	*	23.9	862
Guatemala 1998-99	33.7	28.8	19.6	27.1	991	35.0	29.7	(14.5)	32.3	1,627
Haiti 2000	46.0	37.1	31.4	34.7	1,203	53.2	44.0	(44.7)	50.0	2,442
Nicaragua 2001	33.5	26.1	23.3	26.3	1,931	30.6	22.7	*	29.3	1,875
Peru 2000	28.9	26.2	17.7	24.7	3,744	34.7	21.5	*	33.4	3,046
Median	33.5	27.8	23.4	28.0		34.7	29.7	29.6	33.0	
Mean	34.8	29.3	25.4	29.2		35.4	30.8	29.6	34.2	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

In Figures 5.3.1 and 5.3.2, the range, mean, and median prevalence of fever are shown by residence, region, and level of household wealth. With the exception of Central Asia, the prevalence of fever in young children generally decreases with increasing household wealth in both urban and rural areas.

With the exception of Central Asia, the prevalence of fever in young children generally decreases with increasing household wealth.

For each country, the difference between the period prevalence of fever among children in households in the lowest 40 percent of the wealth index distribution and children in households in the highest 20 percent was computed. In urban areas, over half of these differentials (19 of 36) are positive by more than five percentage points, and over a third (13 of 36) exceed ten percentage points. The largest positive differential is found in Mali, where 50 percent of urban children in the least wealthy households have had a recent episode of fever, compared with 29 percent of those in the wealthiest households. In Latin America/Caribbean, all seven of the urban differentials are positive. In contrast, in Yemen, the Kyrgyz Republic, and Uzbekistan, urban children in the least wealthy households were less likely by more than ten percentage points to have had fever in the past two weeks compared with urban children in the wealthiest households.[2]

In rural areas, again, half of the computed differentials in fever prevalence by household wealth are greater than positive five percentage points (17 of 35). In four countries (Benin, Zambia, Yemen, and Guatemala), rural children in the poorest households are more likely by more than 20 percentage points to have experienced fever in the past two weeks than rural children in the wealthiest households.

In rural areas, only 6 of 35 differentials are negative.

Residence and Mother's Education

In most countries, a negative association is seen between mother's education and the probability of recent fever in urban children.

The period prevalence of fever by residence and mother's education (highest level completed) is shown in Table 5.3. Because few mothers in Central Asia have not completed at least one year of secondary school, data in the first two educational categories are sparse for that region.

In most countries, a moderate to strong negative association is seen between mother's educational attainment and the probability of recent fever in urban children.

On the basis of regional average prevalence by education, prevalence of fever among urban children decreases most prominently with increasing maternal education in the regions of South/East Africa, South/Southeast Asia, and Latin America/Caribbean.

[2] The number of urban children in the poorest wealth index category is less than 50 for the samples from Yemen and the Kyrgyz Republic.

Figure 5.3.1
Percentage of urban children under age three years with fever in the two weeks preceding the survey, by wealth index and region

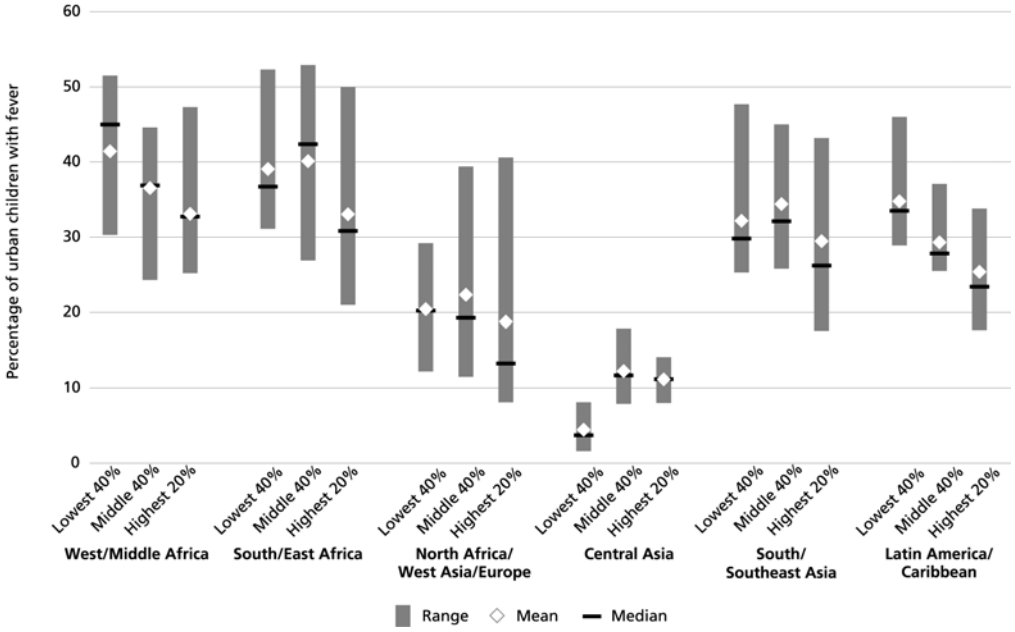
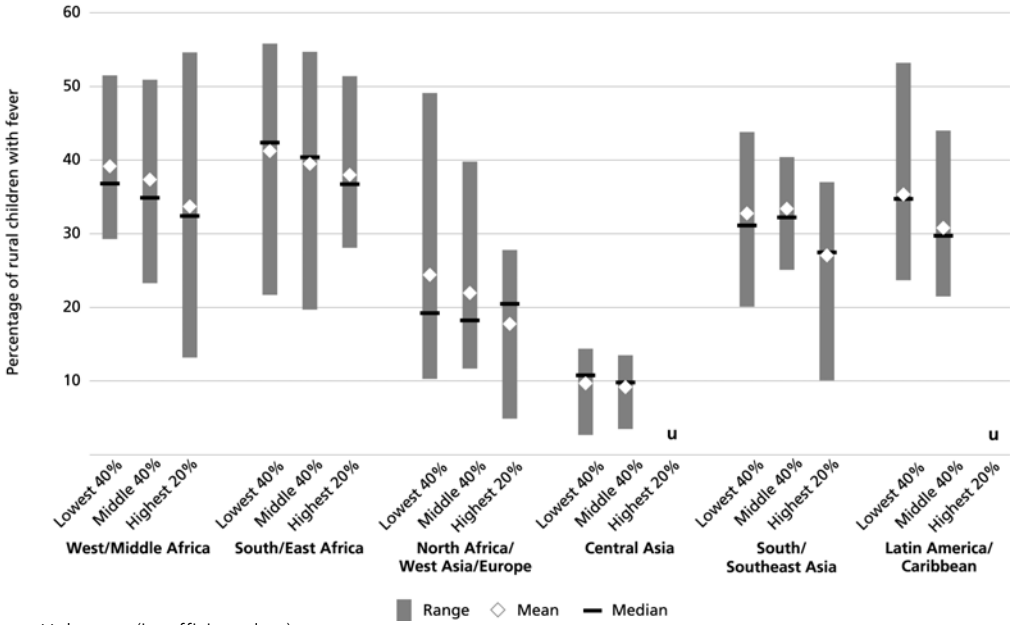


Figure 5.3.2
Percentage of rural children under age three years with fever in the two weeks preceding the survey, by wealth index and region



u = Unknown (insufficient data)

Table 5.3
Percentage of children under age three with a fever in the two weeks preceding the survey, by residence and mother's education, Demographic and Health Surveys 1996-2002

	Urban					Rural				
	Highest level of education				Number of children	Highest level of education				Number of children
Survey	None	Primary	Secondary+	Total		None	Primary	Secondary+	Total	
West/Middle Africa										
Benin 2001	45.4	36.8	29.2	39.9	931	49.7	49.9	45.7	49.6	1,981
Burkina Faso 1998-99	34.6	37.9	27.2	33.6	346	41.4	43.8	*	41.6	2,872
Cameroon 1998	30.6	29.1	28.9	29.3	622	23.8	34.7	33.6	30.4	1,639
Chad 1996-97	32.7	38.4	46.7	36.1	865	35.1	44.4	*	36.7	3,073
Côte d'Ivoire 1998-99	35.2	32.3	40.0	35.2	412	45.6	38.8	*	43.3	809
Gabon 2000	23.0	35.3	33.5	33.3	1,697	(40.5)	27.4	32.4	29.5	627
Ghana 1988	29.8	27.6	24.7	26.4	459	31.1	29.3	28.0	29.6	1,343
Guinea 1999	42.8	44.6	48.6	44.2	795	50.4	48.2	(53.3)	50.3	2,210
Mali 2001	29.5	25.2	29.2	28.7	1,706	31.3	33.1	41.7	31.6	5,267
Mauritania 2000-01	38.2	35.3	29.6	35.5	1,189	31.8	31.4	(39.4)	32.0	1,606
Niger 1998	41.2	36.5	41.7	40.3	733	50.3	44.6	(46.4)	49.9	3,671
Nigeria 1999	28.1	29.3	24.1	26.5	896	30.4	36.2	29.6	31.7	2,312
Togo 1998	38.9	37.7	33.2	37.1	865	39.8	31.8	35.4	37.4	2,828
Median	34.6	35.3	29.6	35.2		39.8	36.2	37.4	36.7	
Mean	34.6	34.3	33.6	34.3		38.6	38.0	38.5	38.0	
South/East Africa										
Comoros 1996	47.7	51.9	45.1	47.8	255	47.3	50.0	44.0	47.6	801
Eritrea 2002	39.0	30.4	23.6	30.4	1,097	38.5	34.3	(10.9)	37.1	2,184
Ethiopia 2000	28.0	23.6	35.2	29.6	649	32.5	35.5	30.5	32.9	5,762
Kenya 1998	(32.0)	46.8	36.9	41.7	600	45.5	43.3	38.1	42.4	2,606
Madagascar 1997	30.9	32.4	28.5	30.6	704	35.3	31.8	31.2	32.6	2,833
Malawi 2000	38.0	39.7	30.9	37.0	891	50.5	50.2	38.5	49.8	5,972
Mozambique 1997	53.1	49.3	40.2	49.2	806	42.3	42.8	(48.7)	42.7	2,996
Namibia 2000	35.9	28.3	22.2	24.7	810	21.9	21.9	20.2	21.2	1,536
Rwanda 2000	48.6	29.7	19.6	27.8	690	38.3	39.8	29.3	38.6	3,604
Tanzania 1999	48.4	39.9	26.4	39.0	354	44.0	41.3	28.7	41.9	1,463
Uganda 2000-01	35.3	46.1	30.0	38.6	486	50.2	51.3	47.0	50.7	3,758
Zambia 2001-02	(63.3)	42.9	32.2	39.0	1,124	58.1	55.4	47.3	54.9	2,556
Zimbabwe 1999	*	27.0	27.8	27.4	668	28.9	31.3	32.5	31.5	1,361
Median	38.5	39.7	30.0	37.0		42.3	41.3	32.5	41.9	
Mean	41.7	37.5	30.7	35.6		41.0	40.7	34.4	40.3	
North Africa/West Asia/Europe										
Armenia 2000	*	*	17.2	17.2	453	*	*	15.9	16.2	427
Egypt 2000	16.5	18.9	16.5	16.8	2,625	22.4	18.4	21.2	21.4	4,116
Jordan 2002	3.4	8.0	11.8	11.4	2,680	14.5	13.1	9.5	10.5	774
Yemen 1997	40.6	39.3	37.8	39.7	1,631	44.6	41.5	31.8	43.9	5,425
Median	16.5	18.9	16.9	17.0		22.4	18.4	18.6	18.8	
Mean	20.2	22.1	20.8	21.3		27.2	24.3	19.6	23.0	
Central Asia										
Kazakhstan 1999	*	*	12.5	12.5	327	*	*	14.2	14.1	462
Kyrgyz Rep. 1997	*	*	14.5	14.5	253	*	*	12.7	12.6	851
Turkmenistan 2000	*	*	8.2	8.2	775	*	*	2.8	3.0	1,192
Uzbekistan 1996	*	*	9.7	9.7	414	*	*	7.5	7.5	911
Median	u	u	11.1	11.1		u	u	10.1	10.1	
Mean	u	u	11.2	11.2		u	u	9.3	9.3	
South/Southeast Asia										
Bangladesh 1999-00	43.3	44.0	41.0	42.6	644	42.2	40.9	39.2	41.1	3,283
Cambodia 2000	41.6	37.2	39.5	38.9	552	39.8	39.7	37.4	39.4	3,680
India 1998-99	29.9	28.9	27.1	28.2	6,925	29.2	29.3	29.1	29.2	23,733
Indonesia 1997	22.4	29.8	28.8	29.0	2,624	28.8	29.8	27.8	29.2	6,698
Nepal 2000	36.3	36.3	29.9	33.4	237	37.6	37.4	35.6	37.3	3,603
Philippines 1998	*	32.6	27.2	28.2	2,049	20.0	32.9	29.8	30.9	2,366
Vietnam 1997	*	22.3	20.3	20.6	255	16.3	22.4	21.2	21.2	1,513
Median	36.3	32.6	28.8	29.0		29.2	32.9	29.8	30.9	
Mean	34.7	33.0	30.5	31.6		30.6	33.2	31.4	32.6	
Latin America/Caribbean										
Bolivia 1998	35.1	34.5	33.9	34.1	2,219	38.0	37.2	37.0	37.3	1,606
Brazil 1996	26.6	30.6	26.7	28.0	2,104	43.9	31.2	30.7	33.0	653
Colombia 2000	(34.4)	30.9	29.0	29.6	1,863	19.8	25.3	21.1	23.9	862
Dominican Rep. 2002	31.8	31.3	27.5	29.3	4,192	38.7	31.3	26.5	30.1	2,204
Guatemala 1998-99	33.6	26.9	23.2	27.1	991	32.9	33.6	17.6	32.3	1,627
Haiti 2000	30.8	35.3	36.2	34.7	1,203	52.5	47.7	51.0	50.0	2,442
Nicaragua 2001	31.5	28.3	24.6	26.3	1,931	32.2	28.6	24.5	29.3	1,875
Peru 2000	36.2	29.2	23.4	24.7	3,744	34.3	35.0	28.7	33.4	3,046
Median	32.7	30.8	27.1	28.7		36.2	32.5	27.6	32.7	
Mean	32.5	30.9	28.1	29.2		36.5	33.7	29.6	33.7	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
u = Unknown (too few cases to calculate estimate)

Eighteen of the 41 intracountry differentials in fever prevalence among urban children whose mothers have no completed years of education versus one or more completed years of secondary education are positive in excess of five percentage points; nine are large, exceeding ten percentage points. Those nine countries are Benin, Eritrea, Mozambique, Namibia, Rwanda, Tanzania, Zambia, Guatemala, and Peru. Only two countries, Chad and Gabon, have negative urban differentials in excess of ten percentage points.

As with urban children, in most countries, a moderate to strong negative association is seen between mother's educational attainment and the probability of recent fever in young rural children.

In rural areas, the regional average prevalence of fever decreases steadily with increasing maternal education in North Africa/West Asia/Europe and Latin America/Caribbean. In South/East Africa, the average prevalence of fever is similar for rural children whose mothers have no completed years of formal education and those whose mothers have at least one year of primary, but not secondary, education.

Intracountry differentials in fever prevalence were computed between rural children whose mothers fall into the lowest versus the highest education categories. In eight countries (Eritrea, Malawi, Tanzania, Zambia, Yemen, Brazil, the Dominican Republic, and Guatemala), rural children whose mothers have the least education are more likely by more than ten percentage points to have had a recent fever episode than same-age children whose mothers have the most education. In four countries, a negative differential of about ten percentage points is found: Cameroon, Mali, Mauritania, and the Philippines.

5.1.4 Demographic Characteristics

In Table 5.4, the period prevalence of fever is tabulated by categories of child's sex, birth order, birth interval, and mother's age.

Child's Sex

The average prevalence of fever does not differ substantially by child's sex in any of the six regions. Differentials in fever prevalence in each country by child's sex are generally small (less than plus or minus five percentage points). This magnitude was exceeded in only three countries. In Côte d'Ivoire and Kazakhstan, fever prevalence is higher among female children by seven and nine percentage points, respectively, while in the Kyrgyz Republic, fever prevalence is higher among male children by six percentage points.

The average prevalence of fever does not differ substantially by child's sex in any of the six regions.

Table 5.4

Percentage of children under age three with a fever in the two weeks preceding the survey, by child's sex, birth order, birth interval, and mother's age, Demographic and health Surveys 1996-2002

