





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 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:

ORC Macro  
11785 Beltsville Drive  
Suite 300  
Calverton, MD 20705 USA  
Telephone: 301-572-0200  
Fax: 301-572-0999  
E-mail: [reports@orcmacro.com](mailto:reports@orcmacro.com)

# DHS Comparative Reports No. 10

## **Nutritional Status of Children: Results from the Demographic and Health Surveys 1994-2001**

Altrena Mukuria  
Jeanne Cushing  
Jasbir Sangha

ORC Macro  
Calverton, Maryland, USA

December 2005



**USAID**  
FROM THE AMERICAN PEOPLE

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.



Editor: Sidney Moore  
Report production: John Chang

Recommended citation:

Mukuria, Altrena, Jeanne Cushing, and Jasbir Sangha. 2005. *Nutritional Status of Children: Results from the Demographic and Health Surveys 1994–2001*. DHS Comparative Reports No. 10. Calverton, Maryland: ORC Macro.

# Contents

Tables and Figures .....	v
Preface.....	ix
Acknowledgements.....	xi
Executive Summary .....	xiii
Introduction .....	1
Data and Methods .....	3
2.1 Sample of Children.....	4
Findings .....	7
3.1 Infant and Under-Five Mortality.....	7
3.2 Contribution of Undernutrition to Mortality.....	9
3.3 Malnutrition Rates.....	9
3.3.1 Levels of Undernutrition.....	9
3.3.2 Patterns of Undernutrition .....	9
3.3.3 Severity of Undernutrition .....	12
3.3.4 Distribution of Z-scores .....	12
3.3.5 Age Distribution of Undernutrition .....	18
3.3.6 Levels of Overnutrition.....	19
3.4 Influences on the Nutritional Status of Children .....	26
3.4.1 Basic Influences.....	26
3.4.2 Underlying Social and Economic Influences .....	29
3.4.2.1 Mother's Education .....	31
3.4.2.2 Mother's Work Status.....	35
3.4.2.3 House Flooring Status .....	39
3.4.2.4 Sanitation Facilities.....	43
3.4.2.5 Source of Drinking Water .....	47
3.4.3 Underlying Biological and Behavioral Influences.....	51
3.4.3.1 Characteristics of Mothers.....	51
3.4.3.2 Child Characteristics .....	62
3.4.3.3 Immediate Influences.....	92
Summary and Conclusions .....	101
References .....	103
Appendix A.....	107



## Tables and Figures

Table 2.1	Demographic and Health Surveys included in this report.....	3
Table 2.2	DHS indicators used in this report .....	4
Figure 3.1	Infant and Under-Five Mortality Rates .....	8
Figure 3.2	Levels of stunting and underweight among children age 0-35 months, Demographic and Health Surveys, 1994-2001 .....	10
Figure 3.3	Levels of wasting among children age 0-35 months .....	11
Figure 3.4	Percentage of children age 0-35 months who are moderately stunted and severely stunted.....	13
Figure 3.5	Percentage of children age 0-35 months who are moderately wasted and severely wasted.....	14
Figure 3.6	Percentage of children age 0-35 months who are moderately underweight and severely underweight .....	15
Figure 3.7	Distribution of height-for-age, weight-for-height, and weight-for-age Z-scores among children age 3-35 months.....	16
Figure 3.8	Levels of stunting by child's age group.....	20
Figure 3.9	Levels of wasting by child's age group.....	21
Figure 3.10	Levels of underweight by child's age group.....	22
Figure 3.11	Distribution of mean Z-scores for height-for-age, weight-for-height, and weight-for-age among children age 3-35 months.....	23
Figure 3.12	Percentage of overweight (weight-for-height) children age 0-35 months .....	25
Figure 3.13	Conceptual framework for child nutritional status .....	27
Figure 3.14	Levels of stunting by urban-rural residence .....	28
Figure 3.15	Levels of wasting by urban-rural residence .....	30
Figure 3.16	Levels of underweight by urban-rural residence .....	31
Figure 3.17	Levels of stunting among children age 0-35 months by mother's education.....	32
Figure 3.18	Levels of wasting among children age 0-35 months by mothers' education.....	33
Figure 3.19	Levels of underweight among children age 0-35 months by mother's education.....	34
Figure 3.20	Levels of stunting among children age 0-35 months by mother's work status .....	36
Figure 3.21	Levels of wasting among children age 0-35 months by mother's work status .....	37
Figure 3.22	Levels of underweight among children age 0-35 months by mother's work status ...	38

Figure 3.23	Levels of stunting among children age 0-35 months by flooring status .....	40
Figure 3.24	Levels of wasting among children age 0-35 months by flooring status .....	41
Figure 3.25	Levels of underweight among children age 0-35 months by flooring status .....	42
Figure 3.26	Percentage of children age 0-35 months who are stunted, by type of household sanitation facility .....	44
Figure 3.27	Percentage of children age 0-35 months who are wasted by type of sanitation facility .....	45
Figure 3.28	Percentage of children age 0-35 months who are underweight by type of household sanitation facility .....	46
Figure 3.29	Percentage of children age 0-35 months who are stunted, by source of drinking water .....	48
Figure 3.30	Percentage of children age 0-35 months who are wasted, by source of drinking water .....	49
Figure 3.31	Percentage of children age 0-35 months who are underweight, by source of drinking water .....	50
Figure 3.32	Percentage of children age 0-35 months who are stunted, by mother's nutritional status.....	52
Figure 3.33	Percentage of children age 0-35 months who are wasted, by mother's nutritional status.....	53
Figure 3.34	Percentage of children age 0-35 months who are underweight, by mother's nutritional status.....	54
Figure 3.35	Percentage of children age 0-35 months who are stunted, by antenatal care visits .....	56
Figure 3.36	Percentage of children age 0-35 months who are wasted, by antenatal care visits .....	57
Figure 3.37	Percentage of children age 0-35 months who are underweight, by antenatal care visits .....	58
Figure 3.38	Levels of stunting among children age 0-35 months by mother's age at delivery .....	59
Figure 3.39	Levels of wasting among children age 0-35 months by mother's age at delivery .....	60
Figure 3.40	Levels of underweight among children age 0-35 months by mother's age at delivery .....	61
Figure 3.41	Levels of stunting among children age 0-35 months by mother's perceived size of child at birth .....	63
Figure 3.42	Levels of wasting among children age 0-35 months by mother's perceived size of child at birth .....	64

Figure 3.43	Levels of underweight among children age 0-35 months by mother's perceived size of child at birth.....	65
Figure 3.44	Levels of stunting among children age 0-35 months by sex of a child .....	66
Figure 3.45	Levels of wasting among children age 0-35 months by sex of child .....	67
Figure 3.46	Levels of underweight among children age 0-35 months by sex of child .....	68
Figure 3.47	Levels of stunting among children age 0-35 months by birth order.....	70
Figure 3.48	Levels of wasting among children age 0-35 months by birth order.....	71
Figure 3.49	Levels of underweight among children age 0-35 months by birth order.....	73
Figure 3.50	Levels of stunting among children age 0-35 months by length of preceding birth interval.....	75
Figure 3.51	Levels of wasting among children age 0-35 months by length of preceding birth interval.....	76
Figure 3.52	Levels of underweight among children age 0-35 months by length of preceding birth interval .....	77
Figure 3.53	Percentage of children age 12-23 months with a measles vaccination.....	79
Figure 3.54	Levels of stunting among children age 0-35 months by measles vaccination status.....	80
Figure 3.55	Levels of wasting among children age 0-35 months by measles vaccination status.....	81
Figure 3.56	Levels of underweight among children age 0-35 months by measles vaccination status.....	82
Figure 3.57	Levels of stunting among children age 0-35 months by vaccination status .....	84
Figure 3.58	Levels of wasting among children age 0-35 months by vaccination status .....	85
Figure 3.59	Levels of underweight among children age 0-35 months by vaccination status .....	86
Figure 3.60	Exclusive Breastfeeding status of children under 6 months.....	88
Figure 3.61	Complementary feeding status of children age 6-9 months .....	89
Figure 3.62	Median duration of exclusive breastfeeding, predominant breastfeeding, and any breastfeeding.....	91
Figure 3.63	Prevalence of ARI among children age 4-23 months by stunting .....	93
Figure 3.64	Prevalence of ARI among children age 4-23 months by wasting.....	94
Figure 3.65	Prevalence of ARI among children age 4-23 months by underweight .....	95
Figure 3.66	Prevalence of diarrhea among children age 4-23 months by stunting .....	97
Figure 3.67	Prevalence of diarrhea among children age 4-23 months by wasting .....	98

Figure 3.68	Prevalence of diarrhea among children age 4-23 months by underweight .....	99
Table A.3.1	Infant and under-five mortality rates .....	107
Table A.3.2	Contribution of undernutrition to under-five mortality .....	108
Table A.3.3	Undernutrition among young children .....	109
Table A.3.4	Height-for-age Z-scores among young children .....	110
Table A.3.5	Weight-for-height Z-scores among young children.....	111
Table A.3.6	Weight-for-age Z-scores among young children.....	112
Table A.3.7	Undernutrition by child's age group.....	113
Table A.3.8	Nutritional status of young children.....	114
Table A.3.9	Overweight children age 0–35 months .....	115
Table A.3.10	Undernutrition by urban-rural residence.....	116
Table A.3.11	Undernutrition by mother's education .....	117
Table A.3.12	Undernutrition by mother's work status .....	118
Table A.3.13	Undernutrition by flooring status.....	119
Table A.3.14	Undernutrition by type of sanitation facility .....	120
Table A.3.15	Undernutrition by source of drinking water.....	121
Table A.3.16	Undernutrition by mother's nutritional status.....	122
Table A.3.17	Undernutrition by antenatal care visits.....	123
Table A.3.18	Undernutrition by mother's age at delivery .....	124
Table A.3.19	Undernutrition by mother's perceived size of child at birth.....	125
Table A.3.20	Undernutrition by sex of child .....	126
Table A.3.21	Undernutrition by birth order .....	127
Table A.3.22	Undernutrition by length of preceding birth interval.....	128
Table A.3.23	Undernutrition by measles vaccination status .....	129
Table A.3.24	Undernutrition by vaccination status .....	130
Table A.3.25	Breastfeeding status of children under 6 months .....	131
Table A.3.26	Breastfeeding status of children age 6-9 months .....	132
Table A.3.27	Median duration and frequency of breastfeeding.....	133
Table A.3.28	Undernutrition by ARI status .....	134
Table A.3.29	Undernutrition by diarrhea status .....	135

## 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 U.S. Agency for International Development. Some reports are updates of previously published reports.

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



## **Acknowledgements**

The authors would like to thank Fred Arnold, Noah Bartlett, Monica Kothari, Robert Johnston, Shea Rutstein, and Vinod Mishra for their work in reviewing the data for the report. The editing and production assistance of Sidney Moore, John Chang, Justin Faulkenburg, and Katherine Senzee is appreciated.



## Executive Summary

This report reviews the nutritional status of children under 3 years of age in 41 developing countries. Nutritional status is based on anthropometric measurements of height and weight of children taken during household interviews conducted by the Demographic and Health Surveys (DHS) program between 1994 and 2001. Five regions are included in this report: sub-Saharan Africa (23 countries), North Africa/West Asia/Europe (4 countries), Latin America and the Caribbean (7 countries), Central Asia (3 countries), and South/Southeast Asia (4 countries).

Malnutrition includes both under- and overnutrition. Although this report focuses primarily on undernutrition (stunting, wasting, and underweight), the prevalence of overweight is also reported. Important differentials of undernutrition, such as age, are presented. Using a conceptual framework for child nutritional status adapted from UNICEF, this report explores variables representing four key influences (basic; underlying social and economic; underlying biological and behavioral; and immediate). As background to the report, tables on infant and under-five mortality rates and the contribution of undernutrition to mortality are included.

DHS continues to find high levels of undernutrition in all the countries surveyed. In 31 of the 41 countries, more than 20 percent of the children are stunted, with 9 of the countries having stunting rates of 40 percent or more. The South/Southeast Asia region has the highest rates of stunting and underweight (40 percent or more), followed by sub-Saharan Africa (about 30 percent). The remaining three regions have stunting rates around 20 percent and underweight rates between 10 percent and 15 percent.

Although undernutrition is of much concern in developing countries, childhood obesity is increasing worldwide. The prevalence of overweight (weight-for-height) in children under three years is particularly noticeable in the Latin America and Caribbean region (almost 6 percent) and Central Asia (5 percent). South/Southeast Asia has the lowest level of overweight among the regions (2 percent).

Differentials in background variables provide insights into patterns of undernutrition. Undernutrition is age dependent. Children younger than 6 months and those age 24-35 months have lower rates of undernutrition than children age 6-23 months. Undernutrition accelerates from 4 to 23 months of age. Undernutrition is more prevalent in rural than urban areas. This differential may be due to differences in social and economic conditions in urban and rural areas, such as mother's education, work status, and availability of water and sanitation facilities. These underlying influences operate to predict higher rates of stunting and underweight but are not strongly associated with wasting rates. Children of working mothers and mothers with primary or less education have higher rates of undernutrition. Likewise, children living in households with unfinished floors, without flush toilets, and without access to piped water have higher rates of undernutrition.

Biological and behavioral influences related to mother and child are also important for child nutrition. Higher rates of undernutrition are found for children whose mothers are undernourished. Antenatal care (at least one clinic visit) is negatively related to child nutrition (stunting and underweight). The influence of mother's age at delivery varies by region and undernutrition indicator. Children of younger mothers (under 20 years) have higher rates of stunting and underweight in sub-Saharan Africa and North Africa/West Asia/Europe, but children of older mothers (35 years or more) have higher rates of stunting and underweight in Latin America and the Caribbean, Central Asia, and South/Southeast Asia. Wasting rates show no consistent pattern by region or mother's age.

Prevalence of undernutrition by child's characteristics, such as size at birth, sex, birth order, and preceding birth interval, was also examined. Babies being very small at birth (as perceived by the mother) is related to poor nutritional status. Females tend to have better nutritional status than males in most regions. However in South/Southeast Asia, males are somewhat less likely to be stunted or underweight than females. Higher birth order is related to poor nutritional status (particularly stunting). A preceding birth interval of less than 24 months is related to poor nutritional status, but first births and intervals of 48 months or longer are associated with lower rates of stunting and underweight.

Other biological and behavioral factors include vaccination history and feeding practices. Children age 12–23 months who are vaccinated against measles have lower rates of undernutrition than those who are not; and children age 12–23 months who have completed “other vaccinations” have lower rates of undernutrition than children who have not received any vaccinations. However, having completed one or more measles vaccinations is the best predictor of lower undernutrition rates. Feeding practices were used only as descriptors of behaviors across countries and regions. In children under six months of age, the prevalence of exclusive breastfeeding is highest in South/Southeast Asia (45 percent) and lowest in sub-Saharan Africa (22 percent). The North Africa/West Asia/Europe and Central Asia regions do not have DHS data on infant feeding practices in some of the countries. Bottle-feeding is low among breastfed babies in all of the regions except Latin America and the Caribbean, where 60 percent or more of breastfed infants under six months are also bottle-fed. Children age 6–9 months are expected to be fed solids in addition to breast milk (complementary feeding). Sub-Saharan Africa has the highest rates of complementary feeding at age 6–9 months (71 percent), and the Latin America and Caribbean region has the lowest (about 54 percent). The median duration of breastfeeding is about 15 months in Latin America and the Caribbean and in North Africa/West Asia/Europe. South/Southeast Asia and sub-Saharan Africa have the longest breastfeeding durations, 27 and 21 months, respectively. The international recommendation is that children continue to breastfeed through two years of age.

This report examines the association between undernutrition and two major childhood diseases—acute respiratory infection (ARI) and diarrhea. Higher rates of ARI and diarrhea were expected among undernourished children. However, a weak association was found between undernutrition and the prevalence of ARI and diarrhea in children. Moreover, the results are not consistent across countries and regions. The results are more consistent for diarrhea than ARI, with higher rates of diarrhea among children who are wasted or underweight.

To conclude, improved health services, water sources, and sanitation facilities, as well as immunizations, are important for the prevention and treatment of childhood illnesses and the improvement of the nutritional status of children. Policies and programs that impact basic and underlying social and economic influences should improve conditions that support chronic undernutrition. Although the developing regions of the world share similar problems related to poverty, there are significant country and regional differences in the prevalence of undernutrition and the factors that influence child nutritional status. Therefore, policies and program interventions need to be tailored to the needs of each country and region. This report provides country and regional comparative data that can be used for policymaking, program planning, and monitoring purposes.

---

# 1

---

## Introduction

Child malnutrition continues to be a major public health problem in developing countries around the world. This report presents data on the status of child nutrition in 41 countries included in the Demographic and Health Surveys (DHS) program between 1994 and 2001. DHS collects anthropometric and related data that enable a comparative exploration of key indicators that influence the nutritional status of children.

Nutritional status is primarily determined by a child's growth in height and weight and is directly influenced by food intake and the occurrence of infections. Food intake is not only a result of food availability at the household level but also of dietary quality and quantity and feeding practices. Optimal infant feeding practices, which include breastfeeding and timely complementary feeding, contribute to the level of food intake in infants and young children (Brown et al., 1998). In addition, acute and chronic infections have a major impact on nutritional status because they impair growth by limiting macro- and micronutrient intake and utilization (Stephensen, 1999).

Nutritional anthropometry—the measurement of size, weight, and proportions of the body—provides the primary indicators of past and present nutritional and health status of children. Anthropometric measures used in this report include weight, standing height, and recumbent length (used for children under two years of age). In combination, anthropometric indices can distinguish between stunting (low stature), wasting (thinness), and under- and overweight. Each indicator gives a different perspective on the nutritional status of children. Chronic (stunting) and acute (wasting) nutritional problems and general health and nutritional status (under- and overweight) can be assessed at the population level through these measures.

The assessment of nutritional status is based on the rationale that in a well-nourished population, there are statistically predictable distributions of children's height and weight at a given age. The variations in height and weight approximate a normal distribution. To examine differences in the anthropometric status of various populations and subpopulations, a standard reference population is used for comparison. The World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) recommend the international reference population that is based on the United States National Center for Health Statistics (NCHS) standard. The use of this reference population is based on the premise that young children of all population groups have similar genetic potential for growth.

Each of the three indicators for undernutrition is expressed in standard deviations (*Z*-scores) from the mean of the reference population. Deviations of the indicators below -2 standard deviations (SD) indicate that the children are moderately or severely affected, while deviations below -3 SD indicate that the children are severely affected.

The prevalence and severity of undernutrition among children age 0-35 months, regional differences, infant and under-five mortality, infant feeding patterns, and infectious diseases are reported here. In addition, important differentials in maternal and child demographic characteristics, child health care, and ma-

ternal nutritional status are explored by child nutritional status. Basic and underlying social and economic differentials, including urban and rural residence, water and sanitation, mother's work status, and household flooring, are examined as proxies for household economic status.

# 2

## Data and Methods

The Demographic and Health Surveys (DHS) is the world's largest survey program, collecting nationally representative data on women age 15-49 years, men age 15-59 years, and children under 5 years of age. More than 160 surveys have been conducted in over 70 countries of sub-Saharan Africa, North Africa/West Asia/Europe, South/Southeast and Central Asia, and Latin America and the Caribbean. Some countries have conducted two or more surveys at intervals of three to six years. The United States Agency for International Development has provided most of the funding for these surveys. Because of funding priorities, surveys are conducted in selected countries.

Data presented in this report are based on the results of surveys conducted in 41 countries between 1994 and 2001 (Table 2.1). Sub-Saharan Africa has the largest number of countries with completed surveys (23), followed by Latin America and the Caribbean (7), South/Southeast Asia (4) and North Africa/West Asia/Europe (4), and Central Asia (3). Since the data are not representative in all regions, this report can provide only limited comparisons within regions and suggested differences across regions. The main purpose of this report is to update information on the indicators of child nutrition in the developing regions of the world.

In each country, information is collected at the household level and the individual level. At the household level, information is collected on basic characteristics of members of the household, structure of the dwelling, anthropometric measures of women and children, anemia testing of women and children, salt testing for iodization, and water supply and sanitation facilities, among others.

The individual questionnaire for women allows for the collection of information on marriage, fertility, fertility preferences, family planning, infant and under-five mortality, maternal mortality, maternal and child health,

**Table 2.1**  
**Demographic and Health Surveys included in this report**

Country	Year of survey
<b>Sub-Saharan Africa</b>	
Benin	1996
Burkina Faso	1998-99
Cameroon	1998
Central African Republic	1994-95
Chad	1996-97
Comoros	1996
Côte d'Ivoire	1994
Eritrea	1995
Ethiopia	2000
Gabon	2000
Ghana	1998
Guinea	1999
Kenya	1998
Madagascar	1997
Malawi	2000
Mali	1995-96
Mozambique	1997
Niger	1998
Tanzania	1999
Togo	1998
Uganda	2000-01
Zambia	1996
Zimbabwe	1999
<b>North Africa/West Asia/Europe</b>	
Egypt	2000
Jordan	1997
Turkey	1998
Yemen	1997
<b>Central Asia</b>	
Kazakhstan	1999
Kyrgyz Republic	1997
Uzbekistan	1996
<b>South/Southeast Asia</b>	
Bangladesh	2000
Cambodia	2000
India	1998-99
Nepal	1996
<b>Latin America/Caribbean</b>	
Bolivia	1998
Brazil	1996
Colombia	2000
Dominican Republic	1996
Guatemala	1998-99
Haiti	2000
Peru	2000

infant and young child feeding, childhood diseases, vaccinations, women's status, and women's attitudes and practices regarding the prevention of sexually transmitted diseases and HIV/AIDS. The indicators included in this report are shown in Table 2.2.

Indicator	Key child survival and nutrition indicators	Basic influences	Underlying social and economic influences	Underlying biological and behavioral influences	Immediate influences
<b>Child survival</b>					
Infant and under-5 mortality	x				
Contribution of malnutrition to mortality	x				
<b>Nutritional status</b>					
Malnutrition rates (stunting, wasting, underweight, and overweight)	x				
Age distribution of undernutrition	x				
<b>DIFFERENTIALS IN UNDERNUTRITION</b>					
<b>Residence</b>					
Urban-rural		x			
<b>Education</b>					
Maternal education			x		
<b>Employment</b>					
Maternal work status			x		
<b>Household assets</b>					
House flooring status			x		
<b>Water sanitation</b>					
Sanitation facilities			x		
Source of drinking water			x		
<b>Maternal characteristics</b>					
Maternal nutritional status				x	
Antenatal care				x	
Mother's age at delivery				x	
<b>Child characteristics</b>					
Size at birth				x	
Sex				x	
Birth order				x	
Preceding birth interval				x	
<b>Feeding practices</b>				x	
<b>Vaccination history</b>				x	
<b>Recent illnesses</b>					x

Nutritional status indicators used in this report are based on anthropometric measurements of children. Vaccination data are derived from inspection of immunization cards or mothers' reports for those children whose cards were not seen. Calculations for other health indicators are based on questions asked of mothers for each child. The infant and under-five mortality rates and demographic factors are derived from birth histories of the mothers interviewed.

## 2.1 Sample of Children

The sample comprises children born between the date of interview and three to six years preceding the survey in each country. All children in households selected to be surveyed were less than five years of age for most surveys and less than three years of age for some countries prior to 1996. For the countries surveyed since 1999, the children were under six years of age. To make the data comparable and to include as

many countries as possible, analyses were carried out on data for children under three years of age at the time of the survey. The results are based on children for whom height and weight measurements were recorded. Sample sizes ranged from 354 in the 1999 DHS survey in Kazakhstan to 24,600 in the 1998-99 National Family Health Survey in India. The average sample size is about 3,500 children.



---

# 3

---

## Findings

Children in developing countries make up a large proportion of the deaths among children under five years of age around the world. Infectious diseases such as acute respiratory infection, diarrhea, malaria, and measles account for over 50 percent of childhood deaths (UNICEF, 1998). Undernutrition compromises child health, making children susceptible to illness and death. This synergistic relationship between undernutrition and infection is widely recognized (Scrimshaw et al., 1968; Tomkins and Watson, 1993). Even if a child is mildly undernourished, the mortality risk is increased. Infant mortality (under-one-year rate) is commonly used as a measure of infant health and is a sensitive indicator of the socio-economic conditions of a country. Under-five mortality is largely a result of infectious diseases and neonatal deaths in developing countries and is related to the availability and accessibility of health services (Mahy, 2003).

### 3.1 Infant and Under-Five Mortality

Although mortality among infants and children has decreased in most countries since the mid-1980s, the decline has recently slowed, stopped, or reversed itself in sub-Saharan Africa (Rutstein, 2000). All of the countries in Africa have infant mortality rates above 50 deaths per 1,000 live births (Table A.3.1 and Figure 3.1)<sup>1</sup>. Infant mortality runs from 57 per 1,000 in Gabon and Ghana to 135 per 1,000 in Mozambique. Under-five mortality runs from 89 per 1,000 in Gabon to 274 per 1,000 in Niger (Table A.3.1).

Countries in North Africa/West Asia/Europe have lower infant mortality rates than countries in sub-Saharan Africa. Jordan has the lowest rate in the region (29 per 1,000) and Yemen has the highest rate (75 per 1,000). Under-five mortality is also somewhat lower in this region than in sub-Saharan Africa, with Jordan again having the lowest rate (34 per 1,000) and Yemen having the highest rate (105 per 1,000) (Figure 3.1).

Infant and child mortality rates vary considerably in the Latin America and the Caribbean region. Colombia has the lowest rates for both infant (21 per 1,000) and under-five mortality (25 per 1,000). Haiti has the highest rates for both infant and under-five mortality (80 and 119 per 1,000, respectively) (Figure 3.1).

As a region, Central Asia has some of the lowest rates of infant and child mortality. Uzbekistan has an infant mortality rate of 49 per 1,000, and the Kyrgyz Republic and Kazakhstan have rates of 61 and 62 per 1,000, respectively. Unlike other regions, the infant and under-five mortality rates in Central Asia do not vary much across countries. Uzbekistan has the lowest rate of under-five mortality (59 per 1,000), and the Kyrgyz Republic has the highest rate (72 per 1,000) (Figure 3.1).

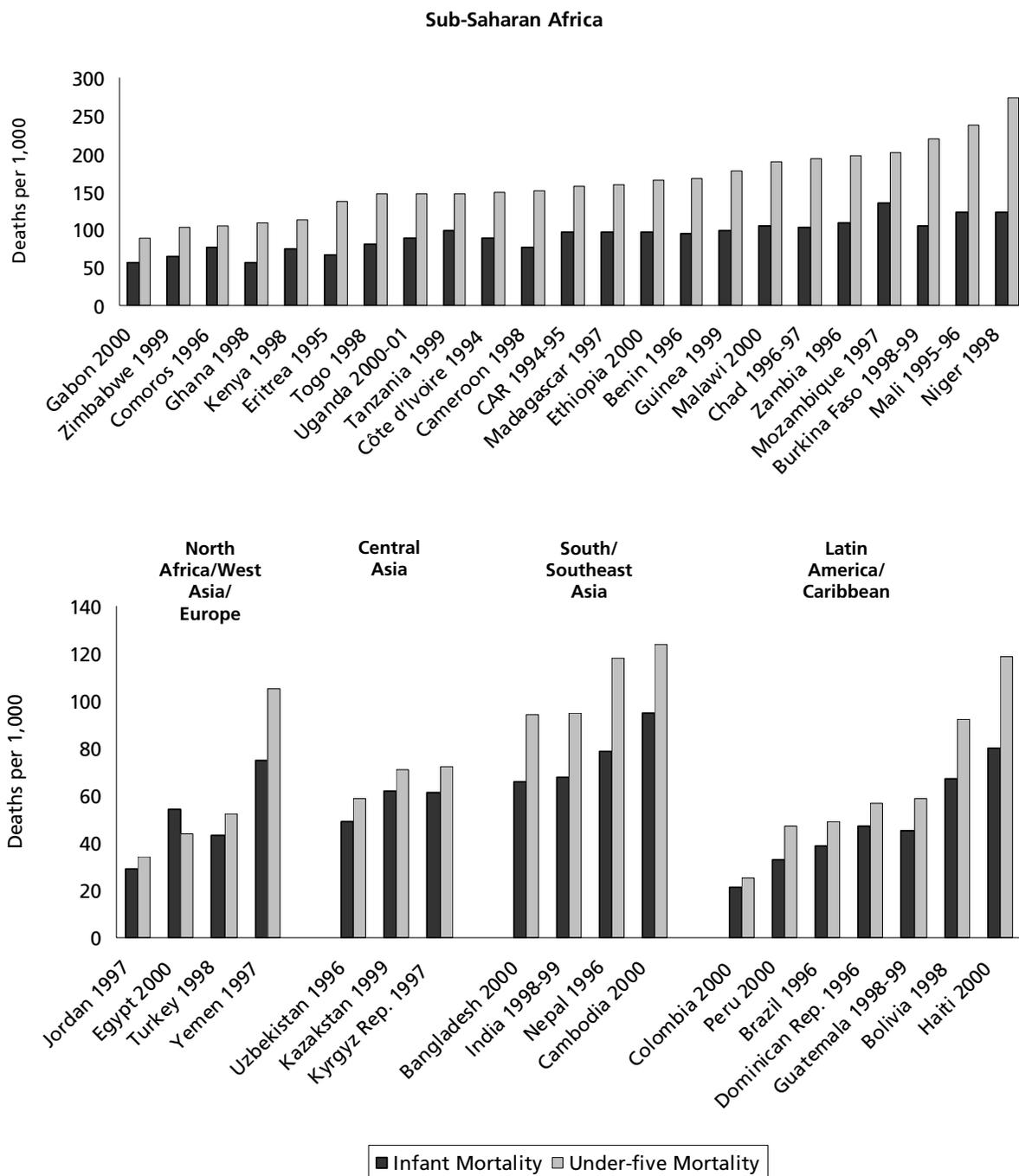
South/Southeast Asia has rates similar to those at the lower end of the range in Africa. Bangladesh has the lowest infant mortality rate (66 per 1,000), and Cambodia has the highest rate (95 per 1,000). Under-

---

<sup>1</sup> Tables mentioned in Chapters 3 and 4 are located in Appendix A.

five mortality rates run from a low of 94 per 1,000 in Bangladesh to a high of 124 per 1,000 in Cambodia (Figure 3.1).

Figure 3.1  
**Infant and Under-Five Mortality Rates, Demographic and Health Surveys, 1994-2001**



## 3.2 Contribution of Undernutrition to Mortality

Undernutrition plays an important role in mortality. Almost 50 percent of all deaths among children are associated with undernutrition (Rice et al., 2000). Even if a child is only mildly undernourished, the mortality risk is increased. Because the prevalence of mild to moderate undernutrition is high, it contributes to a larger proportion of deaths than severe undernutrition. Table A.3.2 shows the contribution of undernutrition to under-five mortality based on the Pelletier model (Pelletier et al., 1994).

In sub-Saharan Africa, undernutrition contributes substantially to under-five mortality, from 28 percent in Zimbabwe to 61 percent in Eritrea. Overall for the region, about 42 percent of early childhood deaths are related to undernutrition. As seen in Table A.3.2, the majority of this effect is not due to severe undernutrition as would be expected, but is mostly due to the effects of mild to moderate undernutrition. With only four countries represented in North Africa/West Asia/Europe the contribution of undernutrition to under-five mortality shows a wide mix, from a low of 9 percent in Egypt to a high of 56 percent in Yemen, demonstrating the broad differences in living standards among the countries in the region. In Central Asia there is a range of more than 20 percentage points between Kazakhstan (10 percent) and Uzbekistan (32 percent) in the contribution of undernutrition to under-five mortality. The Kyrgyz Republic is in between (18 percent). South/Southeast Asia is consistently high: undernutrition contributes to over half of all deaths among children under five years. Overall, India has the highest rate, with undernutrition contributing to 72 percent of under-five deaths. The Latin America and Caribbean region shows two patterns: in one group of countries, undernutrition contributes to 11 to 16 percent of under-five deaths, and in the second group, which is made up of Haiti and Guatemala, undernutrition contributes to 30 and 37 percent of under-five deaths, respectively.

## 3.3 Malnutrition Rates

### 3.3.1 Levels of Undernutrition

DHS surveys indicate that high levels of undernutrition continue to exist among young children in all the countries represented (Table A.3.3). In 31 of the 41 countries, more than 20 percent of children are stunted (too short for their age). The median level of stunting across all countries is 30 percent, and 9 out of 41 countries have stunting rates higher than 40 percent. In sub-Saharan Africa, stunting prevalence ranges from 20 percent in Ghana to 48 percent in Madagascar. North Africa/West Asia/Europe has prevalence rates that vary from 7 percent in Jordan to 46 percent in Yemen. In Central Asia, stunting prevalence ranges from 10 percent in Kazakhstan to 31 percent in Uzbekistan. In South/Southeast Asia, the variation is not as wide: from 37 percent of children in Cambodia to 48 percent in Nepal. The Latin America and Caribbean region also shows a wide variation in stunting rates, from 10 percent in Brazil to 42 percent in Guatemala.

### 3.3.2 Patterns of Undernutrition

Undernutrition (stunting and underweight) among young children is compared by region in Figure 3.2 and Table A.3.3. While patterns are discernible, comparisons between regions need to be viewed with caution because of the large number of African countries and the small number of countries in the other regions. Nevertheless, two patterns emerge. Sub-Saharan Africa and South/Southeast Asia, for the most part, have about equally high rates of stunting and underweight in most countries. Latin America and the Caribbean and Central Asia have rates of underweight that are about half the stunting rates in most countries. There is no discernible pattern in the North Africa/West Asia/Europe region, other than higher rates of stunting than underweight.