	Child's sex		Birth order				Birth interval (months)				Mother's age				
Survey	Male	Female	1	2-3	4-5	6+	1st birth	<24	24-35	36+	<20	20-34	35+	Total	Number of children
West/Middle Africa															
Benin 2001	47.8	45.3	46.2	44.1	46.6	50.5	46.2	49.9	43.5	48.4	45.8	46.4	47.4	46.5	2,912
Burkina Faso 1998-99	43.1	38.4	36.7	38.4	40.9	45.4	36.8	40.5	42.5	41.2	36.5	40.1	44.0	40.8	3,219
Cameroon 1998	31.9	28.4	27.7	30.2	27.1	35.2	28.0	30.5	29.7	31.8	25.8	29.3	37.3	30.1	2,260
Chad 1996-97	37.4	35.7	34.9	36.7	36.3	37.7	35.1	35.3	37.7	36.9	35.1	36.8	36.6	36.5	3,938
Côte d'Ivoire 1998-99	36.9	44.1	40.1	39.7	38.8	43.9	40.1	39.2	41.2	40.7	37.5	41.7	38.5	40.5	1,221
Gabon 2000	33.4	31.2	31.3	33.3	31.5	32.7	31.2	32.7	30.5	34.2	28.7	33.8	29.7	32.3	2,324
Ghana 1988	28.6	28.9	27.0	27.4	29.9	32.0	26.8	30.8	26.3	30.6	20.1	29.1	29.7	28.8	1,802
Guinea 1999	50.0	47.2	47.3	47.0	50.7	49.7	47.3	43.5	48.8	50.5	49.2	49.0	47.5	48.7	3,005
Mali 2001	31.0	30.7	32.3	30.4	30.0	31.1	32.2	29.8	31.1	30.5	33.4	30.1	31.9	30.8	6,973
Mauritania 2000-01	32.6	34.4	34.3	30.6	35.6	34.5	34.2	33.0	31.5	34.4	35.4	33.7	32.3	33.5	2,796
Niger 1998	49.1	47.5	42.0	46.9	47.3	53.3	41.8	50.6	48.9	50.2	44.0	48.1	52.2	48.3	4,403
Nigeria 1999	31.8	28.6	29.0	27.7	31.1	34.3	28.9	30.5	32.0	29.5	29.7	30.3	30.2	30.2	3,208
Togo 1998	39.5	35.2	35.4	36.1	39.7	37.9	35.5	38.1	37.5	37.8	36.5	36.8	39.2	37.3	3,693
Median	36.9	35.2	34.9	36.1	36.3	37.7	35.1	35.3	37.5	36.9	35.4	36.8	37.3	36.5	
Mean	37.9	36.6	35.7	36.0	37.3	39.9	35.7	37.3	37.0	38.2	35.2	37.3	38.2	37.3	
South/East Africa															
Comoros 1996	46.6	48.7	47.4	45.8	49.8	48.1	48.5	49.4	44.9	48.6	50.0	48.5	44.4	47.6	1,056
Eritrea 2002	35.8	34.0	30.5	33.0	35.2	40.8	30.4	32.6	39.2	34.5	33.8	33.6	38.1	34.9	3,281
Ethiopia 2000	33.0	32.1	32.7	32.3	33.4	32.0	32.6	35.5	30.2	33.3	34.3	32.0	33.8	32.5	6,412
Kenya 1998	42.4	42.2	41.5	37.5	44.7	49.5	41.5	43.9	44.8	40.3	42.8	41.6	45.2	42.3	3,205
Madagascar 1997	32.8	31.6	30.2	31.9	34.0	32.7	30.3	32.7	33.5	31.8	32.7	32.4	31.0	32.2	3,537
Malawi 2000	48.3	48.0	45.9	46.2	50.8	51.2	45.9	53.7	50.5	45.8	50.6	47.4	49.8	48.1	6,862
Mozambique 1997	45.8	42.2	35.5	46.9	45.2	46.6	35.6	49.7	45.3	46.2	41.8	45.4	40.4	44.0	3,803
Namibia 2000	21.4	23.4	20.9	20.4	26.7	25.2	21.1	21.9	24.9	22.1	28.9	21.6	22.1	22.4	2,346
Rwanda 2000	37.3	36.5	37.0	38.0	36.6	35.5	36.9	36.0	36.8	37.5	42.7	38.1	33.3	36.9	4,293
Tanzania 1999	42.8	39.8	41.7	42.4	42.1	38.6	41.7	44.7	40.6	40.7	37.1	41.5	42.8	41.3	1,817
Uganda 2000-01	49.8	48.8	44.0	48.6	50.8	52.0	44.0	51.4	51.4	47.9	52.8	49.0	48.5	49.3	4,245
Zambia 2001-02	49.1	50.9	47.5	49.2	51.1	52.9	47.7	53.5	50.8	49.7	49.1	49.3	54.2	50.0	3,681
Zimbabwe 1999	32.2	28.0	26.8	33.9	28.1	29.7	26.7	30.7	33.5	31.5	26.5	30.7	30.5	30.2	2,029
Median	42.4	39.8	37.0	38.0	42.1	40.8	36.9	43.9	40.6	40.3	41.8	41.5	40.4	41.3	
Mean	39.8	38.9	37.0	38.9	40.7	41.1	37.1	41.2	40.5	39.2	40.2	39.3	39.5	39.4	
North Africa/West Asia/Europe															
Armenia 2000	15.3	18.5	18.1	15.6	15.9	*	18.0	16.5	12.3	16.9	15.3	16.7	18.3	16.7	880
Egypt 2000	20.3	18.8	20.6	17.9	21.6	20.0	20.4	17.5	20.2	19.5	23.7	19.5	18.9	19.6	6,741
Jordan 2002	11.0	11.4	12.1	10.7	10.6	11.9	11.9	11.5	11.0	10.6	11.6	11.4	10.4	11.2	3,454
Yemen 1997	44.4	41.5	41.2	40.4	42.8	45.5	41.4	44.2	42.2	43.4	42.9	41.9	46.2	43.0	7,056
Median	17.8	18.7	19.4	16.8	18.8	20.0	19.2	17.0	16.3	18.2	19.5	18.1	18.6	18.2	
Mean	22.8	22.5	23.0	21.1	22.7	25.8	22.9	22.4	21.4	22.6	23.4	22.4	23.5	22.6	
Central Asia															
Kazakhstan 1999	8.9	18.1	16.1	12.9	9.7	*	16.1	13.0	8.3	12.6	*	13.9	10.9	13.5	788
Kyrgyz Rep. 1997	16.3	9.8	11.9	15.8	9.5	9.0	11.8	14.7	15.1	11.7	*	13.5	10.6	13.1	1,104
Turkmenistan 2000	5.6	4.5	5.3	5.5	3.1	4.7	5.3	5.2	2.7	6.7	*	5.2	4.2	5.1	1,968
Uzbekistan 1996	7.8	8.6	9.7	8.2	6.5	4.1	9.7	9.8	5.5	7.7	6.9	8.3	7.6	8.2	1,325
Median	8.4	9.2	10.8	10.6	8.0	4.7	10.8	11.4	6.9	9.7	u	10.9	9.1	10.7	
Mean	9.6	10.3	10.8	10.6	7.2	5.9	10.7	10.7	7.9	9.7	u	10.2	8.3	10.0	
South/Southeast Asia															
Bangladesh 1999-00	43.3	39.4	39.1	39.9	46.3	45.3	39.2	41.1	42.4	42.5	39.8	41.1	47.8	41.4	3,927
Cambodia 2000	39.6	39.1	39.8	39.0	40.6	38.3	40.0	44.8	38.9	37.5	35.8	39.5	39.6	39.4	4,232
India 1998-99	29.9	28.0	29.4	28.0	30.7	29.2	29.4	27.4	30.0	28.6	30.6	28.6	30.0	29.0	30,668
Indonesia 1997	30.4	27.8	29.6	29.1	27.6	30.5	29.7	29.3	30.1	28.4	34.2	29.4	26.2	29.1	9,322
Nepal 2000	37.3	36.9	34.3	36.6	37.1	43.3	34.3	38.7	38.2	37.4	36.4	36.7	39.9	37.1	3,840
Philippines 1998	29.8	29.5	27.9	28.6	30.7	33.5	27.9	31.0	29.0	30.7	34.7	29.5	29.2	29.7	4,415
Vietnam 1997	22.1	20.1	22.8	20.0	24.2	11.4	22.9	23.1	18.7	20.0	*	22.4	14.3	21.1	1,769
Median	30.4	29.5	29.6	29.1	30.7	33.5	29.7	31.0	30.1	30.7	35.3	29.5	30.0	29.7	
Mean	33.2	31.5	31.8	31.6	33.9	33.1	31.9	33.6	32.5	32.2	35.3	32.5	32.4	32.4	
Latin America/Caribbean															
Bolivia 1998	35.8	35.2	35.6	33.2	36.8	38.2	35.7	36.7	34.8	35.0	33.8	35.5	36.0	35.5	3,826
Brazil 1996	30.1	28.2	29.6	26.9	32.0	34.7	29.6	30.0	28.3	28.5	28.4	29.0	30.9	29.2	2,757
Colombia 2000	28.8	26.7	25.8	29.1	27.8	31.2	25.7	27.2	27.5	30.6	26.6	27.5	30.2	27.8	2,725
Dominican Rep. 2002	30.2	29.0	28.6	29.2	30.1	37.3	28.7	31.5	31.3	28.5	31.8	29.2	28.8	29.6	6,395
Guatemala 1998-99	32.1	28.6	31.0	26.7	30.1	35.6	31.0	31.0	30.3	29.1	29.0	30.2	31.5	30.3	2,618
Haiti 2000	43.5	46.5	43.3	42.5	48.2	47.6	43.6	49.1	45.4	42.9	42.6	46.7	40.9	45.0	3,645
Nicaragua 2001	28.1	27.5	25.7	28.8	26.2	31.6	25.7	24.9	32.0	29.1	27.5	27.7	28.6	27.8	3,807
Peru 2000	29.6	27.6	24.4	28.5	32.7	34.1	24.5	29.1	32.8	29.9	26.2	28.6	29.6	28.6	6,790
Median	30.2	28.4	29.1	29.0	31.1	35.2	29.2	30.5	31.7	29.5	28.7	29.1	30.6	29.4	
Mean	32.3	31.2	30.5	30.6	33.0	36.3	30.6	32.4	32.8	31.7	30.7	31.8	32.1	31.7	

Note: An asterisk indicates that a figure is bases on fewer than 25 unweighted cases and has been suppressed.
u = Unknown (too few cases to calculate estimate)

Birth Order

The data indicate there is a small increased probability of recent fever associated with higher birth order in young children, with the notable exception of the Central Asian countries included here.

In every region except North Africa/West Asia/Europe and Central Asia, the average prevalence of fever is slightly higher at birth orders four and above than at three and below. In North Africa/West Asia/Europe, the average fever prevalence is lowest at birth orders two to three and highest at orders six and above. In Central Asia, the average fever prevalence follows a different pattern and decreases from orders two to three to a low at orders six and above.

There is a small increased probability of recent fever associated with higher birth order in young children, with the exception of the Central Asian countries.

Differentials in fever prevalence were computed for each country between children of birth order one and birth orders six and above. Thirty-five of these 47 differentials are negative. In 18 countries, children of birth orders six and above have a prevalence of fever more than five percentage points higher than that of firstborn children. There are just two countries in which the opposite occurs. In Uzbekistan and Vietnam, the prevalence of fever among first-born children is more than five percentage points higher than that of children at birth orders six and above.

Birth Interval

The most consistent evidence of an increased probability of recent fever associated with a short birth interval (<24 months) is found in the South/East Africa region.

The average prevalence of fever does not differ substantially by birth interval in most regions. The exception is South/East Africa, where children born less than 24 months following a prior birth have a higher prevalence than either first-born children or children born after an interval of 24 months or more.

Two sets of intracountry differentials were computed for fever prevalence: first births versus birth interval less than 24 months and birth interval less than 24 months versus 36 or more months. Thirty-five of the 49 differentials in fever prevalence between first-born children and their short birth interval (less than 24 months) counterparts are negative. While most are small, six of these differentials are negative by more than five percentage points: Niger, Madagascar, Malawi, Tanzania, Uganda, and Haiti. Differentials in fever prevalence between the shortest (less than 24 months) and longest (36 or more months) birth intervals are more evenly split between positive and negative values.

The average prevalence of fever does not differ substantially by birth interval in most regions.

Mother's Age

The regional average prevalence of fever does not differ substantially by mother's age except in South/Southeast Asia. However, the pattern seen there of a higher prevalence of fever among children of the youngest mothers (under 20 years) is not corroborated by the intracountry differentials in prevalence between children of the youngest versus the oldest (35 or more years) mothers for countries in that region.

5.1.5 Nutritional Status

In Table 5.5, the percentage of children with a recent fever episode is shown by three indices of undernutrition—underweight, stunting, and wasting—broken down by three levels of severity. Data are sparse in the North Africa/West Asia/Europe and Central Asia regions for children in the severe categories of underweight and wasting, and in the Latin America/Caribbean region for severely wasted children.

Table 5.5

Percentage of children under age three with a fever in the two weeks preceding the survey, by nutritional status indices, Demographic and Health Surveys 1996-2002

Survey	Weight-for-age Z-score			Height-for-age Z-score			Weight-for-height Z-score			Total	Number of children
	≤-3.0	-3.0 to -2.01	≥-2.0	≤-3.0	-3.0 to -2.01	≥-2.0	≤-3.0	-3.0 to -2.01	≥-2.0		
West/Middle Africa											
Benin 2001	60.1	56.9	43.3	56.8	49.0	44.8	67.0	56.5	45.3	46.6	2,610
Burkina Faso 1998-99	53.4	44.9	37.8	43.6	41.7	41.0	60.2	52.8	38.8	41.5	2,530
Cameroon 1998	39.5	31.1	29.6	33.7	31.8	29.5	*	32.7	30.1	30.4	1,923
Chad 1996-97	46.2	37.4	33.7	41.3	36.0	35.4	47.2	42.8	35.0	36.5	3,541
Côte d'Ivoire 1998-99	(64.9)	49.5	40.5	43.4	46.9	42.3	*	58.4	41.3	43.0	1,099
Gabon 2000	38.8	37.8	33.9	39.7	38.6	33.3	*	30.0	34.6	34.4	2,013
Ghana 1988	37.2	37.1	26.2	33.4	34.6	27.6	(36.2)	38.6	27.6	28.9	1,638
Guinea 1999	62.0	57.2	48.1	51.9	55.0	49.8	56.4	65.7	49.0	50.7	2,067
Mali 2001	39.9	36.4	27.9	31.0	35.0	30.2	45.1	43.9	29.3	31.2	6,120
Mauritania 2000-01	41.1	39.0	33.2	39.2	37.8	33.6	39.5	42.8	33.9	35.0	2,227
Niger 1998	59.9	50.4	44.6	52.4	50.5	48.0	73.8	61.7	45.7	49.4	4,022
Nigeria 1999	42.2	34.4	30.0	33.4	33.7	30.8	45.1	39.2	30.7	32.0	1,473
Togo 1998	48.6	47.3	34.4	45.3	42.0	36.2	48.1	47.6	36.3	37.7	3,260
Median	46.2	39.0	33.9	41.3	38.6	35.4	47.7	43.9	35.0	36.5	
Mean	48.8	43.0	35.6	41.9	41.0	37.1	51.9	47.1	36.7	38.3	
South/East Africa											
Comoros 1996	69.9	47.9	46.9	49.6	54.3	47.0	*	58.6	47.7	48.9	921
Eritrea 2002	49.3	42.1	29.9	40.8	42.3	32.4	54.2	46.1	33.4	35.5	2,996
Ethiopia 2000	40.6	35.9	29.2	36.3	33.7	31.4	46.1	40.4	31.8	33.0	6,011
Kenya 1998	57.9	48.0	41.8	52.6	43.5	42.2	(44.0)	49.2	43.4	43.7	2,821
Madagascar 1997	40.0	36.1	30.2	34.9	30.3	33.8	*	41.2	32.3	33.1	3,080
Malawi 2000	62.2	54.6	45.9	51.8	51.8	46.5	54.0	57.3	48.2	48.8	6,177
Mozambique 1997	64.0	52.7	42.1	53.3	45.4	44.2	(78.7)	52.3	44.7	45.9	2,837
Namibia 2000	27.5	26.1	21.6	24.0	24.8	22.1	(23.6)	30.0	22.0	22.5	2,188
Rwanda 2000	47.3	43.6	34.6	38.8	39.4	35.8	48.9	39.5	36.6	37.0	3,915
Tanzania 1999	52.4	47.2	40.4	53.8	42.0	40.7	*	30.8	43.5	42.8	1,674
Uganda 2000-01	66.2	61.0	46.5	49.9	56.7	48.2	*	69.5	49.2	50.2	3,740
Zambia 2001-02	62.7	57.8	47.3	54.0	55.4	47.8	(50.2)	63.8	50.1	50.8	3,432
Zimbabwe 1999	(32.3)	44.5	28.5	35.1	29.1	30.1	(48.4)	38.1	29.6	30.4	1,684
Median	51.7	47.2	40.4	49.6	42.3	40.7	48.9	46.1	43.4	42.8	
Mean	51.7	46.0	37.3	44.2	42.2	38.6	49.8	47.4	39.4	40.2	
North Africa/West Asia/Europe											
Armenia 2000	*	*	17.3	*	20.6	16.6	*	*	17.4	17.1	805
Egypt 2000	(27.2)	26.3	19.2	25.5	22.9	18.5	(33.8)	19.7	19.4	19.5	6,264
Jordan 2002	*	8.3	11.4	14.6	11.8	11.2	*	15.2	11.3	11.3	2,845
Yemen 1997	49.2	45.1	39.1	43.6	42.5	41.8	50.9	50.6	40.9	42.4	4,966
Median	38.2	26.3	18.3	25.5	21.8	17.6	42.4	19.7	18.4	18.3	
Mean	38.2	26.6	21.8	27.9	24.5	22.0	42.4	28.5	22.3	22.6	
Central Asia											
Kazakhstan 1999	*	*	13.5	*	(27.3)	12.5	*	*	13.6	13.5	354
Kyrgyz Rep. 1997	*	24.7	11.7	24.0	17.1	11.2	*	(17.1)	13.0	13.1	1,015
Turkmenistan 2000	(2.0)	4.0	5.2	8.7	3.5	5.0	*	2.1	5.2	5.0	1,745
Uzbekistan 1996	(11.2)	5.1	8.7	5.0	9.9	8.7	*	8.9	7.8	8.4	989
Median	6.6	5.1	10.2	8.7	13.5	10.0	u	8.9	10.4	10.8	
Mean	6.6	11.3	9.8	12.6	14.4	9.4	u	9.4	9.9	10.0	
South/Southeast Asia											
Bangladesh 1999-00	48.0	45.0	39.3	44.6	44.4	40.8	(46.6)	54.9	40.8	42.3	3,306
Cambodia 2000	49.9	43.0	38.5	42.3	41.4	39.3	42.4	38.9	39.7	39.7	4,006
India 1998-99	34.7	32.3	26.8	31.4	32.3	27.9	33.9	35.5	28.5	29.5	27,094
Nepal 2000	42.6	40.8	34.3	39.8	39.5	36.0	46.6	45.3	36.5	37.5	3,707
Median	45.3	41.9	36.4	41.1	40.5	37.7	44.5	42.1	38.1	38.6	
Mean	43.8	40.3	34.7	39.5	39.4	36.0	42.4	43.7	36.4	37.3	
Latin America/Caribbean											
Bolivia 1998	51.9	49.4	34.3	40.6	38.3	34.6	*	49.3	35.5	35.7	3,451
Brazil 1996	*	29.1	29.7	37.3	36.1	29.0	*	33.7	29.5	29.7	2,306
Colombia 2000	(33.9)	44.2	27.1	28.5	31.5	27.8	*	(42.5)	28.0	28.2	2,498
Dominican Rep. 2002	(27.9)	35.3	29.9	33.7	33.8	29.8	*	18.7	30.2	30.1	5,612
Guatemala 1998-99	29.4	42.6	28.8	34.5	34.1	29.1	*	40.6	30.9	31.3	2,149
Haiti 2000	68.4	62.1	42.1	61.1	56.6	42.6	(72.5)	53.7	44.8	45.4	3,532
Nicaragua 2001	50.2	34.8	26.9	29.6	31.1	27.4	*	40.6	27.6	27.9	3,443
Peru 2000	42.3	35.4	28.5	37.3	31.1	28.0	*	33.6	29.0	29.1	6,070
Median	42.3	39.0	29.3	35.9	34.0	29.1	u	40.6	29.9	29.9	
Mean	43.4	41.6	30.9	37.8	36.6	31.0	u	39.1	31.9	32.2	

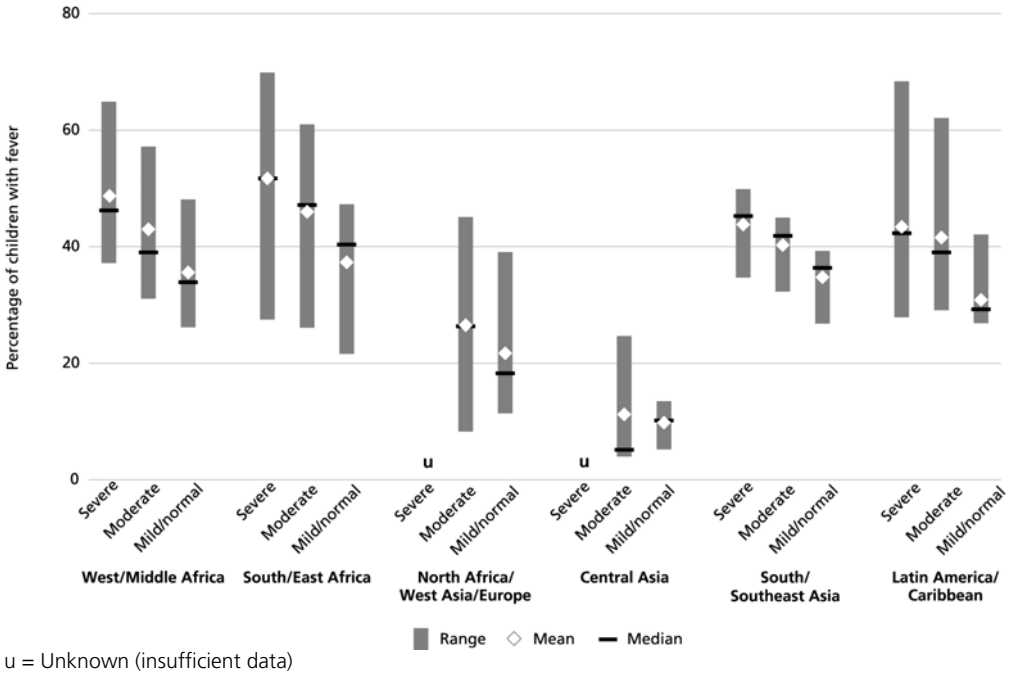
Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
u = Unknown (too few cases to calculate estimate)

These data lend support to a strong and largely consistent negative association between nutritional status and the probability of a recent episode of fever among young children.

The range, mean, and median period prevalence of fever for countries included in each region are depicted in Figure 5.4 by severe, moderate, and mild/normal categories of underweight. There is a strong and consistent decrease in fever prevalence with improved weight-for-age in each region except Central Asia. Strong and consistent decreases in fever prevalence are similarly observed with improved height-for-age and weight-for-height with the exception, again, of Central Asia.

The data support a negative association between nutritional status and the probability of a recent episode of fever among young children.

Figure 5.4
Percentage of children under age three years with fever in the two weeks preceding the survey, by low weight-for-age status and region



u = Unknown (insufficient data)

For each indicator of undernutrition, the difference in fever prevalence between children falling into the severe and the mild/normal categories was computed for each country. With respect to underweight, only 5 differentials are less than positive five percentage points, and 26 of 41 are in excess of positive ten percentage points. In five countries (Côte d'Ivoire, Comoros, Mozambique, Haiti, and Nicaragua), children who are severely underweight have a fever prevalence more than 20 percentage points higher than that of children who are mildly underweight or normal weight-for-age.

In five countries (Côte d'Ivoire, Comoros, Mozambique, Haiti, and Nicaragua), children who are severely underweight have a fever prevalence more than 20 percentage points higher than that of children who are mildly underweight or normal weight-for-age.

For stunting, 18 of 44 differentials exceed positive five percentage points. Children who are severely stunted have a fever prevalence more than ten percentage points higher than that of children who are mildly stunted or normal height-for-age in five countries: Benin, Kenya, Tanzania, the Kyrgyz Republic, and Haiti.

For wasting, more than half (15 of 26) of the differentials exceed positive 10 percentage points, and in six countries (Benin, Burkina Faso, Niger, Eritrea, Mozambique, and Haiti), children who are severely wasted are more likely by more than 20

percentage points to have had a recent fever episode, compared with same-age children who are mildly wasted or normal weight-for-height.

5.1.6 Immunization Status

Fever and Full Immunization

Children in their second year of life appear to have a slightly reduced likelihood of fever if they have received all recommended vaccinations.

Table 5.6 shows the percentage of one- and two-year-old children with a fever episode in the past two weeks by immunization status, i.e., receipt of all recommended vaccinations at any time before the date of interview. Children in their second year of life appear to have a slightly reduced likelihood of fever if they have received all recommended vaccinations. This advantage does not appear to persist into the third year of life.

In each region, with the exceptions of South/East Africa and Central Asia, there is a small but consistent increase in the average prevalence of fever among one-year-old children who have not been fully immunized, compared with fully immunized children of the same age. Among two-year-olds, these small increases are not present, with the exception of the North Africa/West Asia/Europe region.

For each age group, the intracountry differences in fever prevalence by receipt versus nonreceipt of all recommended vaccinations were computed. Among one-year-olds, more than three-fourths of these differentials are negative; 12 are negative by more than five percentage points. The largest negative differentials are found in Côte d'Ivoire (39 versus 50 percent), Zambia (53 versus 64 percent), and Haiti (41 versus 55 percent). In contrast, only three countries have differentials that are positive by more than five percentage points (Namibia, Tanzania, and Uzbekistan). Among two-year-olds, the number of negative and positive differentials in fever prevalence by immunization status is nearly equal.

Table 5.6

Percentage of children age 12 to 23 months and 24-35 months with fever in the two weeks preceding the survey, by immunization status, Demographic and Health Surveys 1996-2002

Survey	Children age 12-23 months fully vaccinated		Children age 24-35 months fully vaccinated		Total	Number of children
	Yes	No	Yes	No		
West/Middle Africa						
Benin 2001	49.5	59.4	45.5	45.7	49.6	1,848
Burkina Faso 1998-99	44.6	51.2	29.7	37.8	42.4	2,030
Cameroon 1998	36.8	34.2	32.3	25.1	31.8	1,443
Chad 1996-97	33.8	40.9	34.3	35.1	37.5	2,431
Côte d'Ivoire 1998-99	38.8	50.3	43.8	34.7	42.0	810
Gabon 2000	36.5	37.1	33.9	31.5	34.5	1,529
Ghana 1988	31.6	35.9	31.7	31.2	32.5	1,193
Guinea 1999	55.1	55.3	46.4	42.9	49.4	1,906
Mali 2001	34.3	36.5	26.4	30.0	32.5	4,223
Mauritania 2000-01	36.3	36.1	27.0	31.0	33.2	1,771
Niger 1998	50.1	51.6	39.8	43.9	47.3	2,757
Nigeria 1999	34.5	34.5	24.5	27.8	31.2	2,099
Togo 1998	41.8	46.3	31.1	33.2	38.5	2,324
Median	36.8	40.9	32.3	33.2	37.5	
Mean	40.3	43.8	34.3	34.6	38.6	
South/East Africa						
Comoros 1996	55.7	51.8	47.1	28.9	47.8	674
Eritrea 2002	42.9	43.0	33.0	26.9	36.9	2,000
Ethiopia 2000	39.6	34.7	30.9	29.1	32.5	4,226
Kenya 1998	44.5	50.0	40.9	40.4	43.8	2,118
Madagascar 1997	32.1	38.7	23.8	32.7	33.0	2,257
Malawi 2000	52.7	56.1	44.0	43.9	49.0	4,345
Mozambique 1997	47.3	48.3	42.8	43.7	45.7	2,362
Namibia 2000	29.8	16.5	19.6	15.0	21.7	1,529
Rwanda 2000	37.7	45.6	30.7	37.1	36.1	2,562
Tanzania 1999	55.3	41.0	31.1	34.3	41.5	1,181
Uganda 2000-01	52.2	60.6	42.4	46.4	51.6	2,760
Zambia 2001-02	52.6	63.6	46.5	49.4	51.9	2,442
Zimbabwe 1999	37.1	35.6	27.7	22.4	31.3	1,368
Median	44.5	45.6	33.0	34.3	41.5	
Mean	44.6	45.0	35.4	34.6	40.2	
North Africa/West Asia/Europe						
Armenia 2000	17.2	21.1	20.2	(31.0)	20.0	581
Egypt 2000	20.7	22.5	17.3	20.5	19.2	4,379
Jordan 2002	13.0	15.6	6.9	8.5	11.4	2,289
Yemen 1997	45.2	48.8	39.7	40.9	44.0	4,512
Median	19.0	21.8	18.8	25.6	19.6	
Mean	24.0	27.0	21.0	25.2	23.6	
Central Asia						
Kazakhstan 1999	20.2	23.6	9.0	3.4	14.3	545
Kyrgyz Rep. 1997	16.1	21.4	9.6	8.9	13.6	738
Turkmenistan 2000	5.6	3.8	3.8	15.4	5.2	1,275
Uzbekistan 1996	10.4	3.9	7.9	6.6	8.4	909
Median	13.3	12.7	8.5	7.8	11.0	
Mean	13.1	13.2	7.6	8.6	10.4	
South/Southeast Asia						
Bangladesh 1999-00	43.5	45.7	39.1	39.0	41.7	2,615
Cambodia 2000	41.9	44.7	36.0	38.6	40.5	2,632
India 1998-99	32.1	34.0	26.3	28.4	30.4	20,125
Indonesia 1997	31.7	35.0	27.0	26.8	30.1	6,109
Nepal 2000	38.8	44.9	31.2	35.4	36.8	2,558
Philippines 1998	34.0	33.7	23.9	26.9	29.3	2,921
Vietnam 1997	25.3	26.1	18.0	14.1	21.1	1,240
Median	34.0	35.0	27.0	28.4	30.4	
Mean	35.3	37.7	28.8	29.9	32.8	
Latin America/Caribbean						
Bolivia 1998	38.5	39.2	34.8	30.7	35.8	2,510
Brazil 1996	31.9	31.1	26.9	24.1	29.0	1,853
Colombia 2000	30.0	33.1	27.1	29.1	29.7	1,784
Dominican Rep. 2002	33.6	34.4	27.1	26.1	30.3	4,384
Guatemala 1998-99	33.2	36.5	26.7	22.8	29.9	1,716
Haiti 2000	40.7	54.8	39.9	43.8	46.1	2,450
Nicaragua 2001	28.5	31.6	27.7	21.7	28.4	2,012
Peru 2000	29.9	30.0	24.6	27.2	28.5	3,500
Median	32.6	33.8	27.1	26.7	29.8	
Mean	33.3	36.3	29.4	28.2	32.2	

Note: Figures in parentheses are based on 25-49 unweighted cases.

5.2 Treatment of Fever

During surveys conducted in malaria-endemic countries under MEASURE *DHS*+, information was optionally collected on any drugs taken by young children for treatment of a fever. In Table 5.7, the percent distribution of children under the age of three years with a fever episode at any time in the past two weeks who received an antimalarial drug, another drug (no antimalarial), or no drug is shown by urban-rural residence for the 17 countries in this report that collected this information.

One of the messages promoted through WHO's IMCI strategy is that in malaria-endemic areas, young children with a fever should be presumed to have malaria and should be treated with a locally recommended antimalarial drug.

One of the messages promoted through WHO's IMCI strategy is that in malaria-endemic areas, young children with a fever should be presumed to have malaria and should be treated with a locally recommended antimalarial drug. Since fever alone does not signify a need for urgent medical attention, mothers in these areas are encouraged to begin administering an antimalarial on their own (Nicoll, 2000).

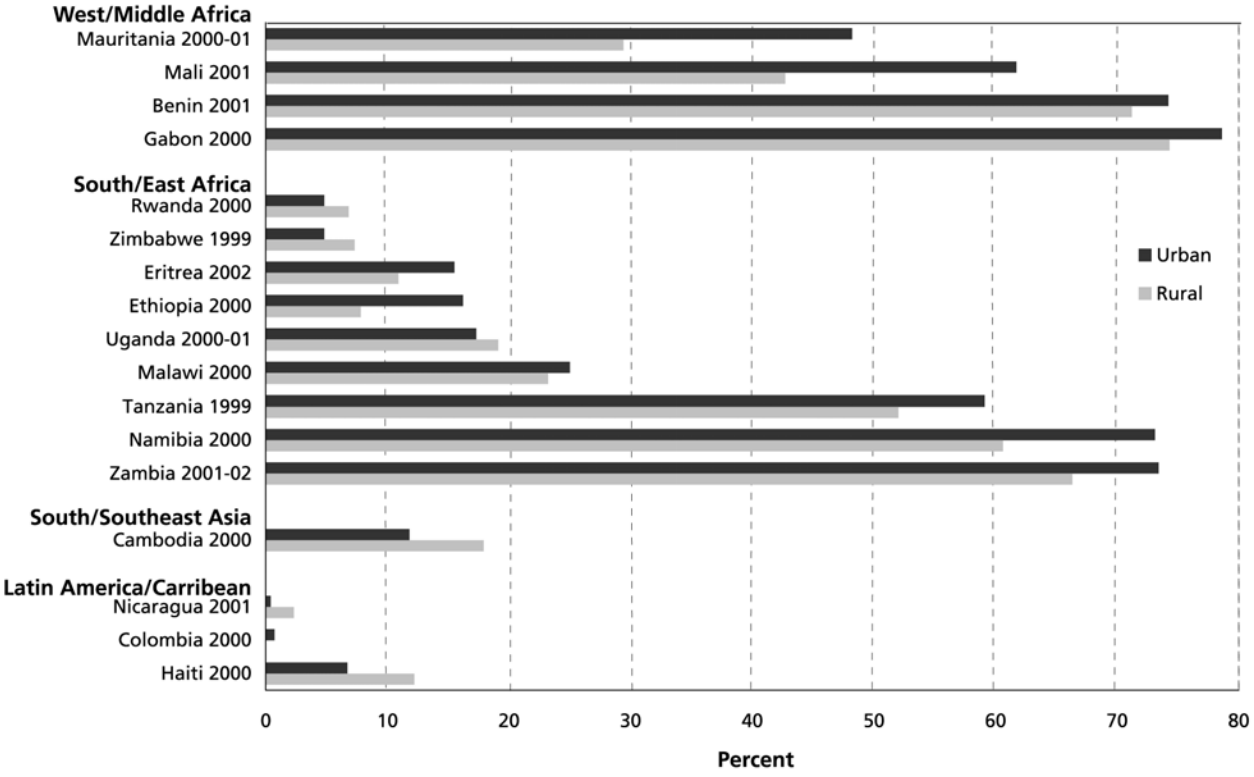
As seen in Figure 5.5, the use of antimalarials for the treatment of fever is highly variable. In the region of South/East Africa, less than 10 percent of either urban or rural children with a fever were given an antimalarial in the countries of Rwanda and Zimbabwe, in contrast to more than half of children with a fever in Tanzania, Namibia, and Zambia. Use of antimalarials is low in the four non-African countries listed in the table, being nearly nonexistent in Nicaragua and Colombia.

Table 5.7
Percent distribution of children under age three with fever in the two weeks preceding the survey, by residence and medication received, Demographic and Health Surveys 1999-2002

	Urban					Rural				
Survey	Any antimalarial	Any other drug	No drug	Total	Number of children	Any antimalarial	Any other drug	No drug	Total	Number of children
West/Middle Africa										
Benin 2001	74.2	15.2	10.6	100.0	372	71.2	13.9	14.9	100.0	983
Gabon 2000	78.6	16.4	5.0	100.0	566	74.3	12.9	12.8	100.0	185
Mali 2001	61.7	26.8	11.5	100.0	489	42.7	25.5	31.8	100.0	1,662
Mauritania 2000	48.2	25.0	26.7	100.0	422	29.4	17.0	53.6	100.0	514
South/East Africa										
Eritrea 2002	15.5	45.7	38.9	100.0	333	10.9	33.6	55.5	100.0	811
Ethiopia 2000	16.2	37.5	46.3	100.0	193	7.8	11.1	81.1	100.0	1,894
Malawi 2000	25.0	70.4	4.6	100.0	330	23.2	66.1	10.7	100.0	2,972
Namibia 2000	73.1	13.6	13.3	100.0	200	60.6	14.8	24.6	100.0	325
Rwanda 2000	4.8	49.9	45.3	100.0	177	6.8	15.5	77.7	100.0	1,364
Tanzania 1999	59.1	34.0	6.9	100.0	138	52.0	31.4	16.6	100.0	613
Uganda 2000	17.3	1.4	81.3	100.0	187	19.1	6.0	75.0	100.0	1,904
Zambia 2001	73.4	16.3	10.3	100.0	439	66.3	10.1	23.6	100.0	1,403
Zimbabwe 1999	4.8	0.8	94.4	100.0	183	7.3	3.2	89.5	100.0	429
South/Southeast Asia										
Cambodia 2000	11.8	83.3	4.9	100.0	215	17.9	72.1	10.0	100.0	1,451
Latin America/Caribbean										
Colombia 2000	0.7	96.2	3.1	100.0	551	0.0	87.2	12.8	100.0	206
Haiti 2000	6.7	66.0	27.4	100.0	418	12.2	45.0	42.8	100.0	1,221
Nicaragua 2001	0.4	95.4	4.2	100.0	509	2.3	83.8	14.0	100.0	549

Urban children with fever are, in general, more likely than rural children to be given an antimalarial drug. For each country, the difference in the percentage of children with fever who were given any antimalarial drug was computed between urban

Figure 5.5
Percentage of children under age three years with fever in the two weeks preceding the survey who received an antimalarial drug, by residence



and rural residents. In one-third of these countries (6 of 17), urban children with fever were more likely by more than five percentage points to receive an antimalarial, compared with rural children. The largest positive differences are found in Mali (62 versus 43 percent) and Mauritania (48 versus 29 percent). In Cambodia and Haiti, rural children with fever are more likely to be treated with an antimalarial drug than urban children by about six percentage points.

Urban children with fever are more likely than rural children to be given an antimalarial drug.

5.3 Seeking Care for Symptoms of ALRI and/or Fever

During surveys conducted under MEASURE *DHS+,* questions about careseeking were not asked separately for cough and fever. Hence, in the event that a child had separate rather than joint episodes of cough and fever, it is not possible to discern if care was sought for the cough episode, the fever episode, or both. Therefore, in this section, careseeking behavior is combined to describe those children with symptoms of ALRI (cough with short, rapid breaths), fever, or both.

5.3.1 Residence

Figure 5.6 shows the percentage of children for whom advice or treatment was sought from an appropriate health care provider (exclusive of pharmacists, shopkeepers, and traditional practitioners) among children under age three years with symptoms of ALRI and/or fever by urban-rural residence and region. In 11 of 50 countries, care was sought for at least half of both urban and rural sick children. Care was sought for at least half of urban sick children in an additional four countries and for half of rural sick children in one more country. In all but two countries (Zimbabwe and the Kyrgyz Republic), sick children from urban areas were more likely than those from rural areas to be taken to an appropriate health care provider.

In all but two countries (Zimbabwe and the Kyrgyz Republic), sick children from urban areas were more likely than those from rural areas to be taken to an appropriate health care provider.

5.3.2 Residence and Wealth Index

In Table 5.8, the percentage of children for whom advice or treatment was sought from an appropriate health care provider among children with symptoms of ALRI and/or fever is shown by residence and by three categories of the country-specific household wealth index distribution. In the countries included from Central Asia, data are very sparse in all columns because of small numbers of sick children in those samples. Elsewhere, data are sparse in some columns because of the skewed distribution of sick children by wealth index.