Figure 3.2  
Levels of stunting and underweight among children age 0-35 months, Demographic and Health Surveys, 1994-2001

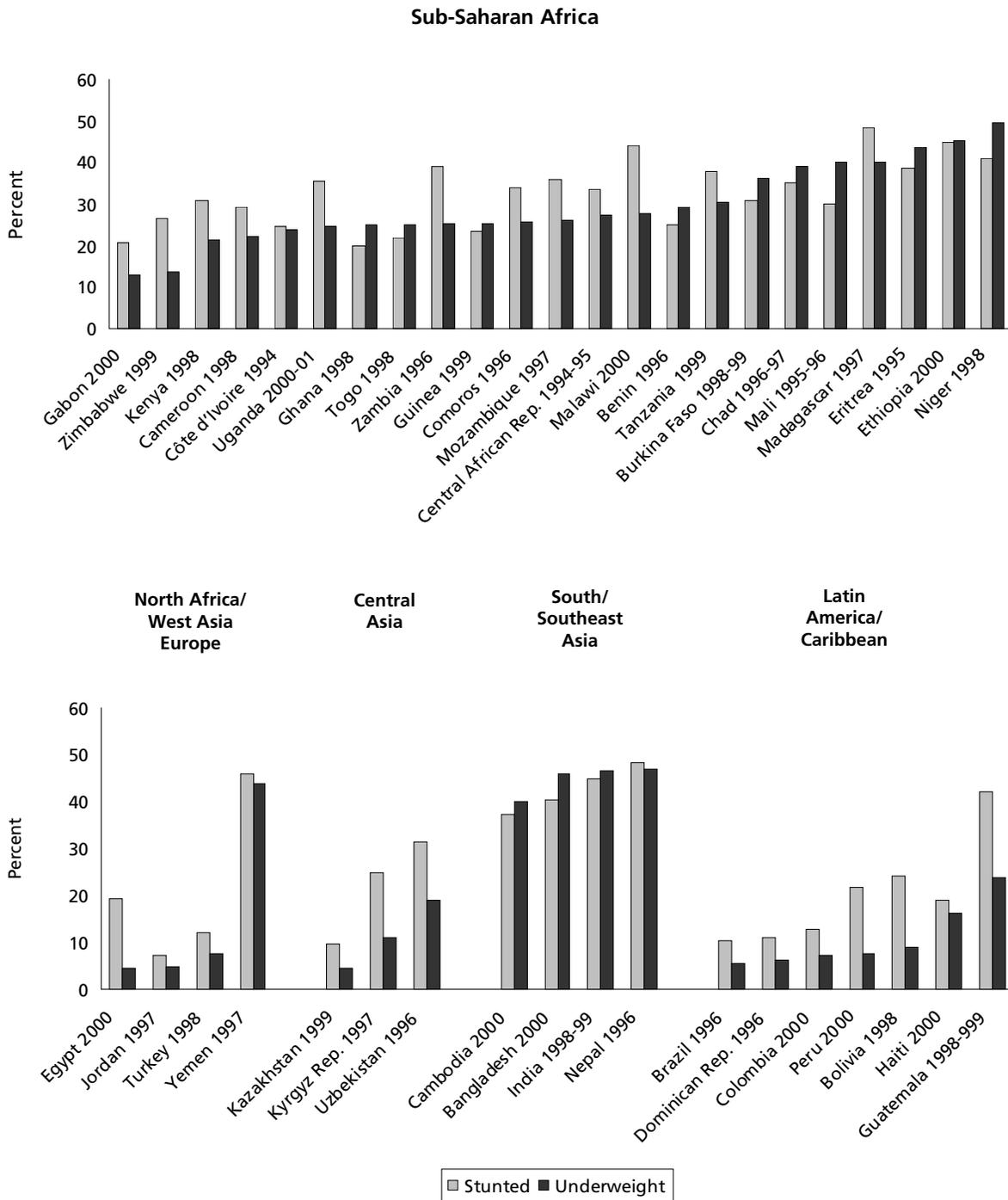
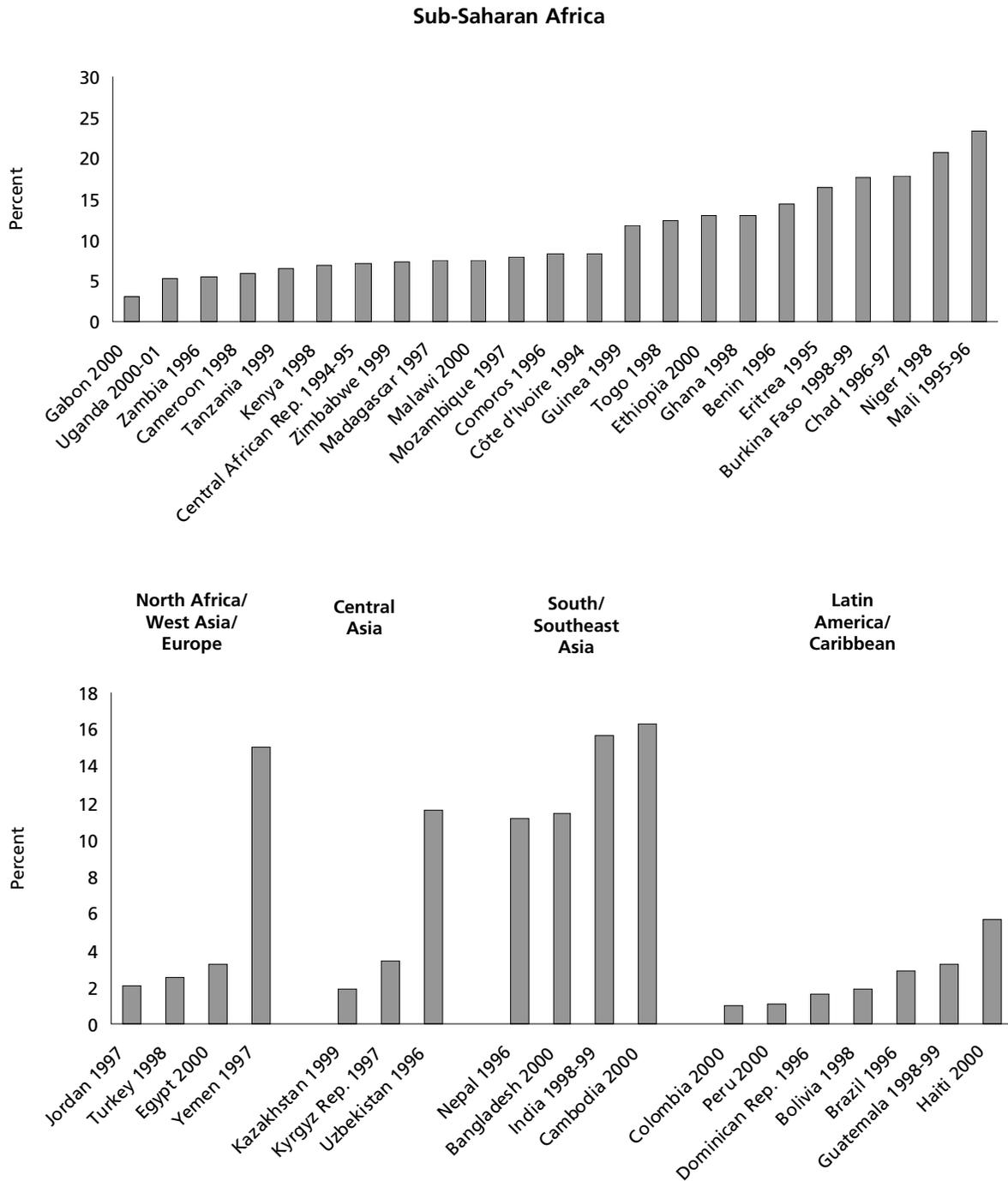


Figure 3.3 shows children's levels of wasting, a measure of weight-for-height that is a seasonally affected indicator of current nutritional status. This indicator is influenced by illness, food availability, and feeding patterns. With lower rates of underweight accompanying moderately high rates of stunting, for the most part, children are short although not necessarily thin. However, Asian and African countries surveyed

have short and thin children as a result of high rates of stunting and wasting. In countries with rates of underweight exceeding rates of stunting by more than 2 percent, there are exceptionally high (over 10 percent) rates of wasting. In these countries, there are probably many children who are very thin but not too short for their age (Table A.3.3).

Figure 3.3  
Levels of wasting among children age 0-35 months, Demographic and Health Surveys, 1994-2001



### 3.3.3 Severity of Undernutrition

Tables A.3.4 through A.3.6 show the Z-score distributions for the indices of undernutrition—stunting (height-for-age), wasting (weight-for-height), and underweight (weight-for-age)—in all the countries surveyed. Figures 3.4 through 3.6 show the percentage of children with moderate undernutrition (Z-scores of -2.01 to -3.00 SD from the mean) and severe undernutrition (Z-score below -3.00 SD) for stunting, wasting, and underweight, respectively. In most countries and in all regions, moderate stunting occurs at a higher rate than severe stunting. However, there is a difference of two percentage points or less between the rates of severe stunting and the rates of moderate stunting in 8 of 23 countries in sub-Saharan Africa, Yemen in North Africa/West Asia/Europe, and India in South/Southeast Asia. In 7 countries, severe stunting is 20 percent or higher.

Table A.3.5 and Figure 3.5 show that moderate wasting is much more prevalent than severe wasting in all of the regions. A similar pattern is observed for underweight (Table A.3.6 and Figure 3.6), except that for underweight, the differences between severe and moderate are not so large.

### 3.3.4 Distribution of Z-scores

Providing another picture of children's nutritional status, Figure 3.7 shows the distribution of the three Z-scores for selected countries in each region. Ethiopia, Ghana, Mali, and Zimbabwe were chosen as examples for sub-Saharan Africa. In these countries, all measures of undernutrition are shifted to the left of the normal curve; however, the degree of shift varies. In Ethiopia, the weight-for-age and height-for-age curves are shifted farther to the left than is the weight-for-height curve. Since the data indicate that the children are short and thin for their ages, it appears that for their heights their weights are not as skewed. Nevertheless, undernutrition is very serious; a large percentage of Ethiopian children are stunted and underweight. Zimbabwe has a bimodal distribution, with a group of children falling within the normal distribution, and another group with high rates of stunting, wasting, and underweight falling just to the left of the normal curve. Further investigation is required to determine the characteristics of these two groups of children.

In North Africa/West Asia/Europe (Figure 3.7), curves for Egypt are similar to the normal curve, but the weight-for-height curve is skewed to the right, indicating a larger proportion of overweight children (A.3.7). Yemen's curves are skewed to the left, showing higher levels of undernutrition for all measures.

Figure 3.4  
**Percentage of children age 0-35 months who are moderately stunted and severely stunted, Demographic and Health Surveys, 1994-2001**

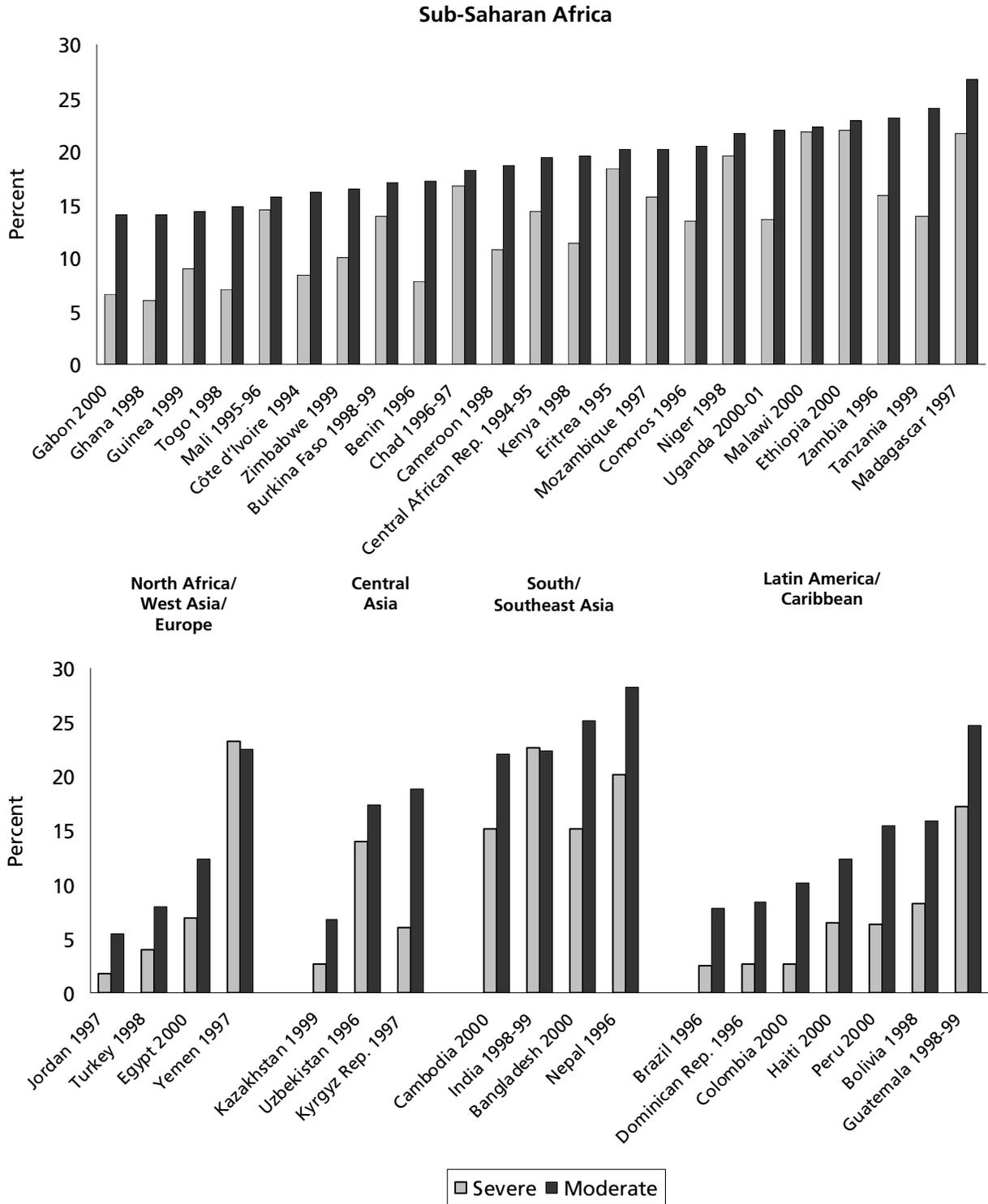


Figure 3.5  
**Percentage of children age 0-35 months who are moderately wasted and severely wasted, Demographic and Health Surveys, 1994-2001**

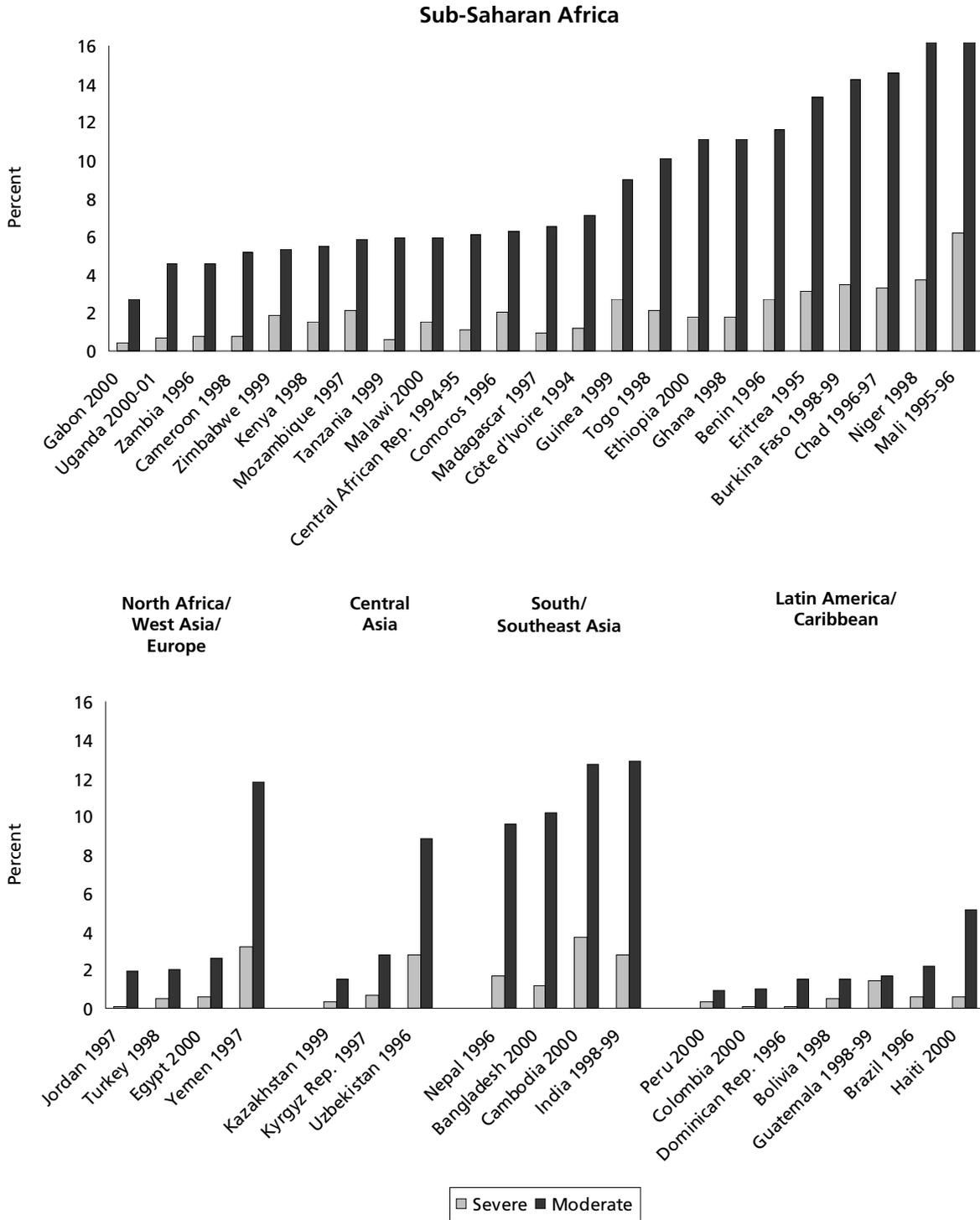
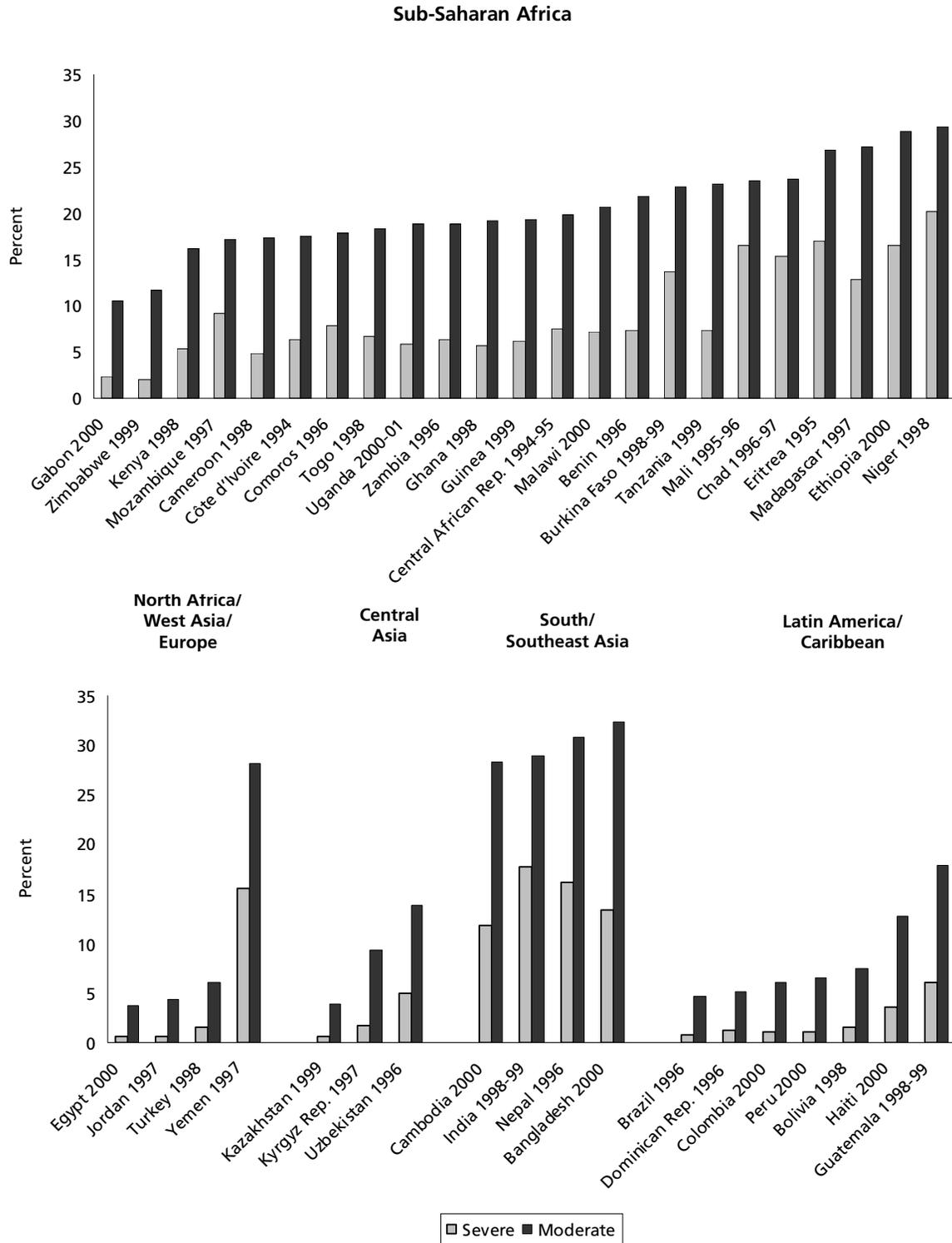


Figure 3.6  
**Percentage of children age 0-35 months who are moderately underweight and severely underweight, Demographic and Health Surveys, 1994-2001**



In Central Asia (Figure 3.7), Kazakhstan's curves are close to the normal curve. In the Kyrgyz Republic, the weight-for-height curve is skewed to the right, indicating that there are children who are overweight, whereas the height-for-age and weight-for-age curves are skewed to the left, indicating stunting and underweight.

South/Southeast Asia curves are widely skewed to the left, indicating high rates of undernutrition in both India and Cambodia (Figure 3.7). Curves for India are more skewed to the left than those for Cambodia, indicating higher rates of undernutrition in India than in Cambodia.

**Figure 3.7**  
**Distribution of height-for-age, weight-for-height, and weight-for-age Z-scores among children age 3-35 months, Demographic and Health Surveys, 1994-2001**

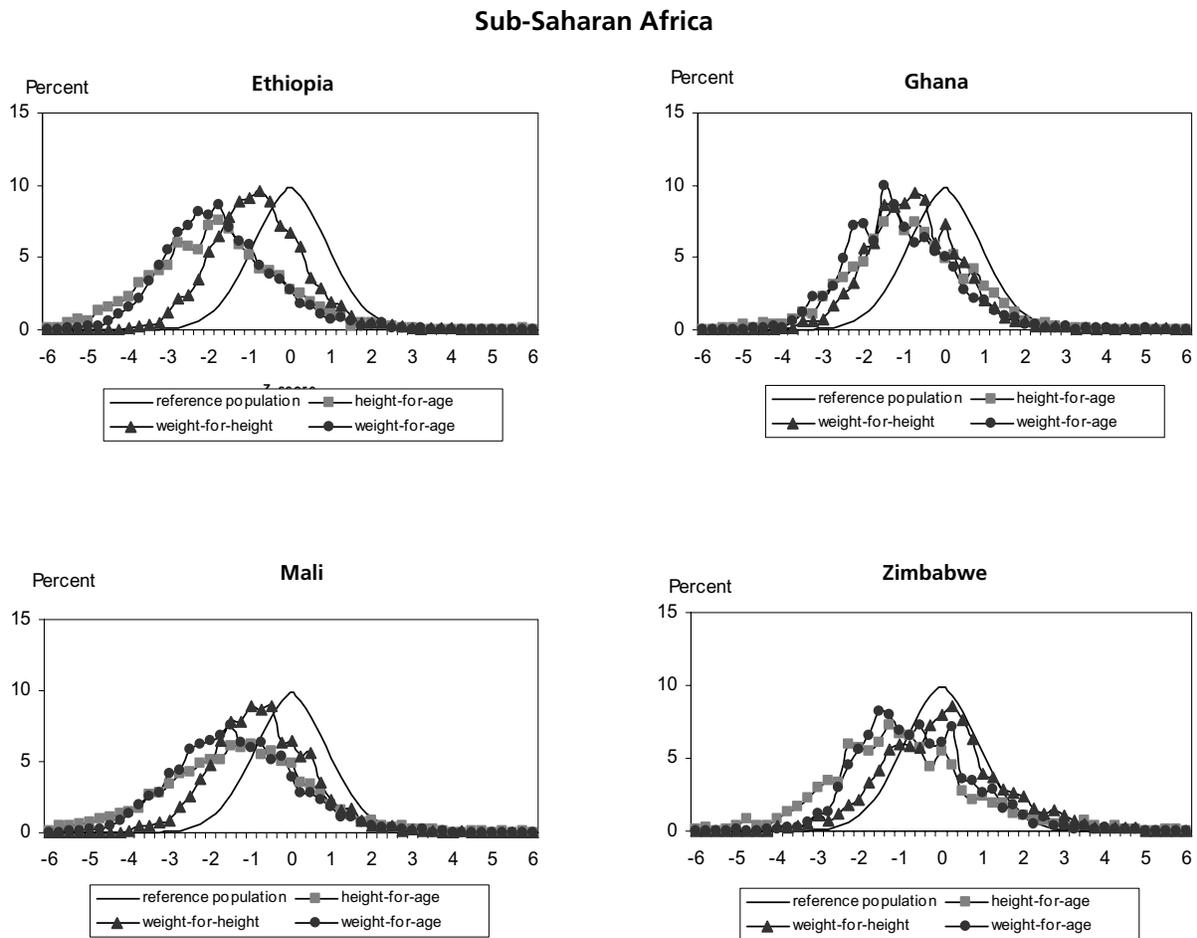
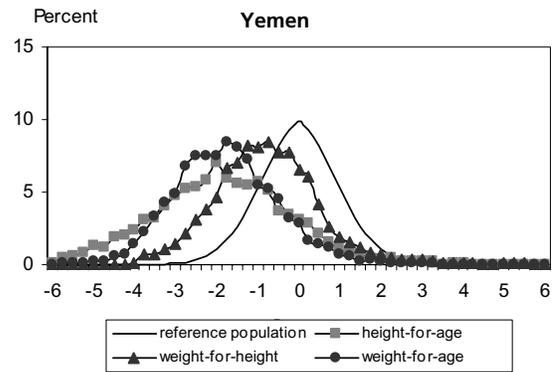
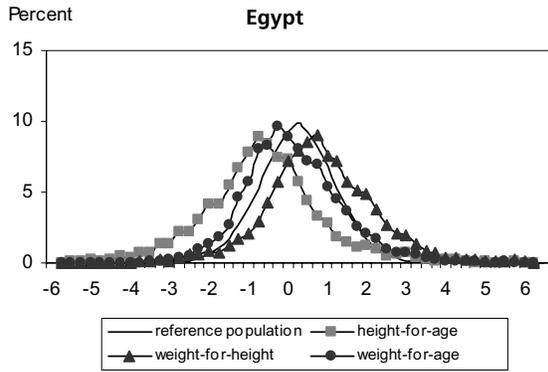


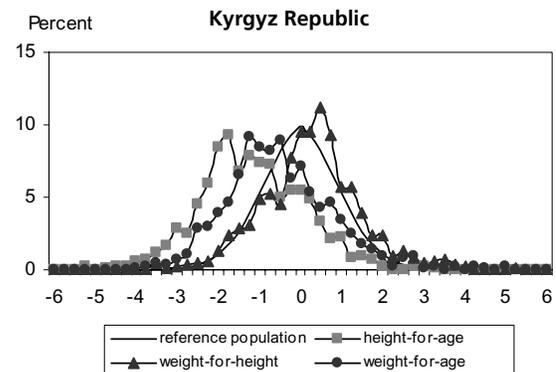
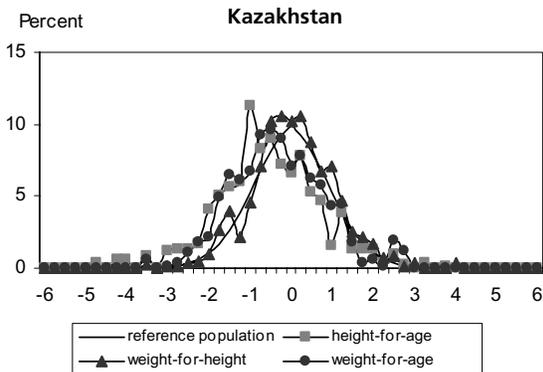
Figure 3.7 (continued)

Distribution of height-for-age, weight-for-height, and weight-for-age Z-scores among children age 3-35 months, Demographic and Health Surveys, 1994-2001

North Africa/West Asia/Europe



Central Asia



South/Southeast Asia

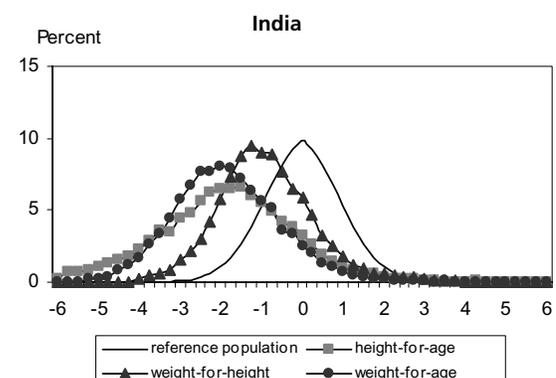
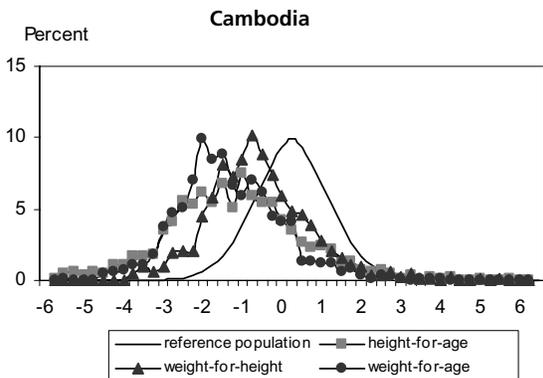
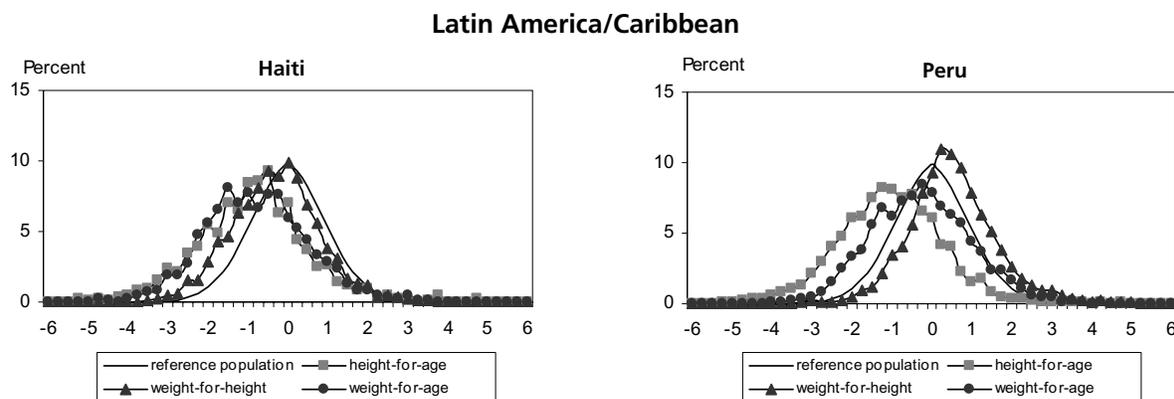


Figure 3.7 (continued)

Distribution of height-for-age, weight-for-height, and weight-for-age Z-scores among children age 3-35 months, Demographic and Health Surveys, 1994-2001



In Latin America and the Caribbean (Figure 3.7), Peru has a high percentage of well-nourished children, as evidenced by a right-skewed curve for weight-for-height. However, there are high rates of stunting, with the height-for-age curve having its center between -1 and -2 SD. Weight-for-age is only slightly skewed to the left. Haiti's curve differs from Peru's in that the weight-for-height curve is very close to the normal curve, with a slight skewing to the left. Left-skewed curves in weight-for-age and weight-for-height indicate considerable prevalence of wasting and underweight in Haiti, whereas in Peru, there is a higher prevalence of stunting.

### 3.3.5 Age Distribution of Undernutrition

Levels of undernutrition are shown for children age 0 to 35 months, by age group in Table A.3.7. The age groups are based on WHO recommendations for appropriate child feeding (Pan American Health Organization, 2003). Infants from birth through six months are expected to be exclusively breastfed (breast milk only, no other fluids or foods). Infants are recommended to begin eating solids (complementary foods) at around six months of age through nine months, with continued breastfeeding through two years of age and beyond while eating a nutritionally adequate diet. The infant feeding patterns indicate that the lowest rates of stunting, wasting, and underweight are found among children less than six months of age (Figures 3.8 through 3.10, respectively). The highest rates of stunting are observed among children over one year of age (i.e., age 13-24 months and/or 25 months or more) in all regions (Figure 3.8).

In sub-Saharan Africa, the lowest rates of wasting are among children under six months of age, followed by those age 25 months or more. Wasting increases from the period of the introduction of solid foods (age six months) through the second year of life (Figure 3.9). This is probably due to higher rates of illness among children during this period. In Latin America and the Caribbean, the data show less striking differences in wasting patterns across age groups, except in Haiti where the pattern is similar to that of sub-Saharan Africa.

The pattern is less consistent in the Asian regions. In most countries, children age 10-24 months have higher rates of wasting than other children, with the exception of Uzbekistan, where the rates are highest for children under 10 months of age. This may be due to differences in infant feeding patterns; however,

the data on infant feeding in Uzbekistan could not be analyzed because the sample of children was not comparable to the samples in other countries.

Countries in North Africa/West Asia/Europe have patterns similar to those in Latin America and the Caribbean, except in Yemen, where the patterns are more like those in the countries of South/Southeast Asia and sub-Saharan Africa. Underweight patterns, by age of child, are similar to stunting patterns in most cases (Figure 3.10).

Mean Z-scores for the three nutritional status indexes for children age 0-35 months are shown in Table A.3.8. The graphs in Figure 3.11 show the mean Z-scores for 12 selected countries. Since the number of cases at each age is small, a three-point moving average was calculated. The graphs show that in most countries, the prevalence of low weight-for-height reaches its nadir between 12 and 18 months and then finds a plateau through 36 months of age. On the other hand, low height-for-age increases rapidly from birth to 18 to 24 months. It then decreases and begins to level off between 24 and 30 months and further declines again after that. The weight-for-age graph usually falls between the wasting and stunting lines. For most countries in this report, all of the curves fall below a mean Z-score of 0. However in Egypt, Peru, and the Kyrgyz Republic, the weight-for-height lines are around or above a mean Z-score of 0. In Egypt and Peru, children start out with weight-for-height Z-scores around 0 (a little chubby). The Z-scores decline a little with age but through 36 months of age stay clearly above 0 (Figure 3.11). Also in the Kyrgyz Republic, children start out a little heavy but lose their baby fat around six months when their weight-for-height Z-scores stabilize at a mean of about 0.

### 3.3.6 Levels of Overnutrition

While undernutrition is the major concern in developing countries, childhood obesity is increasing worldwide. The prevalence of overweight (defined as a weight-for-height Z-score above 2 SD from the mean of the reference population) in children less than three years of age is particularly noticeable in the Latin America and the Caribbean countries, followed by countries in Central Asia and North Africa/West Asia/Europe (Table A.3.9 and Figure 3.12).

The proportion of overweight children in sub-Saharan Africa ranges from a low of less than 1 percent in Niger and Eritrea to a high of 9 percent in Zimbabwe. In 13 of 23 countries in sub-Saharan Africa, less than 3 percent of children are overweight, and in only two countries is the rate over 5 percent. The countries in South/Southeast Asia have the lowest rates: in all four countries, less than 3 percent of the children surveyed are overweight. In Latin America and the Caribbean, the proportion overweight ranges from a low of 2 percent in Haiti to a high of 8 percent in Bolivia and Peru. In Central Asia, the rate ranges from 3 percent in Kazakhstan to 14 percent in Uzbekistan. In North Africa/West Asia/Europe, it ranges from 2 percent in Yemen to 13 percent in Egypt.