Figure 5.6

Among children under age three years with symptoms of ALRI and/or fever in the two weeks preceding the survey, percentage for whom advice or treatment was sought from an appropriate health care provider

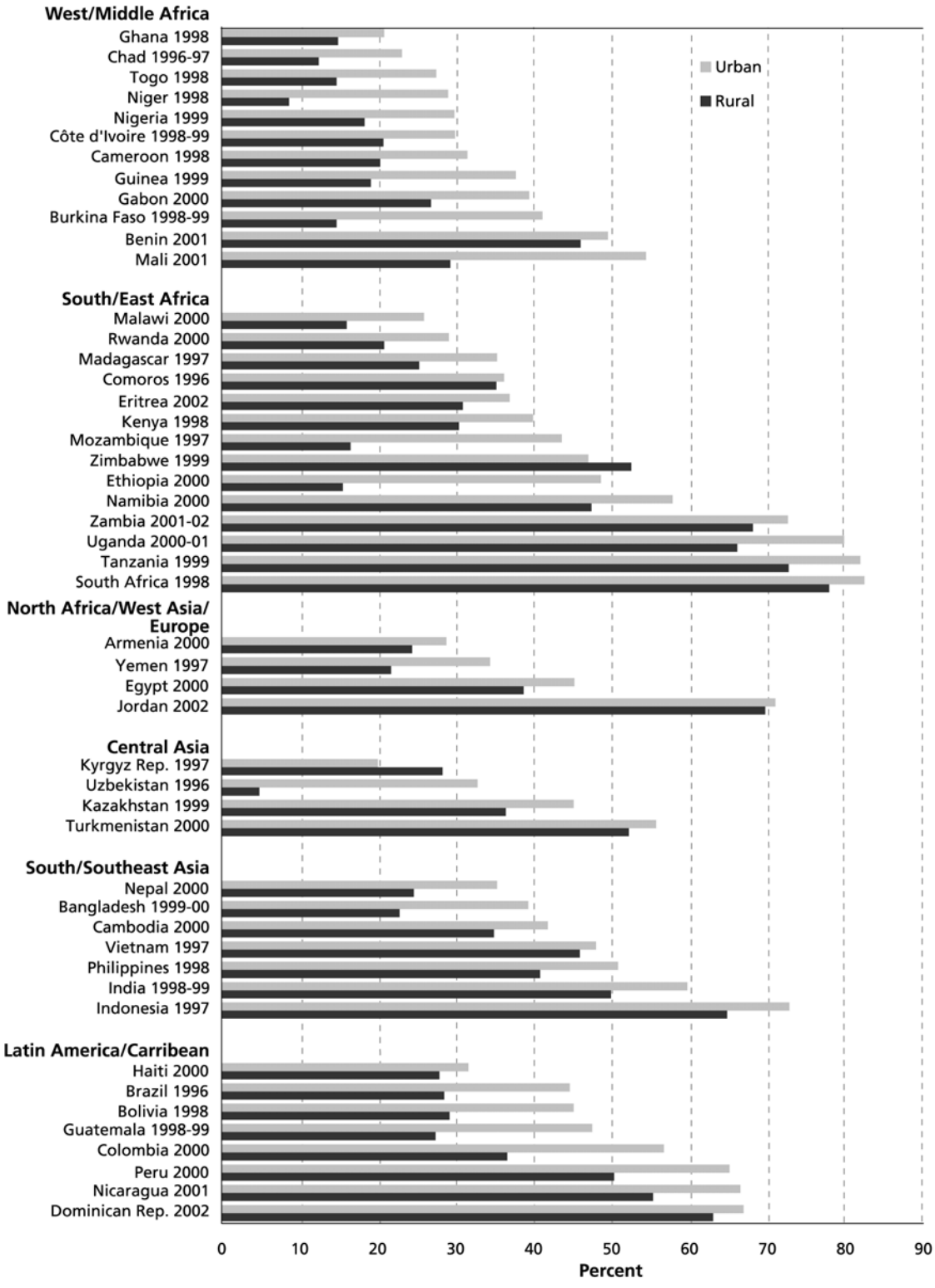


Table 5.8

Among children under age three with symptoms of acute lower respiratory infection (ALRI) and/or fever in the two weeks preceding the survey, percentage taken to an appropriate health care provider, by residence and wealth index, Demographic and Health Surveys 1996-2002

	Urban					Rural				
	Household wealth index				Number	Household wealth index				Number
Survey	Lowest 40%	Middle 40%	Highest 20%	Total	of children	Lowest 40%	Middle 40%	Highest 20%	Total	of children
West/Middle Africa										
Benin 2001	35.9	48.5	60.0	49.5	417	41.4	51.4	*	46.0	1,059
Burkina Faso 1998-99	*	*	42.7	41.1	130	13.1	13.5	33.4	14.7	1,298
Cameroon 1998	*	34.0	30.0	31.5	243	15.5	24.3	*	20.3	653
Chad 1996-97	*	15.6	26.0	23.1	363	9.5	14.0	28.3	12.4	1,305
Côte d'Ivoire 1998-99	*	30.6	30.6	30.0	148	19.3	19.2	*	19.4	356
Gabon 2000	37.9	39.6	41.2	39.4	677	24.7	(45.6)	*	26.8	224
Ghana 1988	*	16.2	25.4	20.8	145	12.2	19.5	*	14.9	518
Guinea 1999	*	35.8	39.5	37.7	381	14.4	24.7	(44.1)	19.1	1,184
Mali 2001	(42.9)	63.0	70.4	66.1	551	35.0	35.4	56.2	35.7	1,836
Mauritania 2000-01	24.6	24.0	28.5	25.8	473	4.5	14.8	*	7.9	566
Niger 1998	*	28.1	30.0	29.0	327	7.3	10.3	9.3	8.6	1,903
Togo 1998	(8.1)	25.0	31.6	27.5	378	13.2	16.7	(24.3)	14.7	1,283
Median	35.9	30.6	31.1	30.8		13.8	19.4	30.8	17.0	
Mean	29.9	32.8	38.0	35.1		17.5	24.1	32.6	20.0	
South/East Africa										
Comoros 1996	(40.0)	(30.6)	(39.1)	36.2	130	33.2	37.6	(36.8)	35.2	420
Eritrea 2002	*	35.5	40.3	36.9	406	27.5	37.2	*	30.9	1,025
Ethiopia 2000	*	*	51.3	48.6	239	14.6	14.8	25.6	15.5	2,406
Kenya 1998	*	42.7	38.7	39.9	270	30.0	29.0	40.4	30.4	1,238
Madagascar 1997	31.4	39.1	35.1	35.3	271	25.8	22.9	(40.5)	25.3	1,201
Malawi 2000	(12.8)	25.3	27.2	25.9	392	13.8	16.9	22.5	16.0	3,605
Mozambique 1997	*	38.5	47.9	43.6	427	14.5	17.1	26.1	16.5	1,351
Namibia 2000	*	53.1	65.8	57.8	239	44.5	52.2	*	47.4	502
Rwanda 2000	*	21.8	29.7	27.2	255	19.0	21.2	20.7	20.2	1,762
South Africa 1998	93.7	79.9	78.4	82.4	298	75.5	86.1	*	77.9	339
Tanzania 1999	*	(82.6)	80.3	81.9	154	70.7	74.5	77.5	72.7	666
Uganda 2000-01	*	73.3	81.8	79.8	221	62.5	69.1	76.5	66.1	2,184
Zambia 2001-02	*	75.6	67.6	72.6	483	66.6	70.5	*	68.1	1,494
Zimbabwe 1999	*	40.4	53.2	47.0	211	52.5	52.0	*	52.5	524
Median	35.7	40.4	49.6	45.3		31.6	37.4	36.8	33.1	
Mean	44.5	49.1	52.6	51.1		39.3	42.9	40.7	41.0	
North Africa/West Asia/Europe										
Armenia 2000	*	(32.4)	(23.8)	28.8	101	22.4	*	*	24.4	101
Egypt 2000	40.2	45.0	47.3	45.2	520	39.0	38.3	(39.6)	38.7	1,075
Jordan 2002	69.6	70.7	(78.2)	71.0	414	66.9	72.8	*	69.7	113
Yemen 1997	*	33.5	34.4	34.4	747	18.1	25.5	37.9	21.7	2,722
Median	54.9	39.3	40.8	39.8		30.7	38.3	38.8	31.6	
Mean	54.9	45.4	45.9	44.8		36.6	45.5	38.8	38.6	
Central Asia										
Kazakhstan 1999	*	(36.4)	*	(31.7)	44	(22.7)	*	*	20.1	70
Kyrgyz Rep. 1997	*	*	*	(20.0)	38	27.0	(28.8)	*	28.3	129
Turkmenistan 2000	*	*	*	(55.0)	61	*	*	*	(52.2)	36
Uzbekistan 1996	*	(23.3)	(45.0)	32.8	44	(5.3)	*	*	4.8	70
Median	u	29.8	u	32.2		22.7	u	U	24.2	
Mean	u	29.8	u	34.9		18.3	u	U	26.4	
South/Southeast Asia										
Bangladesh 1999-00	37.2	23.1	50.1	39.3	300	18.9	25.1	42.2	22.8	1,486
Cambodia 2000	34.3	40.8	45.5	41.8	222	30.4	37.4	51.3	34.9	1,502
India 1998-99	49.8	60.8	60.5	59.7	2,371	44.8	55.5	61.8	49.9	8,642
Indonesia 1997	61.5	73.7	73.7	72.8	809	58.2	72.2	80.7	64.8	2,110
Nepal 2000	*	(42.4)	35.8	35.3	105	21.5	26.0	34.7	24.6	1,619
Philippines 1998	44.3	56.0	46.9	50.8	682	37.6	48.2	59.3	40.8	888
Vietnam 1997	*	(22.5)	58.0	48.0	63	46.2	45.4	47.6	45.9	397
Median	44.3	42.4	50.1	48.0		37.6	45.4	51.3	40.8	
Mean	45.4	45.6	52.9	49.7		36.8	44.3	53.9	40.5	
Latin America/Caribbean										
Bolivia 1998	34.7	45.6	54.0	45.1	934	29.0	31.6	*	29.2	722
Brazil 1996	40.3	44.1	57.7	44.6	853	25.0	(53.2)	*	28.5	297
Colombia 2000	49.1	59.0	62.7	56.7	551	34.6	*	*	36.6	206
Guatemala 1998-99	65.5	47.2	(30.6)	47.5	354	23.9	31.8	*	27.4	662
Haiti 2000	(10.3)	27.2	39.8	31.6	574	27.0	30.3	*	27.9	1,532
Nicaragua 2001	67.1	62.6	74.6	66.5	778	53.5	65.4	*	55.3	844
Peru 2000	49.5	65.3	81.8	65.1	1,301	49.0	67.8	*	50.3	1,213
Median	49.1	47.2	57.7	47.5		29.0	42.5	U	29.2	
Mean	45.2	50.1	57.3	51.0		34.6	46.7	U	36.5	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
u = Unknown (too few cases to calculate estimate)

Higher household wealth is consistently associated with the likelihood that advice or treatment will be sought for young children with symptoms of ALRI and/or fever in both urban and rural areas.

Higher household wealth is associated with the likelihood that advice or treatment will be sought for young children with symptoms of ALRI and/or fever.

Figures 5.7.1 and 5.7.2 show for urban and rural areas, respectively, the range, mean, and median percentage of sick children for whom advice or treatment was sought for countries included in each region by categories of the household wealth index distribution. On average, sick children in households in the highest 20 percent of the country's wealth index distribution were more likely than children in households in the lowest 40 percent of the distribution to be taken for care.

In the regions of West/Middle Africa, South/Southeast Asia, and Latin America/Caribbean, the average prevalence of care for urban sick children in the middle 40 percent of the wealth index distribution is similar to that for children in the lowest 40 percent of the distribution (Figure 5.7.1). However, in these same regions, the average prevalence of care for rural children increases from the lowest category to the middle category of the wealth index (Figure 5.7.2).

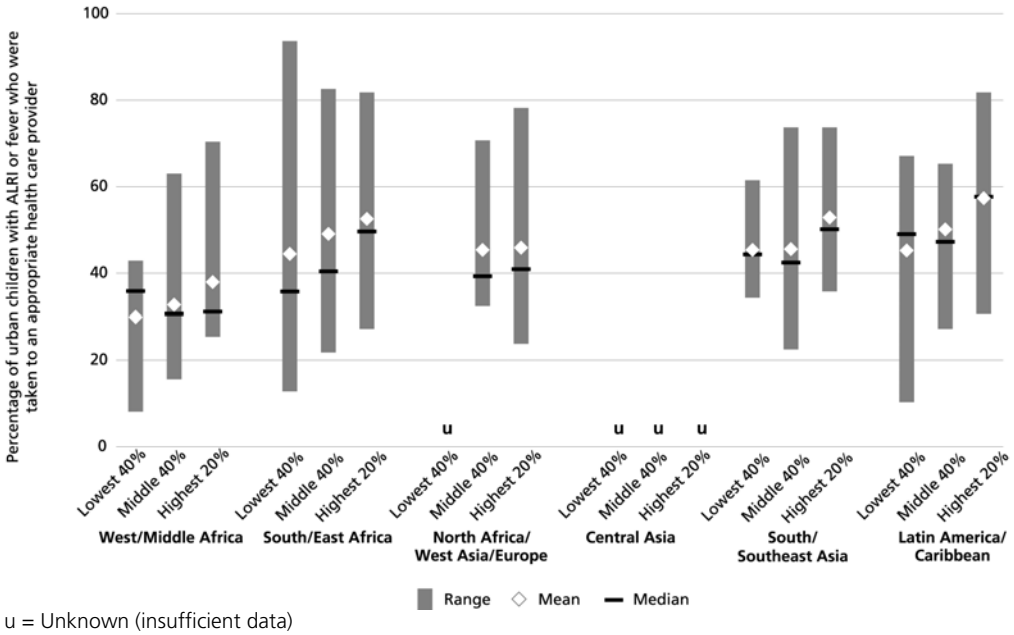
5.3.3 Residence and Mother's Education

Careseeking for ALRI symptoms and/or fever is shown in Table 5.9 by residence and categories of the mother's education (highest level completed). In the Central Asian countries shown plus Armenia and Jordan, there are very few mothers of sick children who have not completed at least one year of secondary school. Hence, data in the first two education categories are sparse for those countries.

There is a strong and largely consistent positive association between careseeking for ALRI symptoms and/or fever in young children and mother's educational attainment in both urban and rural areas, with the notable exception of Guatemala.

Figure 5.7.1

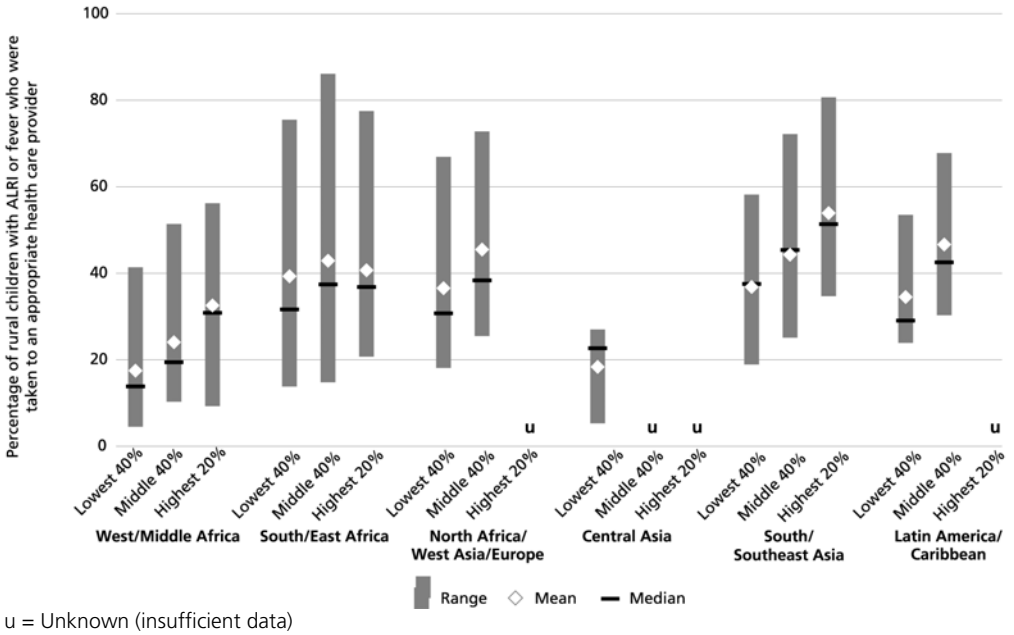
Percentage of urban children under age three years with symptoms of ALRI and/or fever in the two weeks preceding the survey, who were taken to an appropriate health care provider, by wealth index and region



u = Unknown (insufficient data)

Figure 5.7.2

Percentage of rural children under age three years with symptoms of ALRI and/or fever in the two weeks preceding the survey, who were taken to an appropriate health care provider, by wealth index and region



u = Unknown (insufficient data)

Table 5.9

Among children under age three with symptoms of acute lower respiratory infection (ALRI) and/or fever in the two weeks preceding the survey, percentage taken to an appropriate health care provider, by residence and mother's education, Demographic and Health Surveys 1996-2002

	Urban					Rural				
	Highest level of education				Number of	Highest level of education				Number of
Survey	None	Primary	Secondary+	Total	children	None	Primary	Secondary+	Total	children
West/Middle Africa										
Benin 2001	45.8	58.9	47.8	49.5	417	44.8	53.1	(42.5)	46.0	1,059
Burkina Faso 1998-99	34.7	(41.7)	56.2	41.1	130	14.1	28.4	*	14.7	1,298
Cameroon 1998	17.1	27.4	43.0	31.5	243	7.7	24.7	28.4	20.3	653
Chad 1996-97	21.2	23.8	28.9	23.1	363	10.6	18.9	*	12.4	1,305
Côte d'Ivoire 1998-99	24.2	36.9	33.9	29.9	170	19.3	25.9	*	20.7	394
Gabon 2000	(25.6)	36.9	42.0	39.4	677	*	28.1	25.8	26.8	224
Ghana 1988	(21.0)	(13.7)	23.8	20.8	145	16.2	16.1	12.7	14.9	518
Guinea 1999	35.1	46.7	37.4	37.7	381	17.4	39.4	(47.0)	19.1	1,184
Mali 2001	61.3	73.8	76.9	66.1	551	35.5	37.0	(40.2)	35.7	1,836
Mauritania 2000-01	26.5	21.8	32.8	25.8	473	8.0	8.5	*	7.9	566
Niger 1998	24.1	37.8	38.0	29.0	327	8.5	8.7	*	8.6	1,903
Nigeria 1999	22.1	26.2	37.3	29.8	273	14.7	20.6	24.4	18.3	834
Togo 1998	20.7	30.0	34.8	27.5	378	12.7	18.7	23.1	14.7	1,283
Median	24.2	36.9	37.4	29.9		14.4	24.7	27.1	18.3	
Mean	29.2	36.6	41.0	34.7		17.5	25.2	30.5	20.0	
South/East Africa										
Comoros 1996	37.9	(27.6)	(40.0)	36.2	130	33.8	39.2	(35.9)	35.2	420
Eritrea 2002	25.7	47.7	37.0	36.9	406	28.6	42.2	*	30.9	1,025
Ethiopia 2000	44.8	41.7	55.2	48.6	239	14.7	19.3	(25.5)	15.5	2,406
Kenya 1998	*	36.4	45.1	39.9	270	29.9	28.8	36.1	30.4	1,238
Madagascar 1997	(16.9)	35.7	41.2	35.3	271	21.1	24.9	34.9	25.3	1,201
Malawi 2000	25.1	22.9	34.4	25.9	392	13.6	16.2	32.6	16.0	3,608
Mozambique 1997	32.6	46.8	(35.5)	43.6	427	13.1	18.3	*	16.5	1,351
Namibia 2000	*	55.1	57.0	57.8	239	49.0	41.3	53.4	47.4	502
Rwanda 2000	16.4	27.2	33.7	27.2	255	20.2	20.0	23.6	20.2	1,762
South Africa 1998	*	81.7	83.3	82.4	298	(76.4)	84.5	74.3	77.9	339
Tanzania 1999	(86.1)	79.2	(98.1)	81.9	154	62.8	77.3	(73.5)	72.7	666
Uganda 2000-01	(70.7)	80.4	80.8	79.8	221	58.8	67.8	75.1	66.1	2,184
Zambia 2001-02	*	68.5	76.9	72.6	483	58.6	69.2	78.3	68.1	1,494
Zimbabwe 1999	*	(24.2)	52.9	47.0	211	33.8	52.4	57.0	52.5	524
Median	32.6	44.3	49.0	45.3		31.9	40.3	46.6	33.1	
Mean	39.6	48.2	55.1	51.1		36.7	43.0	50.0	41.0	
North Africa/West Asia/Europe										
Armenia 2000	*	*	28.8	28.8	101	*	*	24.8	24.4	101
Egypt 2000	40.9	48.9	45.7	45.2	520	37.2	38.4	41.2	38.7	1,075
Jordan 2002	*	*	71.7	71.0	414	*	(84.4)	69.1	69.7	113
Yemen 1997	35.5	36.3	29.5	34.4	747	20.4	28.1	47.1	21.7	2,722
Median	38.2	42.6	37.6	39.8		28.8	38.4	44.2	31.6	
Mean	38.2	42.6	43.9	44.8		28.8	50.3	45.5	38.6	
Central Asia										
Kazakhstan 1999	*	*	(31.7)	(31.7)	44	*	*	20.1	20.1	70
Kyrgyz Rep. 1997	*	*	(20.0)	(20.0)	38	*	*	28.3	28.3	129
Turkmenistan 2000	*	*	56.2	55.7	64	*	*	(47.8)	(52.2)	36
Uzbekistan 1996	*	*	32.8	32.8	44	*	*	4.8	4.8	70
Median	u	u	32.2	32.2		u	u	24.2	24.2	
Mean	u	u	35.2	35.0		u	u	25.3	26.4	
South/Southeast Asia										
Bangladesh 1999-00	30.1	41.4	45.8	39.3	300	18.0	21.6	35.4	22.8	1,486
Cambodia 2000	36.9	43.2	43.7	41.8	222	26.4	36.7	50.7	34.9	1,502
India 1998-99	56.5	60.7	61.4	59.8	2,370	45.9	53.7	57.4	49.9	8,639
Indonesia 1997	*	71.1	76.0	72.8	809	57.0	62.1	75.2	64.8	2,110
Nepal 2000	19.6	(35.0)	52.2	35.3	105	22.4	31.6	30.1	24.6	1,619
Philippines 1998	*	41.9	52.7	50.8	682	(17.9)	36.2	46.2	40.8	888
Vietnam 1997	*	*	45.5	48.0	63	(24.0)	45.1	48.5	45.9	397
Median	33.5	42.6	52.2	48.0		24.0	36.7	48.5	40.8	
Mean	35.8	48.9	53.9	49.7		30.2	41.0	49.1	40.5	
Latin America/Caribbean										
Bolivia 1998	(29.4)	32.5	53.3	45.1	934	23.6	28.8	39.0	29.2	722
Brazil 1996	(31.3)	40.0	48.1	44.6	853	15.7	30.2	33.6	28.5	297
Colombia 2000	*	48.0	60.6	56.7	551	*	32.8	50.1	36.6	206
Dominican Rep. 2002	57.1	63.9	70.3	66.9	1,506	59.0	63.3	63.4	63.0	820
Guatemala 1998-99	60.2	46.1	39.5	47.5	354	27.8	27.5	(21.3)	27.4	662
Haiti 2000	28.1	26.9	40.6	31.6	574	23.0	29.8	47.0	27.9	1,532
Nicaragua 2001	70.0	61.2	69.9	66.5	778	45.3	60.5	63.8	55.3	844
Peru 2000	(46.9)	51.6	69.5	65.1	1,301	42.0	49.8	57.5	50.3	1,213
Median	46.9	47.1	57.0	52.1		27.8	31.5	48.6	32.9	
Mean	46.1	46.3	56.5	53.0		33.8	40.3	47.0	39.8	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
u = Unknown (too few cases to calculate estimate)

Figures 5.8.1 and 5.8.2 show for urban and rural areas, respectively, the range, mean, and median percentage of sick children for whom advice or treatment was sought for countries in each region by mother's education. Among urban residents in Latin America/Caribbean, the regional averages are the same for children of mothers with either no education or only primary education. Among rural residents in North Africa, the regional averages overlap for children of mothers with primary and secondary or higher education. Otherwise, there is a clear and consistent rise in the percentage of sick children taken for care with increasing level of mother's education

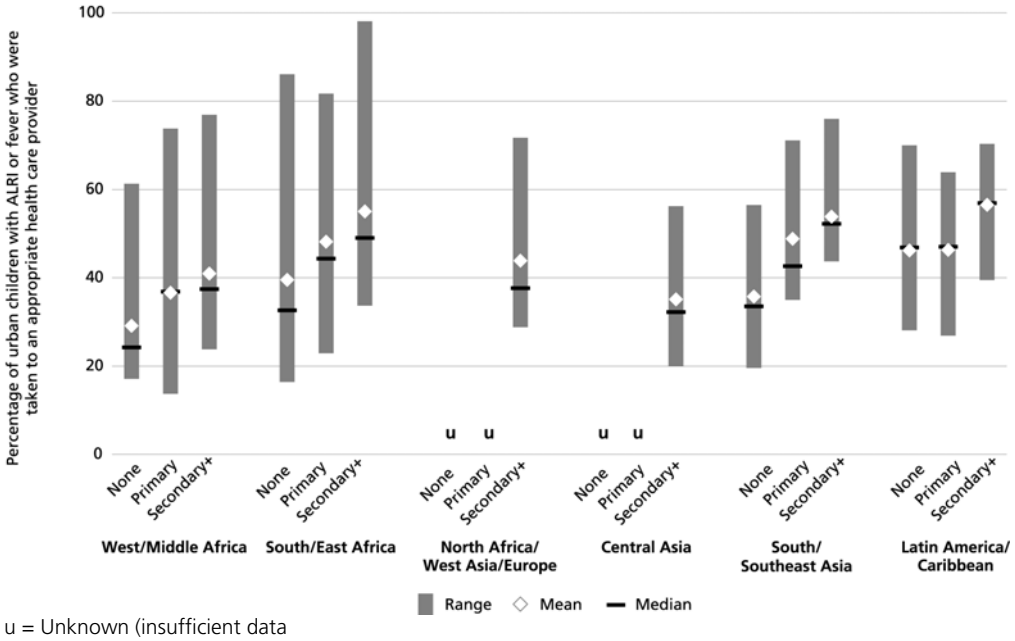
There is a consistent rise in the percentage of sick children taken for care with increasing level of mother's education

Differentials in careseeking for sick children between mothers in the lowest versus the highest education categories were computed for each country separately for urban and rural residents, where data allowed. Nearly all of the differentials are negative in both urban and rural areas.

In urban areas, 20 of 35 differentials are negative in excess of ten percentage points. In six countries (Burkina Faso, Cameroon, Madagascar, Nepal, Bolivia, and Peru), urban children with symptoms of ALRI and/or fever are less likely by more than 20 percentage points to be taken for medical care if their mothers have no formal education, compared with children whose mothers have completed at least one year of secondary school. The largest negative urban differential is found in Nepal (20 versus 52 percent). Guatemala is the only country in which a large positive urban differential is observed: sick urban children of mothers with no education are substantially more likely to have been taken for medical care (60 percent) than children of mothers with secondary or higher education (40 percent).

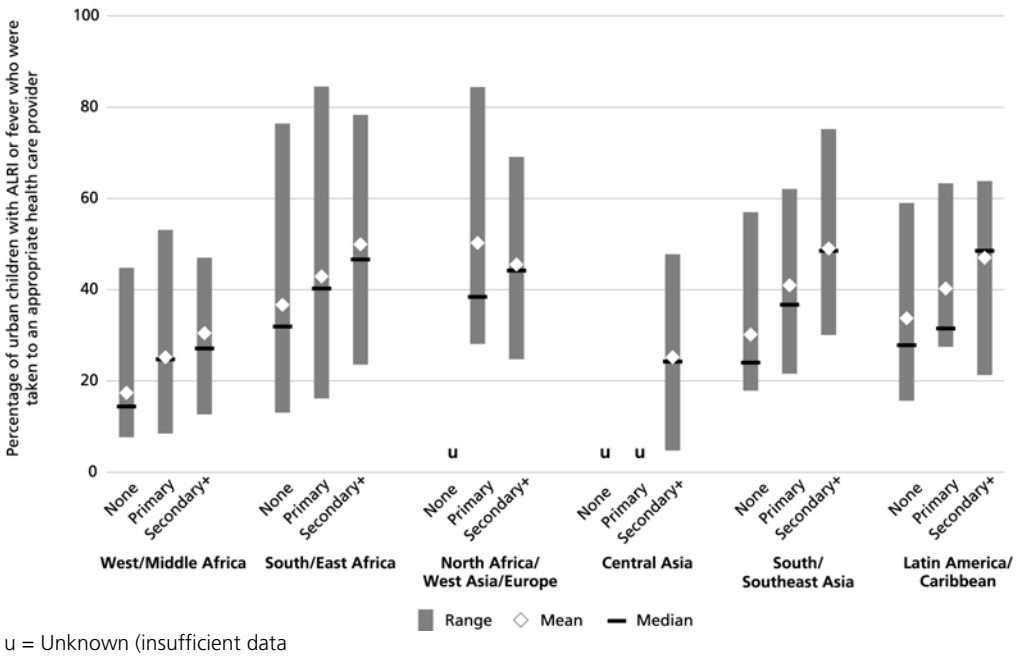
This reverse pattern is also found in rural Guatemala, although the magnitude is much smaller (28 versus 21 percent). In contrast, 22 of 35 differentials computed for rural residents are negative by more than 10 percentage points; 8 differentials are negative by more than 20 percentage points (Cameroon, Guinea, Zimbabwe, Yemen, Cambodia, the Philippines, Vietnam, and Haiti).

Figure 5.8.1
Percentage of urban children under age three years with symptoms of ALRI and/or fever in the two weeks preceding the survey, who were taken to an appropriate health care provider, by mother's education and region



u = Unknown (insufficient data

Figure 5.8.2
Percentage of rural children under age three years with symptoms of ALRI and/or fever in the two weeks preceding the survey, who were taken to an appropriate health care provider, by mother's education and region



u = Unknown (insufficient data

5.3.4 Demographic Characteristics

Table 5.10 shows the percentage of children with symptoms of ALRI and/or fever for whom medical advice or treatment was sought from an appropriate provider by child's sex, age in months, birth order, birth interval, and mother's age.

Child's Sex

The regional average prevalence of careseeking for symptoms of ALRI and/or fever is similar for male and female children with the exception of South/Southeast Asia.

The regional average prevalence of careseeking for symptoms of ALRI and/or fever is similar for male and female children with the exception of South/Southeast Asia, where young male children were somewhat more likely, on average, to have been taken for care than female children. At the country level, differentials in careseeking by child's sex were computed. Four of these differentials are positive by more than ten percentage points, in favor of males (Jordan, Turkmenistan, Uzbekistan, and Vietnam), while two are negative by more than ten percentage points, in favor of females (Armenia and the Kyrgyz Republic).

Age in Months

In the Central Asian countries, the number of children under age one year with symptoms is too small to provide stable estimates of careseeking. In the other regions, the mean prevalence of careseeking is higher at age 6-11 months than at age 0-5 months. The mean prevalence then declines by age 24-35 months to a level near or below that at age 0-5 months, except in South/Southeast Asia, where careseeking continues to remain higher through age 12-23 months.

Intracountry differentials were computed for careseeking at age 0-5 months compared with age 24-35 months. Careseeking for sick children age 0-5 months is substantially lower than for sick children age 24-35 months in just one country, Tanzania (61 versus 79 percent), and is substantially higher (by more than ten percentage points) in five countries: Benin, Gabon, Ghana, Namibia, and Colombia.

Birth Order

There is a negative association between increasing birth order and the likelihood of seeking advice or treatment for a young child with symptoms of ALRI and/or fever.

There is a moderate to strong negative association between increasing birth order and the likelihood of seeking advice or treatment for a young child with symptoms of ALRI and/or fever, especially in South/Southeast Asia and Latin America/Caribbean.

The number of sick children of birth orders four and above from the Central Asian countries is too small to provide stable estimates of careseeking. In West/Middle Africa, South/Southeast Asia, and Latin America/Caribbean, the regional average prevalence of careseeking declines steadily with increasing birth order.

Intracountry differentials in the prevalence of careseeking were computed between children of birth order one versus six and above. All but one of the 44 differentials computed are positive; 14 are positive by more than ten percentage points. The four largest positive differentials (in percentage points) are found in Brazil (22), Colombia (28), the Dominican Republic (19), and Peru (18).

Table 5.10

Percentage of children under age three with symptoms of acute lower respiratory infection (ALRI) and/or fever in the two weeks preceding the survey who were taken to an appropriate health provider, by child's sex, age in months, birth order, birth interval, and mother's age, Demographic and Health Surveys 1996-2002

	Child's sex		Child's age in months				Birth order				Birth interval (months)				Mother's age				Number of
Survey	Male	Female	0-5	6-11	21-23	24-35	1	2-3	4-5	6+	1st birth	<24	24-35	36+	<20	20-34	35+	Total	children
West/Middle Africa																			
Benin 2001	49.9	44.1	53.8	51.2	47.9	40.2	52.2	50.8	42.8	41.2	52.2	37.1	50.4	43.9	48.4	47.4	45.0	47.0	1,476
Burkina Faso 1998-99	17.7	16.5	17.1	19.3	17.4	15.2	20.0	17.7	15.7	16.2	19.9	14.9	15.0	18.2	13.7	17.6	16.9	17.1	1,428
Cameroon 1998	21.3	25.6	22.1	27.5	21.1	23.6	25.2	24.7	24.1	19.6	24.8	25.0	22.0	22.9	26.5	24.0	19.0	23.4	896
Chad 1996-97	16.1	13.3	14.8	15.8	12.6	16.4	16.5	13.6	15.3	14.2	16.6	14.9	14.8	13.4	15.3	14.6	14.7	14.7	1,668
Côte d'Ivoire 1998-99	22.9	24.0	(24.1)	24.6	25.3	20.2	26.6	29.5	17.3	16.8	26.6	(20.9)	24.7	21.6	21.2	24.3	22.2	23.5	564
Gabon 2000	40.5	32.0	43.4	44.4	32.5	33.1	37.8	37.6	34.7	33.5	37.7	32.7	42.7	33.2	34.0	35.7	41.7	36.3	901
Ghana 1998	17.0	15.5	28.3	21.8	15.7	10.1	18.1	18.7	15.0	11.3	17.9	16.7	8.4	18.6	(8.7)	17.8	12.7	16.2	663
Guinea 1999	22.5	25.0	22.1	28.8	24.2	21.2	31.6	24.8	20.8	20.1	31.3	16.8	21.4	23.6	24.7	24.2	21.4	23.7	1,565
Mali 2001	42.4	43.0	36.3	42.4	43.8	45.3	46.3	41.5	46.0	39.7	46.3	48.4	41.1	40.5	43.6	43.4	40.1	42.7	2,387
Mauritania 2000-01	16.3	15.8	15.0	17.7	14.2	17.8	16.7	18.7	14.6	13.9	16.7	13.4	15.8	16.7	17.7	16.0	15.6	16.0	1,039
Niger 1998	11.4	11.9	10.0	11.9	12.5	11.3	16.1	11.8	9.9	10.5	16.1	12.6	10.1	10.5	12.4	11.6	11.1	11.6	2,230
Nigeria 1999	20.7	21.6	13.5	22.8	21.6	22.9	24.7	19.4	22.0	19.2	24.8	20.5	20.7	19.3	21.4	21.3	20.3	21.1	1,106
Togo 1998	16.6	18.7	16.6	22.6	16.8	15.0	20.3	20.8	14.7	14.8	20.7	16.9	17.5	16.5	17.3	19.0	13.3	17.6	1,660
Median	20.7	21.6	22.1	22.8	21.1	20.2	24.7	20.8	17.3	16.8	24.8	16.9	20.7	19.3	21.2	21.3	19.0	21.1	
Mean	24.3	23.6	24.4	27.0	23.5	22.5	27.1	25.4	22.5	20.8	27.0	22.4	23.4	23.0	23.5	24.4	22.6	23.9	
South/East Africa																			
Comoros 1996	36.7	34.2	38.0	37.5	37.0	30.1	32.3	40.9	41.7	27.5	32.0	35.4	36.9	36.2	(40.0)	35.4	34.5	35.5	550
Eritrea 2002	32.7	32.4	28.9	38.4	36.3	25.3	37.1	37.8	25.1	29.4	36.9	32.7	29.4	33.2	41.6	33.9	27.6	32.6	1,431
Ethiopia 2000	20.5	16.3	15.1	20.0	20.0	17.5	22.7	20.2	16.3	15.5	22.4	21.0	17.8	16.1	22.3	19.2	15.3	18.5	2,645
Kenya 1998	32.4	31.8	28.7	34.0	30.4	34.4	27.8	35.8	36.3	27.6	27.6	32.2	32.4	35.2	22.1	32.9	34.8	32.1	1,508
Madagascar 1997	25.6	28.6	26.3	31.6	25.9	26.1	29.7	30.8	26.6	20.5	29.5	26.8	28.5	24.2	27.4	28.3	21.7	27.1	1,472
Malawi 2000	16.8	17.2	15.8	20.0	17.4	14.9	19.4	16.9	14.6	17.0	19.2	14.5	15.7	17.5	18.0	16.5	18.6	17.0	4,000
Mozambique 1997	22.1	24.0	22.9	29.5	21.7	20.3	22.9	19.8	30.7	19.8	23.5	27.7	19.8	23.8	19.4	25.4	15.5	23.0	1,778
Namibia 2000	49.4	52.0	55.8	52.3	53.4	42.0	54.8	48.6	54.6	43.1	54.3	49.0	44.0	52.5	56.6	51.7	44.6	50.7	741
Rwanda 2000	20.5	21.8	18.4	27.9	19.7	17.7	20.7	22.1	20.2	20.8	20.7	19.3	23.3	20.4	15.4	21.5	20.5	21.1	2,017
South Africa 1998	78.9	81.0	77.9	82.7	83.1	75.3	83.7	78.3	79.7	74.6	83.8	(79.8)	70.6	79.4	80.5	80.4	77.7	80.0	637
Tanzania 1999	75.9	72.7	61.3	79.4	73.6	79.1	76.8	69.9	79.4	74.3	76.8	61.4	73.1	79.0	60.3	76.4	71.8	74.4	820
Uganda 2000-01	68.5	66.1	62.6	72.6	70.6	60.8	70.9	68.6	65.5	65.7	70.7	65.0	68.5	65.6	64.9	68.9	61.5	67.4	2,405
Zambia 2001-02	68.6	69.8	68.1	75.1	71.2	63.3	72.3	70.9	68.6	64.3	71.9	72.9	69.1	66.3	71.0	70.8	61.2	69.2	1,978
Zimbabwe 1999	52.8	48.8	46.8	46.5	52.6	53.0	54.1	49.9	52.3	44.8	54.1	52.0	47.2	50.2	54.8	51.4	45.7	50.9	736
Median	34.7	33.3	33.5	38.0	36.7	32.3	34.7	39.4	39.0	28.5	34.5	34.1	34.7	35.7	40.8	34.7	34.7	34.1	
Mean	43.0	42.6	40.5	46.3	43.8	40.0	44.7	43.6	43.7	38.9	44.5	42.1	41.2	42.8	42.5	43.8	39.4	42.8	
North Africa/ West Asia/Europe																			
Armenia 2000	21.1	32.8	*	(41.1)	22.9	23.4	28.5	25.1	*	*	28.5	(23.5)	*	31.0	*	29.9	*	26.6	202
Egypt 2000	40.9	40.8	40.7	47.4	40.5	36.7	40.6	42.6	39.6	37.9	40.7	39.7	39.8	42.3	50.7	40.3	40.2	40.9	1,595
Jordan 2002	76.6	64.1	67.5	82.4	64.8	70.0	77.5	64.7	70.1	74.0	77.5	67.2	75.4	65.4	*	71.0	64.9	70.7	526
Yemen 1997	24.4	24.5	19.6	26.6	26.1	23.7	26.1	23.9	25.2	23.8	26.2	23.0	23.6	25.9	24.5	24.2	25.2	24.5	3,469
Median	32.7	36.8	40.7	44.2	33.3	30.2	34.6	33.9	39.6	37.9	34.6	31.6	39.8	36.7	37.6	35.1	40.2	33.8	
Mean	40.8	40.5	42.6	49.4	38.6	38.5	43.2	39.1	45.0	45.2	43.2	38.3	46.3	41.2	37.6	41.3	43.4	40.7	
Central Asia																			
Kazakhstan 1999	(27.2)	23.2	*	*	30.8	*	(25.8)	25.4	*	*	(25.8)	*	*	(20.5)	*	25.1	*	24.7	114
Kyrgyz Rep. 1997	21.4	34.5	*	(18.2)	30.7	(21.5)	(36.9)	23.2	*	*	(36.9)	(28.8)	(19.9)	(20.1)	*	27.2	*	26.4	167
Turkmenistan 2000	(58.9)	(48.7)	*	*	(63.5)	(51.2)	(46.3)	(57.6)	*	*	(46.3)	*	*	*	*	55.6	*	54.4	100
Uzbekistan 1996	21.0	10.5	*	*	20.0	(6.5)	(21.7)	14.0	*	*	(21.7)	(6.8)	*	(20.2)	*	13.9	*	15.6	115
Median	24.3	28.8	u	u	30.8	21.5	31.4	24.3	u	u	31.4	17.8	u	20.2	u	26.2	u	25.6	
Mean	32.1	29.2	u	u	36.3	26.4	32.7	30.0	u	u	32.7	17.8	u	20.3	u	30.5	u	30.3	
South/Southeast Asia																			
Bangladesh 1999-00	27.3	23.7	22.0	21.3	28.6	26.4	31.8	25.9	21.1	16.7	32.1	22.9	21.0	24.1	29.1	25.4	18.5	25.6	1,786
Cambodia 2000	38.4	33.1	26.8	37.8	41.1	32.7	38.6	40.0	33.3	28.9	38.9	33.1	32.9	37.1	34.8	37.5	31.7	35.8	1,725
India 1998-99	55.0	48.5	47.8	56.2	51.4	52.0	58.1	51.2	46.5	47.2	58.1	49.3	50.2	48.8	54.0	52.1	46.0	52.0	11,013
Indonesia 1997	65.7	68.6	59.6	72.5	69.5	62.0	67.5	68.7	64.1	62.9	67.6	59.7	64.3	69.1	61.9	67.8	65.6	67.0	2,919
Nepal 2000	28.1	22.7	23.4	29.1	27.6	20.5	33.6	23.8	21.4	21.9	33.5	17.8	23.5	24.5	34.5	24.3	24.4	25.3	1,724
Philippines 1998	47.8	42.2	41.7	50.0	47.4	40.1	50.5	47.4	43.2	36.2	50.5	40.9	40.6	48.2	47.0	45.9	42.3	45.2	1,570
Vietnam 1997	52.1	38.9	(44.8)	37.4	49.5	47.8	50.3	42.3	48.2	*	50.1	(21.3)	47.5	48.9	*	45.4	(51.7)	46.2	460
Median	47.8	38.9	41.7	37.8	47.4	40.1	50.3	42.3	43.2	32.6	50.1	33.1	40.6	48.2	40.9	45.4	42.3	45.2	
Mean	44.9	39.7	38.0	43.5	45.0	40.2	47.2	42.8	39.7	35.6	47.3	35.0	40.0	43.0	43.5	42.6	40.0	42.4	
Latin America/ Caribbean																			
Bolivia 1998	39.5	36.8	39.1	39.2	39.1	36.0	44.9	40.7	35.8	28.2	45.0	36.5	31.4	39.2	44.0	39.2	32.5	38.2	1,656
Brazil 1996	42.0	38.6	39.4	47.7	42.5	34.2	48.0	40.9	28.3	26.4	47.9	29.8	30.0	42.4	38.1	41.4	37.7	40.4	1,150
Colombia 2000	53.6	48.5	58.3	55.3	51.6	46.3	59.3	50.3	41.1	(31.8)	59.0	48.0	33.1	51.7	43.2	52.9	50.1	51.2	757
Dominican 2002	65.1	66.0	74.2	67.2	62.9	64.3	68.1	65.6	67.7	49.3	67.9	60.3	62.2	68.3	65.0	66.5	57.7	65.5	2,327
Guatemala 1998-99	37.9	30.5	31.9	42.2	33.3	31.9	37.1	35.3	32.6	32.4	37.1	38.0	29.5	34.1	34.9	35.9	28.1	34.4	1,016
Haiti 2000	27.3	30.6	32.9	28.4	32.7	23.6	33.9	28.8	30.0	23.4	33.8	29.3	26.1	27.6	30.5	30.2	24.5	28.9	2,106
Nicaragua 2001	62.4	58.8	57.4	63.2	62.1	58.6	65.1	61.4	56.2	54.3	65.1	49.0	54.0	65.9	63.7	60.8	55.3	60.7	1,622
Peru 2000	57.5	58.4	56.5	65.6	59.2	52.6	63.6	63.3	46.6	45.5	63.8	52.5	51.9	58.6	55.6	59.3	54.0	57.9	2,514
Median	47.8	43.6	48.0	51.5	47.1	41.2	53.7	45.6	38.5	32.1	53.5	43.0	32.3	47.1	43.6	47.2	43.9	45.8	
Mean	48.2	46.0	48.7	51.1	47.9	43.4	52.5	48.3	42.3	36.4	52.5	42.9	39.8	48.5	46.9	48.3	42.5	47.2	