Figure 3.8  
Levels of stunting by child's age group, Demographic and Health Surveys, 1994-2001

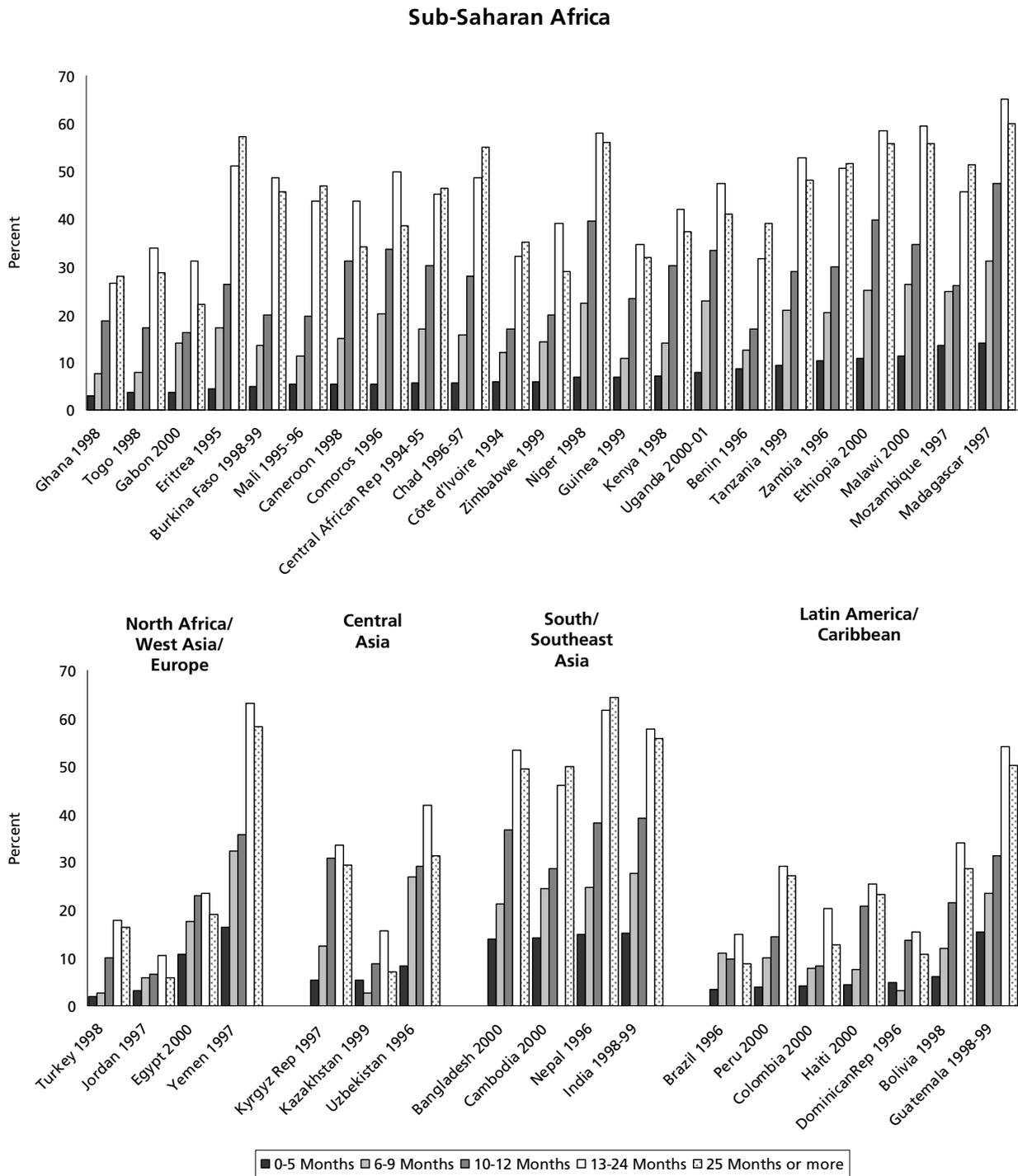


Figure 3.9  
Levels of wasting by child's age group, Demographic and Health Surveys, 1994-2001

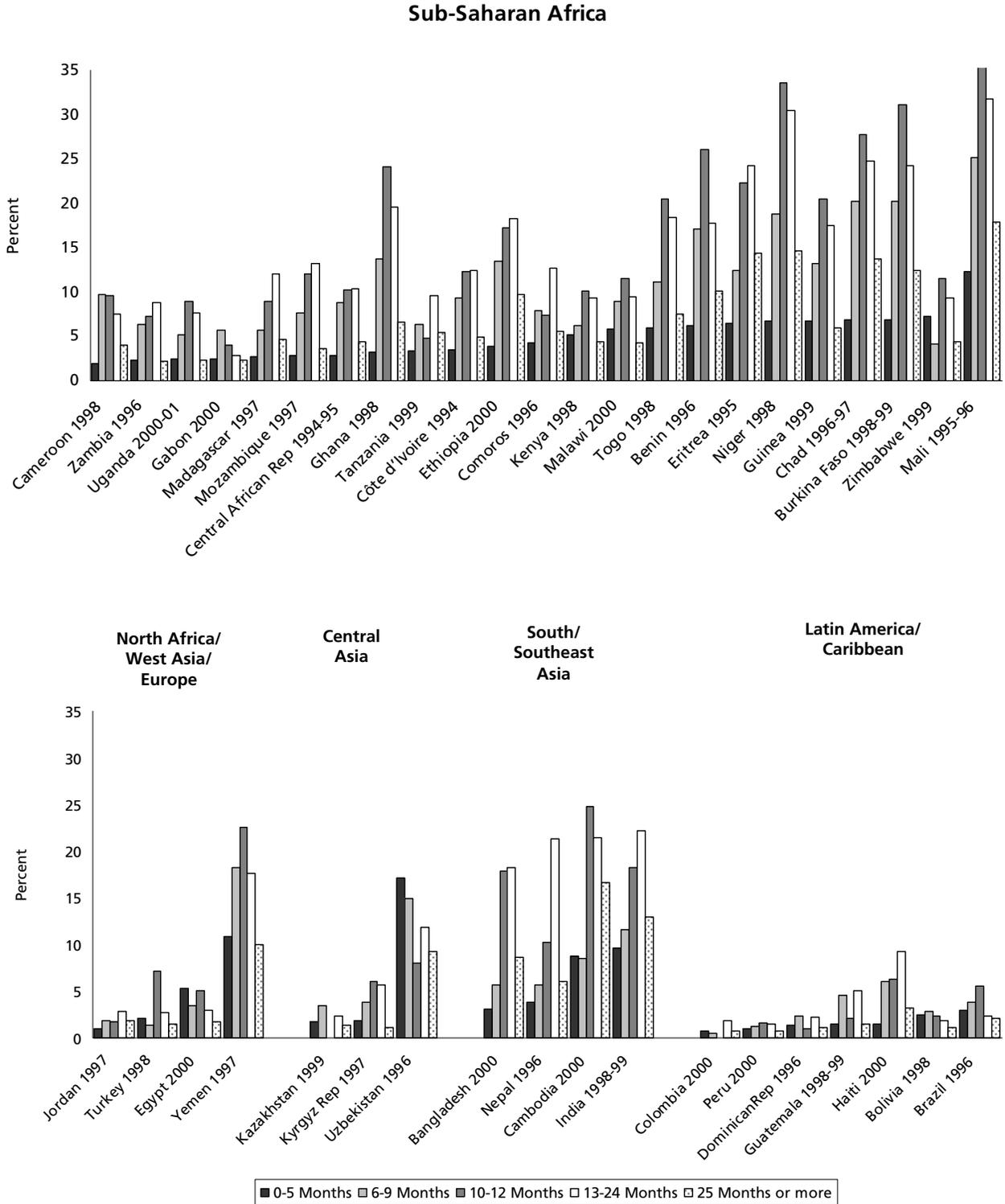


Figure 3.10  
Levels of underweight by child's age group, Demographic and Health Surveys, 1994-2001

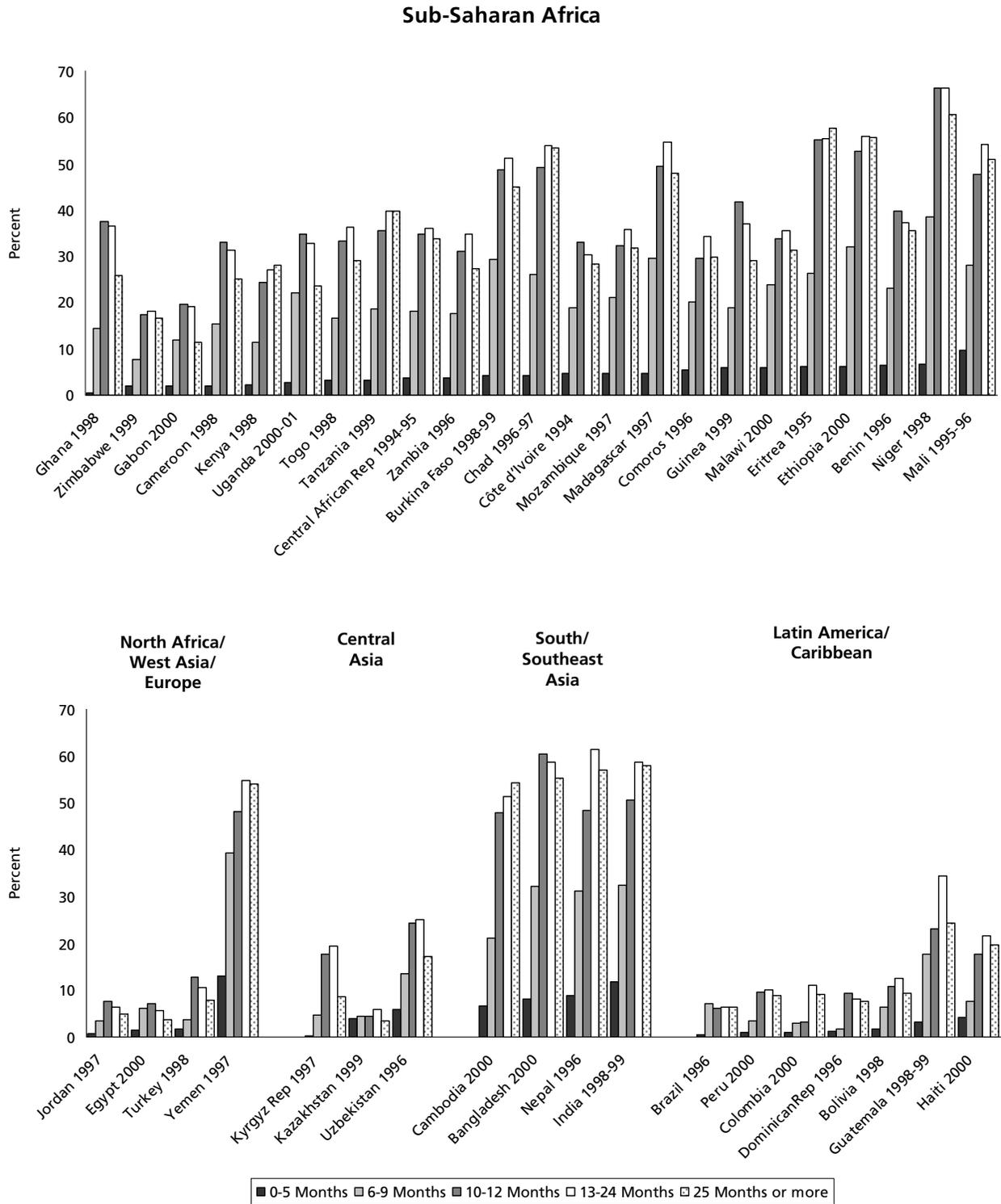
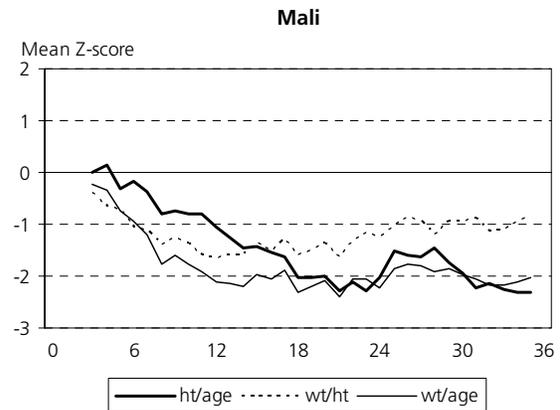
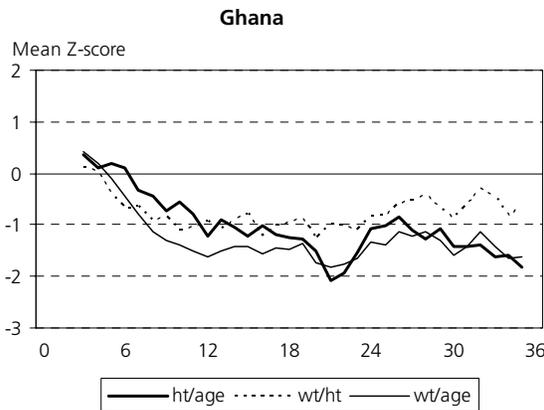
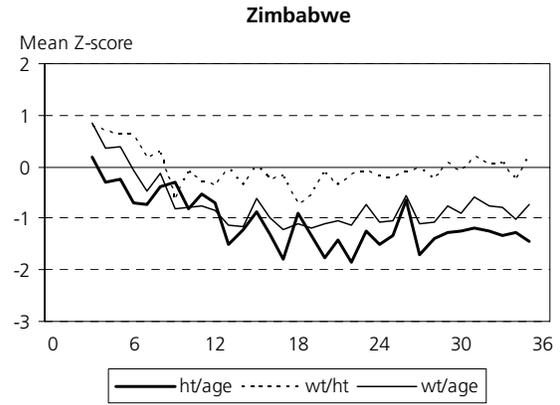
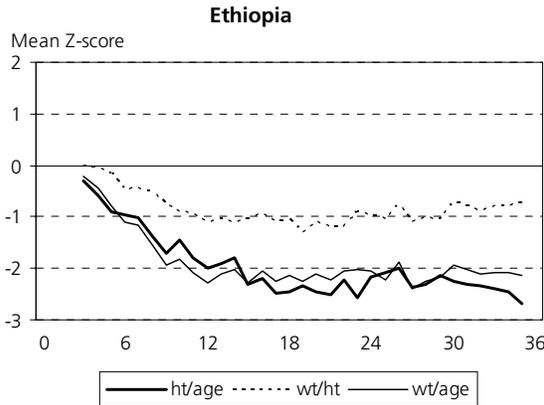


Figure 3.11  
 Distribution of mean Z-scores for height-for-age, weight-for-height, and weight-for-age among children age 3-35 months, Demographic and Health Surveys, 1994-2001

Sub-Saharan Africa



North African/West Asia/Europe

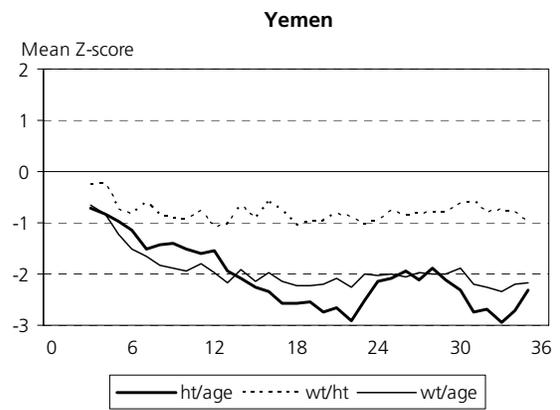
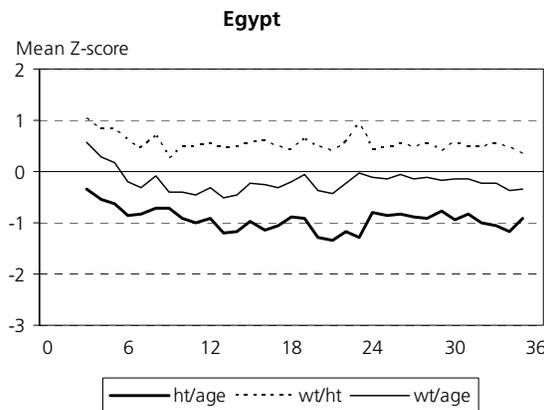


Figure 3.11 (continued)  
**Distribution of mean Z-scores for height-for-age, weight-for-height, and weight-for-age among children age 3-35 months, Demographic and Health Surveys, 1994-2001**

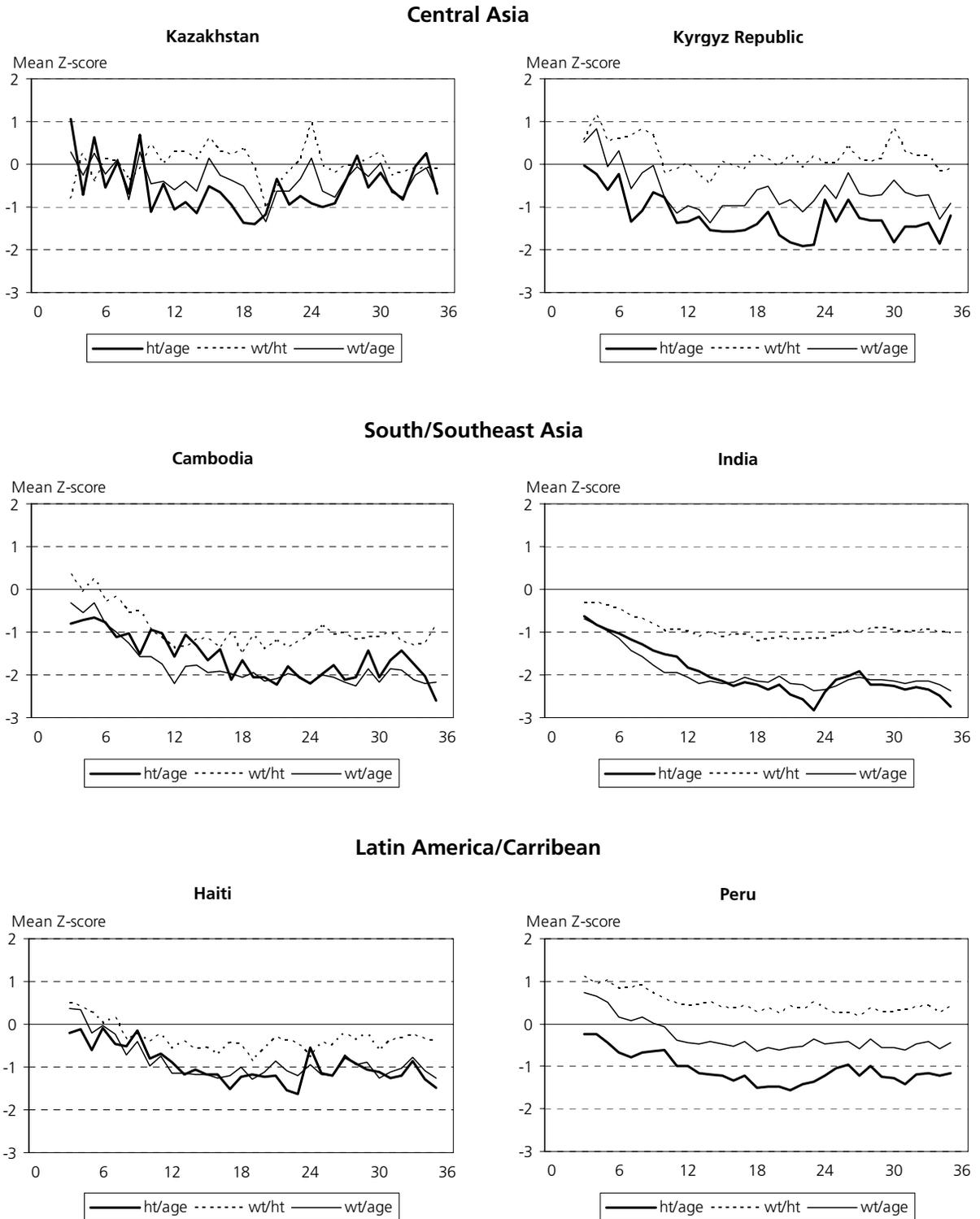
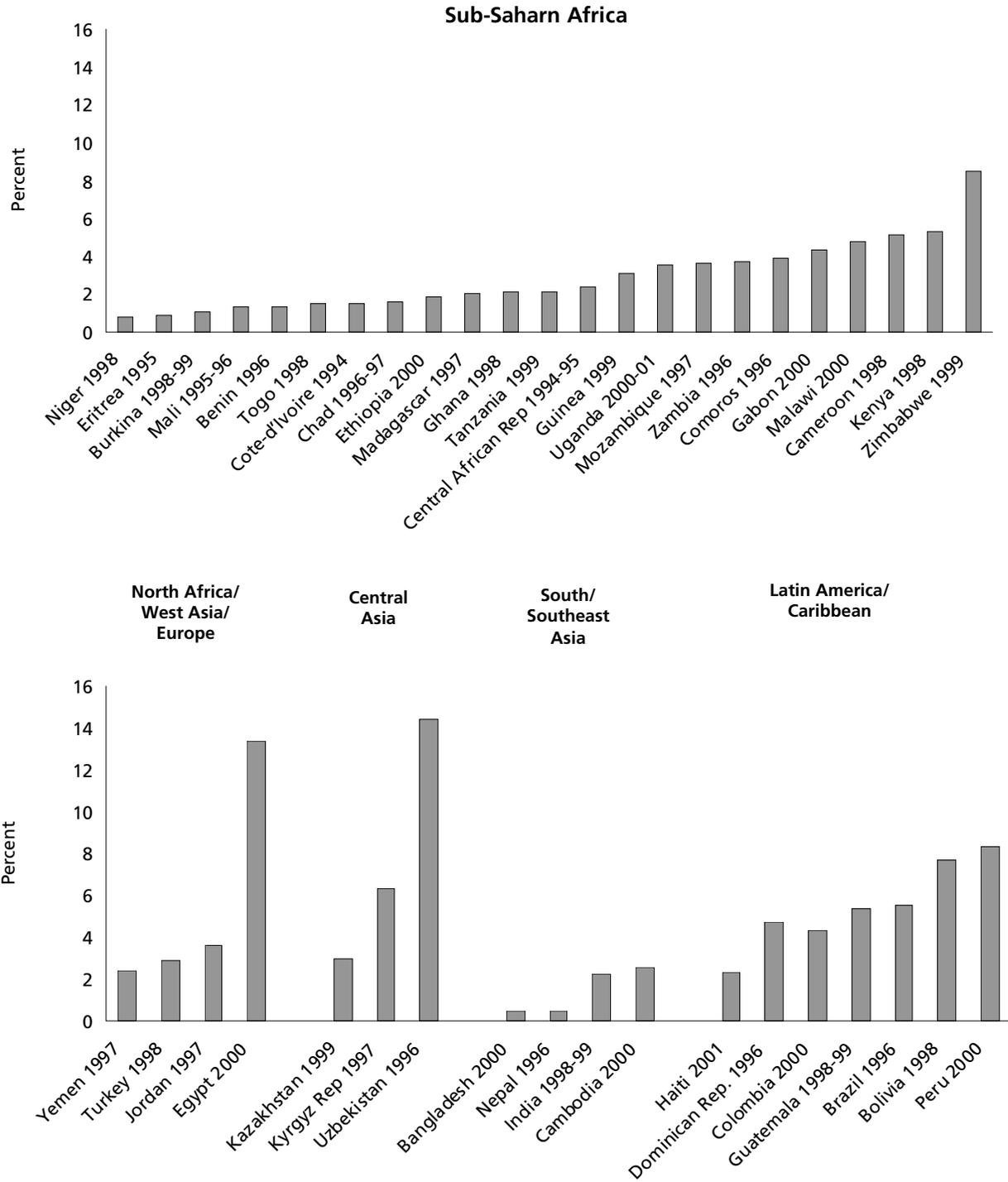


Figure 3.12  
**Percentage of overweight (weight-for-height) children age 0–35 months, Demographic and Health Surveys, 1994-2001**



### **3.4 Influences on the Nutritional Status of Children**

Adapting the United Nations Children’s Fund (UNICEF) framework for nutrition (Figure 3.13), this report examines influences on child nutritional status (UNICEF, 1998). Immediate influences that lead to undernutrition include infectious diseases and inadequate food intake. These factors reflect other underlying biological and behavioral factors as well as socioeconomic conditions at the household, community, and national levels. Food availability, access to health services, health-related behaviors, and the environment are supported by the political, economic, and ideological structures in a country. This section discusses the relationships of these various factors and their influence on the nutritional status of children.

Area of residence (urban or rural) is a basic influence on child nutritional status. Underlying social and economic influences are represented by mother’s education, house construction (flooring), water sources, sanitation facilities, and mother’s work status. Underlying biological and behavioral influences include immunization status, maternal and child characteristics, and feeding patterns that are more proximate influences on child nutrition. Immediate influences on nutrition are represented by micronutrient status/supplementation and reporting of recent bouts of acute respiratory infection and diarrhea. Although many factors, including poverty, affect the nutritional status of children, the variables included in this report are those that were collected by the majority of the surveys.

#### **3.4.1 Basic Influences**

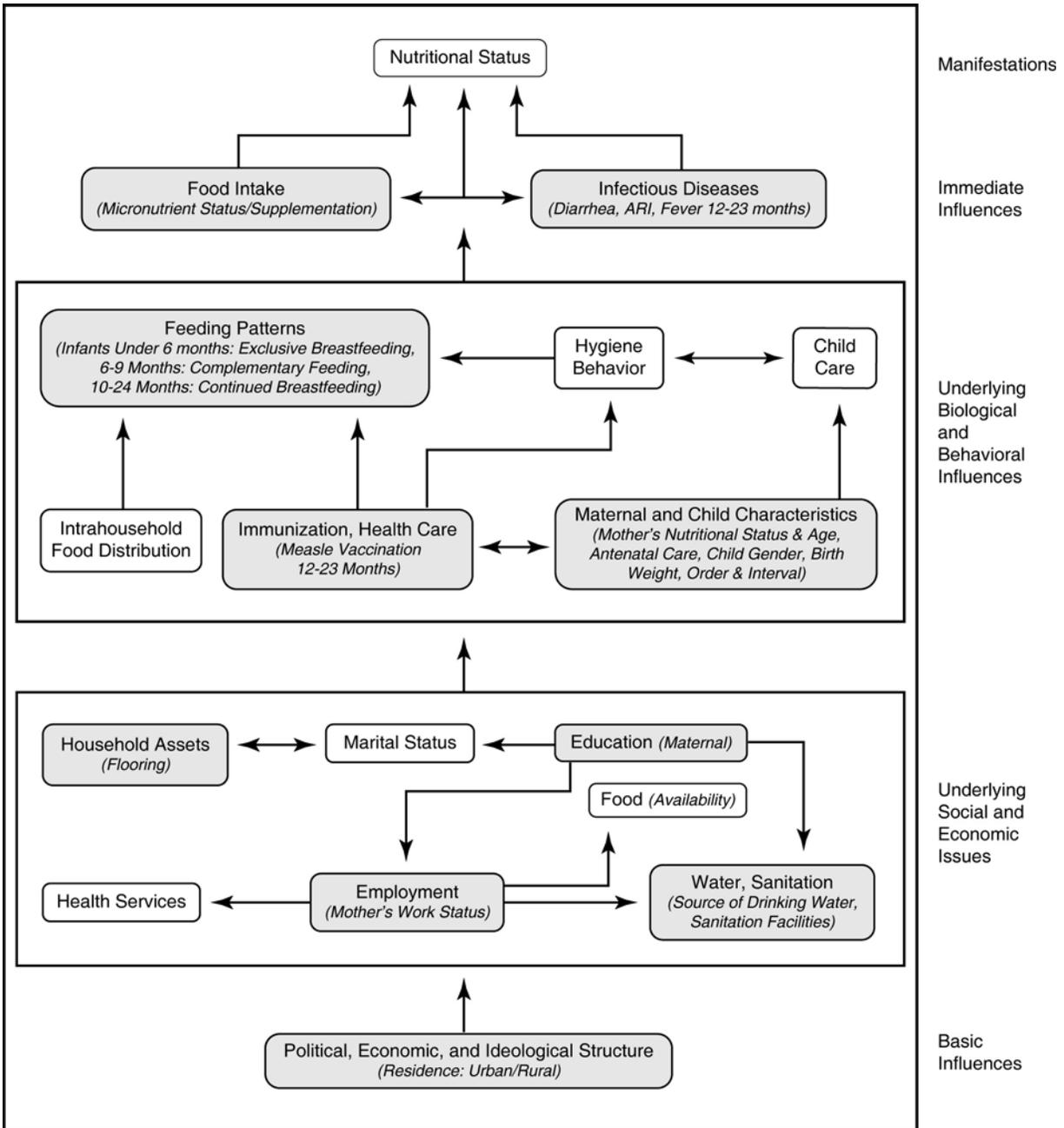
Whether a child is undernourished is as much a consequence of factors at the national, regional, and community levels as it is a consequence of individual household conditions.

##### **3.4.1.1 Urban-Rural Residence**

The classification of urban and rural places of residence is based on the definitions used by the national statistical offices in each country. Therefore, the size of towns and cities defined as urban may differ from one country to another.

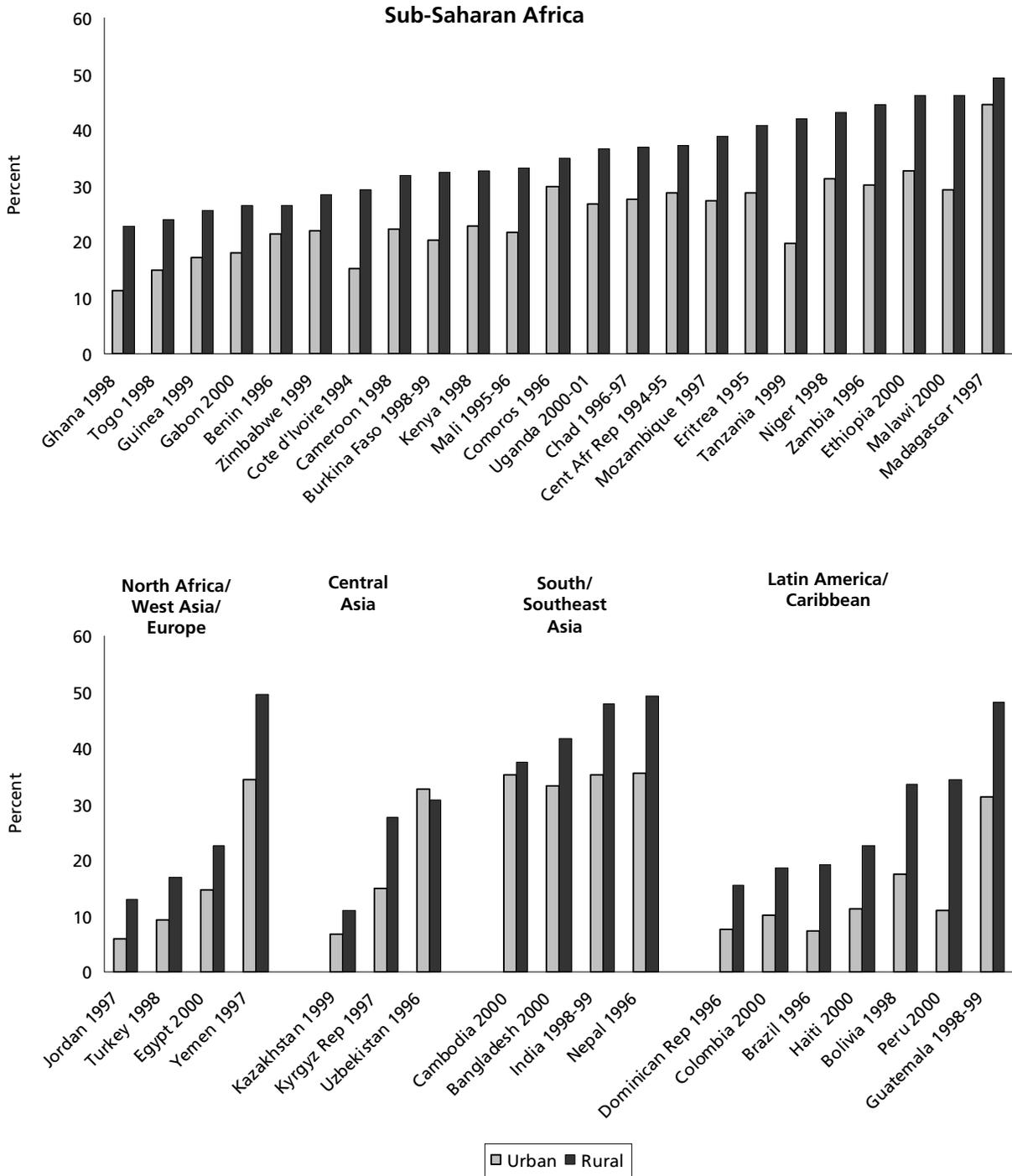
There are consistent differences in undernutrition based on residence (Table A.3.10). Although the magnitude of the difference varies in almost all countries, stunting is considerably more common in rural areas than in urban areas (Figure 3.14). Uzbekistan is the only country surveyed where stunting prevalence is slightly greater in urban areas than in rural areas.

Figure 3.13  
 Conceptual framework for child nutritional status



Adapted from: UNICEF, State of the World's Children, 1998

Figure 3.14  
Levels of stunting by urban-rural residence, Demographic and Health Surveys, 1994-2001



Wasting is also more common in rural areas than in urban areas in most countries (Figure 3.15). In sub-Saharan Africa, two countries have a higher prevalence of wasting in urban areas than in rural areas: Mozambique (10 percent in urban areas and 7 percent in rural areas) and Comoros (10 percent in urban areas and 8 percent in rural areas) (Table A.3.10). In 5 of the 23 countries in sub-Saharan Africa, urban-rural differences are minimal or nonexistent. In Latin America and the Caribbean, the urban-rural difference in prevalence of wasting is generally small. In Haiti, which has the highest prevalence of wasting in the region (6 percent), wasting is higher in urban areas than in rural areas. In the other three regions, the prevalence of wasting is higher in rural areas than in urban areas of all countries except Kazakhstan and the Kyrgyz Republic.

As with stunting, in most countries, the prevalence of underweight is higher in rural areas than in urban areas (Figure 3.16). In 14 of the 23 countries in sub-Saharan Africa, the urban-rural difference is over 10 percentage points, with Malawi and Niger having almost a 20 percentage point difference. Comoros is the only country in sub-Saharan Africa where the rates of underweight are about the same in urban and rural areas. Among other regions, the urban-rural differential in percent underweight is particularly noticeable for Nepal in South/Southeast Asia region and Guatemala and Peru in Latin America and the Caribbean. Kazakhstan is the only country where percent underweight is higher in urban areas than in rural areas.

The reasons for the urban-rural differences in undernutrition may be due to differences in some of the more proximate influences. Improved accessibility to food (in and out of season) and health care in urban areas may explain some of these differences. In addition, differences in women's education, availability of water and sanitary facilities, socioeconomic status, women's decisionmaking power, access and utilization of antenatal and delivery care, as well as differences in quality of complementary feeding and immunization rates all contribute to improved nutritional status of urban children (Smith et al., 2004).

### **3.4.2 Underlying Social and Economic Influences**

The following variables are proxies for social and economic influences on child undernutrition: mother's education and work status, house flooring, sanitation facilities and source of drinking water. Mother's education may indicate the economic level, but it also demonstrates a mother's knowledge level and ability to adequately care for her child. A mother's work status may also indicate her economic level. House flooring, sanitation facilities, and source of drinking water reflect household living conditions and thus suggest economic influences beyond cash availability. In addition, these conditions reflect environmental conditions that may influence illness and undernutrition.

A recently developed wealth index may better represent underlying social and economic influences on child nutrition in future comparative analyses (Rutstein and Johnson, 2004). In addition, multivariate analyses of the determinants of undernutrition would provide better insights into the relative importance of these influences.

Figure 3.15  
Levels of wasting by urban-rural residence, Demographic and Health Surveys, 1994-2001

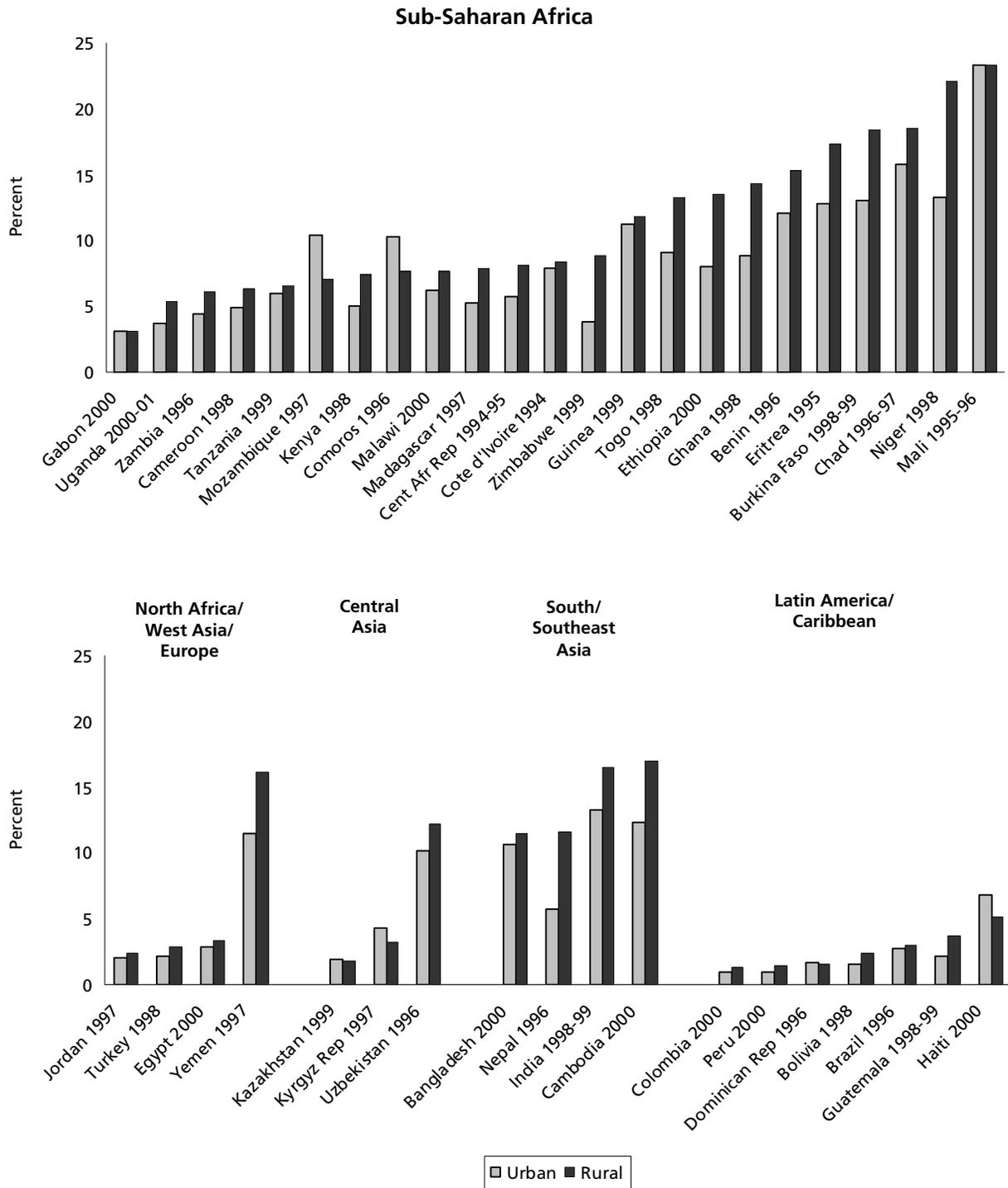
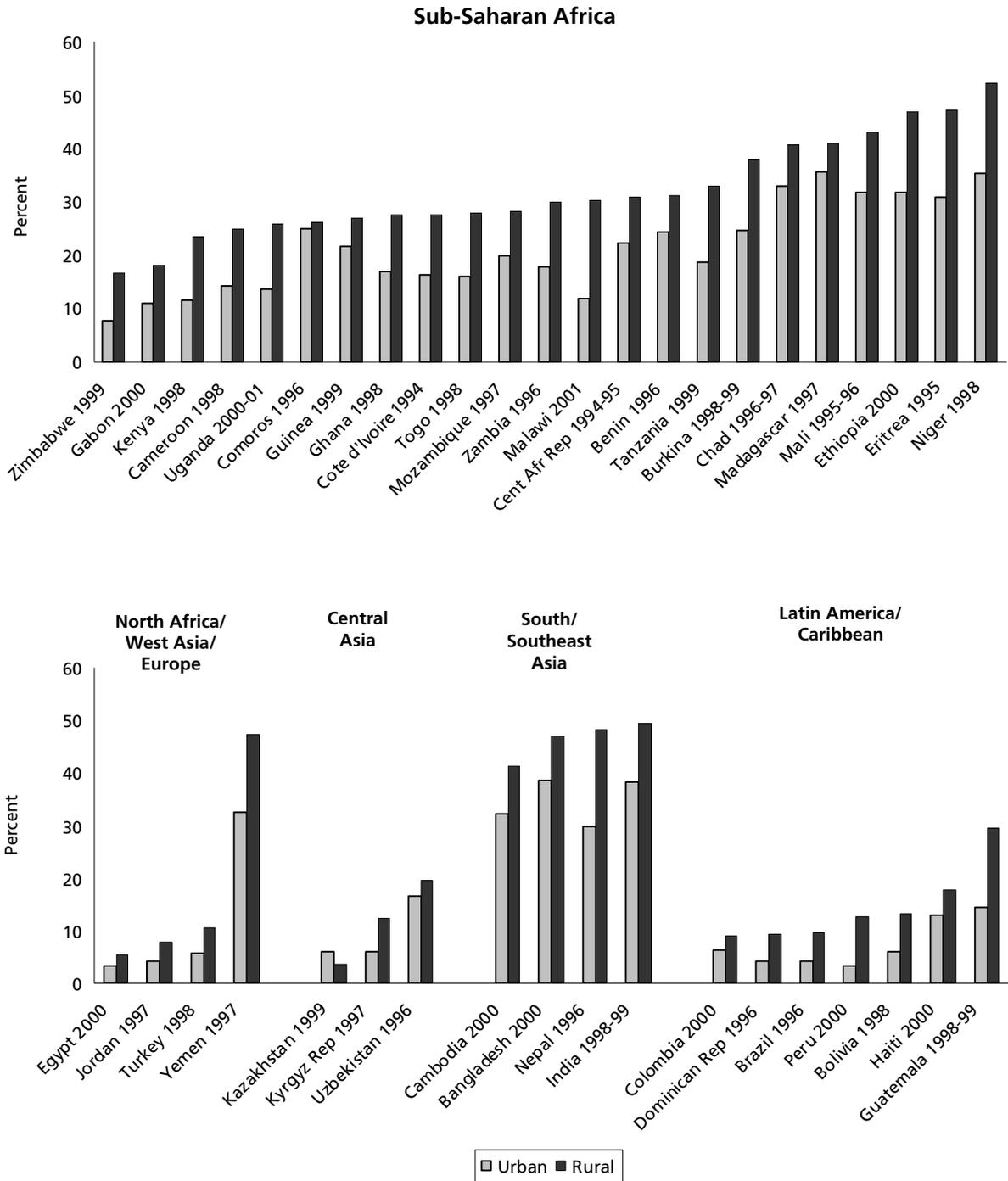


Figure 3.16  
Levels of underweight by urban-rural residence, Demographic and Health Surveys, 1994-2001



### 3.4.2.1 Mother's Education

Mother's education is defined as the highest level of schooling attended, but not necessarily completed. The three levels are no education, primary, and secondary or more (Table A.3.11). As expected, there is an inverse relationship between the mother's education and child undernutrition across all regions. The higher the level of education, the lower the prevalences of childhood stunting and underweight (Figures 3.17 and 3.19, respectively). Wasting does not have this universal response (Figure 3.18). For example, in Mozambique, children of mothers with secondary or higher levels of education are more likely to be wasted than children of less-educated mothers. The Central Asian countries are not included because there is no variability in mother's education: almost all of the mothers fall into the secondary and higher level of education.

Figure 3.17  
Levels of stunting among children age 0-35 months by mother's education, Demographic and Health Surveys, 1994-2001

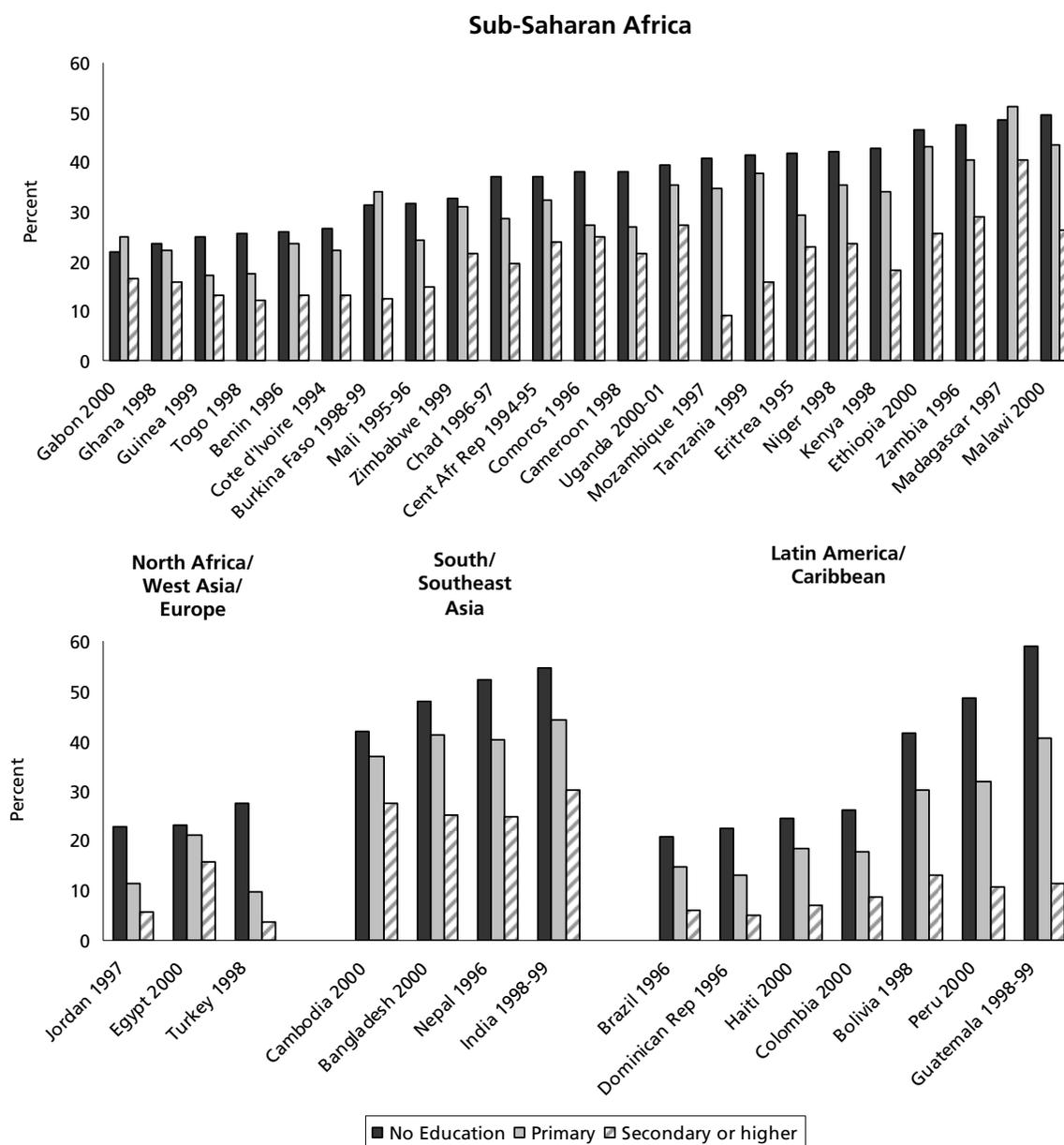


Figure 3.18  
**Levels of wasting among children age 0-35 months by mothers' education, Demographic and Health Surveys, 1994-2001**

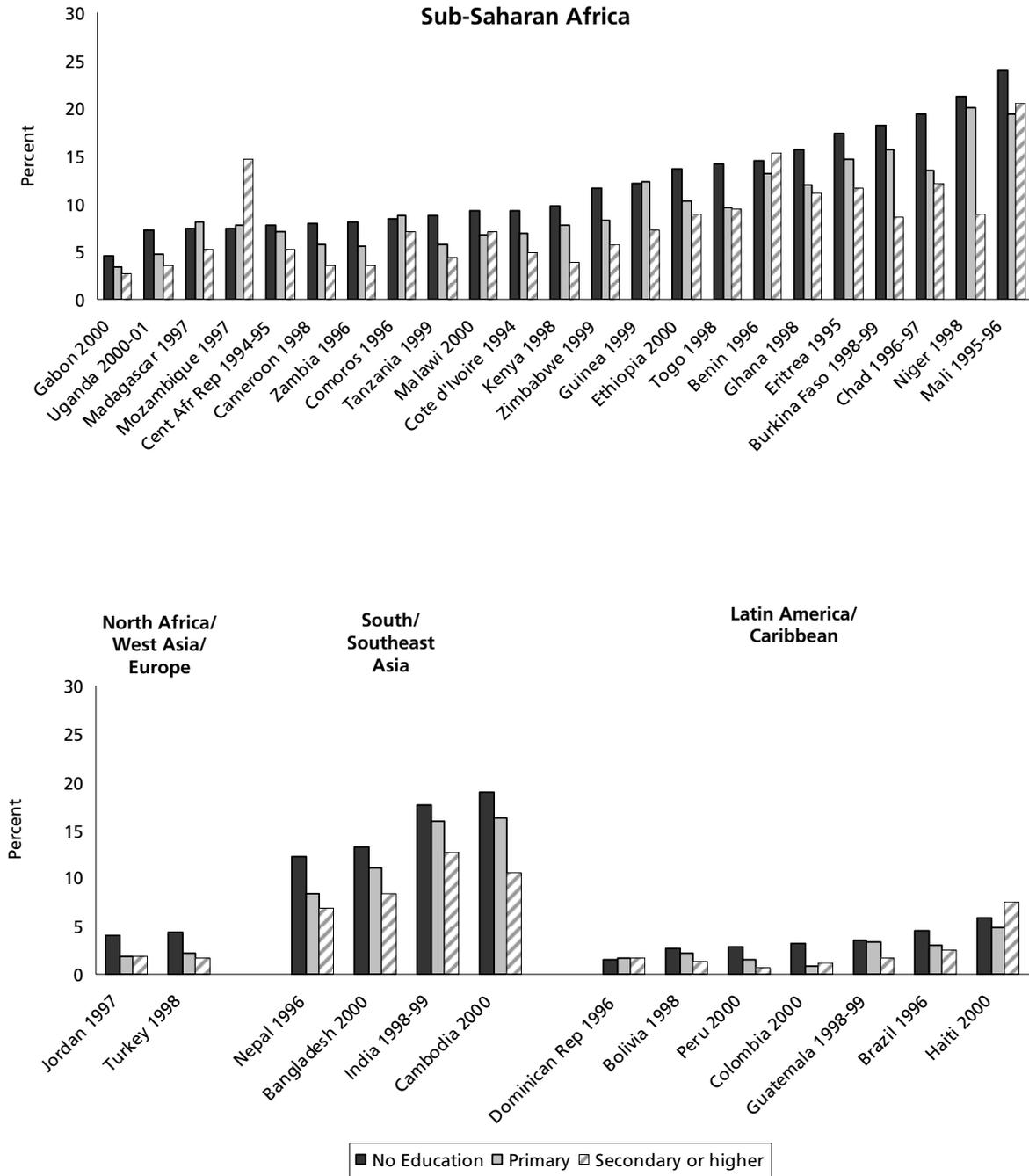
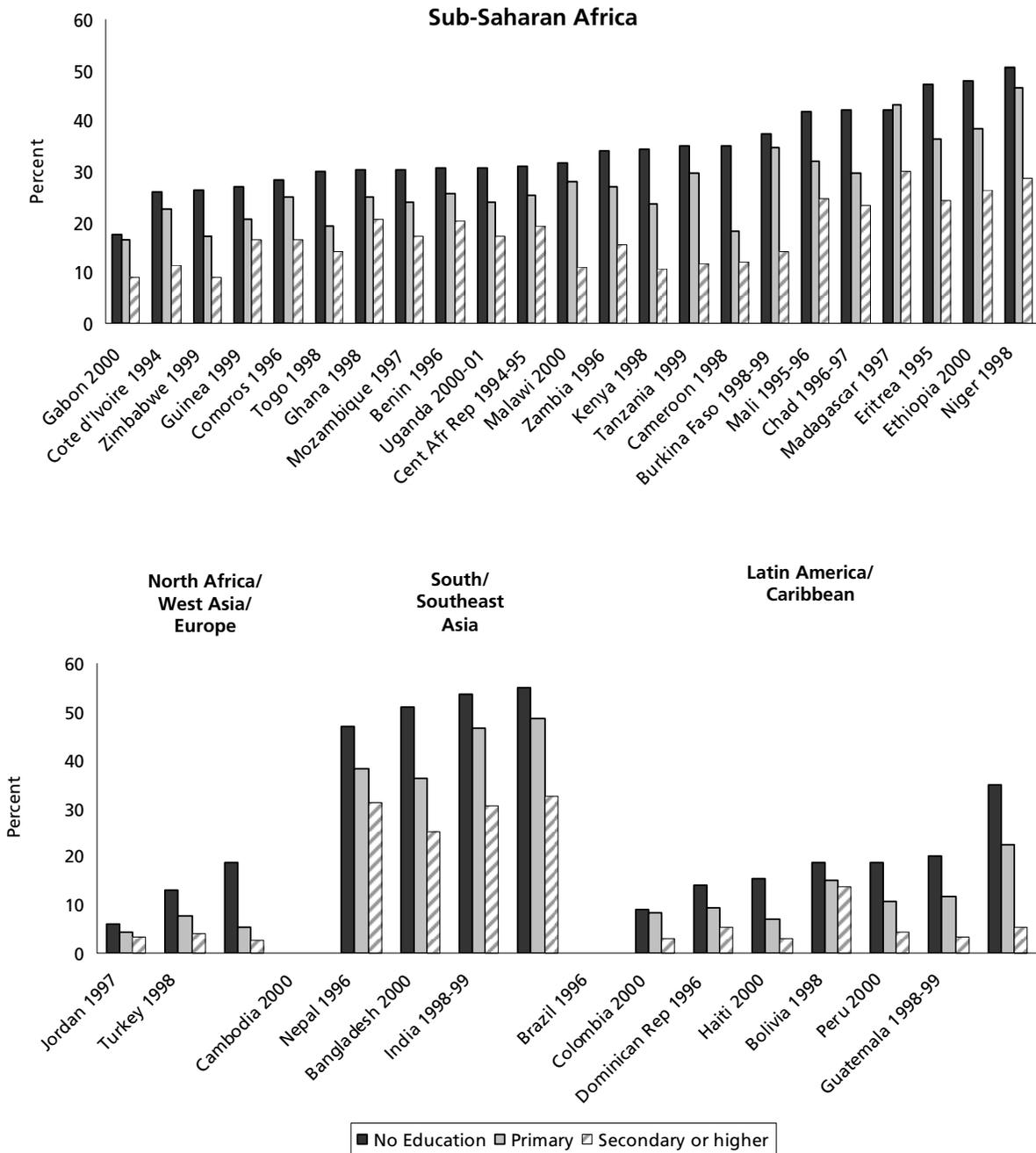


Figure 3.19  
**Levels of underweight among children age 0-35 months by mother's education, Demographic and Health Surveys, 1994-2001**

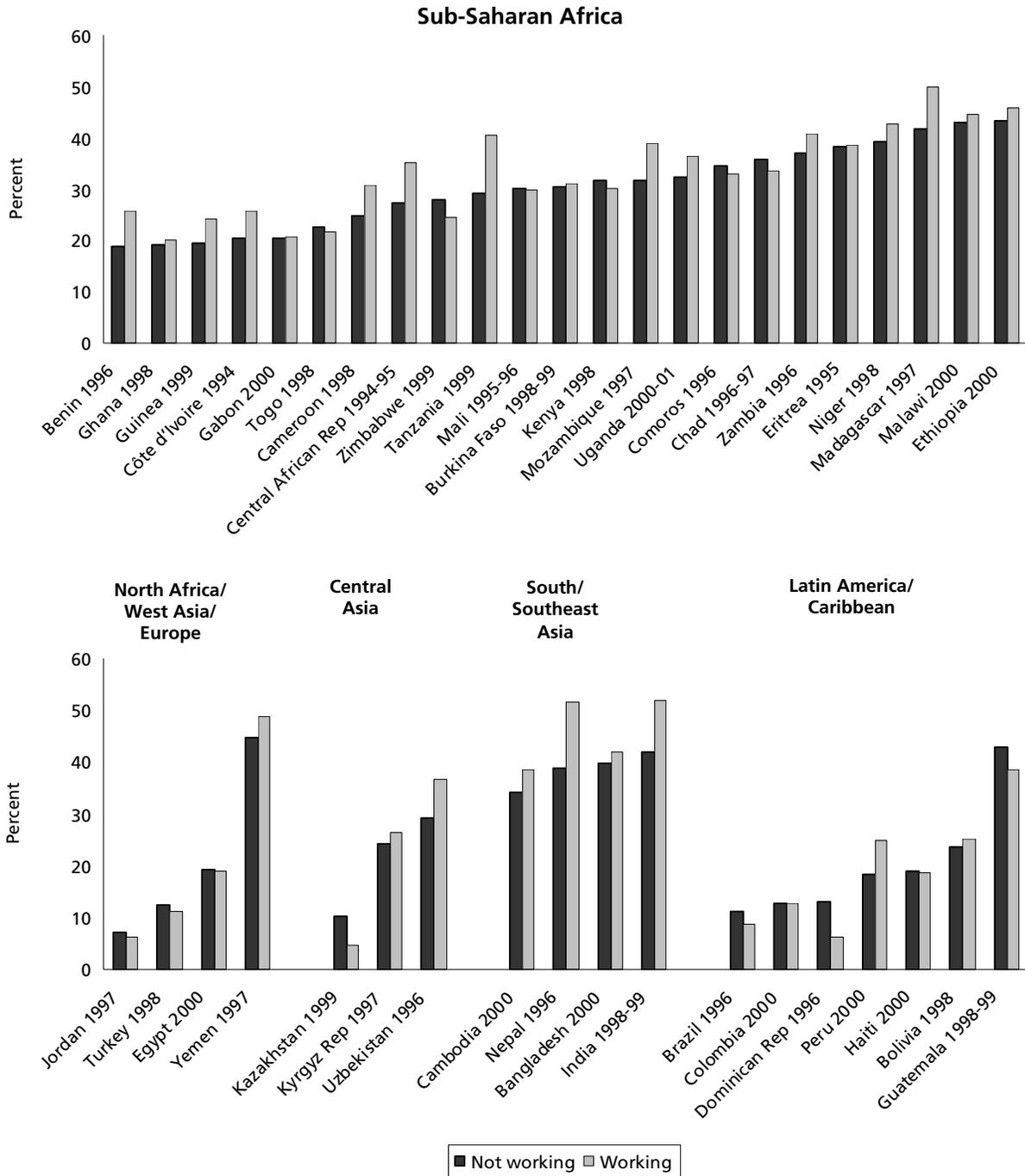


### **3.4.2.2 Mother's Work Status**

In each survey, women were asked, "Aside from your own housework, are you currently working?" In 20 of the 23 countries surveyed in sub-Saharan Africa, 40 percent or more women of reproductive age (15-49 years) reported that they were currently working (Mukuria et al., 2005). This report finds that mother's work status has an impact on the nutritional status of children. For most countries, undernutrition is higher among children of working mothers than children whose mothers are not working (Table A.3.12). This may be due to the high poverty rates in these countries, which are reflected in women's need to work and its relationship to children's nutritional status. However, if poverty is the major influencing factor, it may also affect the quality of alternative child care that a working mother is able to access. Other research has found that the characteristics of the caregiver have a stronger influence on child nutritional status when socioeconomic factors are controlled (Begin et al., 1998). When mothers work outside of the home, having inadequate alternative child care has a negative impact on child nutritional status (Lamontagne et al., 1998).

In 15 of the 23 countries surveyed in sub-Saharan Africa, there were higher rates of stunting among children whose mothers worked than among those whose mothers did not work (Figure 3.20). This is consistent with previous research that found children of working mothers had a significantly lower height-for-age Z-score (stunting) than children of nonworking mothers (Toyama et al., 2001). However, the types of work in which mothers were engaged differentiated between the poverty avoiders, who worked in the informal sector, and the income enhancers, who worked in the formal sector. The real influence of mother's work on the nutritional status of her child was related to the type of work she did, which reflected her economic status.

Figure 3.20  
Levels of stunting among children age 0-35 months by mother's work status, Demographic and Health Surveys, 1994-2001



There is no one discernible relationship between wasting and mother's work status in sub-Saharan countries. There were almost as many countries (9 of 23) with higher rates of wasting among children of women who worked as there were countries (10 of 23) with higher rates of wasting among children of women who did not work. Six countries had about equal rates of wasting among children of mothers who worked and mothers who did not work (Table A.3.12 and Figure 3.21). As with stunting, underweight rates were higher among children of working mothers in 14 of 23 countries (Table A.3.12 and Figure 3.22).

Figure 3.21  
Levels of wasting among children age 0-35 months by mother's work status, Demographic and Health Surveys, 1994-2001

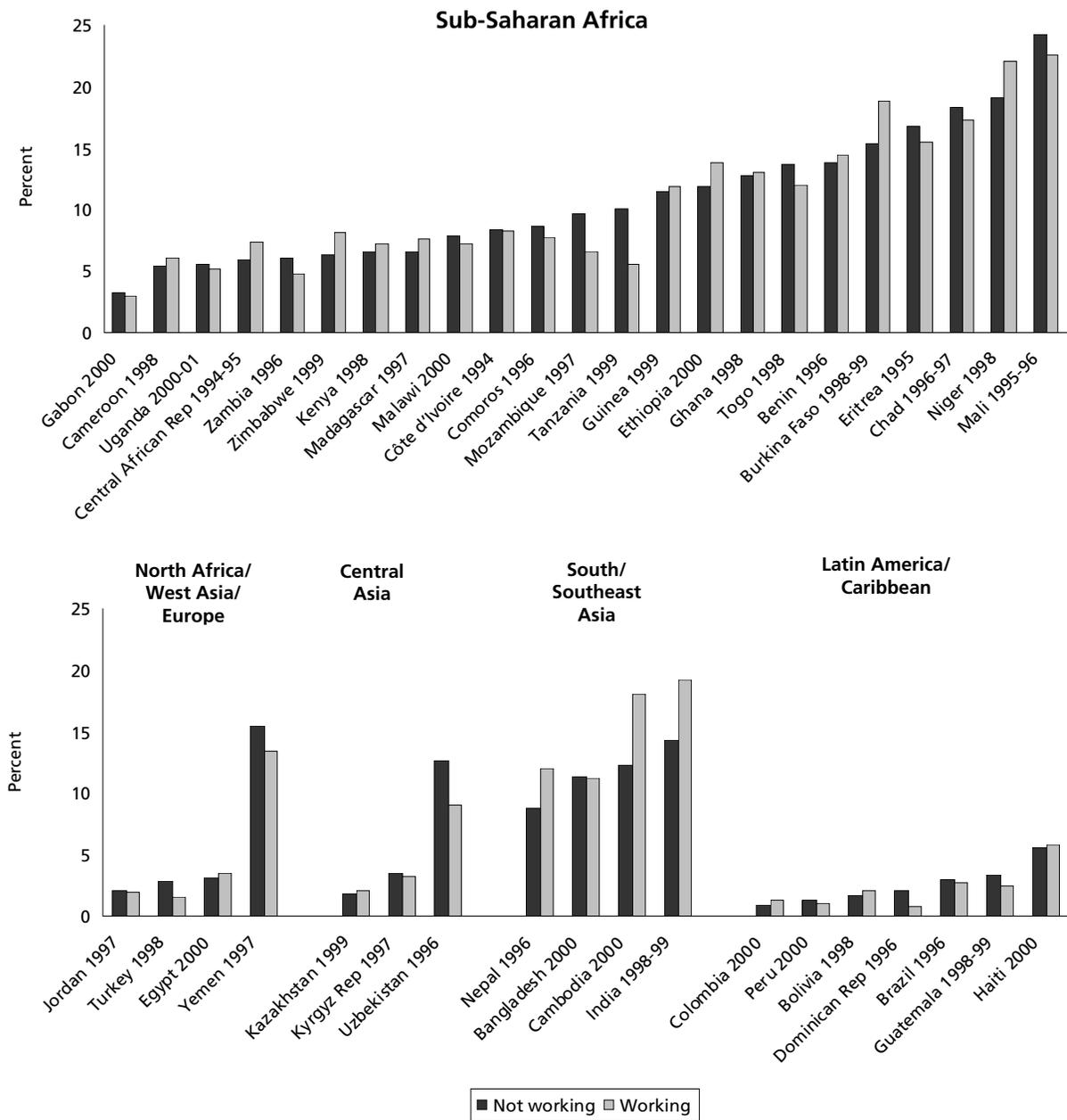
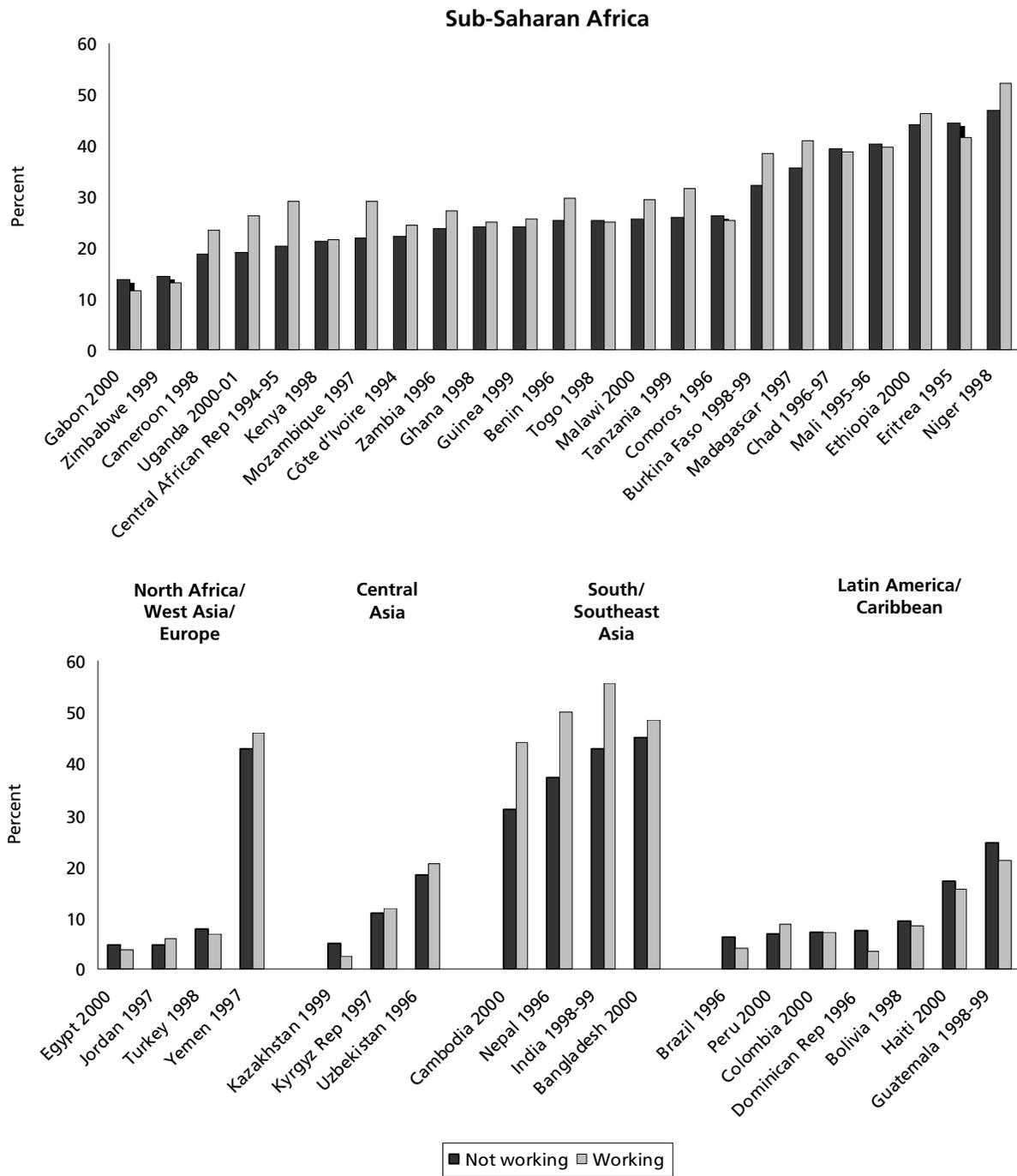


Figure 3.22  
Levels of underweight among children age 0-35 months by mother's work status, Demographic and Health Surveys, 1994-2001



In six of seven countries surveyed in Latin America and the Caribbean, over 40 percent of women surveyed reported that they were working (Mukuria et al., 2005). Only two countries, Peru and Bolivia, have slightly higher rates of stunting (Figure 3.20) among children of working mothers than among children of nonworking mothers. In five of seven countries, wasting rates are about the same, regardless of whether the mother worked or not (Figure 3.21); and in five of seven countries, rates of underweight are slightly higher among children of mothers who do not work compared with children whose mothers do work (Figure 3.22). Other factors may be involved in the patterns observed in the Latin America and Caribbean countries. For example, poor women may not have the education or skills needed to obtain work outside of the home.

In the Central Asia region, around 40 percent of women surveyed reported that they were working (Mukuria et al., 2005). In two of the three countries, the Kyrgyz Republic and Uzbekistan, higher rates of stunting exist among children of working mothers, compared with children of nonworking mothers (Figure 3.20). In the same two countries, however, children of nonworking mothers have a higher rate of wasting than children of working mothers (Figure 3.21). There are only slightly different rates of underweight among the children of working mothers and nonworking mothers (Figure 3.22). Kazakhstan rates contrast directly with those of the other two countries on all three measures of undernutrition, and the rates of undernutrition are much lower in Kazakhstan than in any of the other countries surveyed in Central Asia.

In the South/Southeast Asia region, all indicators point to higher rates of undernutrition among children whose mothers work than among those whose mothers do not, except in Bangladesh, where wasting rates are about the same, regardless of the mother's work status (Figures 3.20 through 3.22). In this region, the proportion of women who reported themselves as working varies widely from 23 to 77 percent (Mukuria et al., 2005).

In North Africa/West Asia/Europe, the rates of stunting, wasting, and underweight do not vary much by mother's work status in most cases, except in Turkey and Yemen, where wasting is more prevalent among children of nonworking mothers than children of working mothers.