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
u = Unknown (too few cases to calculate estimate)

Birth Interval

There appears to be a modest, though somewhat inconsistent, association between short birth intervals and a lower probability of careseeking for symptoms of ALRI and/or fever in young children.

By definition, children of birth order one in Table 5.10 are the same as those shown in the first category of birth interval. Looking at regional average prevalence of careseeking across the remaining three categories, no consistent pattern was seen. In West/Middle Africa and South/East Africa, the regional average values are similar across birth interval categories. In North Africa/West Asia/Europe, the regional average value is highest in the middle category (24 to 35 months); in South/Southeast Asia, the regional average values increase; and in Latin America/Caribbean, the regional average value is lowest in the middle category (24 to 35 months).

There is more consistency in careseeking differentials between children with the shortest birth interval (less than 24 months) versus those with the longest (36 or more months). Two-thirds (31 of 48) of these differentials are negative. In five countries (Tanzania, Uzbekistan, Vietnam, Brazil, and Nicaragua), children with the shortest birth interval are less likely by more than ten percentage points than children with the longest birth interval to have been taken for medical care.

Mother's Age

These data support a modest, though somewhat inconsistent, association between younger maternal age and a higher probability of careseeking for symptoms of ALRI and/or fever in young children.

The data support an association between younger maternal age and a higher probability of careseeking for symptoms of ALRI and/or fever in young children.

The number of sick children whose mothers are in either the youngest (less than 20) or oldest (35 or older) age group from the Central Asian countries is too small to provide stable estimates of careseeking. Elsewhere, the regional average prevalence of careseeking does not vary consistently or substantially across the three maternal age classes.

Differentials in careseeking prevalence were computed between children of the youngest versus the oldest mothers. Almost three-fourths of these computed differentials are positive, indicating a higher probability of careseeking by the youngest mothers, compared with the oldest mothers. In six countries, the computed differential is positive by more than ten percentage points: Eritrea, Namibia, Egypt, Bangladesh, Nepal, and Bolivia. However, there are two countries with equally large negative differentials: Kenya and Tanzania.

6

Summary and Conclusions

An important strength of nationally representative sample surveys such as the DHS surveys is their ability to provide statistically reliable estimates of reported morbidities and other indicators not only at a national level, but for major geographic, socioeconomic, and demographic subgroups.

The data presented in this report show wide variation both within and between world regions in the prevalence[1] of diarrhea, fever, and the symptoms of ALRI in young children. There is also substantial variation in maternal careseeking and treatment responses to early childhood illnesses.

The data presented in this report show wide variation both within and between world regions in the prevalence of diarrhea, fever, and the symptoms of ALRI in young children.

Cross-sectional surveys are not designed to prove or disprove causal relationships, but they can be used to assess the relative strength of associations between social, economic, biological, and environmental factors. It should be borne in mind, however, while every effort is made to ensure the reliability and validity of questions in the DHS surveys, cultural and linguistic factors may affect the ways in which questions are understood by respondents in each country.

As put forth by Mosley and Chen (1984), socioeconomic determinants operate through proximate determinants to influence morbidity. These distal determinants include community-level variables such as season of the year, and household- and individual-level variables.

Seasonality, with changes in rainfall and temperature, directly affects the day-to-day risk of exposure to pathogens associated with these illnesses. A limitation of cross-sectional surveys such as the DHS surveys is the inability to capture longitudinal variation in prevalence due to seasonality. In this report, it was not possible to assess the extent to which intra- or interregional variation might be explained by differences in the seasons at the time of data collection.

However, other distal determinants were available for examination, including residence (urban-rural), a household wealth index developed recently by ORC Macro in collaboration with the World Bank, and mother's highest level of completed formal education.

Four groups of proximate determinants influence the rate at which a healthy child becomes unhealthy. These groups include maternal factors, nutrient deficiency, environmental contamination, and injury, the last of which is not relevant to the illnesses covered in this report.

Maternal and child characteristics available from DHS surveys include mother's age, birth interval, birth order, child's age, and sex.

Nutrient deficiency is ascertained in several ways in the DHS surveys. Weight, height, sex, and date of birth are used to classify children according to standard indi-

[1] Prevalence is defined here as the mother's report of illness symptoms for the index child at any time in the two weeks prior to the interview.

ces of nutritional status, namely height-for-age, weight-for-height, and weight-for-age. In addition, mothers are asked several questions that together allow the child to be classified according to breastfeeding status.[2]

The extent of environmental contamination to which a child is exposed is routinely measured in DHS surveys with questions about the source of drinking water, the type of toilet facilities, and the main flooring material in the home, plus the number of household members, which can be used as a measure of crowding. In some surveys, additional environmental information is collected, such as the main type of fuel used for cooking and the number of rooms for sleeping.[3] Where available, these household-level variables were included this report. At the individual level, mothers are asked about offering their child a bottle with a nipple and offering plain water—both potential sources of contaminants—during the day or night prior to the interview.

A fifth group of proximate determinants, personal illness control, influences the frequency of illness (via prevention) and the rate of recovery (via treatment). One important means of preventing illness in young children is through adherence to the recommended immunization schedule, which, in the DHS surveys, is ascertained from immunization cards or mother's recall.

6.1 Prevalence of Diarrhea

For children whose mothers reported a recent episode of diarrhea, followup questions are asked about careseeking from appropriate health care providers, use of oral rehydration solutions and generally nonrecommended treatments, and feeding practices during the diarrheal episode. For children whose mothers reported a recent episode of fever and/or cough with rapid breathing, followup questions are asked about careseeking from appropriate health care providers and the use of antimalarials (where included).

Children living in households in the highest 20 percent of the wealth index distribution for that country are consistently less likely to have had a recent diarrheal episode than children in households in the lowest 40 percent, with the exception of Central Asia.

The prevalence of diarrhea among children under age three years is, on average, about 20 percent in Sub-Saharan Africa, North Africa/West Asia/Europe, and Latin America/Caribbean, 16 percent in South/Southeast Asia, and 11 percent in Central Asia. In general, diarrhea is more prevalent among rural children than urban children. When viewed by six-month age groups, diarrhea is highest for children age 6-17 months, consistent with the introduction of weaning foods and a reduction of the early benefit of passively acquired antibodies from the mother through the placenta to the fetus and via breast milk prior to the maturation of the infant's secretory immune system.

Children living in households in the highest 20 percent of the wealth index distribution for that country are consistently less likely to have had a recent diarrheal episode than children in households in the lowest 40 percent, with the exception of children in Central Asia. This finding holds for both urban and rural children.

[2] In recent years, in a number of countries, anemia testing and/or testing of household salt for iodine has been conducted in conjunction with DHS surveys and mothers have been asked about child's receipt of a vitamin A supplement in the past 6 months. However, these variables were not examined in this report because of their limited availability.

[3] In less than 10 of the 52 surveys, other questions about handwashing and disposal of child's stools were included in the DHS questionnaire. These variables were not examined in this report because of their limited availability.

Children of mothers with more years of formal education are less likely to have had diarrhea recently than children of less educated mothers. While this association is demonstrated for both urban and rural children, it is somewhat stronger for urban children. Perhaps, in rural areas, the greater lack of hygienic water supplies and adequate sanitary facilities preclude a significant influence of mother's education on diarrhea.

In a number of countries in North Africa/West Asia/Europe, Central Asia, and Latin America/Caribbean, modest to strong differences in diarrhea prevalence are seen by mother's age: children of mothers age 35 and over are less likely than children of mothers under age 20 to have had diarrhea recently. Diarrhea prevalence is not noticeably affected by increments in birth intervals or birth order, or by child's sex.

The association between nutritional status and diarrhea prevalence is strong and generally consistent, with better nourished children being less likely to have had a recent diarrheal episode than children who are less well nourished.

The association between nutritional status (defined by three nutritional indices) and diarrhea prevalence is strong and generally consistent, with better nourished children being less likely to have had a recent diarrheal episode than children who are less well nourished. Central Asia is the exception to this pattern. It is probable that in Central Asia the nearly universal access to adequate santitation facilities and the more temperate climate reduce the influence of nutritional status on diarrhea in that region.

Breastfeeding status is another indicator of nutrient deficiency. Among infants under six months of age, the prevalence of diarrhea is generally much lower for fully breastfed infants compared with partially breastfed infants, except in the Latin America/Caribbean region. This association continues to hold among children age 6 to 11 months.

There is wide variation by residence and within and between regions in household access to safe drinking water. The percentage of urban households with access to safe drinking water ranges from 25 to 100 percent; the range for rural households is 4 to 99 percent.

Overall, the prevalence of diarrhea in urban areas does not differ markedly by access to safe drinking water except in Sub-Saharan Africa. Likewise, there is no consistent association between diarrhea prevalence and safe drinking water in rural areas. This finding is not surprising in light of research indicating the primary importance of sanitation in diarrhea prevalence (see below) and evidence that the quantity of water available to the household is a better predictor of diarrhea risk than the quality (Esrey and Habicht, 1986).

The means of disposing of human waste varies substantially by residence in most countries. In a majority of countries, more than 90 percent of urban households have adequate sanitary facilities, while in two-fifths of countries, less than half of rural households meet this criteria.

In general, for children living in urban areas, there is a strong association between natural floors (earth, sand, or dung) and the likelihood of a recent episode of diarrhea.

In urban areas, the prevalence of diarrhea is lower for children in households with adequate sanitary facilities than for children in households without adequate sanitary facilities. This association is especially strong in South/East Africa and Latin America/Caribbean. The finding also holds for rural areas.

Another indicator of environmental contamination is the type of flooring material used in the home. In general, for children living in urban areas, there is a strong association between natural floors (earth, sand, or dung) and the likelihood of a recent episode of diarrhea. The association also holds for rural children but is not as strong.

A measure of crowding, the number of children in the household below the age of five years, is not consistently associated with diarrhea prevalence among either urban or rural children, with the possible exception of rural children in South/East Africa.

Two variables that are ascertained along with information about breastfeeding and feeding practices are used as indicators of environmental contamination. These are giving a child plain water or a bottle with a nipple on the day or night preceding the interview. For infants under six months, a clear and consistent association is seen wherein infants who were given water in the past 24 hours are more likely to have experienced a recent episode of diarrhea. This finding does not hold for infants age 6 to 11 months.

For infants under six months, an association is seen wherein infants given water in the past 24 hours are more likely to have experienced a recent episode of diarrhea.

Similarly, diarrhea prevalence is higher among infants under six months who were given a bottle with a nipple in the past 24 hours compared with infants not given a bottle, with the exception of the Latin America/Caribbean region. However, it is interesting to note that at age 6 to 11 months, this association is largely reversed.

While acknowledging the limitations of linking a behavior that occurred in the past 24 hours with an outcome that occurred at any time in the past two weeks, this reverse association could be real and might be logically explained if mothers of older infants are more likely than mothers of younger infants to give oral rehydration solutions in response to diarrhea, and do so using a bottle with a nipple. The data show that children under six months are less likely to be given oral rehydration solutions than older children.

There is wide variation by residence and within and between regions in measles immunization, a personal illness prevention measure. The region with the lowest level of measles immunization in both urban and rural areas is West/Middle Africa, which also has the largest mean difference in measles immunization by residence. Only two countries (Jordan and Egypt) met the World Summit for Children's goal of 90 percent measles immunization coverage in both urban and rural areas.

There is a strong and consistent negative association between measles immunization and the likelihood of a recent diarrheal episode among children in their second and third years of life. It is recognized that this association may be explained by socioeconomic factors related to the probability of being vaccinated.

Only two countries (Jordan and Egypt) met the World Summit for Children's goal of 90 percent measles immunization coverage in both urban and rural areas.

6.2 Careseeking and Treatment for Diarrhea

Seeking care for diarrhea from an appropriate health care provider varies considerably even within regions. In Rwanda, the percentages of urban and rural children taken for care are among the lowest (both 15 percent), while in South Africa and Tanzania, the percentages of urban and rural children taken for care are among the highest: 64 and 69 percent of urban children and 59 and 60 percent of rural children, respectively.

Although the proportion of children with diarrhea who had symptoms consistent with a need for medical attention cannot be ascertained from these data, it is likely to be relatively small. Therefore, the wide variation in careseeking across countries is likely to be primarily correlated with the availability, accessibility, and affordability of health care facilities and providers relative to the population of each country.

Except for Central Asia, there is a relatively consistent differential in careseeking by residence, wherein urban children with diarrhea are more likely to be taken to a health care provider than their rural counterparts.

There is considerable variation within regions in the use of oral rehydration salts (ORS) to treat children with diarrhea. Among children with diarrhea who were taken to a health provider, ORS use ranges from 49 to 68 percent by region. Among children not taken to a health provider, ORS use ranges from 12 to 24 percent.

Recommended homemade fluids (RHF) are used considerably less than ORS to treat diarrhea. Among children who were taken to a health provider, the mean percentage given RHF ranges from 11 to 33 percent by region. Among children not taken to a health provider, RHF use ranges from 7 to 24 percent by region.

There is a strong and consistent difference in the use of oral rehydration solutions (either ORS or RHF) by careseeking behavior. Children taken to a health provider are more likely to have been given a solution at some time during the diarrheal episode. While it may be the case that health providers are likely to have ORS on hand and correctly administer it to treat dehydration, it may also be the case that women who initiate ORS or RHF use at home are more likely than other women to subsequently take their sick children to a health provider.

Mothers are advised by health care providers and through health education messages to increase fluids and continue to feed a child with diarrhea. The mean percentage of sick children offered more fluids ranges by region from 48 to 72 percent among children taken to a health provider and from 37 to 60 percent among children not taken for care.

Among sick children taken to a health provider, the mean percentage offered about the same or more food than usual ranges from 24 to 44 percent by region. In nearly every country, continued feeding is reported less often than increasing fluids for children taken for care. On average, among sick children not taken for care, the percentage continuing to be offered about the same or more food ranges from 38 to 46 percent by region.

Sick children who are taken to a health provider are more likely to be offered more fluids than children not taken for care. The opposite association is found with respect to continued feeding: children with diarrhea who are taken to a health provider are less likely to be offered about the same or more food than usual than children not taken for care. One explanation for this negative association may be that a sharp drop in appetite and refusal to eat may be an important factor in a mother's decision to seek care.

It is appropriate for a health provider to treat diarrhea with an antibiotic when other signs or symptoms point to cholera or dysentery. In the vast majority of cases, however, the use of antibiotics and other drugs (e.g., antimotility agents) is not warranted and their use is discouraged because of concerns about increasing antibiotic resistance in a population and ineffectiveness, respectively.

The DHS data show that antibiotics and other nonrecommended treatments are still widely used.

The DHS data show that antibiotics and other nonrecommended treatments are still widely used. The mean percentage of children with diarrhea who were taken to a health provider and who received, at any time during the diarrheal episode, a nonrecommended treatment, ranges from 48 to 74 percent by region. Among sick children not taken to a health provider, the mean percentage who received a nonrecommended treatment ranges from 15 to 48 percent by region.

There is a strong and consistent difference by careseeking in the likelihood that a child with diarrhea will be given a nonrecommended treatment during the diarrheal episode, with children taken for care more likely to receive a nonrecommended treatment than those not taken.

The level of reported use of antibiotics and other drugs for sick children who were not taken for care is substantial, suggesting that mothers are purchasing or otherwise obtaining many medications on their own without appropriate medical advice.

The DHS child illness questions do not allow assessment of the severity of the diarrhea episode or whether a particular treatment was an antibiotic. Under the assumption that the proportion of children with diarrhea in need of an antibiotic is small and that the proportion of all medications given by health care providers for diarrhea that are antibiotics is large, it could be hypothesized that antibiotics are widely overprescribed by health providers. However, the level of reported use of these same treatments for sick children who were not taken for care is substantial, suggesting that mothers are purchasing or otherwise obtaining many medications on their own without appropriate medical advice.