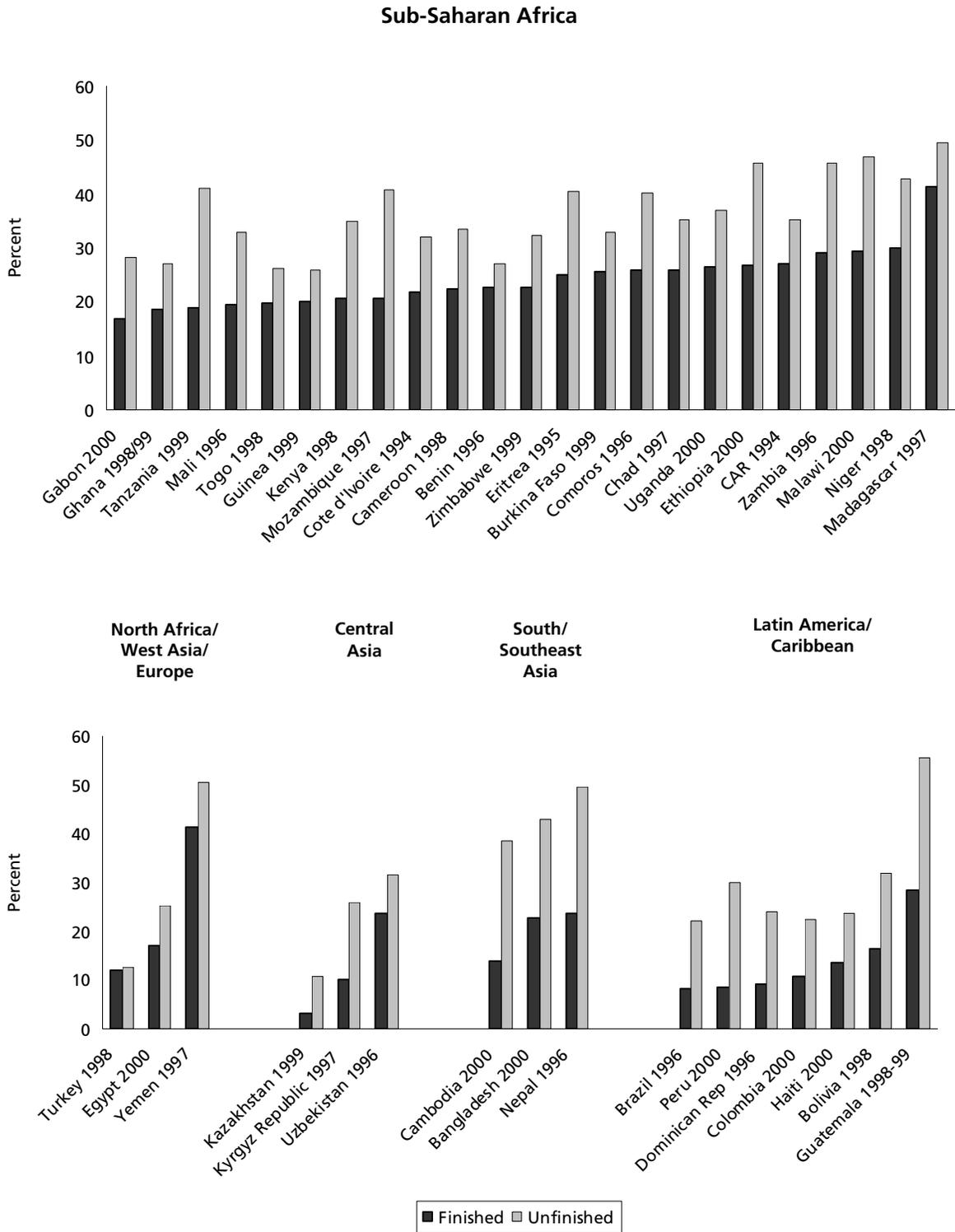
### **3.4.2.3 House Flooring Status**

In this study, the type of flooring of the residence serves as a proxy for household economic level (Table A.3.13). To explore the relationship between this variable and child nutritional status, the study categorized flooring into two groups: finished flooring and unfinished flooring, the latter being rudimentary and natural flooring. The data on flooring status are not available for India, and Jordan has fewer than 25 cases of unfinished flooring, so the percentages are suppressed (Figures 3.23 through 3.25).

As expected, stunting rates are higher among children who live in households with unfinished flooring than among those who live in households with finished flooring.

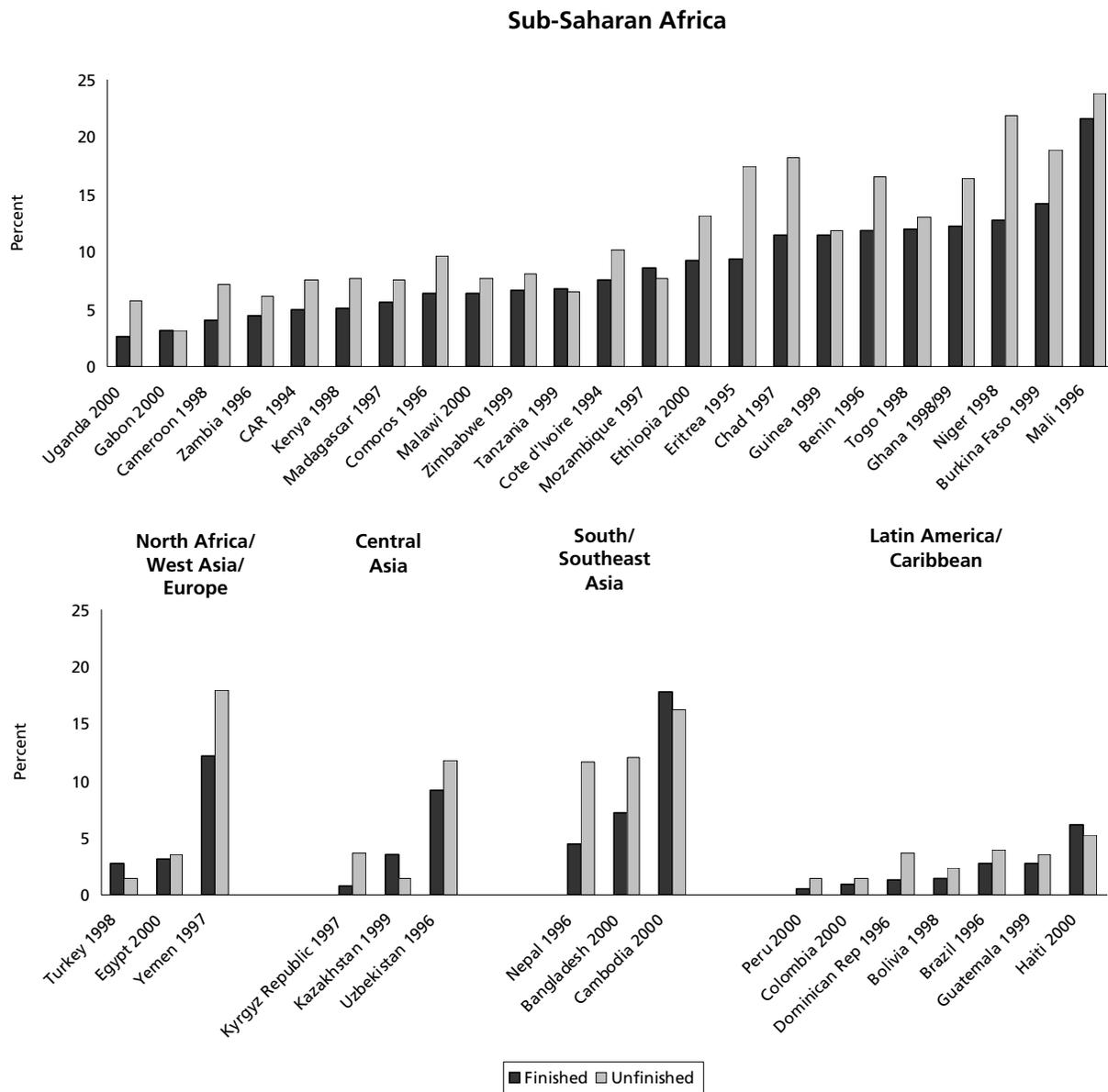
Wasting rates present a less consistent pattern. In sub-Saharan Africa, 19 of the 23 countries have higher rates of wasting among children who live in households with unfinished flooring than among children who live in households with finished flooring.

Figure 3.23  
 Levels of stunting among children age 0-35 months by flooring status, Demographic and Health Surveys, 1994-2001



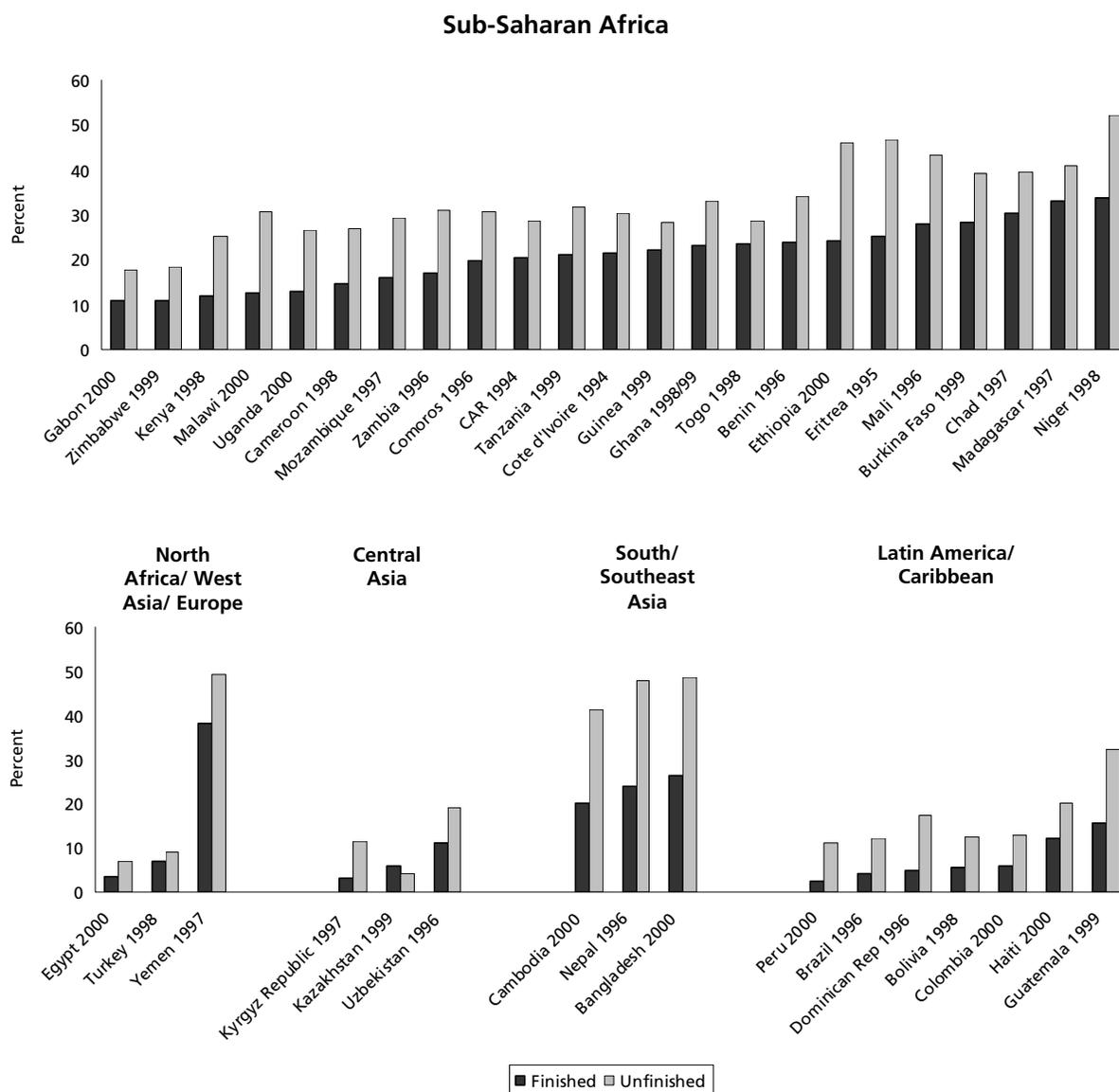
In the Latin America and Caribbean region, which has some of the lowest wasting rates of all the regions, higher rates of wasting are also evidenced among children living in households with unfinished flooring in all countries except Haiti, where the rate of wasting is slightly higher among those who live in households with a finished floors. Most countries in the North Africa/West Asia/Europe region have the same pattern, except Turkey, where the wasting rate is higher among children living in households with finished flooring. Unexpectedly, Kazakhstan in Central Asia, and Cambodia in South/Southeast Asia have higher rates of wasting among children living in households with finished flooring than unfinished flooring (Table A.3.13). It should be noted that in this region a large percentage of households have flooring made of wood planks. For this analysis, wood planks are included in natural flooring.

**Figure 3.24**  
**Levels of wasting among children age 0-35 months by flooring status, Demographic and Health Surveys, 1994-2001**



The pattern of underweight by household flooring status is similar to that of stunting, with higher rates of underweight among children who live in households with unfinished flooring than children who live in households with finished flooring, except in Turkey and Kazakhstan. In Turkey, there is small difference in rates of underweight by flooring status; whereas in Kazakhstan, the rate of underweight is slightly higher among children who live in households with finished flooring than among children who live in households with unfinished floors. The latter may be a reflection of the higher rates of underweight among children living in urban areas than in rural areas of this country (Figure 3.25).

Figure 3.25  
Levels of underweight among children age 0-35 months by flooring status, Demographic and Health Surveys, 1994-2001



#### 3.4.2.4 Sanitation Facilities

Diarrhea and parasitic infections, particularly intestinal helminthic infections (hookworms and roundworms), are extremely prevalent in children living in poor sanitary conditions. In undernourished children, deworming leads to improvements in growth. DHS surveys do not collect data on these parasitic conditions, but all surveys collect information on water and sanitation. There are plans to collect deworming information in future surveys.

The type of sanitation facility a household has reflects its economic status, and poor households are less likely to have adequate toilet facilities. Inadequate sanitation facilities result in an increased risk of diarrheal disease, which contributes to undernutrition. According to the WHO and UNICEF Joint Monitoring Programme for Water Supply and Sanitation, sanitation technologies consist of two categories: improved and unimproved. Improved sanitation facilities include connection to a public sewer system or septic system, simple and improved pit latrines, and pour-flush pit latrines. Unimproved facilities include latrines that are manually removed, public latrines and open latrines. In this report, “no facility” is included in the unimproved category (WHO and UNICEF, 2000).

According to the DHS data, infants and young children from households with unimproved sanitation facilities are at greater risk of being undernourished than are children from households with improved facilities (Table A.3.14). Children age 0-35 months living in households with unimproved toilet facilities are more likely to be stunted in all the countries surveyed, except Madagascar, where the prevalence of stunting is higher among children living in households with improved sanitation facilities (Figure 3.26).

The pattern is less consistent for wasting (Figure 3.27). In 17 of 22 sub-Saharan countries—Comoros was not included because there were fewer than 25 cases in the unimproved category—there are higher rates of wasting among those who live in households with unimproved facilities. However, in two countries (Mozambique and Zimbabwe) there is almost no difference, and in three countries (Ghana, Tanzania, and Gabon) there are slightly higher rates of wasting among children living in households with improved facilities.

In most countries of North Africa/West Asia/Europe and South/Southeast Asia, there are higher rates of wasting among children in households with unimproved facilities (Figure 3.27). However, in Egypt and Bangladesh, there is almost no difference in wasting rates by type of sanitation facility. The Central Asian countries have very few children living in households with unimproved sanitation facilities and, therefore, were not included in this analysis.

In Latin America and the Caribbean, four of the seven countries have higher rates of wasting among children who live in households with unimproved sanitation facilities (Figure 3.27). In the other three countries, Bolivia, Dominican Republic, and Haiti, the rates of wasting are about the same, regardless of the type of sanitation facility available to the household.

The rates for underweight by type of sanitation facility are similar to the rates for stunting. There are higher rates of underweight among children who live in households with unimproved sanitation facilities, except in Gabon and Tanzania, where the rates are higher among children who live in households with improved sanitation facilities (Figure 3.28).

Figure 3.26  
**Percentage of children age 0-35 months who are stunted, by type of household sanitation facility, Demographic and Health Surveys, 1994-2001**

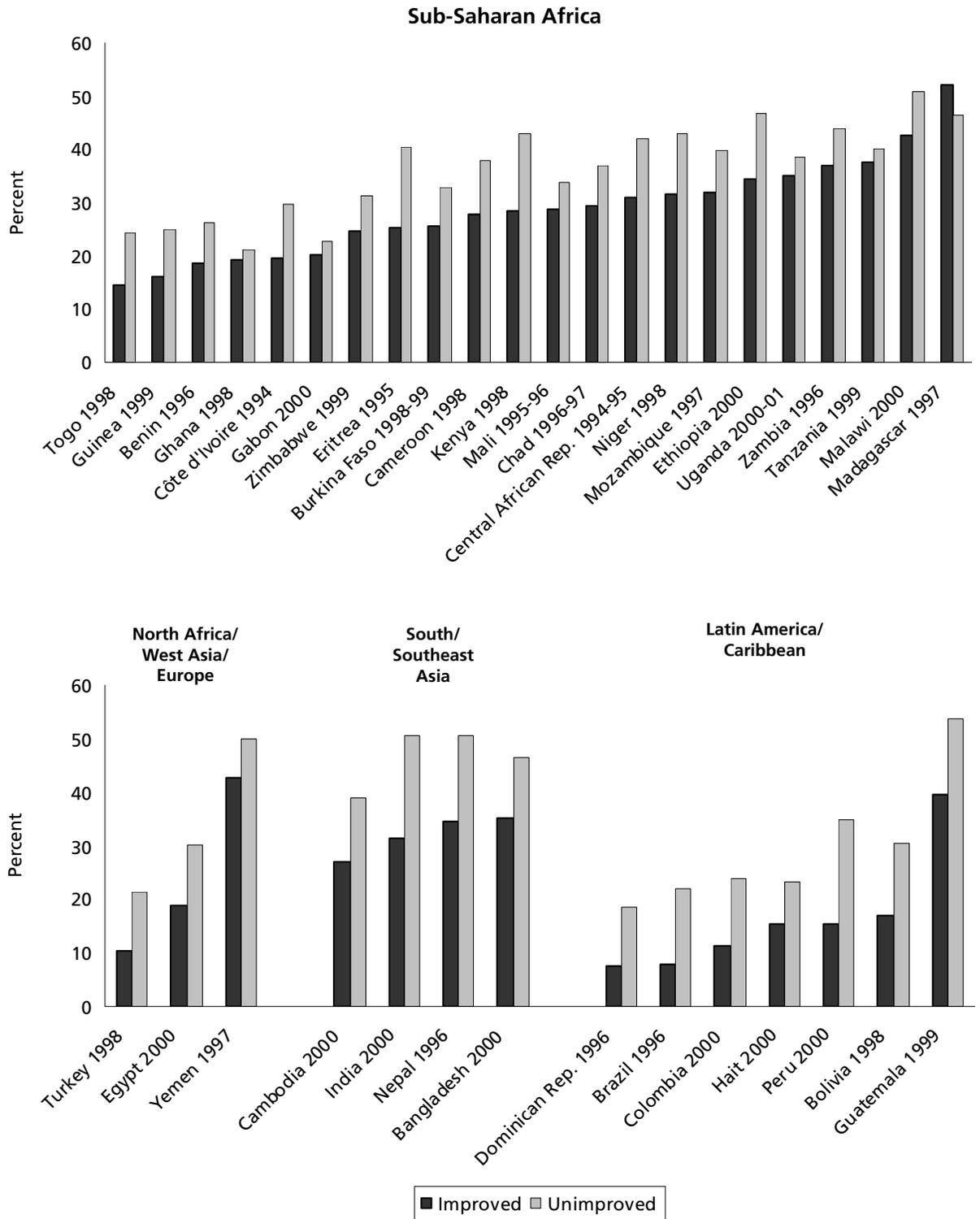


Figure 3.27

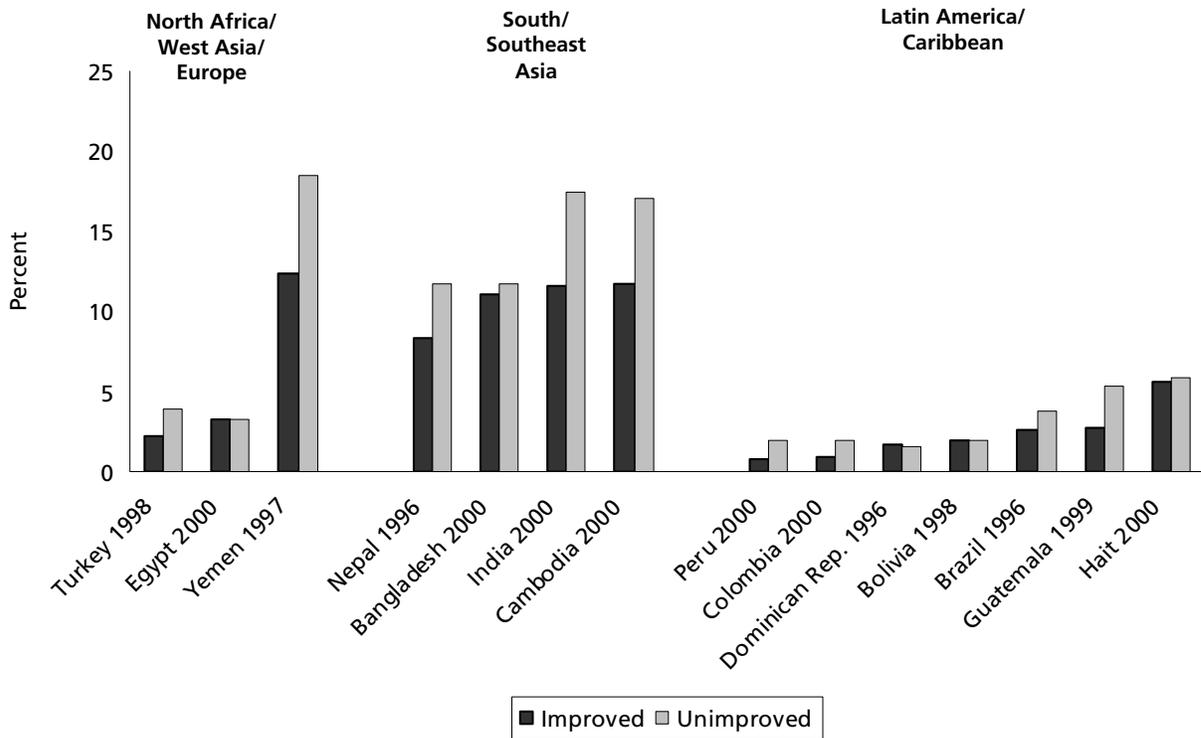
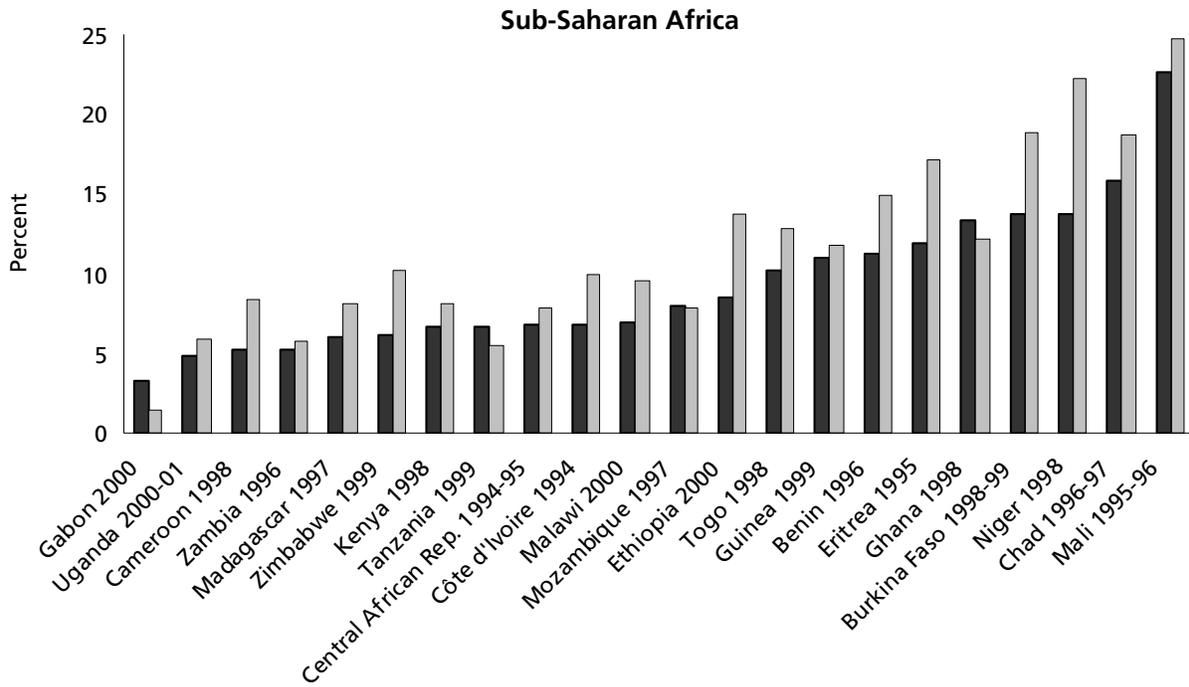
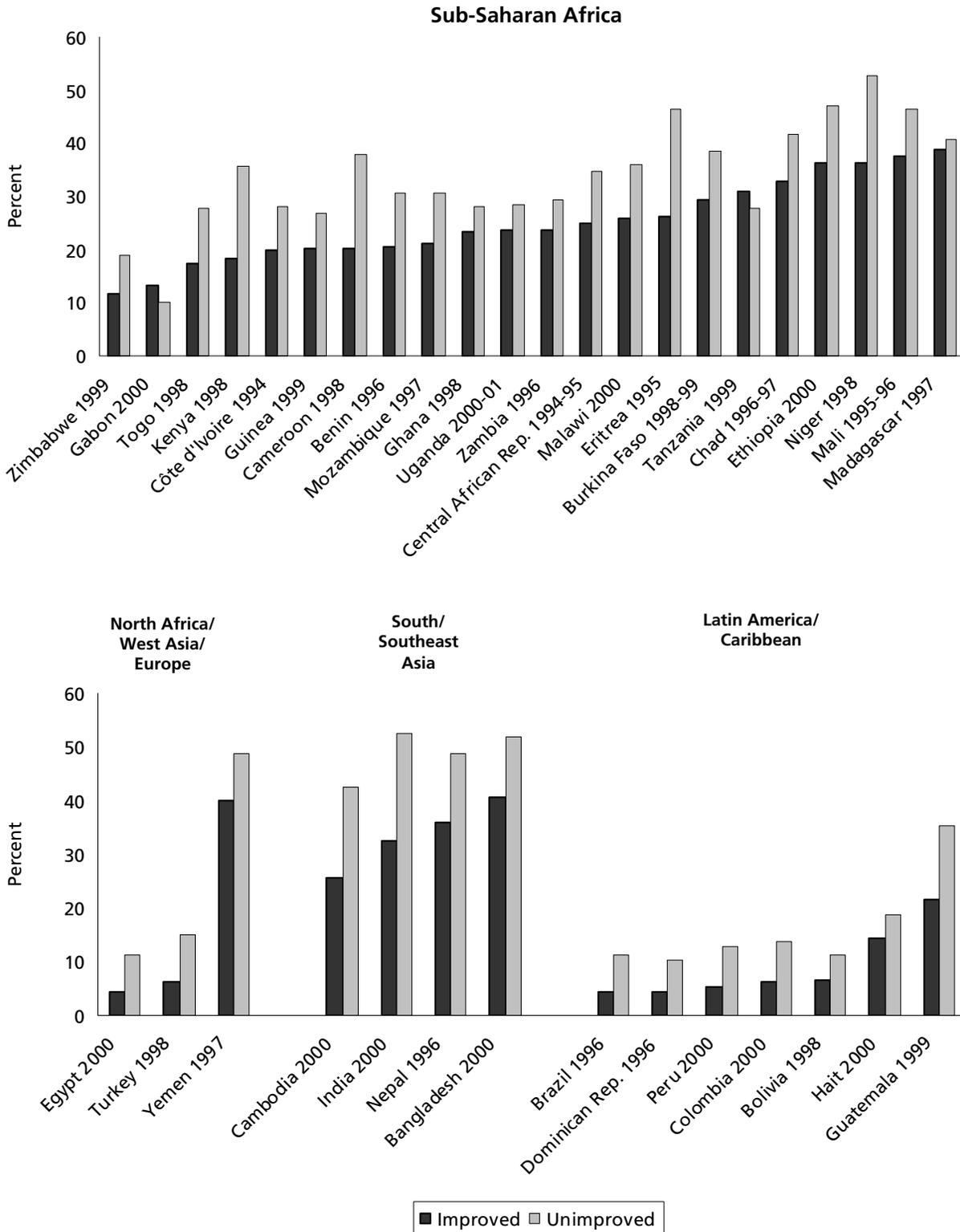


Figure 3.28  
 Percentage of children age 0-35 months who are underweight by type of household sanitation facility, Demographic and Health Surveys, 1994-2001



### 3.4.2.5 Source of Drinking Water

The data collected on household source of drinking water were divided into improved and unimproved categories based on the guidelines of the WHO and UNICEF Joint Monitoring Programme for Water Supply and Sanitation (Table A.3.15 and Figures 3.29 through 3.31). Improved water sources include piped water, public taps, protected wells and springs, boreholes, and rainwater. Unimproved sources include surface water, unprotected wells and springs, bottled water, and tanker truck or vendor-supplied water. Although the quality of the water is not in question, bottled water is included in unimproved water sources because the reliability and quantity of bottled water are not ensured for adequate consumption. For the most part, improved water sources correlate with lower rates of undernutrition.

In all but three countries (the Dominican Republic, Guatemala, and Egypt), children living in households with unimproved water sources have a higher prevalence of stunting than those living in households with improved water sources (Figure 3.29). The difference in stunting rates by water source is small in Chad, Burkina Faso, Guinea, Mali, and Togo in sub-Saharan Africa; in Uzbekistan in Central Asia; and in Bangladesh, Cambodia, and India in South/Southeast Asia.

Wasting rates are less consistent by source of drinking water. In 14 of the 23 countries in sub-Saharan Africa, the rates of wasting are higher among children living in households with unimproved water sources. However, in six countries, there is little or no difference, and in three countries (Comoros, Chad, and Mozambique) the rates of wasting are higher among children who live in households with improved water sources. In North Africa/West Asia/Europe, there appears to be no distinction in wasting rates by water source, except in Yemen, where the rate is noticeably higher among children living in households with unimproved water sources. Children in Central Asian countries have higher wasting rates in households with unimproved water sources, except for Kazakhstan, where there is little difference in the wasting rate by water source (Figure 3.30).

In two of the seven countries in Latin America and the Caribbean, there are higher rates of wasting among children who live in households with unimproved water sources. However, in Guatemala, the rates of wasting are higher among children who live in households with improved water sources. There is little difference in wasting by water source in the remaining countries (Figure 3.30).

Underweight rates are mostly higher among children living in households with unimproved water sources than in households with improved water sources (Figure 3.31). In two countries in sub-Saharan Africa, Guinea and Chad, the rates of underweight are about the same for the two types of water sources.