In most countries, better educated mothers, with at least one completed year of secondary school, in both urban and rural areas are more likely to administer oral rehydration solutions, to increase fluids, and to continue feeding than less well educated mothers.

Mother's age, birth order, and child's sex are not associated with differential use of oral rehydration solutions for diarrhea. However, infants under six months are less likely to be treated with these solutions than older children. Since most of these young infants are still breastfeeding, it may be that their mothers prefer to increase breast milk consumption during the diarrheal episode as a treatment strategy rather than to administer oral rehydration solutions.

Birth order, child's age, and sex are not associated with differential practices of increasing fluids and continuing to feed during diarrhea. However, there is a modest but largely consistent association with mother's age, wherein mothers under age 20 are less likely to engage in these practices.

6.3 Prevalence of ALRI Symptoms

The prevalence of symptoms of ALRI varies widely by region from a low mean value of 2 percent in Central Asia to a high mean value of 25 percent in Latin America/Caribbean. Rural children are slightly more likely than urban children to have experienced recent ALRI symptoms. An examination of prevalence by six-month age groups shows that, like diarrhea, symptoms of ALRI peak at age 6 to 17 months.

With the exception of West/Middle Africa, there is a largely consistent negative association between household wealth and the likelihood of recent ALRI symptoms in both urban and rural areas. The negative association between ALRI symptoms and mother's education is more consistent in urban than in rural areas. Mother's age, birth interval, birth order, and child's sex are not associated with differential prevalence of ALRI symptoms.

In general, nutritional status, as measured by weight-for-age, height-for-age, and weight-for-height, is associated with the prevalence of ALRI symptoms, wherein better nourished children are less likely to have experienced recent symptoms of ALRI than children who are less well nourished.

In general, nutritional status, as measured by weight-for-age, height-for-age, and weight-for-height, is associated with the prevalence of ALRI symptoms, wherein better nourished children are less likely to have experienced recent symptoms of ALRI than children who are less well nourished. This is seen especially for weight-for-age, with the exception of the Central Asian region.

Regarding environmental factors, in urban areas, children in households with natural floors (earth, sand, or dung) are generally more likely to have had ALRI symptoms recently than children from households with finished floors, particularly in the regions of South/East Africa and Latin America/Caribbean. This relationship also holds for children in rural areas.

Information about the type of fuel used by the household for cooking was available for only 12 countries. Nonetheless, in urban areas a strong association is seen between

the use of biomass fuels and increased likelihood of recent ALRI symptoms among children. The association is not seen among children in rural areas. It can be hypothesized that adequate ventilation is a greater problem in urban areas, where housing is more crowded, than in rural areas.

One measure of crowding, the average number of persons per sleeping room for the household, was available for 24 countries. In urban areas, children living in households with 5 or more persons per sleeping room are generally more likely to have had recent ALRI symptoms than children living in households with 1 to 2 persons per sleeping room. This relationship is not seen among children in rural areas. A second measure of crowding, the total number of household members, is not significantly associated with the prevalence of ALRI symptoms in either urban or rural areas. The average number of persons per sleeping room in urban areas thus appears to be a better indicator of risk for symptoms of ALRI in young children than household size. Perhaps it is a better indicator of the intensity of exposure to airborne pathogens.

Receipt of all recommended childhood vaccinations varies widely. At the time of the survey, only one country, Egypt, had met the World Summit for Children's goal of 90 percent full immunization coverage for both urban and rural children; 80 percent coverage was achieved by four countries in urban areas and by two countries in rural areas. Differentials in immunization coverage by residence are substantial and are especially large in West/Middle Africa, with higher coverage among urban children.

There is no evidence of a consistent significant association between the receipt of all recommended vaccinations and the likelihood of recent ALRI symptoms.

6.4 Prevalence of Fever

The prevalence of fever (in the two-week period preceding the survey) is highest in West/Middle Africa and South/East Africa (about 38 percent) and lowest in Central Asia (10 percent). While fever is a common symptom associated with many diseases, this pattern is consistent with malaria endemicity.

The prevalence of fever is consistently higher in rural than in urban areas. Examining fever prevalence by six month age groups shows that, like diarrhea and symptoms of ALRI, fever also peaks at age 6 to 17 months.

The prevalence of fever is consistently higher in rural than in urban areas. Examining fever prevalence by six month age groups shows that, like diarrhea and symptoms of ALRI, fever also peaks at age 6 to 17 months.

In both urban and rural areas, the prevalence of fever is negatively associated with the household wealth index, with children in the lowest wealth index category having the highest prevalence of fever. In most countries, mother's educational attainment is also negatively associated with the prevalence of fever.

Mother's age and child's sex are not significantly associated with the likelihood of a recent occurrence of fever. An examination of fever prevalence by birth interval categories shows inconsistencies. However, with the exception of Central Asia, differentials in fever prevalence between children born after a short birth interval (<24 months) and first births are small but consistent, wherein children born after a short interval are more likely to have had fever recently. Similar findings are seen when birth order is considered. Children of birth order six or higher are more likely than first-born children to have had fever recently.

In all regions except Central Asia, better nourished children, as measured by three indices of nutritional status, are less likely than children who are less well nourished to have had a recent occurrence of fever.

Looking at a measure of personal illness prevention, fully immunized children in their second year of life are slightly less likely than children not fully immunized to have had fever recently. However, this association no longer holds by the third year of life.

6.5 Use of Antimalarials

Antimalarials are more likely to have been used to treat fever in urban children than rural children.

Treatment of fever with antimalarials was ascertained in 17 malaria endemic countries. Use is highly variable across these countries and is less than 5 percent in Rwanda, Zimbabwe, Colombia, and Nicaragua. Antimalarials are more likely to have been used to treat fever in urban children than rural children. These findings may be explained by differences among countries in the local availability and cost of antimalarial drugs, or the intensity of educational campaigns to promote their use as a presumptive treatment for malaria. However, the differences may also reflect variation among countries in the most prevalent *Plasmodium* species, their severity, and the epidemic state of the disease at the time of the survey.

6.6 Careseeking for ALRI Symptoms and/or Fever

Finally, we focus on careseeking in response to symptoms of ALRI and/or fever. In most countries, less than half of either urban or rural children with symptoms of ALRI and/or fever in the two weeks prior to the survey were taken to an appropriate health care provider for advice or treatment. In all but three countries, urban children are more likely than rural children to have been taken for care.

When careseeking for symptoms of ALRI and/or fever is examined by age groups (0-5, 6-11, 12-23, 24-35 months), it is found that careseeking peaks at age 6 to 11 months, except in South/Southeast Asia, where the level of careseeking remains high throughout the second year of life.

Careseeking is generally higher for children living in households in the highest 20 percent of the wealth index distribution for that country than for children whose households are in the lowest 40 percent. This relationship holds for both urban and rural children.

Generally, in both urban and rural areas, there is a consistent increase in the percentage of children with symptoms of ALRI and/or fever taken to a health care provider by mother's increasing educational attainment.

In both urban and rural areas, there is a consistent increase in the percentage of children with symptoms of ALRI and/or fever taken to a health care provider by increasing level of mother's educational attainment.

The exception to this pattern is Guatemala, where urban mothers with no formal education are significantly more likely to have taken a sick child to a health provider than mothers with at least one completed year of secondary school. A similar reversed pattern is seen across wealth categories for urban areas of Guatemala. This suggests that primary health care resources, at least in urban areas, may have been targeted at the time of the survey toward lower income families (and thus less educated parents).

Younger mothers (under age 20) are somewhat more likely than older mothers (age 35 and over) to have taken a child with symptoms of ALRI and/or fever to a health care provider. Children born after a shorter birth interval (<24 months) are less likely, overall, than children born after a longer birth interval (36+ months) to have been taken for care.

There is a moderate to strong negative association between birth order and the likelihood of seeking advice or treatment for symptoms of ALRI and/or fever, particularly in South/Southeast Asia and Latin America/Caribbean. It may be that

mothers with many children are more confident in their ability to care for a sick child on their own or, alternatively, that inexperienced mothers, who are typically younger, may be more aware of messages promoting appropriate careseeking behaviors.

Child's sex is not differentially associated with the likelihood of seeking care with the exception of South/Southeast Asia, where male children are somewhat more likely than female children to be taken for care.

6.7 Special Comments about Central Asia

Throughout the report, several exceptions to otherwise largely consistent associations have been noted with respect to the Central Asia region. Most importantly, there is a lack of association between household wealth and diarrhea prevalence, a lack of association between nutritional status and either ALRI symptom or fever prevalence, and a lack of association between birth interval and birth order and fever prevalence in Central Asia as a region.

In the Central Asia region, there is a lack of association between household wealth and diarrhea prevalence, a lack of association between nutritional status and either ALRI symptom or fever prevalence, and a lack of association between birth interval and birth order and fever prevalence.

It should be borne in mind that in the four countries of Central Asia included in this report, the prevalence of ALRI symptoms is lower than in all the other countries, and the prevalence of diarrhea and fever are among the lowest. In addition, there are very few children in these four countries who are either severely underweight or severely wasted. Likewise, the numbers are small for children in urban households in the lowest 40 percent of the wealth index distribution for the country and for children in rural households in the highest 20 percent. In contrast, mean immunization coverage is highest in the Central Asian region. Last, since malaria and other tropical diseases are not endemic in these four countries, the morbidities with which fever symptoms are associated and hence factors associated with their risk can reasonably be expected to differ.

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Appendix

Table A.1

Percentage of children age 12-23 months immunized at any time before the survey, by residence, Demographic and Health Surveys 1996-2002

	Urban								Rural							
Survey	BCG	DPT (3 doses)	Polio (3 doses)	Measles	All	None	Vaccination card seen	Number of children	BCG	DPT (3 doses)	Polio (3 doses)	Measles	All	None	Vaccination card seen	Number of children
West/Middle Africa																
Benin 2001	91.0	80.1	74.0	75.3	64.4	4.7	74.5	325	89.3	68.4	66.8	64.1	56.1	8.7	72.7	606
Burkina Faso 1999	96.4	73.3	71.6	75.5	59.5	1.3	87.5	107	69.5	37.2	39.1	42.3	25.9	13.6	52.2	934
Cameroon 1998	91.8	67.9	61.9	67.6	48.6	3.8	60.7	200	68.6	44.2	41.6	49.3	31.2	15.6	52.8	548
Chad 1997	71.4	41.6	36.0	38.9	20.5	17.8	41.9	247	30.4	13.8	13.5	18.6	9.0	51.2	23.6	963
Côte d'Ivoire 1998	94.3	78.3	77.5	82.0	69.6	2.6	83.9	140	78.8	52.7	52.7	58.8	41.8	11.5	68.5	299
Gabon 2000	92.5	41.5	29.3	61.1	17.8	3.2	65.1	591	79.9	20.6	16.8	37.1	5.7	6.4	56.6	211
Ghana 1998	93.4	83.7	81.8	81.5	72.3	3.7	78.5	180	85.7	67.7	67.6	69.2	58.0	8.4	75.1	463
Guinea 1999	91.3	64.7	59.0	66.9	47.3	5.8	62.2	246	70.2	39.4	37.3	46.7	26.7	25.9	40.7	675
Mali 2001	90.4	68.4	64.5	70.8	50.3	7.1	64.3	546	62.0	30.1	31.1	41.3	21.5	26.4	43.0	1,650
Mauritania 2000	86.5	48.7	49.7	74.3	38.0	9.7	39.0	402	66.1	33.4	39.5	53.0	27.4	18.9	31.0	548
Niger 1998	89.6	72.4	67.0	67.1	54.2	7.0	77.6	257	38.0	14.6	14.6	27.8	10.5	47.3	25.4	1,173
Nigeria 1999	75.0	44.7	41.8	61.5	31.7	19.6	28.1	310	46.0	19.5	18.5	32.7	11.3	45.1	16.3	851
Togo 1998	88.0	61.9	64.4	58.0	46.3	8.4	71.3	249	72.3	36.4	41.6	38.2	26.5	18.5	54.8	885
Median	91.0	67.9	64.4	67.6	48.6	5.8	65.1		69.5	36.4	39.1	42.3	26.5	18.5	52.2	
Mean	88.6	63.6	59.9	67.7	47.7	7.3	64.2		65.9	36.8	37.0	44.5	27.0	22.9	47.1	
South/East Africa																
Comoros 1996	90.2	68.5	65.2	63.0	56.5	7.6	72.8	92	91.0	68.2	65.7	63.5	53.8	8.3	74.7	277
Eritrea 2002	97.6	93.5	91.3	93.8	88.4	1.8	82.7	355	87.7	76.5	78.6	78.5	68.6	7.2	73.2	604
Ethiopia 2000	70.7	51.3	60.3	63.1	42.0	4.7	51.3	225	42.7	17.2	31.5	22.3	11.0	17.9	24.2	1,919
Kenya 1998	98.0	79.0	72.0	92.8	58.3	1.6	42.5	210	95.3	79.2	75.0	76.1	59.8	2.9	58.5	888
Madagascar 1997	80.3	59.2	58.8	60.8	46.4	12.4	57.3	256	62.1	45.5	44.8	42.0	33.5	21.4	47.6	953
Malawi 2000	96.3	92.4	85.8	90.6	78.6	1.1	77.4	307	91.8	82.8	78.9	82.0	68.7	3.0	81.6	1,930
Mozambique 1997	98.2	93.8	88.9	93.0	85.0	1.3	89.2	281	72.2	49.6	45.5	47.1	36.4	25.0	59.3	963
Namibia 2000	95.5	85.3	80.5	84.3	69.5	2.4	68.2	277	87.2	76.3	75.2	78.4	62.4	6.6	76.4	539
Rwanda 2000	98.3	86.5	87.2	89.9	77.0	1.1	63.5	217	96.8	85.9	87.6	86.3	75.8	1.8	66.8	1,113
South Africa 1998	98.0	81.7	75.5	85.1	67.1	1.6	75.3	491	95.6	71.0	68.6	79.3	59.6	2.7	73.8	483
Tanzania 1999	100.0	89.9	84.8	90.3	80.5	0.0	69.6	112	91.0	78.9	78.8	75.3	65.5	6.5	75.1	481
Uganda 2000	91.9	59.1	60.0	68.4	42.1	6.2	42.6	167	77.0	44.5	53.4	55.3	36.0	13.7	47.8	1,337
Zambia 2001	95.5	87.9	85.1	85.5	76.9	3.2	81.3	379	93.3	76.8	78.1	83.9	67.2	3.4	78.8	920
Zimbabwe 1999	92.5	86.1	67.8	86.2	65.0	7.5	61.3	227	86.0	78.4	68.3	75.7	63.6	13.6	72.0	472
Median	95.9	85.7	78.0	85.8	68.3	2.1	68.9		89.3	76.4	71.8	75.9	61.1	6.9	72.6	
Mean	93.1	79.6	75.9	81.9	66.7	3.8	66.8		83.6	66.5	66.4	67.6	54.4	9.6	65.0	
North Africa/West Asia/Europe																
Armenia 2000	90.6	87.1	91.1	76.0	73.2	7.0	93.0	169	90.6	93.1	93.2	72.1	69.1	4.0	96.0	131
Egypt 2000	99.7	93.5	94.3	97.8	92.8	0.2	68.9	843	99.1	94.3	95.3	96.2	91.8	0.3	74.7	1,327
Jordan 2002	35.2	98.4	97.6	95.4	34.0	0.0	75.7	879	6.8	97.3	97.5	94.2	6.8	0.4	84.1	256
Turkey 1998	91.6	63.9	69.0	82.2	51.2	2.9	45.5	424	83.7	50.3	57.0	72.7	36.8	4.8	27.5	265
Yemen 1997	81.8	70.8	66.1	71.9	56.4	9.1	54.9	513	45.2	30.3	39.6	33.8	19.6	12.9	23.4	1,675
Median	90.6	87.1	91.1	82.2	56.4	2.9	68.9		83.7	93.1	93.2	72.7	36.8	4.0	74.7	
Mean	79.8	82.7	83.6	84.7	61.5	3.8	67.6		65.1	73.1	76.5	73.8	44.8	4.5	61.1	
Central Asia																
Kazakhstan 1999	89.1	86.9	84.2	81.4	74.9	10.1	90.4	118	90.5	90.1	82.3	76.2	71.7	9.0	91.0	151
Kyrgyz Rep. 1997	98.5	88.4	89.9	83.7	76.2	0.0	84.3	76	97.9	80.4	84.1	84.5	68.0	0.1	76.9	296
Turkmenistan 2000	89.0	86.5	86.1	81.8	80.1	10.8	89.2	281	96.7	96.6	95.6	92.0	88.5	1.9	98.1	365
Uzbekistan 1996	97.5	83.8	87.5	84.2	68.7	0.0	87.4	145	97.5	90.9	93.6	94.7	83.2	0.0	91.6	321
Median	93.3	86.7	86.8	82.8	75.6	5.1	88.3		97.1	90.5	88.8	88.3	77.4	1.0	91.3	
Mean	93.5	86.4	86.9	82.8	75.0	5.2	87.8		95.7	89.5	88.9	86.8	77.8	2.8	89.4	
South/Southeast Asia																
Bangladesh 2000	95.2	82.0	79.6	80.7	69.7	3.7	52.9	220	90.2	70.0	69.0	68.9	58.5	8.9	41.6	1,095
Cambodia 2000	75.4	53.5	54.9	61.0	46.3	19.8	48.9	156	70.8	47.8	51.0	54.6	39.0	21.9	47.3	1,096
India 1999	86.8	73.4	78.2	69.2	60.5	6.3	46.0	2,306	67.1	49.8	58.3	45.3	36.6	16.8	30.1	7,888
Indonesia 1997	92.6	75.2	84.9	79.2	65.8	2.3	37.5	927	81.6	59.4	68.8	67.3	50.0	7.0	28.0	2,161
Nepal 2000	88.4	78.2	95.4	80.6	74.9	0.0	17.5	87	84.2	71.7	91.2	69.9	65.0	0.9	16.1	1,226
Philippines 1998	95.0	85.5	85.5	82.2	76.1	3.8	42.1	700	86.9	76.7	78.4	75.9	69.8	11.2	40.8	775
Vietnam 1997	96.5	77.5	68.2	85.5	60.2	1.7	25.9	101	88.2	63.7	59.8	75.5	48.3	3.8	10.9	530
Median	92.6	77.5	79.6	80.6	65.8	3.7	42.1		84.2	63.7	68.8	68.9	50.0	8.9	30.1	
Mean	90.0	75.0	78.1	76.9	64.8	5.4	38.7		81.3	62.7	68.1	65.3	52.5	10.1	30.7	
Latin America/Caribbean																
Bolivia 1998	92.3	56.2	43.3	54.8	27.9	4.8	42.6	735	80.6	38.3	33.3	45.4	22.2	13.7	36.8	541
Brazil 1996	95.1	84.8	84.3	90.2	77.5	2.2	79.2	725	84.2	66.6	68.0	76.5	55.2	6.1	77.8	209
Colombia 2000	94.8	78.9	73.5	71.6	54.8	0.3	76.3	605	90.4	72.3	66.8	69.0	46.0	1.8	71.1	285
Dominican Rep. 2002	94.5	58.7	44.7	89.5	36.2	1.5	49.9	1,430	91.6	52.1	42.6	86.0	32.4	1.4	51.1	754
Guatemala 1999	93.9	73.6	62.2	80.8	55.2	2.3	62.2	320	88.3	68.5	69.4	80.4	62.1	4.6	72.2	528
Haiti 2000	82.5	49.0	49.9	60.9	33.6	4.5	69.9	415	65.1	39.7	39.3	50.2	33.5	21.3	64.4	810
Nicaragua 2001	98.7	84.7	86.9	89.8	73.9	0.9	77.0	661	92.5	80.7	82.7	83.1	69.4	3.4	79.9	709
Peru 2000	98.0	89.4	80.4	86.1	71.6	0.8	63.1	1,307	93.9	78.8	71.4	82.2	59.6	3.0	51.8	1,046
Median	94.7	76.3	67.8	83.4	55.0	1.9	66.5		89.4	67.6	67.4	78.4	50.6	4.0	67.8	
Mean	93.7	71.9	65.7	78.0	53.8	2.2	65.0		85.8	62.1	59.2	71.6	47.5	6.9	63.1	

Figure A.1

Percentage of children age 12-23 months immunized against measles at any time before the survey, by residence

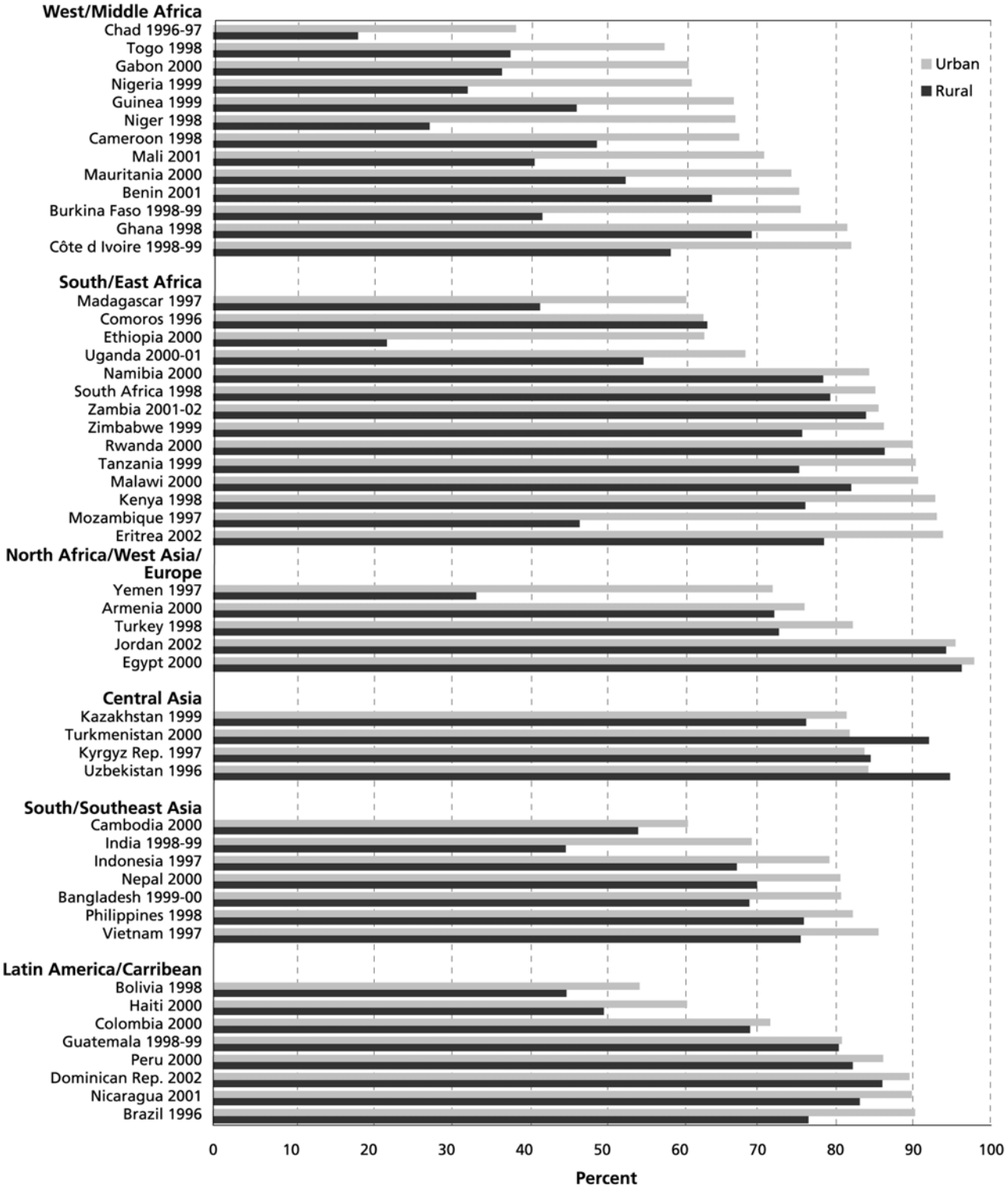


Figure A.2
Percentage of children age 12-23 months fully immunized at any time before the survey by residence

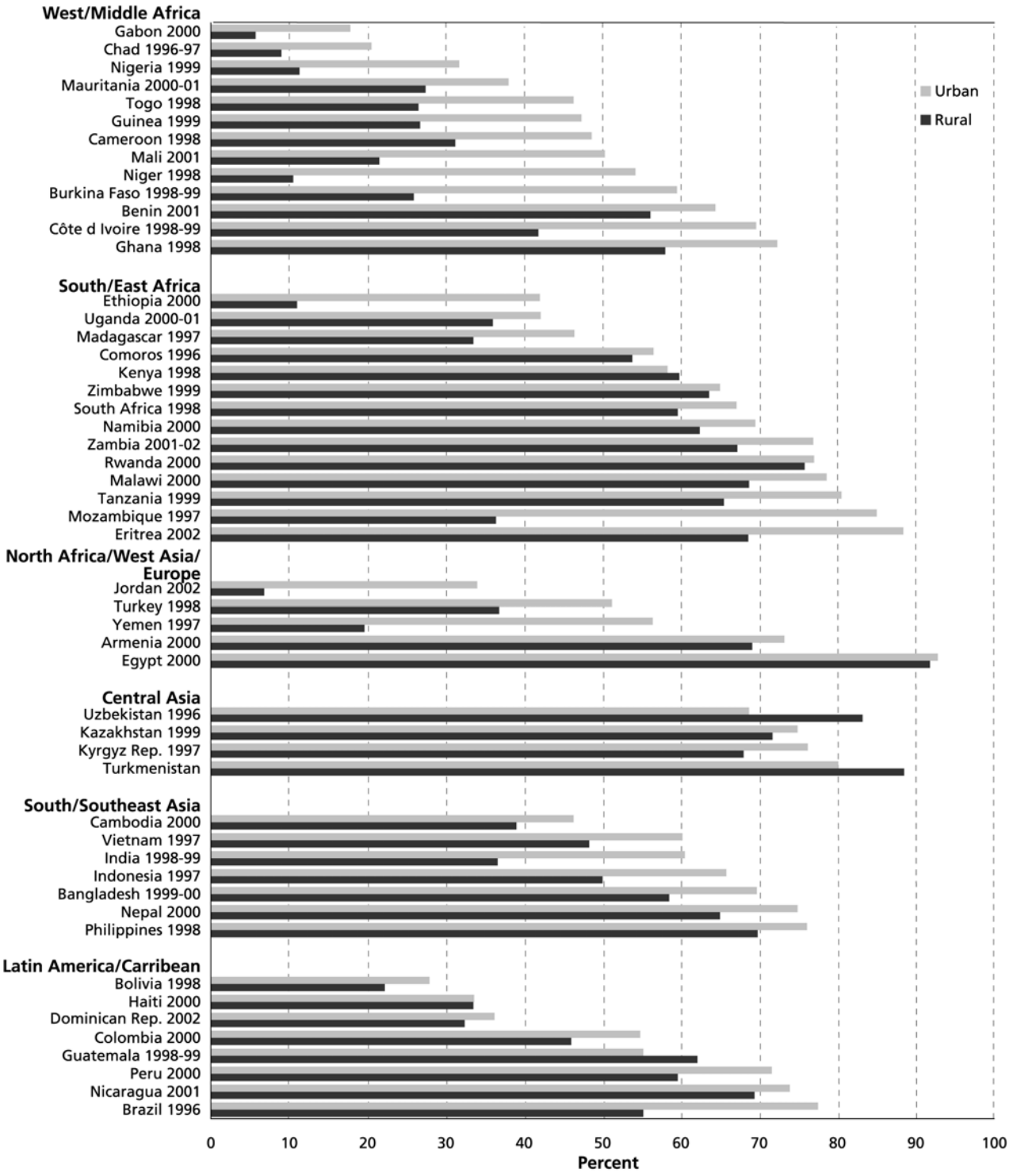


Figure A.3
Percentage of households with access to safe drinking water, by residence

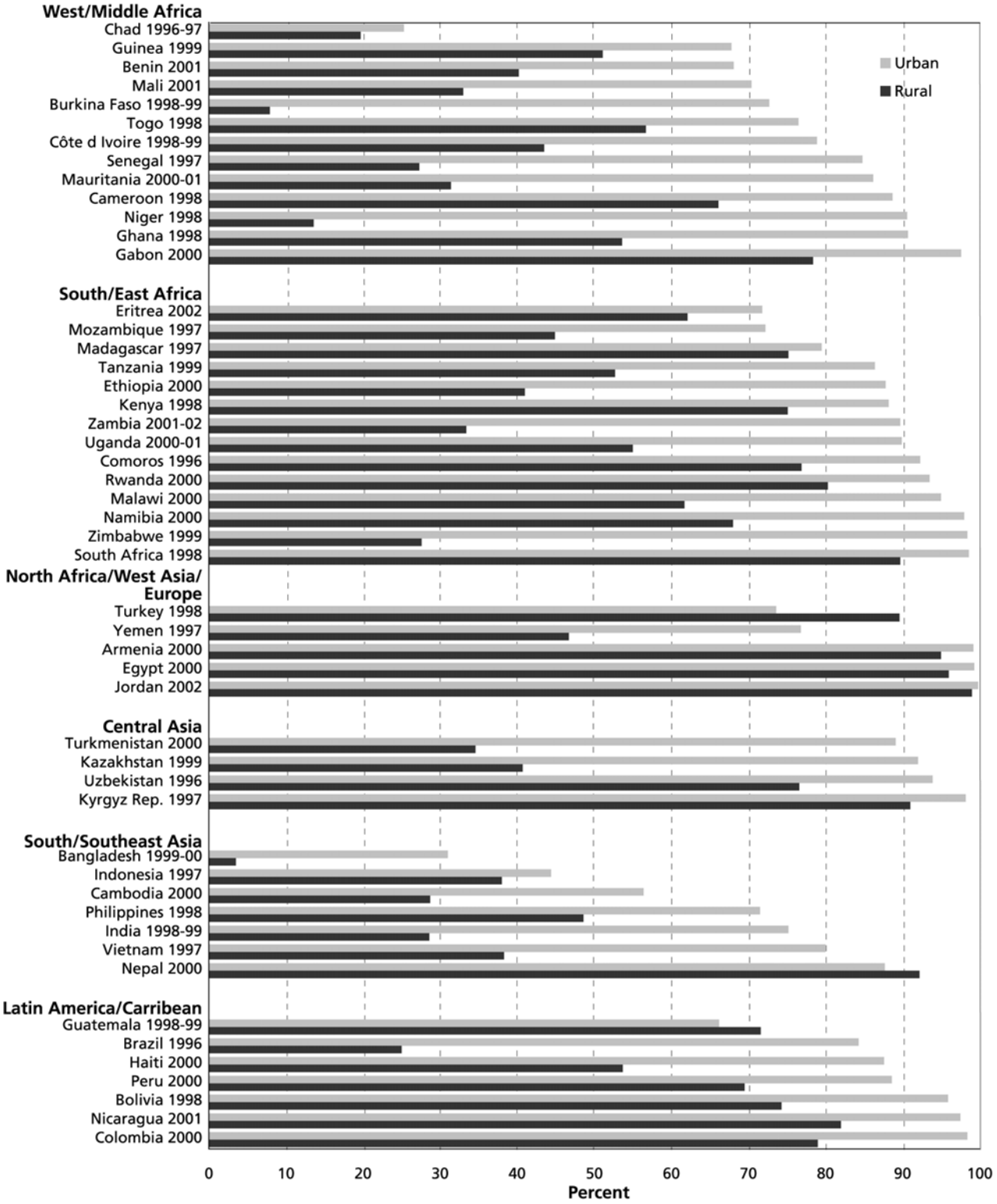


Figure A.4
Percentage of households with sanitary means of excreta disposal, by residence

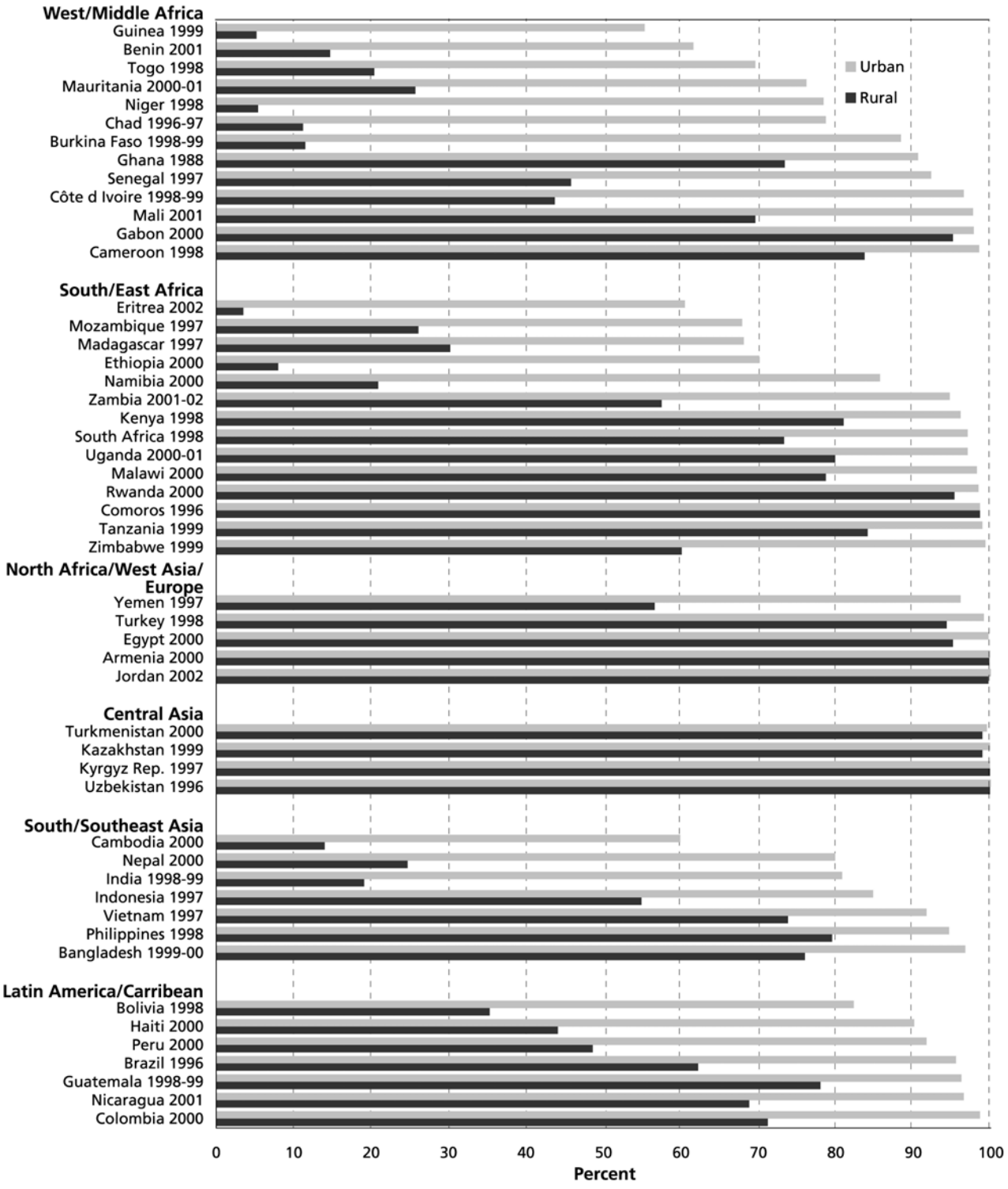
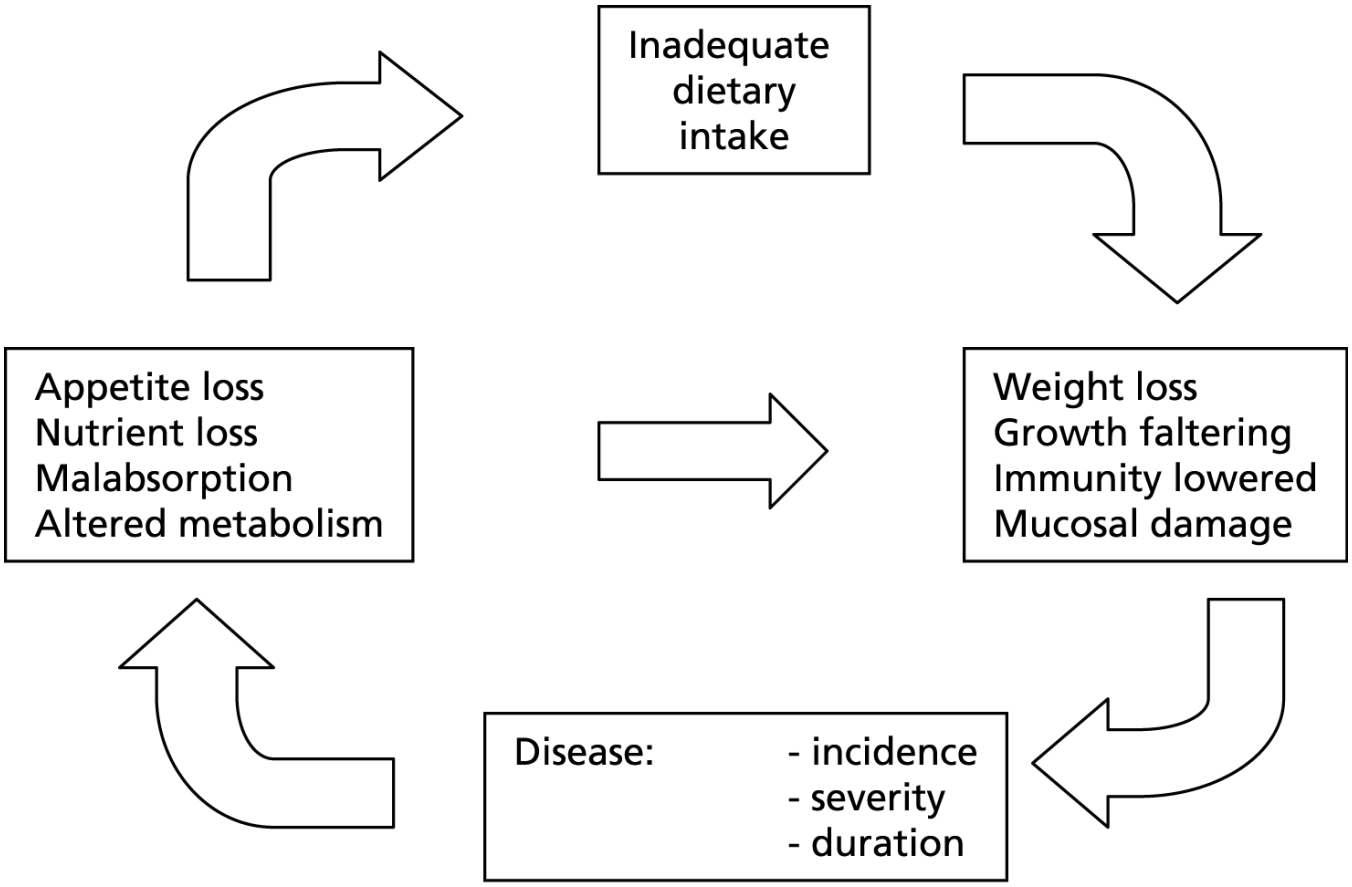


Figure A.5
Undernutrition/infection cycle



Adapted from Tomkins and Watson, 1989

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