Figure 3.29  
 Percentage of children age 0-35 months who are stunted, by source of drinking water, Demographic and Health Surveys, 1994-2001

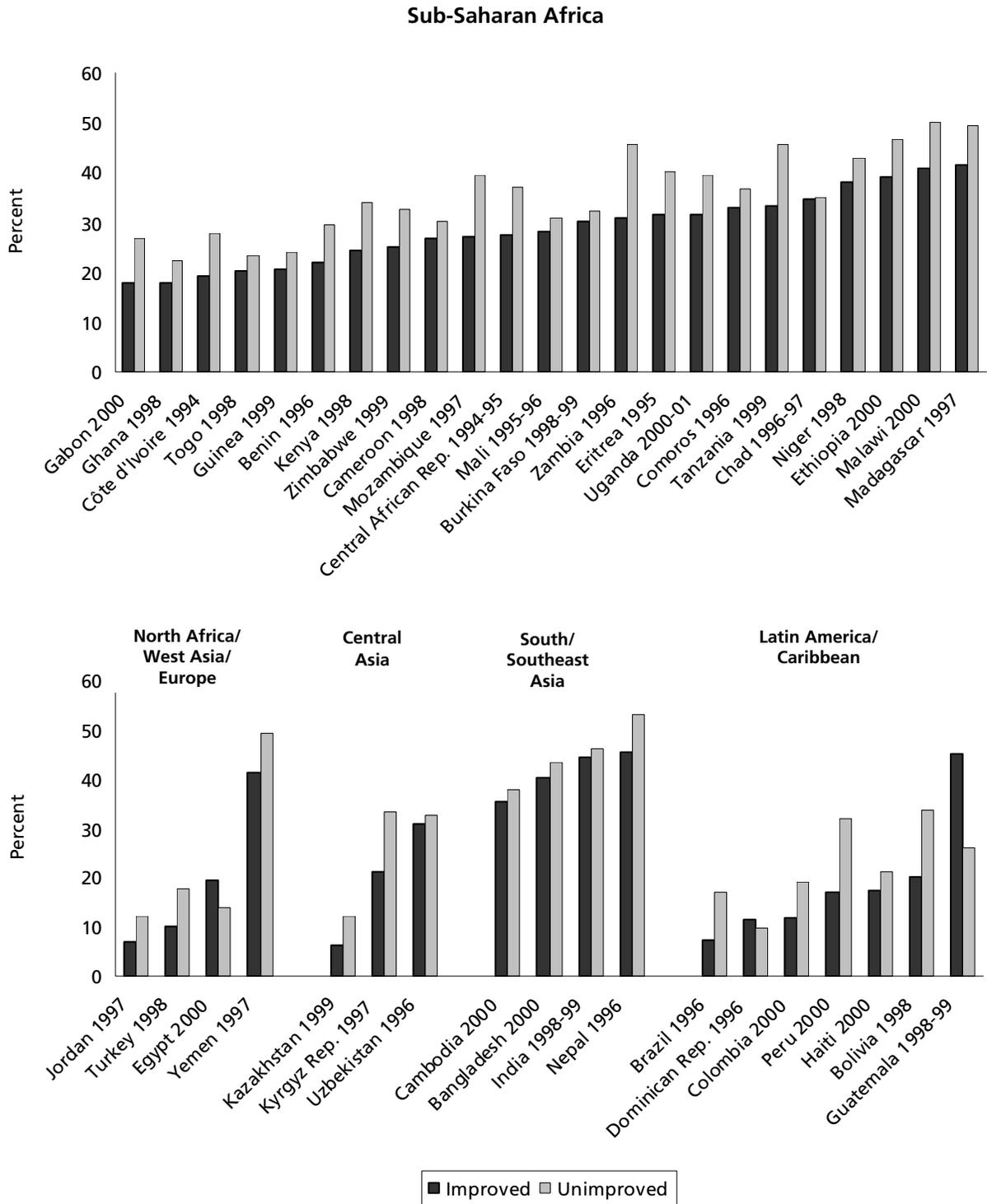


Figure 3.30  
**Percentage of children age 0-35 months who are wasted, by source of drinking water, Demographic and Health Surveys, 1994-2001**

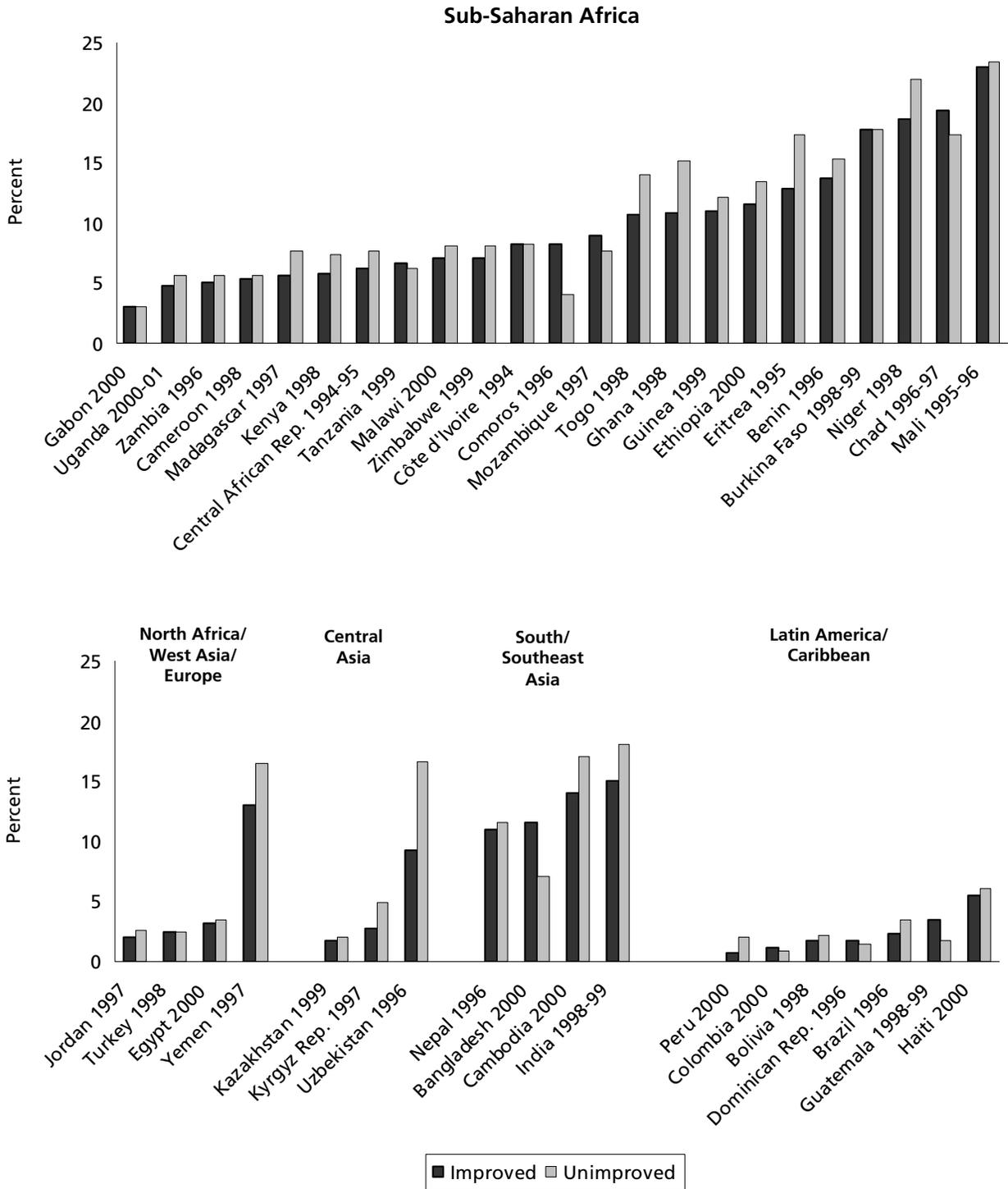
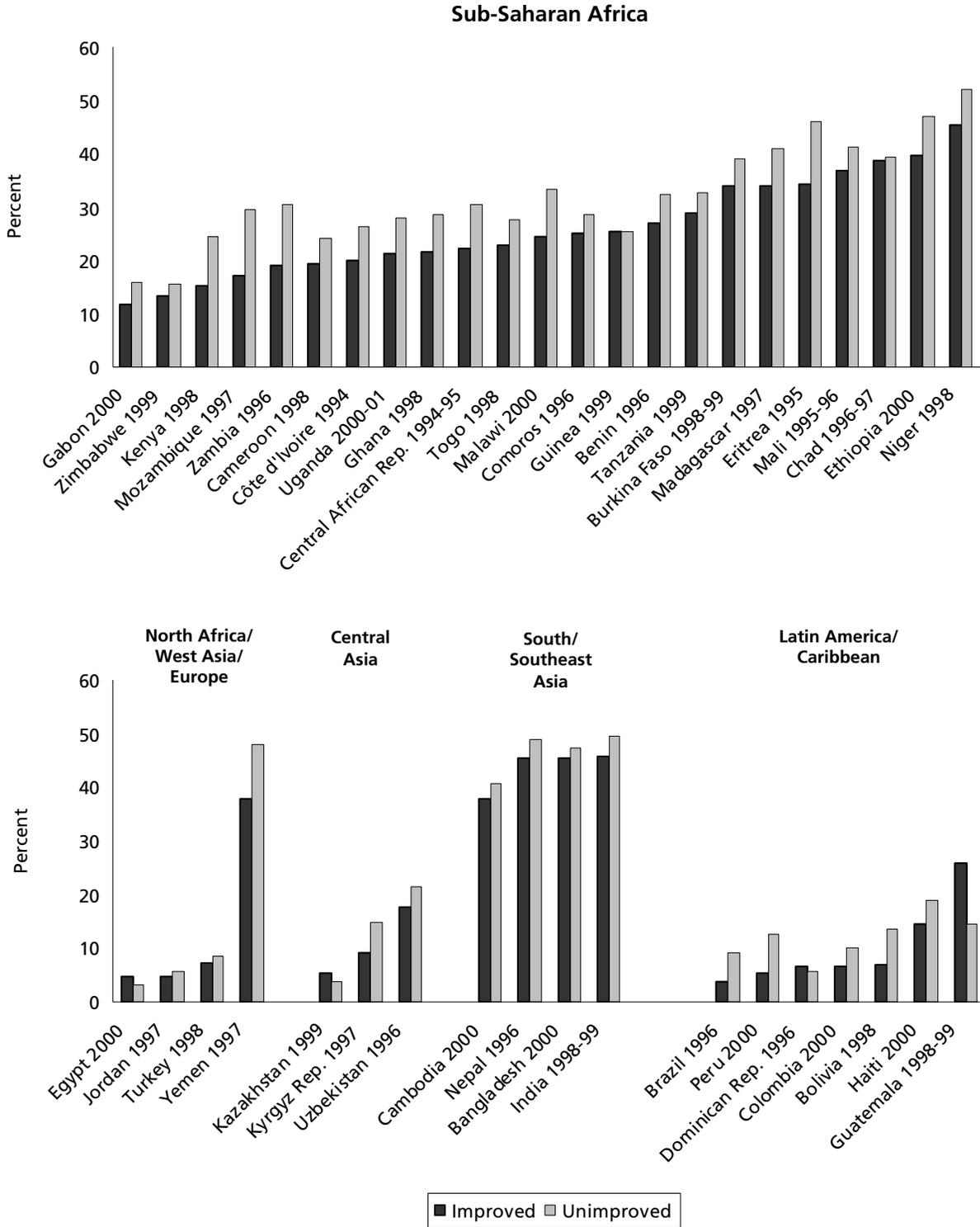


Figure 3.31  
**Percentage of children age 0-35 months who are underweight, by source of drinking water, Demographic and Health Surveys, 1994-2001**



In North Africa/West Asia/Europe, there are small differences between rates of underweight by source of drinking water. Yemen is an exception, with a prevalence of underweight that is 10 percentage points higher among children living in households with unimproved water sources. On the other hand, in Egypt the difference is small, but the rate is higher among children living in households with improved water sources (Figure 3.31).

Two of the three countries of Central Asia demonstrate a higher rate of underweight among children living in households with unimproved water sources. In Kazakhstan, however, children living in households with improved water sources are slightly more likely to be underweight (Figure 3.31).

In South/Southeast Asia, although the rates of underweight are higher for children living in households with unimproved water sources, the differences are small (Figure 3.31).

In Latin America and the Caribbean, five of the seven countries have higher rates of underweight among children in households with unimproved water sources. In the Dominican Republic, the rate is about the same for the two groups of children, and in Guatemala, the rate is higher among children living in households with improved water sources than among children in households with unimproved water sources (Figure 3.31).

### **3.4.3 Underlying Biological and Behavioral Influences**

#### **3.4.3.1 Characteristics of Mothers**

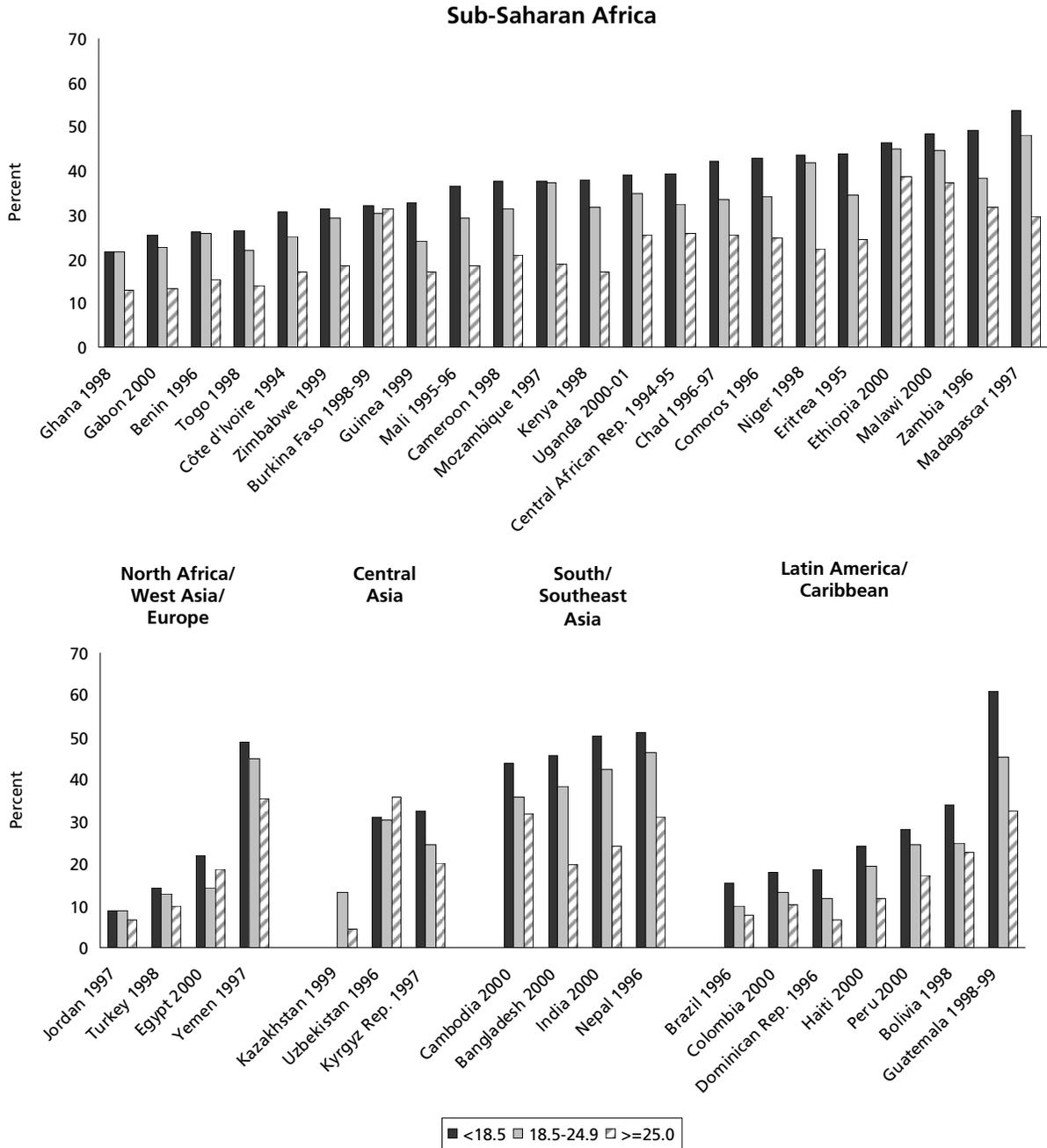
##### **Maternal Nutritional Status**

A mother's nutritional status has important implications for her own health status as well as the health status of her children. A woman who has poor nutritional status has a greater risk of giving birth to a low birth weight baby. Intrauterine growth retardation (IUGR) accounts for more than two-thirds of low birth weight babies in developing countries (Black, 1999). Infants born with IUGR have a greater chance of growth retardation in childhood and have an increased risk of illness, a major contributor to undernutrition. (Ramakrishnan et al., 1999).

Maternal nutritional status is typically measured by the body mass index (BMI). The BMI is calculated as a ratio of weight to height squared ( $\text{kg}/\text{m}^2$ ). Incorporating both height and weight, the BMI provides a better measure of nutritional status than height or weight alone. A BMI of less than 18.5 in women is considered undernutrition.

In most of the countries included in this analysis, higher rates of stunting are found among children age 0-35 months whose mothers are undernourished (BMI <18.5) than among children whose mothers are adequately nourished (BMI 18.5 to 24.9) (Table A.3.16 and Figure 3.32) Infants of overweight mothers (BMI  $\geq$ 25) have the lowest rates of stunting. An exception is Burkina Faso, where stunting rates are about the same for all levels of maternal nutritional status. In five countries (Benin, Ghana, Mozambique, Jordan, and Uzbekistan), rates of stunting are about the same for children of well-nourished mothers as for children of undernourished mothers. In Uzbekistan, stunting is highest among children of overweight women (Table A.3.16 and Figure 3.32).

Figure 3.32  
**Percentage of children age 0-35 months who are stunted, by mother's nutritional status, Demographic and Health Surveys, 1994-2001**



Wasting and underweight rates are also highest among children of mothers who are undernourished and lowest among children of mothers who are overweight (Figures 3.33 and 3.34). The exception is Uzbekistan, where the proportion underweight is highest among children of mothers with a normal BMI and lowest among children of undernourished mothers.

**Figure 3.33**  
**Percentage of children age 0-35 months who are wasted, by mother's nutritional status, Demographic and Health Surveys, 1994-2001**

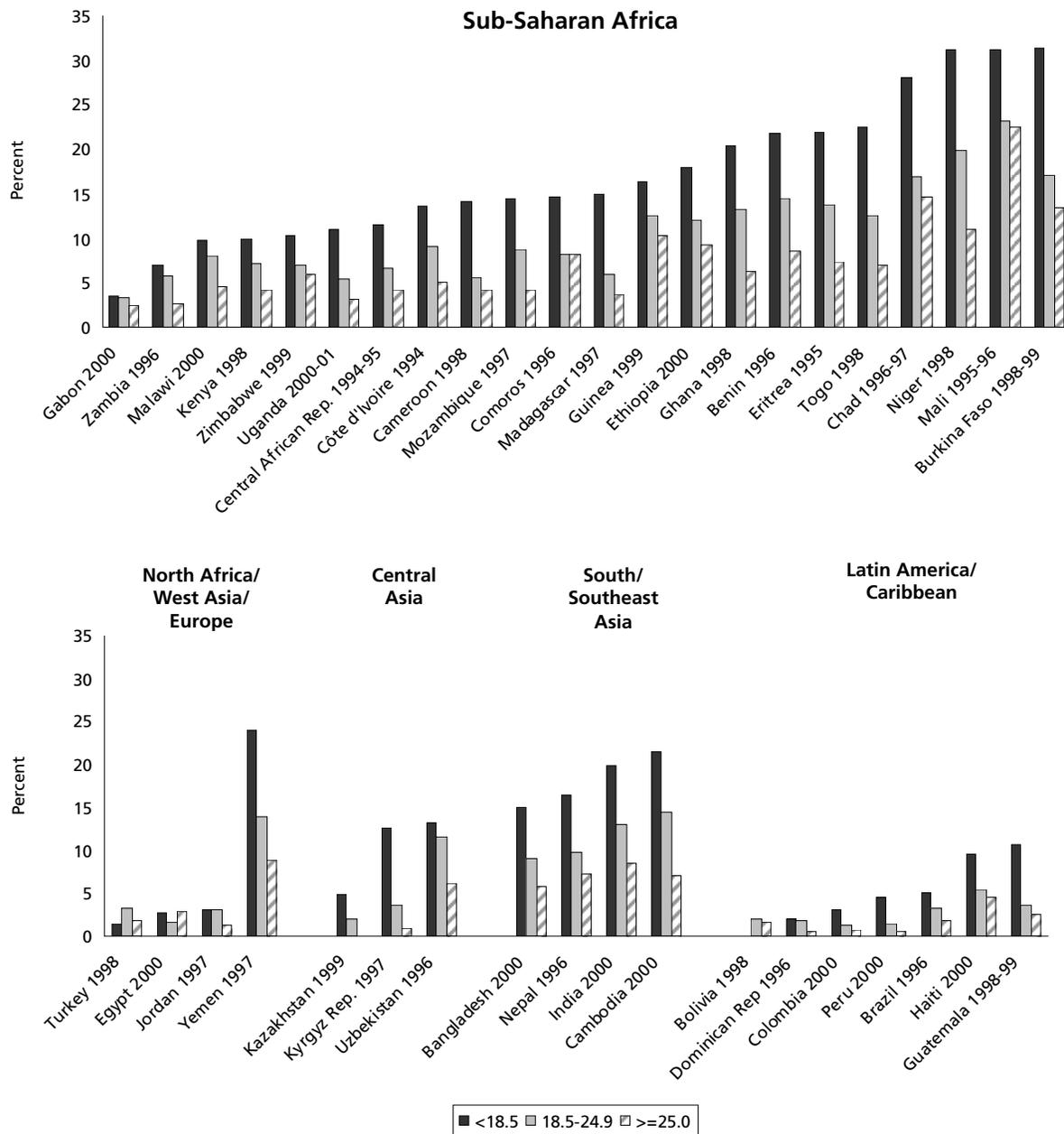
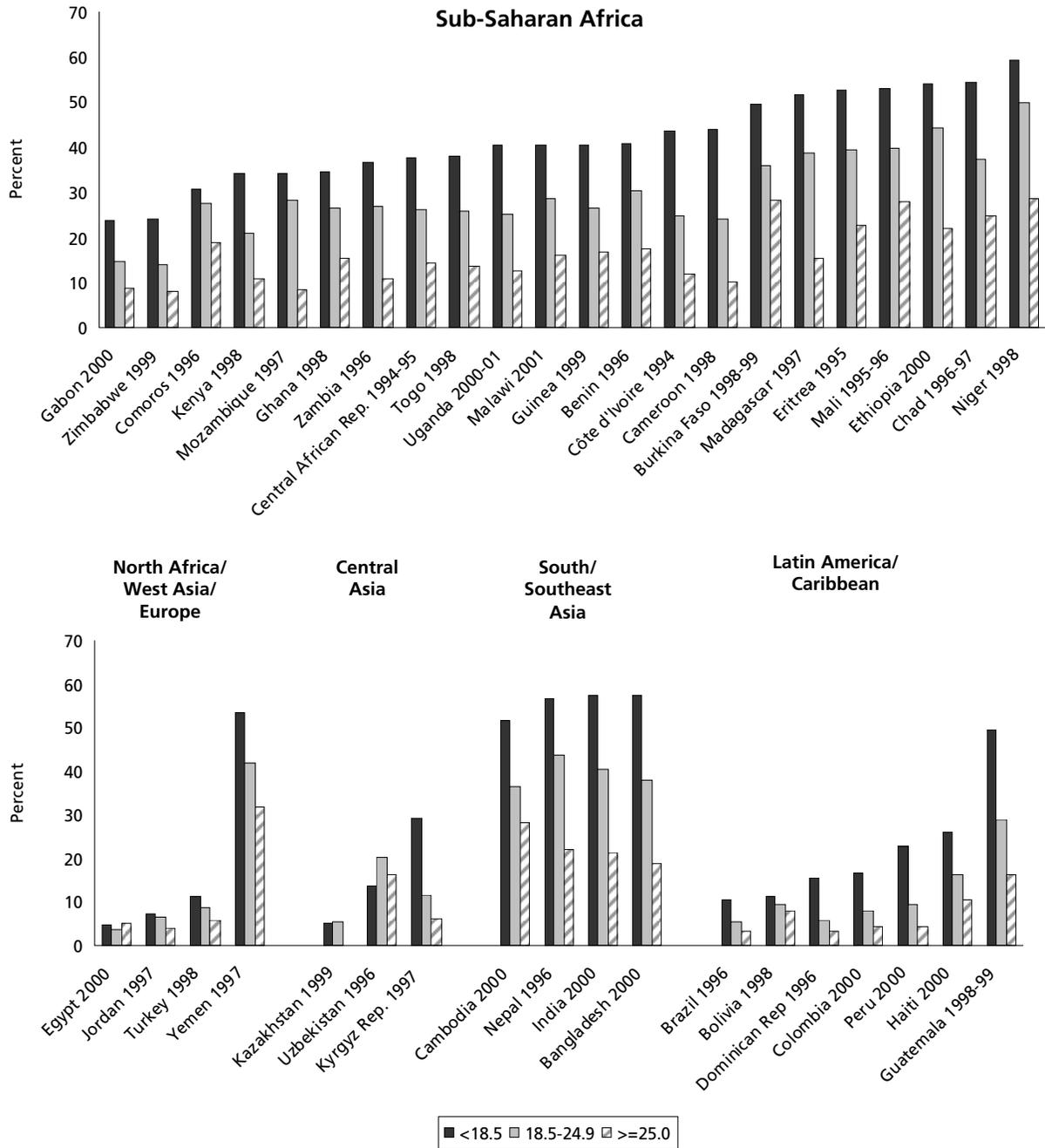


Figure 3.34  
**Percentage of children age 0-35 months who are underweight, by mother's nutritional status, Demographic and Health Surveys, 1994-2001**



## **Antenatal Care**

Regular antenatal care is needed to help detect and manage pregnancy-related complications and improve delivery outcomes. Since most pregnancy-related complications cannot be anticipated, women need access to appropriate care if complications arise. WHO defines antenatal care as having one or more visits with a skilled medical attendant during pregnancy (WHO and UNICEF, 2003). Adequate, timely, and regular use of antenatal care contributes to improved birth outcomes and higher birth weight.

The analysis of undernutrition by number of antenatal care visits looked at children of mothers who had one or more antenatal visits and children of mothers who had no visits (Table A.3.17). In most cases, children whose mothers had one or more antenatal care visits were less likely to be stunted and underweight than children whose mothers had no antenatal visits (Figures 3.35 and 3.37, respectively). Wasting rates were not as clearly related to antenatal care visits (Figure 3.36). In most countries, the rate of wasting was about the same for children of mothers who had one or more antenatal visits and those whose mothers had no visits. (This is not surprising since wasting measures acute undernutrition, which may be more influenced by a recent illness.) Use of antenatal care may be indicative of improved availability and/or access to health services as well as a willingness or ability to practice effective health behaviors. A multivariate analysis would better determine the impact of these factors on the nutritional status of children.

## **Mother's Age at Delivery**

Mother's age at delivery is related to maternal nutritional status. There are higher rates of undernutrition among younger mothers, and undernourished mothers have higher rates of low birth weight babies. Younger women usually have lower BMIs than older women, and younger mothers and older mothers tend to have higher risk of low birth weight infants (Karim and Mascie-Taylor, 1997). In the DHS surveys, mother's age at delivery is calculated from the mother's date of birth and the child's date of birth. In this analysis, three categories were used: under 20 years, 20 to 34 years, and 35 years or older.

Some interesting region-specific patterns of undernutrition emerge by mother's age at the time of the child's birth (Table A.3.18). In sub-Saharan Africa, 17 of the 23 countries have the highest rates of stunting among children of mothers under age 20 (Figure 3.38). However wasting has a different pattern. In half of the 23 countries, wasting is most common among children of older mothers (35 years or older). In three countries (Comoros, Kenya, and Central African Republic), wasting is most common among children of younger mothers (under 20 years).

Although the differences are small for Brazil, Colombia, and Haiti, in Latin America and the Caribbean, stunting is most common among children of older mothers (35 years or older). Wasting rates are quite low in this region, yet there are some noticeable differences by mother's age at delivery. Wasting is highest among children of younger mothers (under 20 years) in the Dominican Republic. It is highest among children of older mothers (35 years or older) in Guatemala (Figure 3.39).

Figure 3.35  
**Percentage of children age 0-35 months who are stunted, by antenatal care visits, Demographic and Health Surveys, 1994-2001**

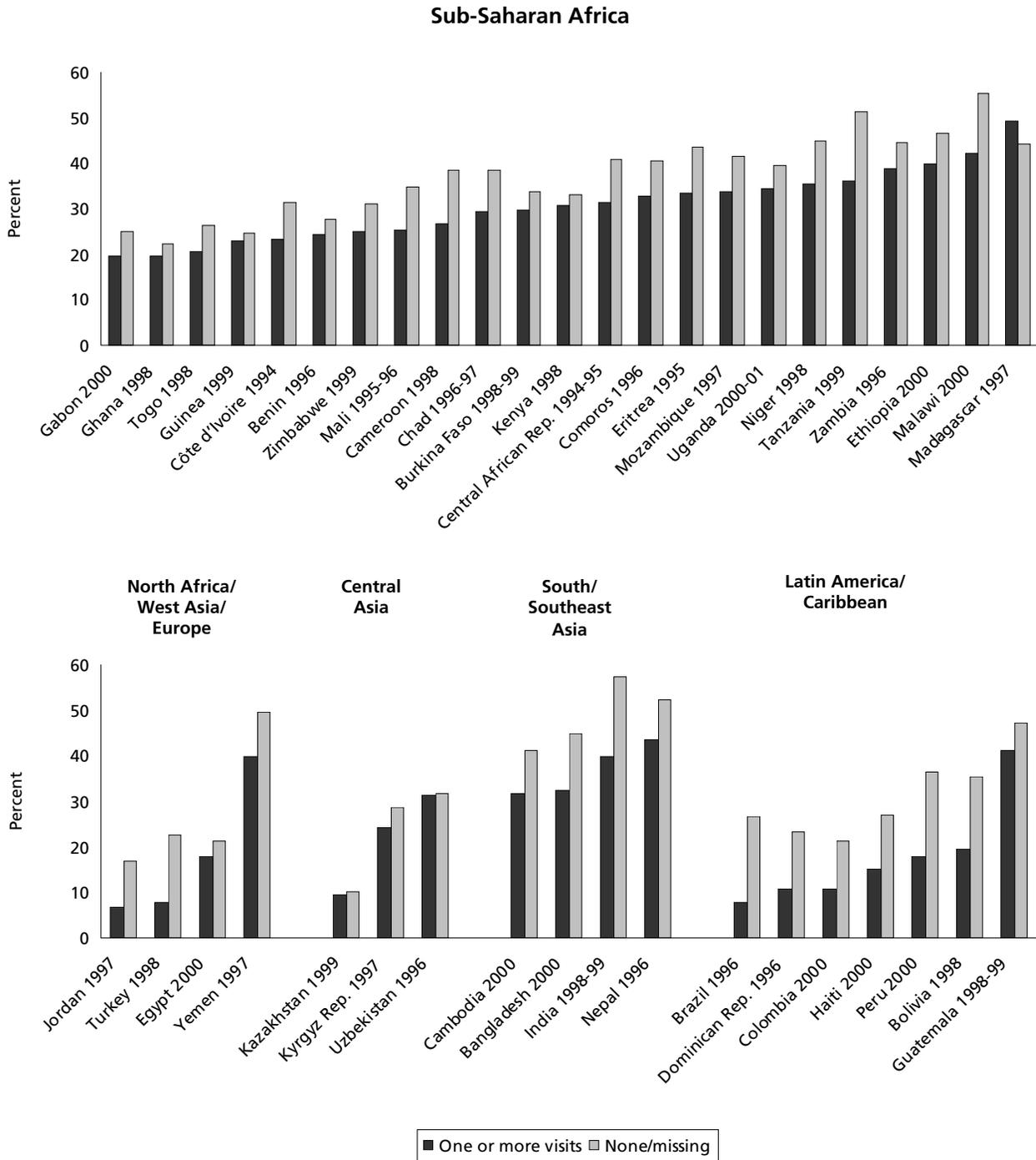


Figure 3.36  
**Percentage of children age 0-35 months who are wasted, by antenatal care visits, Demographic and Health Surveys, 1994-2001**

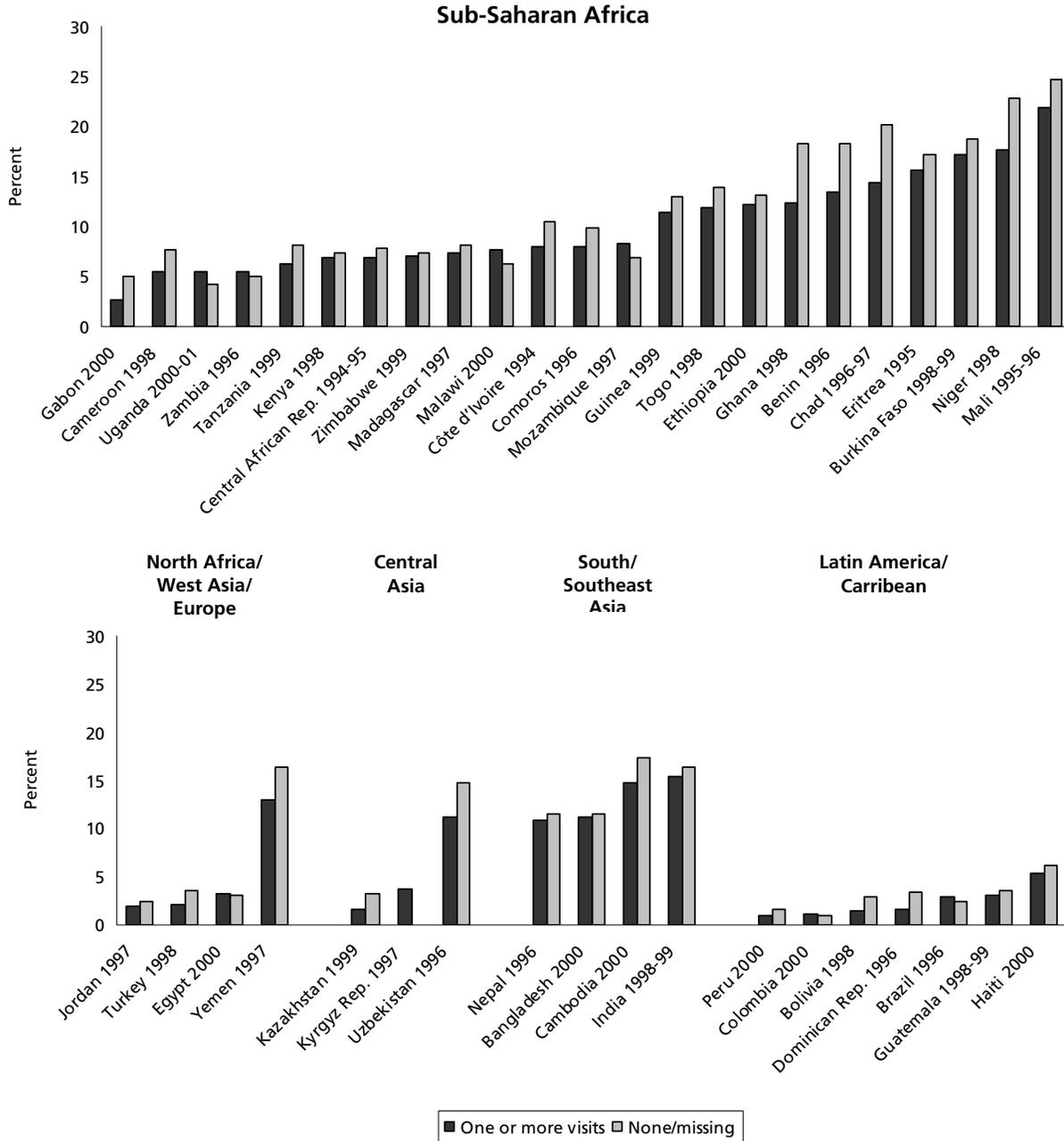


Figure 3.37  
**Percentage of children age 0-35 months who are underweight, by antenatal care visits, Demographic and Health Surveys, 1994-2001**

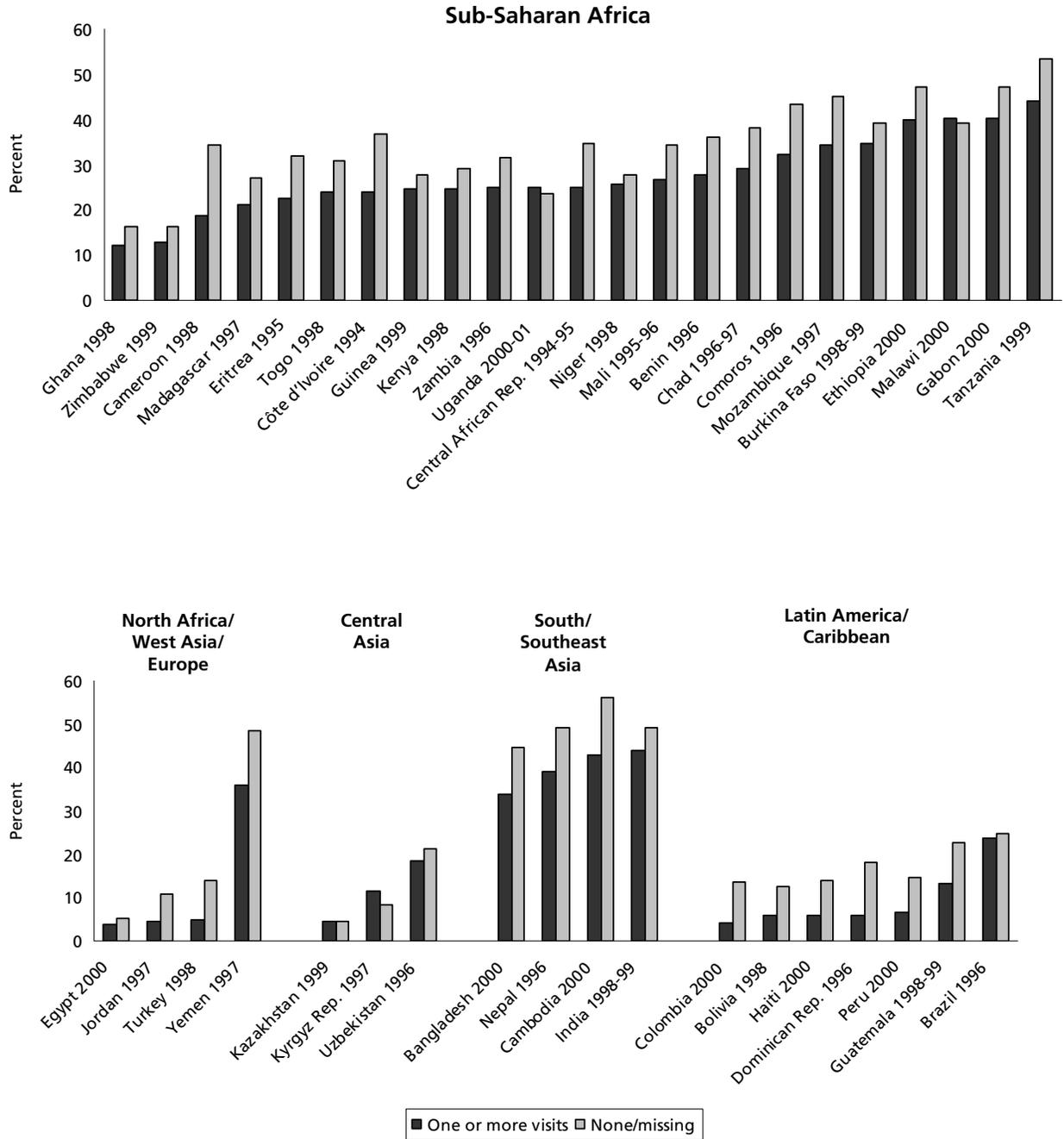


Figure 3.38  
**Levels of stunting among children age 0-35 months by mother's age at delivery, Demographic and Health Surveys, 1994-2001**

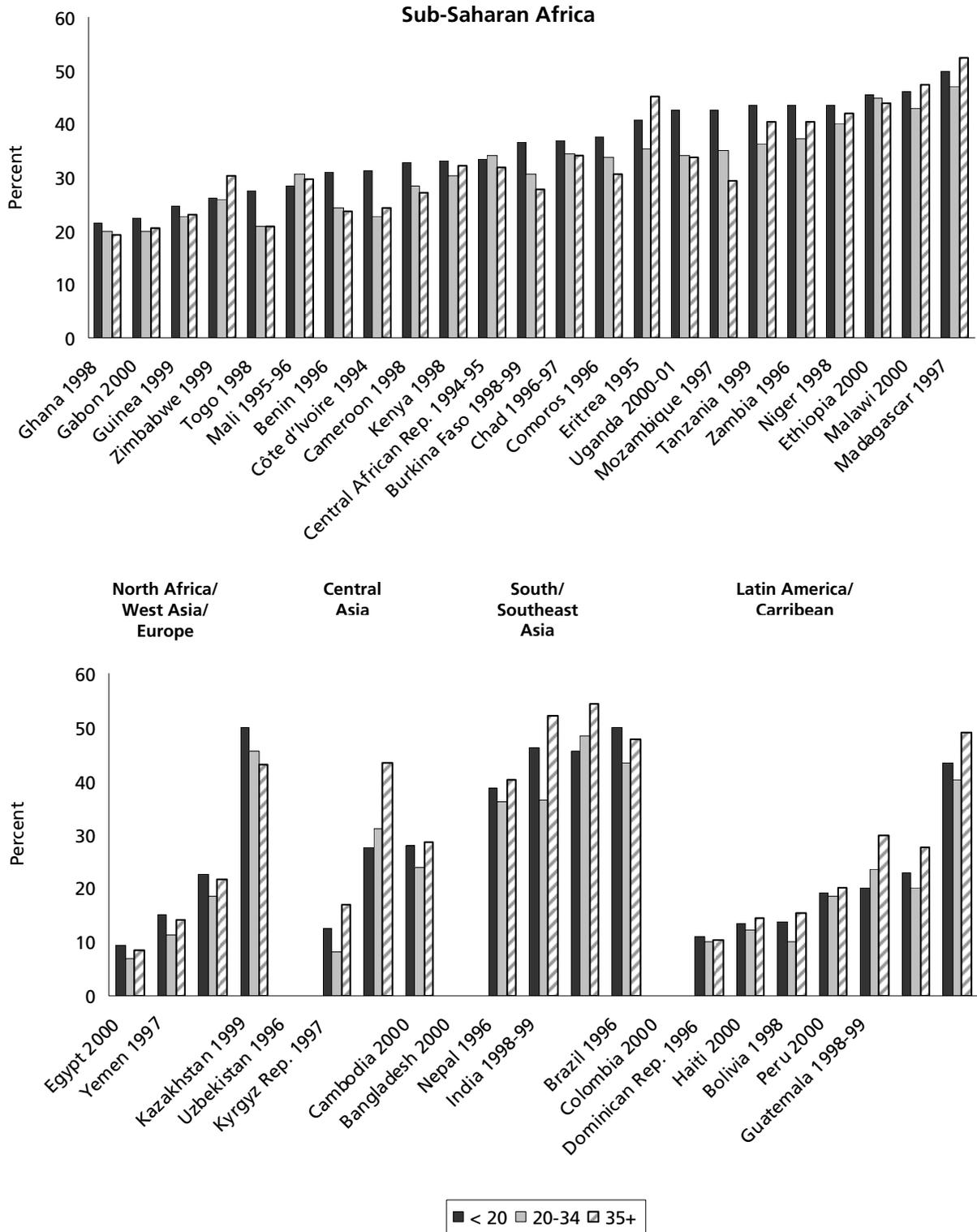


Figure 3.39  
**Levels of wasting among children age 0-35 months by mother's age at delivery, Demographic and Health Surveys, 1994-2001**

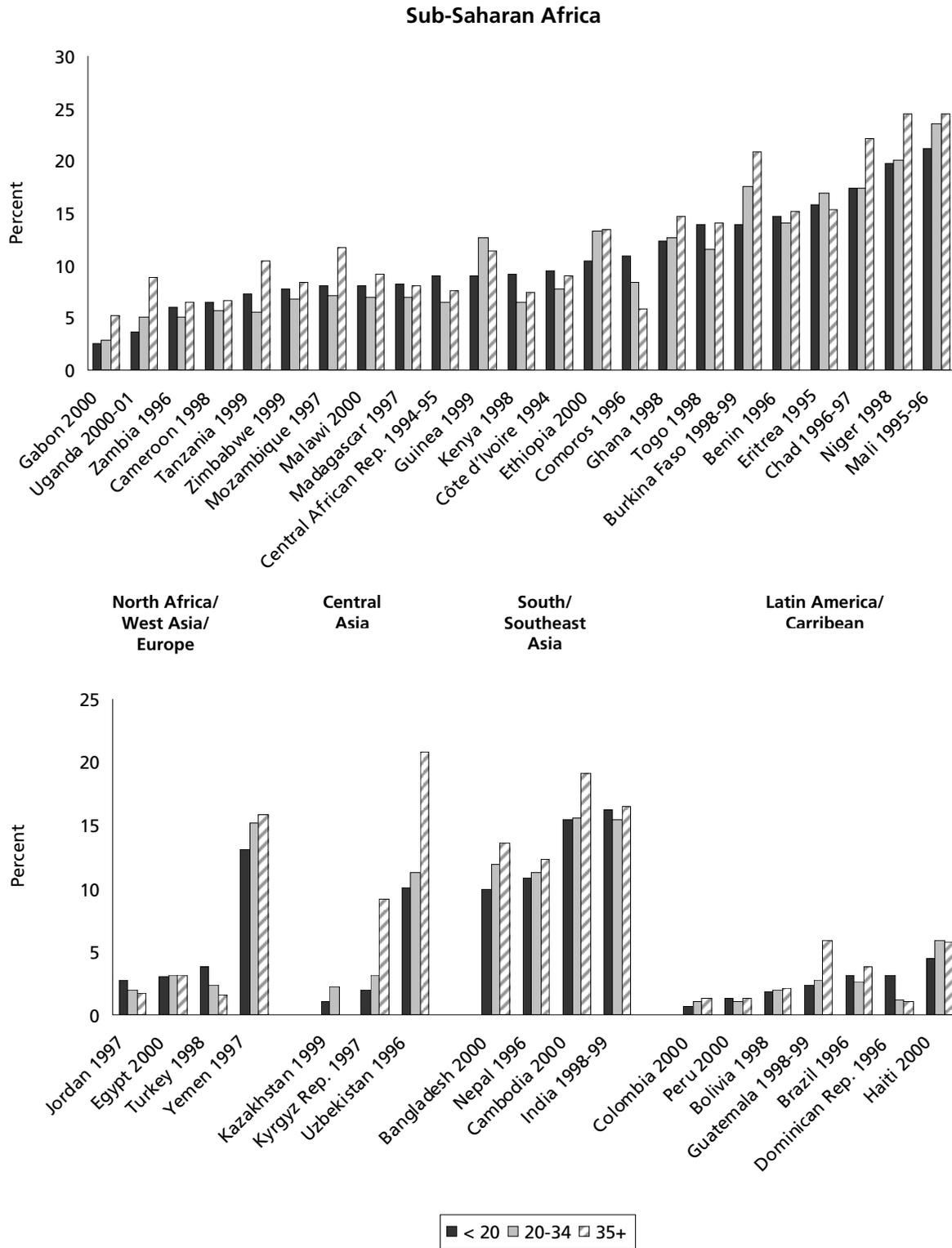
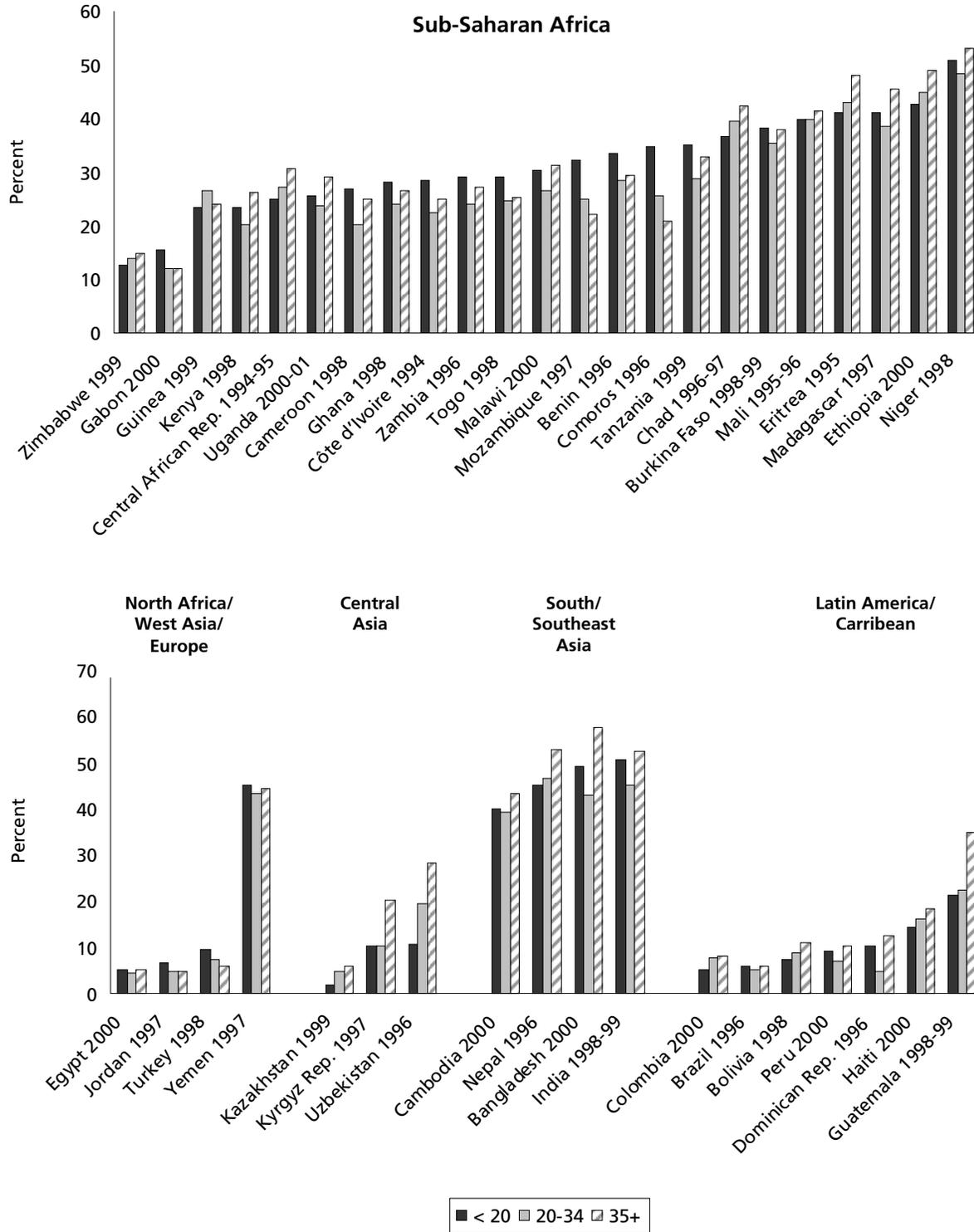


Figure 3.40  
**Levels of underweight among children age 0-35 months by mother's age at delivery, Demographic and Health Surveys, 1994-2001**



In Central Asia, there is no discernible maternal age pattern in regard to stunting. However, wasting and underweight are higher among children of older mothers (35 years or older). In South/Southeast Asia stunting, wasting, and underweight rates are higher among children of older mothers (35 years or older). Stunting is slightly higher among children of younger mothers in the North Africa/West Asia/Europe region. However, wasting and underweight rates are almost the same in all maternal age groups in this region (Figures 3.39 and 3.40, respectively).

### **3.4.3.2 Child Characteristics**

#### **Size at Birth**

The birth weight of an infant is a determinant of child health and nutrition. Low birth weight babies face higher risks of illness and death than do babies of normal birth weight. With only about 40 to 60 percent of women delivering in health facilities in most of the countries surveyed, actual birth weight is not available for most infants. As a proxy, a mother's assessed size of her infant at birth is used. Mothers were asked, "When (NAME) was born, was he/she very large, larger than average, average, smaller than average, or very small." The child's nutritional status is assessed based on the mother's report of the child's size at birth (Table A.3.19). In this analysis, there are three categories of birth size: very small, smaller than average, and average or larger.

In most countries in sub-Saharan Africa, the lowest rates of stunting, wasting, and underweight were recorded among children reported to be average or larger than average at birth (Figures 3.41 through 3.43). On the other hand, children whom the mothers perceived as very small at birth had the highest rates of undernutrition. Ghana, Mozambique, and Tanzania had fewer than 50 cases of very small infants; hence their results in this category should be interpreted with caution.

Countries in North Africa/West Asia/Europe, South/Southeast Asia, and Latin America and the Caribbean have a pattern of birth size similar to that of sub-Saharan Africa, with low rates of undernutrition among children reported as average and above average at birth and the highest rates among children reported as very small at birth. The question of child size at birth was not asked in the Colombia and Peru surveys.

The Central Asia region has very small numbers of children reported to be very small at birth. This category is therefore not included in the discussion. In most cases, the children who were reported to be average to above average at birth had lower rates of stunting, wasting, and underweight than those reported to be smaller than average.

Figure 3.41  
**Levels of stunting among children age 0-35 months by mother's perceived size of child at birth, Demographic and Health Surveys, 1994-2001**

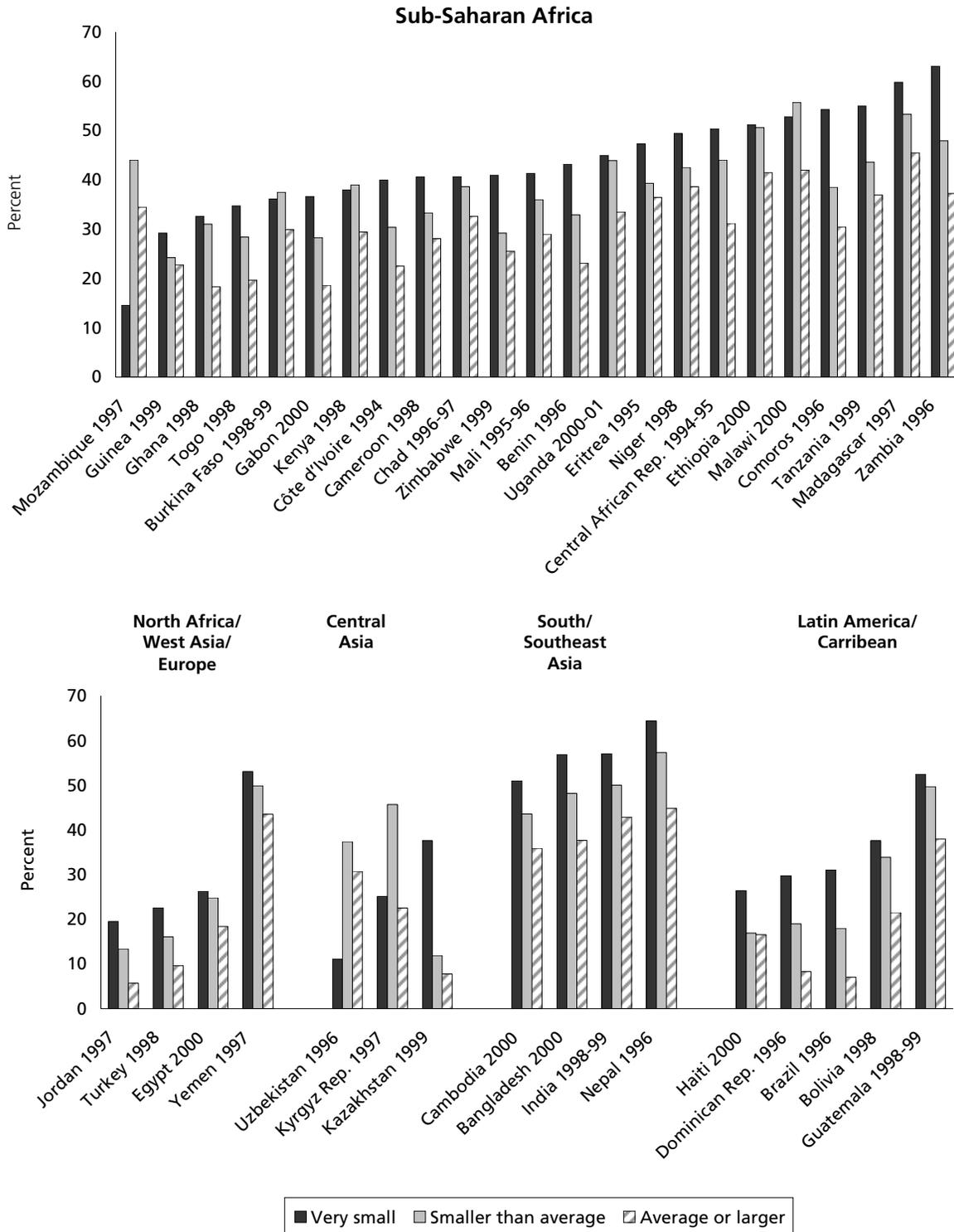


Figure 3.42  
**Levels of wasting among children age 0-35 months by mother's perceived size of child at birth, Demographic and Health Surveys, 1994-2001**

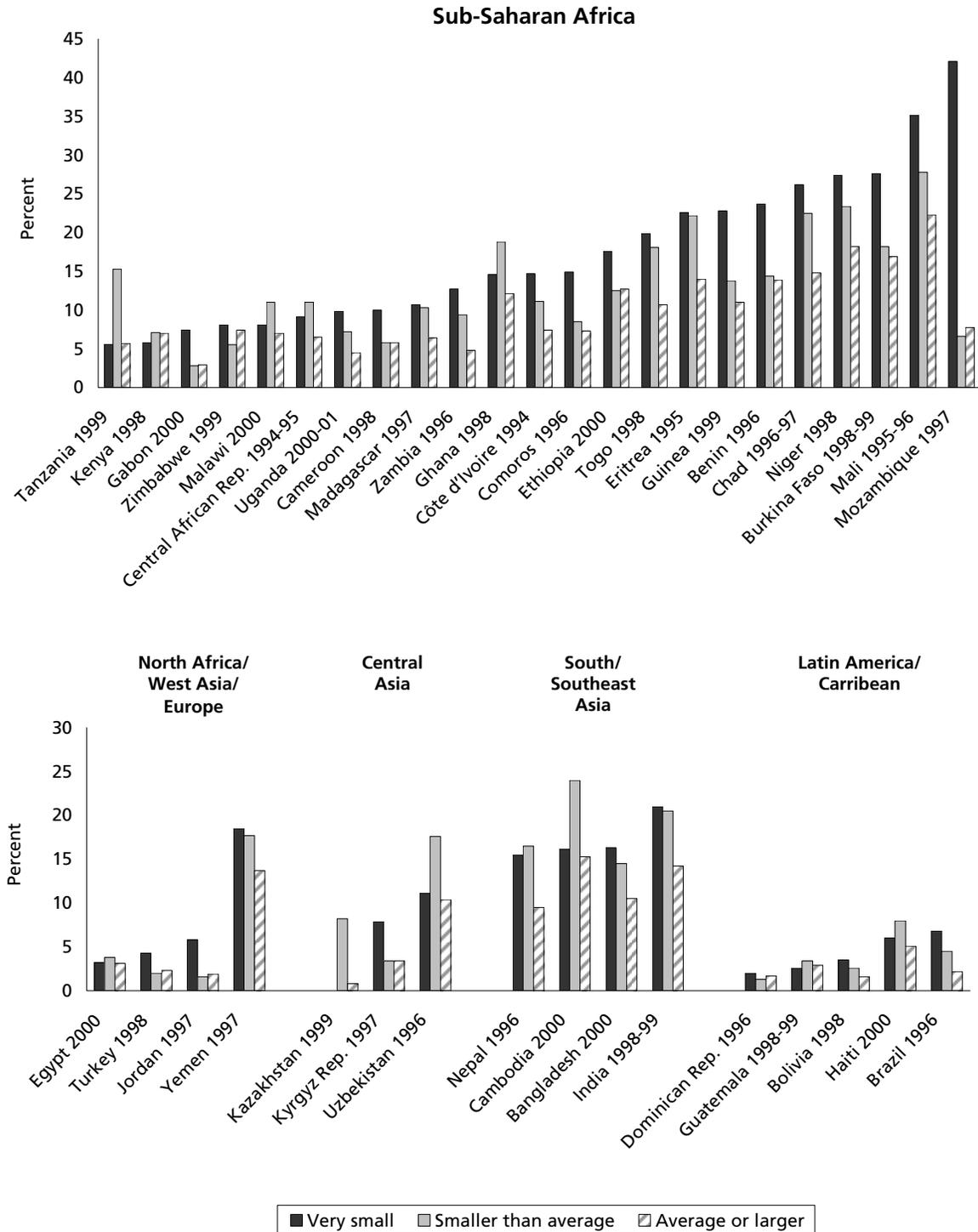
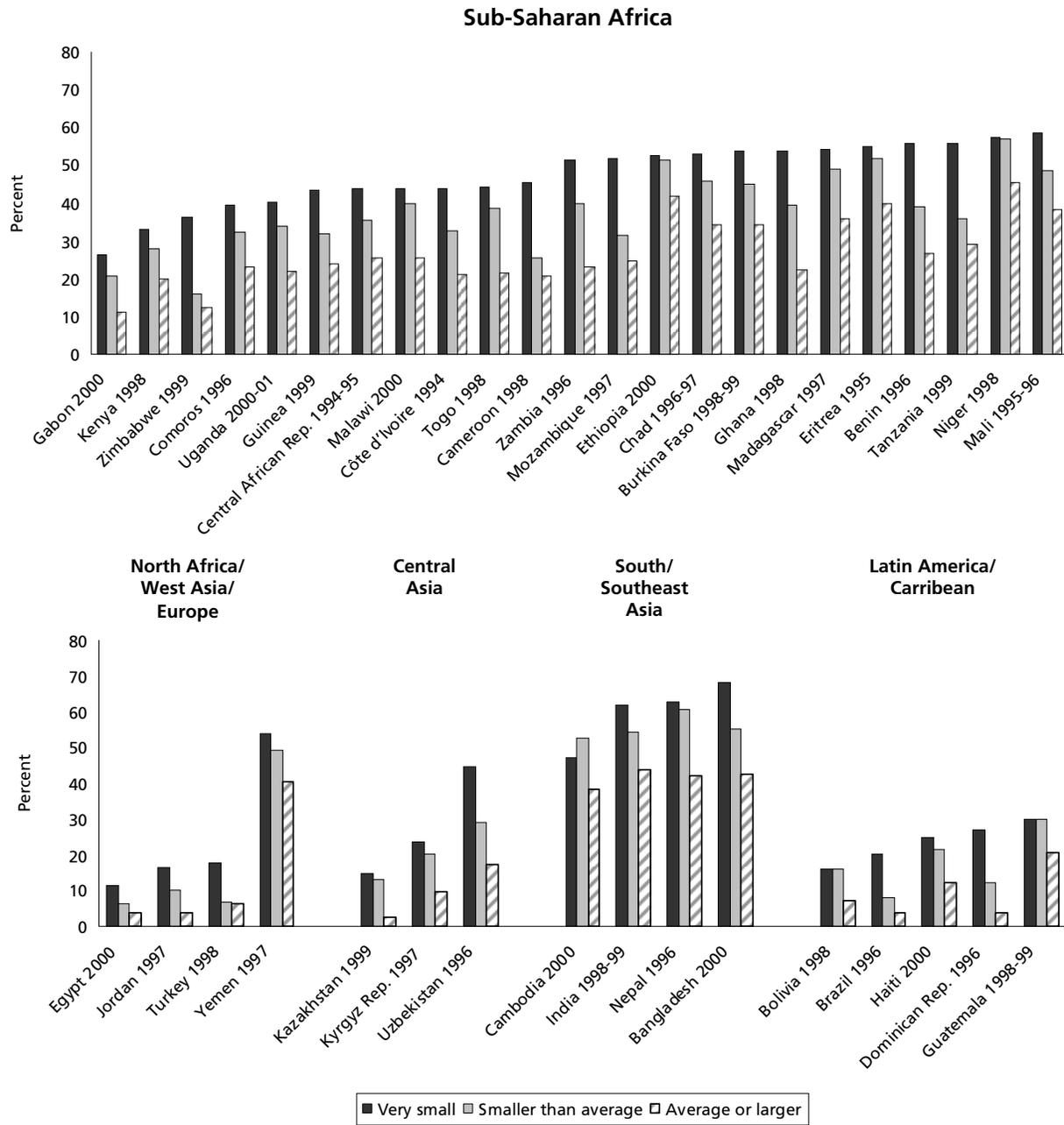


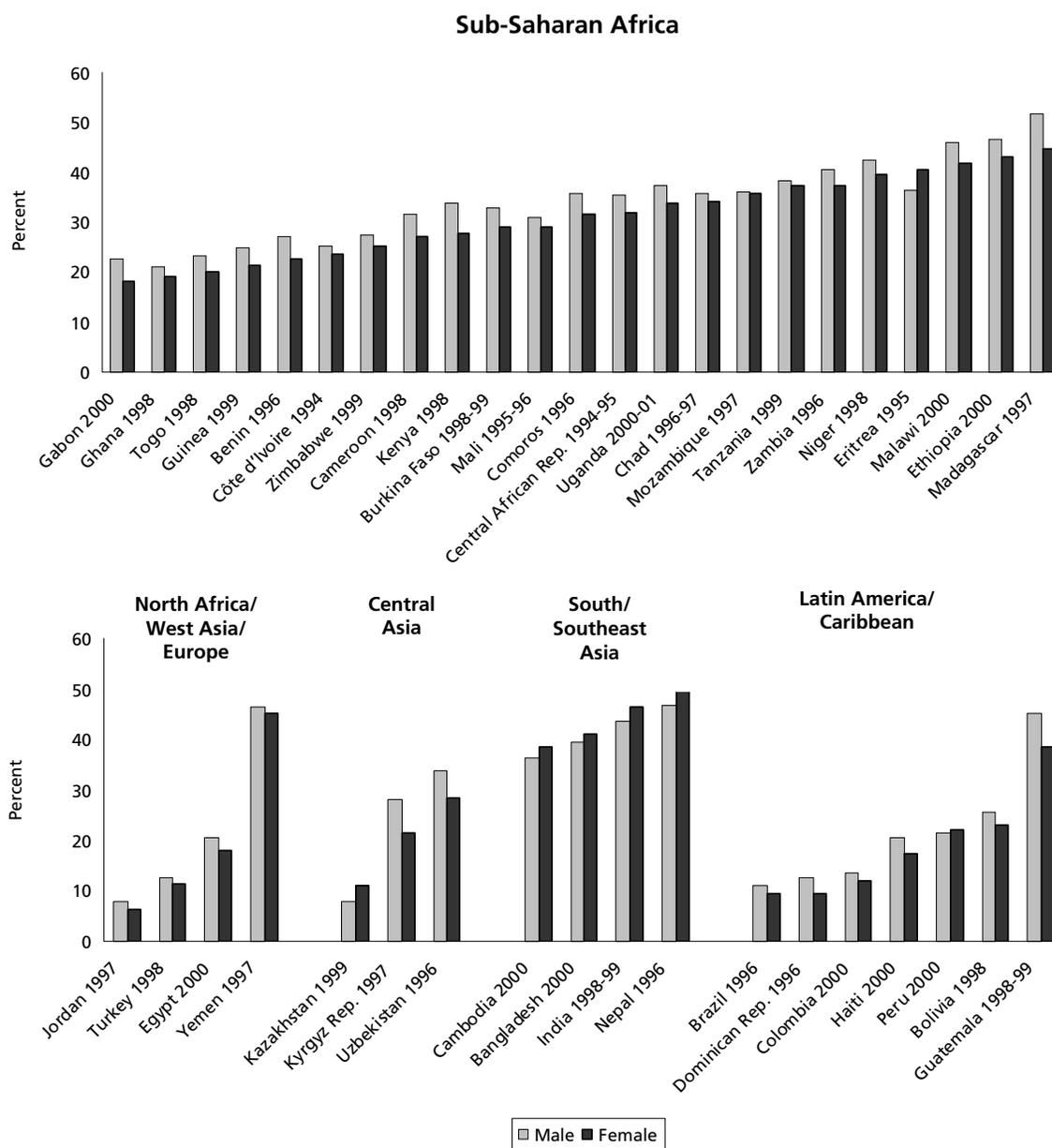
Figure 3.43  
**Levels of underweight among children age 0-35 months by mother's perceived size of child at birth, Demographic and Health Surveys, 1994-2001**



## Sex

In most of the regions, there are gender differentials in stunting based on sex (Figure 3.44). Typically, males have a slightly higher rate of stunting than females (Table A.3.20). However, in South/Southeast Asia, there is a higher rate of stunting among females than males. Of the sub-Saharan countries included here, Eritrea is the only one in which females have a slightly higher rate of stunting (41 percent) than males (36 percent). In Tanzania and Mozambique, the stunting rates are about equal between males and females.

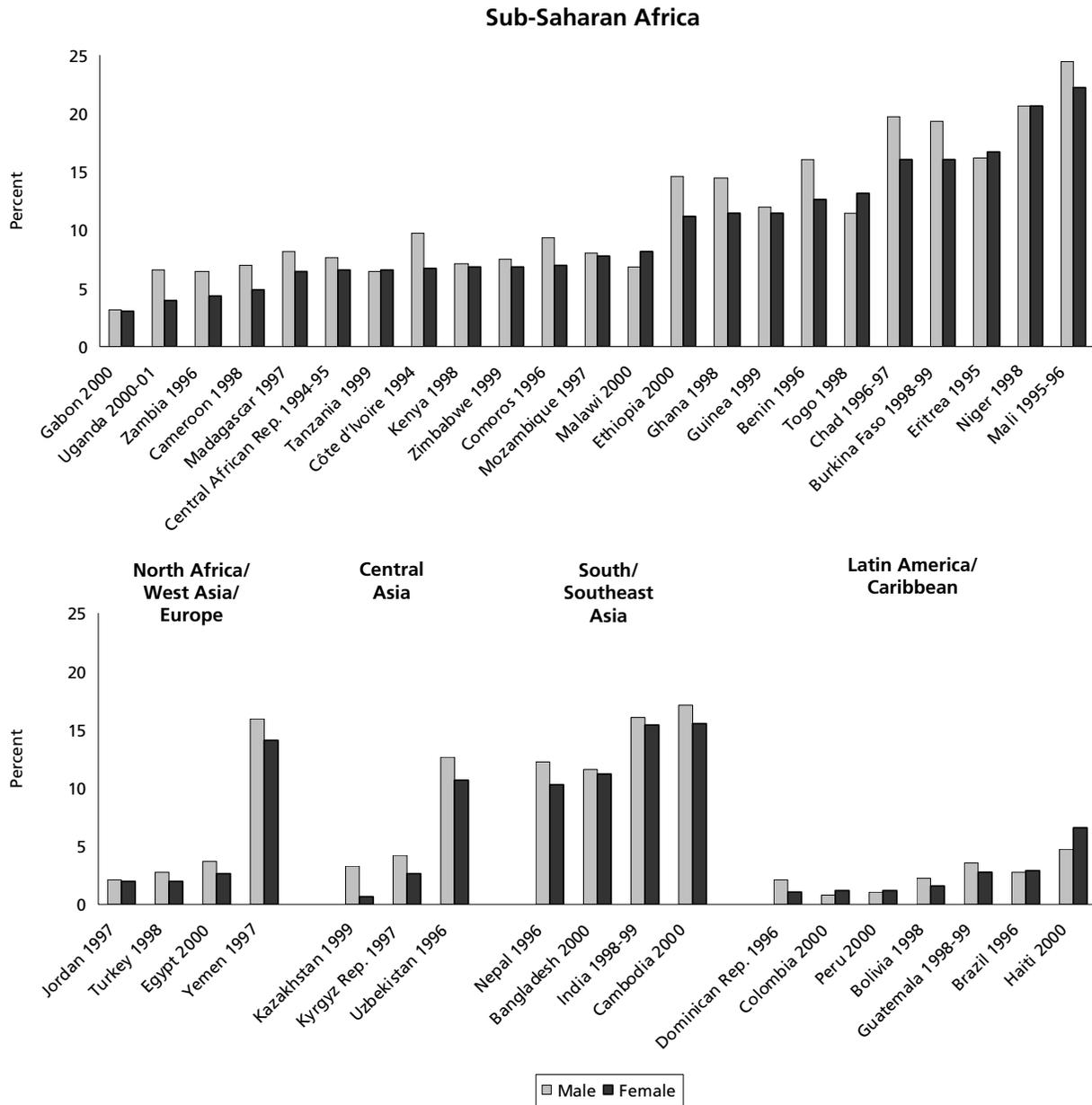
Figure 3.44  
Levels of stunting among children age 0-35 months by sex of a child, Demographic and Health Surveys, 1994-2001



In Latin America and the Caribbean, males have a higher rate of stunting, except in Peru, where the rate of stunting between males and females is about the same. Among all regions, the North Africa/West Asia/Europe region shows the smallest differences between males and females (Figure 3.44).

Again, females seem to have a slight advantage when it comes to wasting, with slightly higher rates of wasting among males than among females across all regions (Figure 3.45). However, there are a few exceptions. In sub-Saharan Africa, eight countries have about equal rates of wasting for males and females. And in Togo and Malawi, the rates of wasting are higher among females. Jordan, in the North

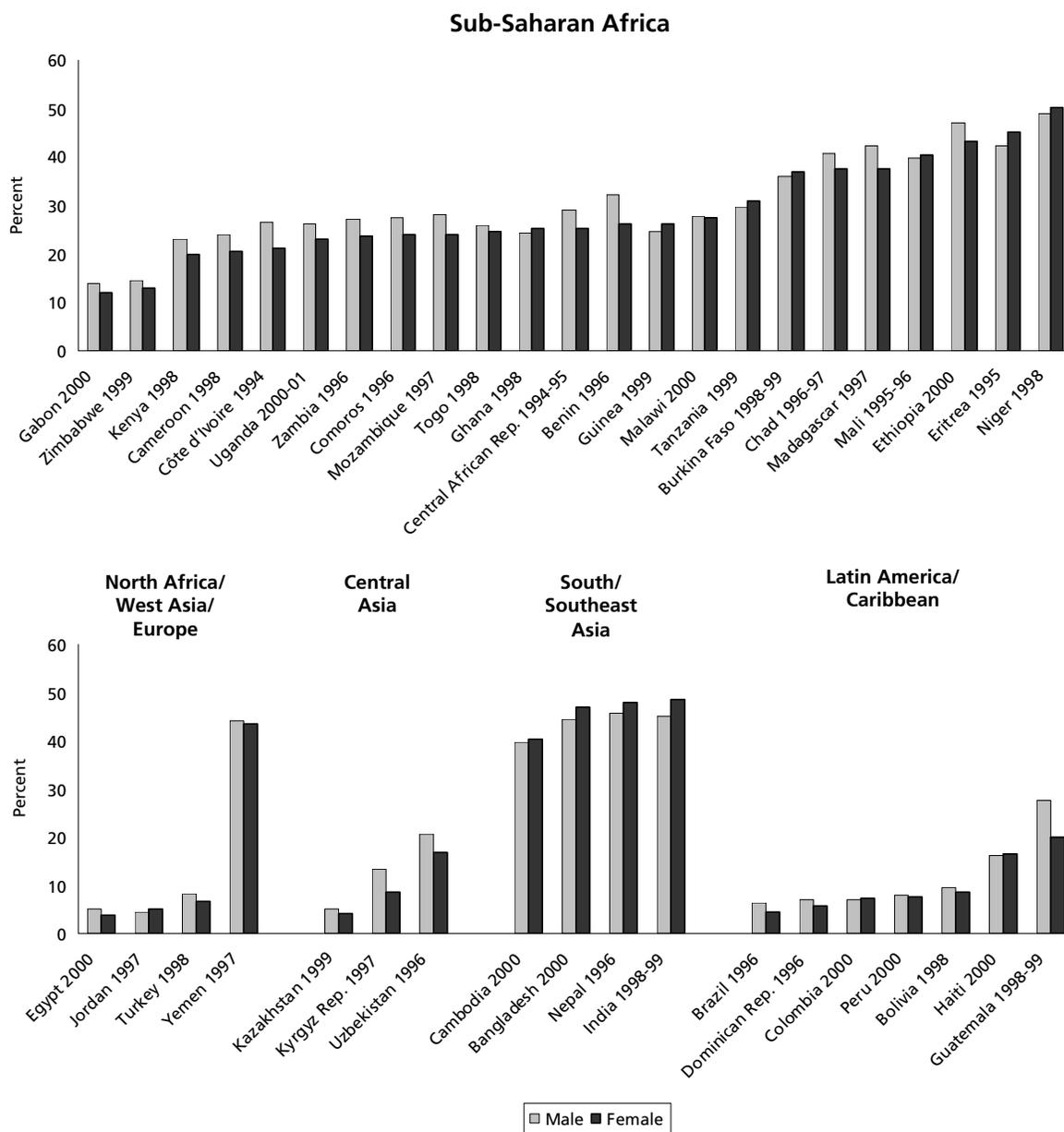
**Figure 3.45**  
**Levels of wasting among children age 0-35 months by sex of child, Demographic and Health Surveys, 1994-2001**



Africa/West Asia/Europe region, shows no gender differences for wasting, and this is also the case in Colombia, Peru, and Brazil in Latin America and the Caribbean. In South/Southeast Asia, where rates of stunting are higher among females than males, rates of wasting are higher among males than females.

Underweight has a different distribution by sex, although females continue to have a small advantage over males (Figure 3.46). In sub-Saharan Africa, there are a few countries (namely, Burkina Faso, Ghana, Tanzania, Malawi, and Mali) where the prevalence of underweight is about the same for males and females. In Eritrea and Niger, females have a higher rate of underweight than males.

**Figure 3.46**  
**Levels of underweight among children age 0-35 months by sex of child, Demographic and Health Surveys, 1994-2001**



In North Africa/West Asia/Europe, underweight rates are higher for males than females, except in Jordan, where females are at a slight disadvantage to males. In Central Asia, males also have a higher rate of underweight than females. South/Southeast Asia has the opposite pattern, with higher rates of underweight among females, except in Cambodia where the rates are about the same for males and females. In Latin America and the Caribbean, four of the seven countries have almost the same rates of underweight for males and females (Figure 3.46).

### **Birth Order**

A child's birth order is taken from the birth history given by the mother at the time of the interview. Birth orders were recoded into four categories (first, second or third, fourth or fifth, and sixth or higher). Data on undernutrition and birth order are presented in Table A.3.21 and Figures 3.47 to 3.49.

Figures 3.47 through 3.49 show the patterns of undernutrition by birth order for the five regions. With the exception of sub-Saharan Africa, all of the regions have a pattern of stunting that increases as birth order increases (Figure 3.47). This pattern may be partly a reflection of poverty because larger families are usually poorer than smaller families and therefore less likely to have adequate food resources available. Yemen, in North Africa/West Asia/Europe, has a pattern that is almost flat, with high levels of stunting among children of all birth orders. In Kazakhstan, in Central Asia, the highest levels of stunting are among children of fourth or fifth birth order: this is not surprising because Kazakhstan has a small number of births overall and therefore only a small number of higher order births in the sample.

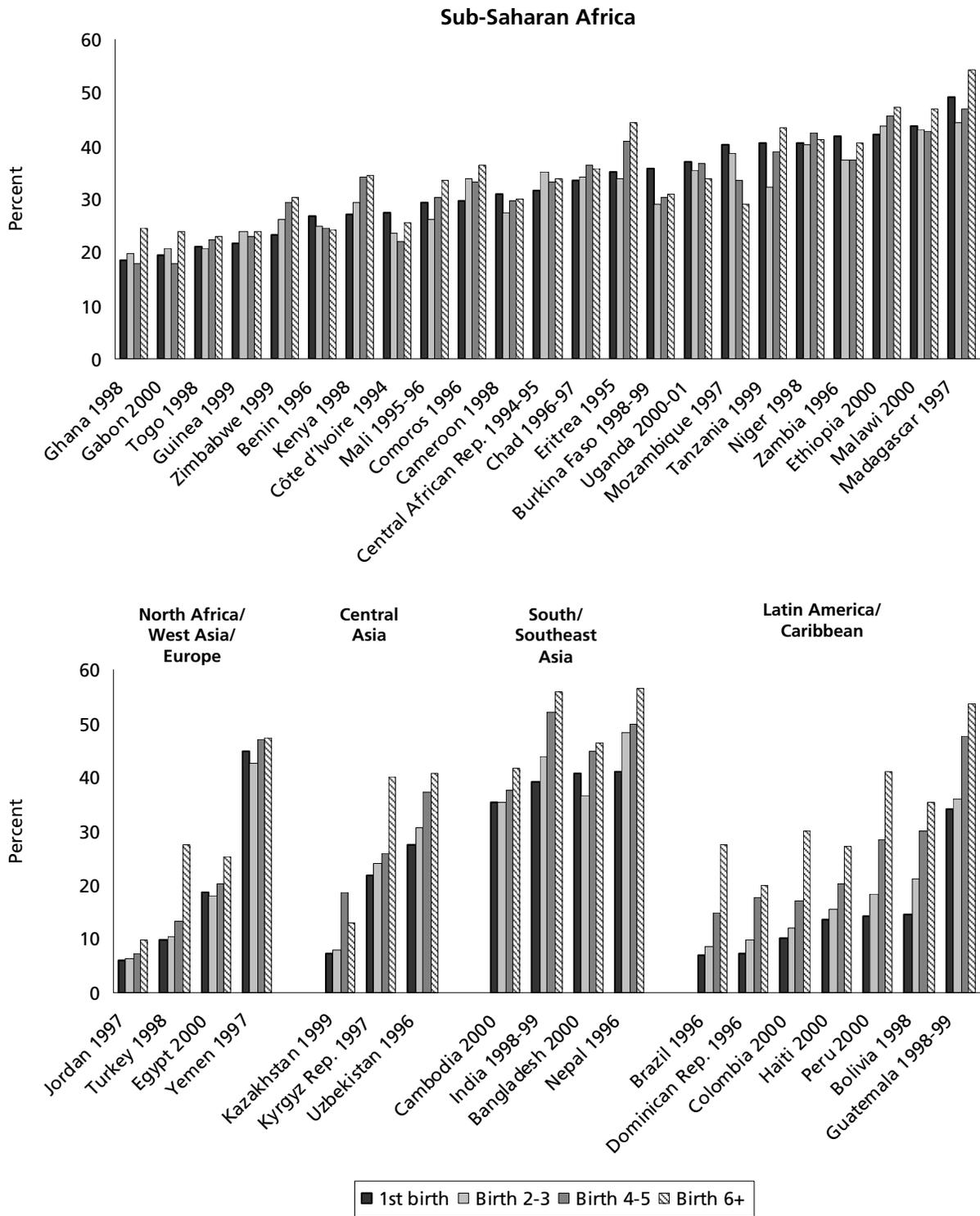
The sub-Saharan region shows four patterns of undernutrition by birth order, not all of which can be fully explained by poverty. The data suggest that the largest group (10 countries) has a pattern of stunting that increases with birth order, as seen in the other regions. Mothers of children of higher birth order tend to be older and less educated than younger mothers.

A second group, made up of six countries (Cameroon, Central African Republic, Chad, Guinea, Niger, and Togo), has a flatter distribution of stunting, indicating that undernutrition as measured by stunting is not influenced by birth order (Figure 3.47). This may be due to the overall high levels of poverty in these countries.

A third group, made up of five countries (Burkina Faso, Côte d'Ivoire, Tanzania, Zambia, and Madagascar), shows a U-shaped distribution of stunting, with levels of stunting being higher for the first and sixth or higher order births than the middle order births. This may be related to the mother's increased experience with child feeding practices as well as the application of improved health behaviors with subsequent children. However, at higher birth orders, poverty may negate the improvements gained from knowledge and experience.

In Benin, Burkina Faso, and Uganda, the prevalence of stunting is highest for first births and levels off for second and higher order births. Mozambique has a unique pattern of undernutrition that shows decreasing stunting with increasing birth order.

Figure 3.47  
Levels of stunting among children age 0-35 months by birth order, Demographic and Health Surveys, 1994-2001



Wasting increases with increasing birth order in most countries. In 11 of 23 countries in sub-Saharan Africa, children that are of sixth or higher order have the highest rates of wasting. In three countries, wasting shows a generally flat pattern across all birth orders. Three countries have a U-shaped pattern, which may be a reflection of mothers' experience and improved health and nutrition practices. Four countries in this region have wasting levels that are highest for fourth and fifth order children. Two countries (Kenya and the Central African Republic) show unique patterns of low rates of wasting for first births and birth order six or higher (Figure 3.48).

Countries in Latin America and the Caribbean have very low rates of wasting to start with, and these rates are about equal across birth orders, with the exception of Colombia and Brazil, where wasting rates increase with increasing birth order. All countries in South/Southeast Asia have high rates of wasting (over 10 percent for all births of second or higher order), and their rates increase with increasing birth order in most cases. In Central Asia, the Kyrgyz Republic and Kazakhstan have low rates of wasting, but the rates in Uzbekistan are much higher. In Uzbekistan, wasting increases with increasing birth order; in Kazakhstan and the Kyrgyz Republic, first births have the highest prevalence of wasting. North Africa/West Asia/Europe has low rates of wasting in three of the four countries. Birth order has little effect on wasting rates in this region (Figure 3.48).

Underweight patterns by birth order are similar to stunting patterns in most regions, the prevalence of underweight increases with increasing birth order (Figure 3.49). However, sub-Saharan Africa again offers a more challenging picture with four distinct patterns of underweight. Like the other regions, the first group, including Kenya, Uganda, Guinea, and others, has an increasing relationship of birth order to underweight. A second group, including Cameroon, Ghana, Mali, and others, shows a J-shaped pattern between birth order and underweight. A third group has a U-shaped pattern. In a fourth group of countries, including Comoros, Togo, Côte d'Ivoire, and others, the prevalence of underweight does not vary much by birth order.

Figure 3.48  
 Levels of wasting among children age 0-35 months by birth order, Demographic and Health Surveys, 1994-2001

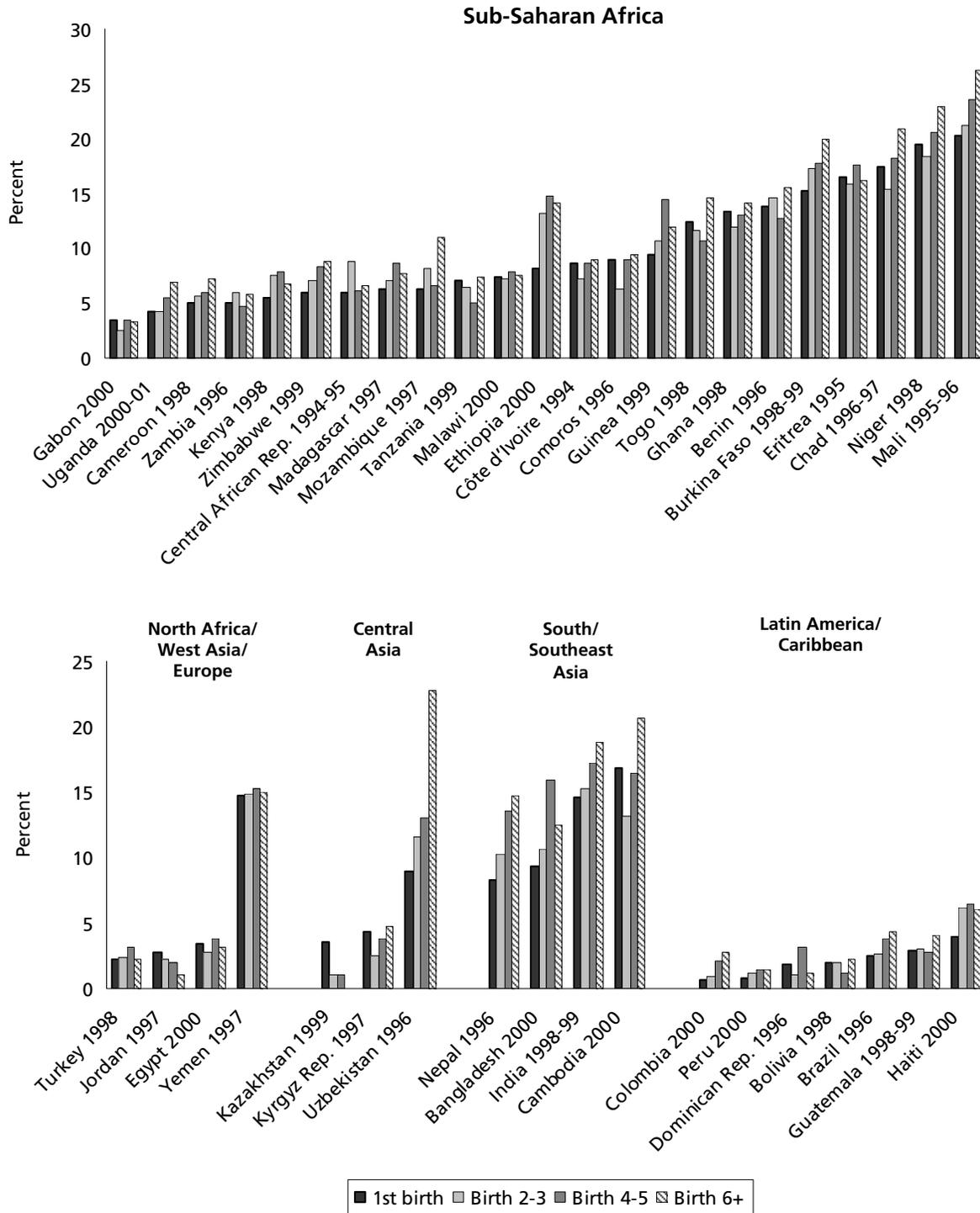
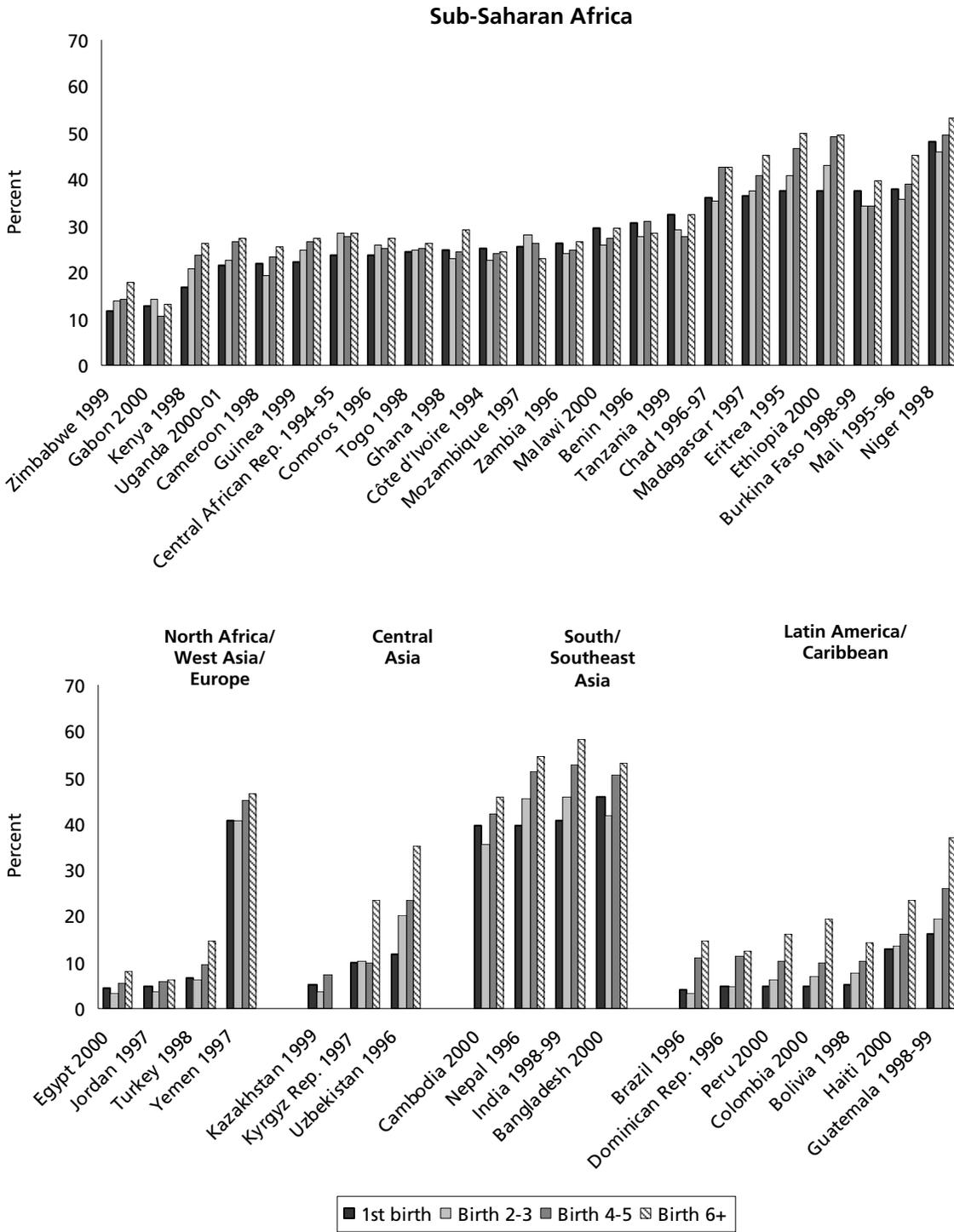


Figure 3.49  
**Levels of underweight among children age 0-35 months by birth order, Demographic and Health Surveys, 1994-2001**



### **Preceding Birth Interval**

The length of the birth interval provides not only a descriptive variable for undernutrition (Mozumder et al., 2000; Rafalimanana and Westoff, 2000; Sharmanov et al., 1997; Boerma and Bicego, 1992), but it also explains how other relationships operate. Short birth intervals have been found to be associated with low birth weight and with intrauterine growth retardation, both of which have major implications for child undernutrition. (Fikree and Berendes, 1994). In other studies, children of women who live in urban areas or have secondary or more education are less likely to be born after a short interval than children of women who live in rural areas or have lower levels of education (Rutstein, 2002). Both place of residence and level of education were reported earlier to be related to child undernutrition.

The length of the interval preceding each child's birth is derived from the birth history provided by the mother. Birth interval length is divided into four categories: first birth, less than 24 months, 24 to 47 months, and 48 months or longer (Table A.3.22 and Figures 3.50 through 3.52).

The pattern that emerges for all regions is that the highest rates of stunting are among children with birth intervals of less than 24 months, followed by intervals of 24 to 47 months. Four countries (Kenya, Uzbekistan, the Kyrgyz Republic, and Bolivia) are exceptions. In Kenya, the Kyrgyz Republic, and Bolivia the highest rate of stunting is among children with a birth interval of 24 to 47 months, and in Uzbekistan, the highest rate is among children with an interval of 48 months or longer. In Zambia, first births have the highest rate of stunting (Figure 3.50).

In sub-Saharan Africa, the lowest rate of stunting is typically among children born after an interval of 48 months or longer. Again, Kenya is the exception with a rate for the 48-month interval almost the same as that for first births; in Comoros and Zimbabwe, stunting is the lowest for first births. In the Latin America and Caribbean region, first births and children born after an interval of 48 months or longer have almost the same rate of stunting, except for Guatemala, where the rate of stunting is higher for first births. In the South/Southeast Asia region, Cambodia and Bangladesh have the lowest rates of stunting following an interval of 48 months. In Nepal and India, stunting rates are higher for children born after an interval of 49 months or longer than for first births. The North Africa/West Asia/Europe region has the lowest rates of stunting for children with intervals of 48 months or longer, except in Egypt, where the rate is almost the same in three of the four birth interval categories (Figure 3.50).

There are no discernible patterns in the level of wasting by the length of the preceding birth interval (Figure 3.51). The patterns for underweight by preceding birth interval are similar to those for stunting. In 17 of the 23 countries of sub-Saharan Africa, underweight is highest among children with the shortest birth interval (less than 24 months). Cameroon, Côte d'Ivoire, Guinea, Malawi, Tanzania, and Zambia are the exceptions (Figure 3.52).

In most countries in the other four regions, the highest rates of underweight are among children with birth intervals of less than 24 months. There are a few exceptions. Bolivia and Guatemala in Latin America and the Caribbean, the Kyrgyz Republic in Central Asia, and Nepal in South/Southeast Asia all have rates of underweight that are higher among children with a birth interval of 24 to 47 months than among those with an interval of less than 24 months. The countries in South/Southeast Asia and Yemen in North Africa/West Asia/Europe all have high levels of underweight; the patterns of underweight by birth interval are similar to those of countries in sub-Saharan Africa that have high levels of underweight (Figure 3.52).

Figure 3.50  
Levels of stunting among children age 0-35 months by length of preceding birth interval, Demographic and Health Surveys, 1994-2001

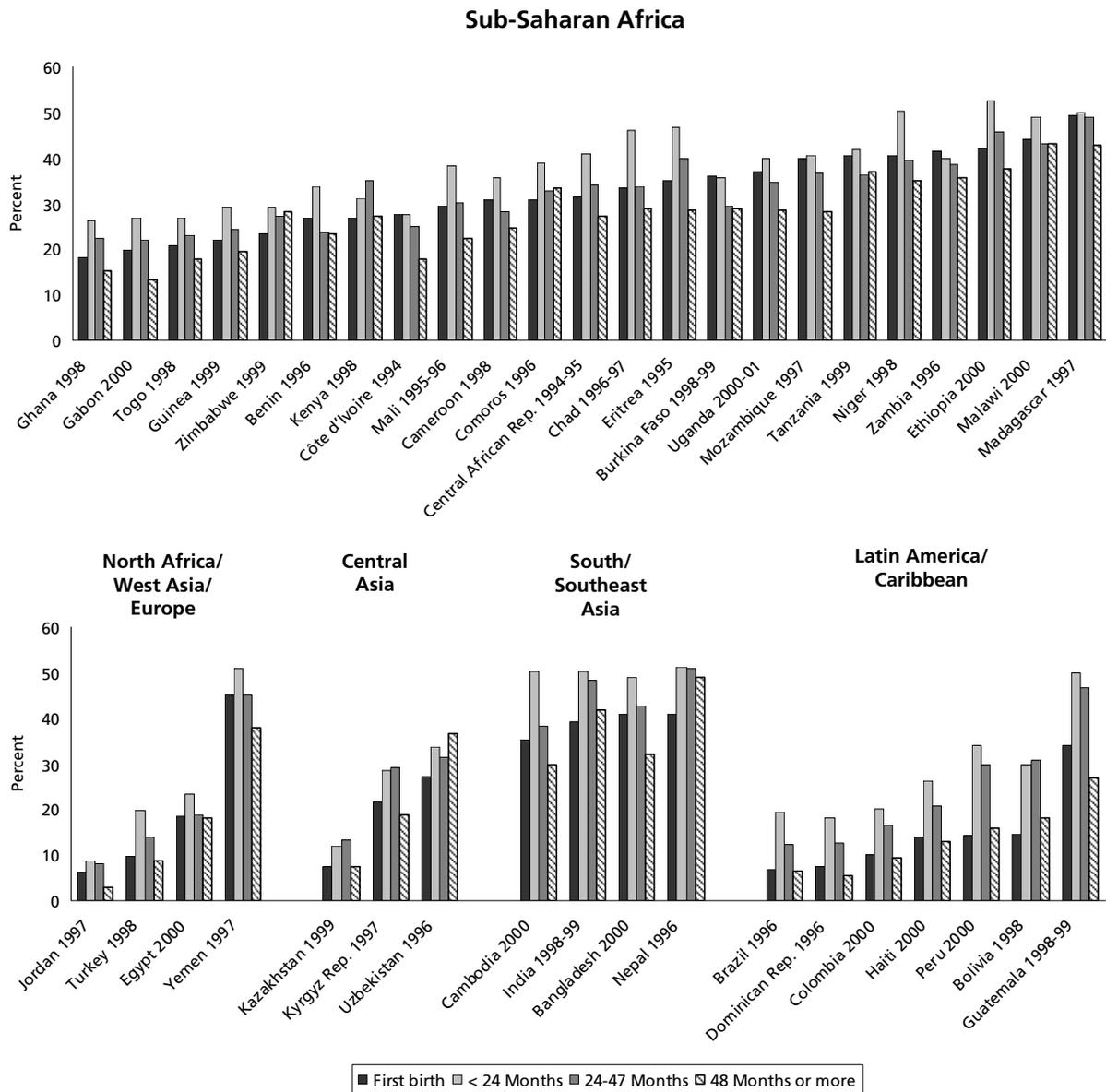


Figure 3.51  
Levels of wasting among children age 0-35 months by length of preceding birth interval, Demographic and Health Surveys, 1994-2001

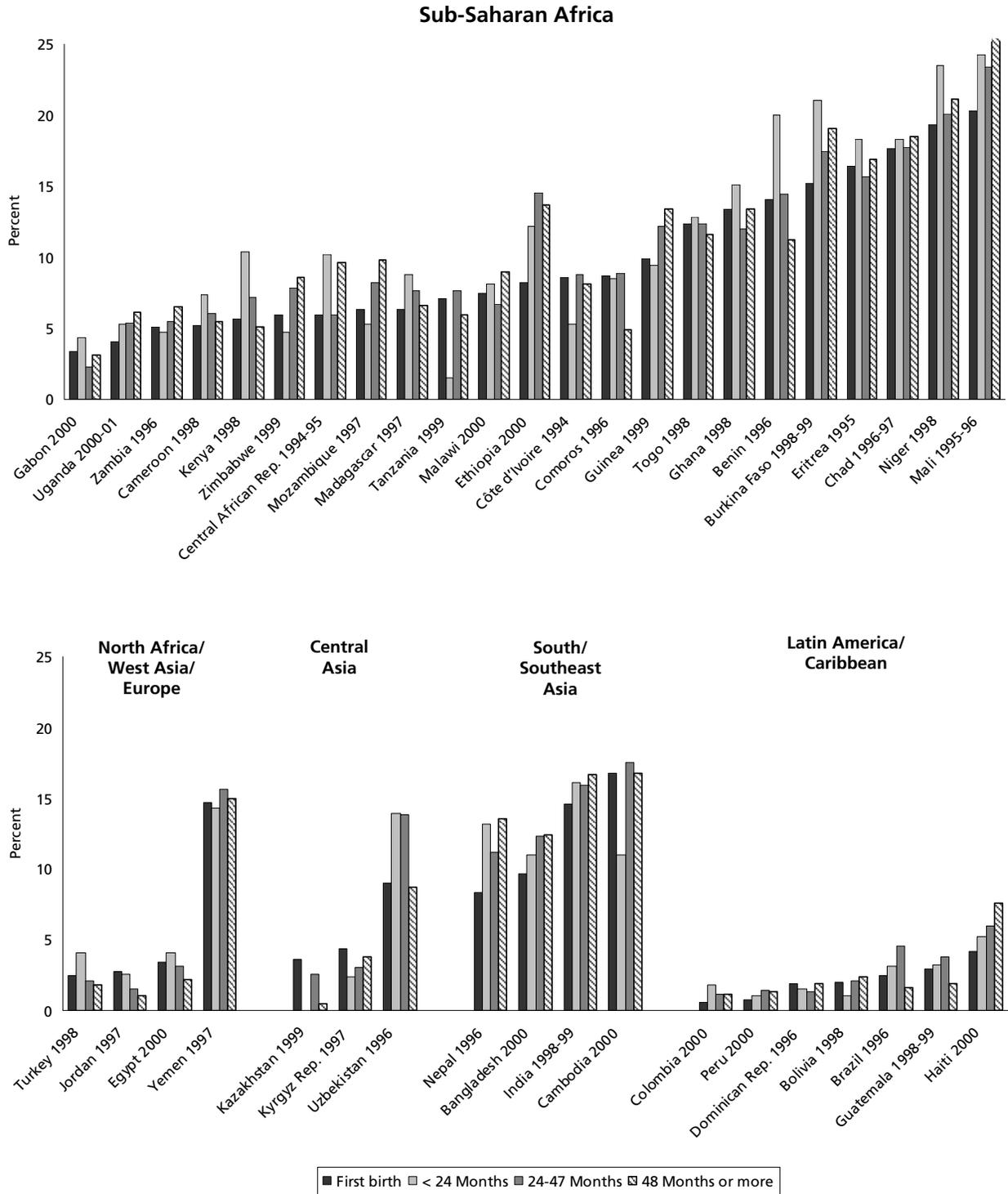
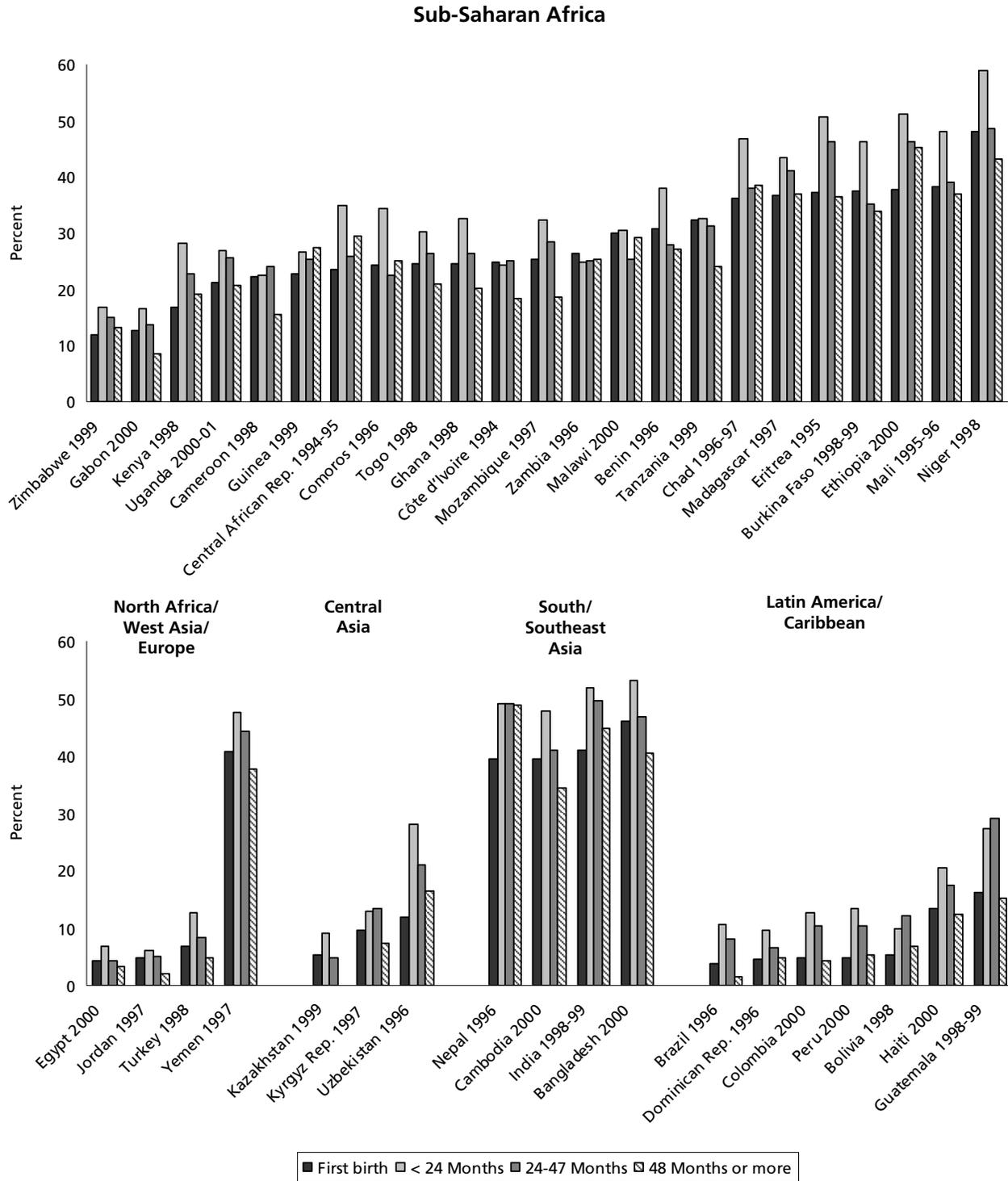


Figure 3.52  
 Levels of underweight among children age 0-35 months by length of preceding birth interval, Demographic and Health Surveys, 1994-2001



## **Vaccination History**

Universal immunization of children less than one year of age against the six vaccine-preventable childhood diseases (tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis, and measles) is one of the most cost-effective approaches to reducing child morbidity and mortality. To be fully immunized, a child should receive one dose of BCG (vaccination against tuberculosis) at birth, three doses each of DPT (diphtheria, pertussis, tetanus) and polio, and one dose of measles vaccine, although this vaccination schedule has been modified recently. Some countries recommend a second dose of measles vaccine after the first year. Nevertheless, for countries included in this study, a child who received one dose of measles vaccine is considered fully immunized for measles. Because it is recommended that children receive the complete schedule of vaccinations before 12 months of age, this report analyzes the vaccination status of children age 12-23 months.

## **Measles**

Measles is a severe disease with high case fatality rates in developing countries. The primary reason for the difference in clinical severity and case fatality between developed and developing countries is the poor nutritional status of children in developing countries. Undernutrition reduces the body's resistance to infections and adversely affects the immune system. Therefore, immunization against measles has proven to be very effective in reducing the incidence in many countries.

In sub-Saharan Africa, the prevalence of measles vaccination (Table A.3.23) runs from a low of 23 percent (Chad) to 87 percent (Zambia). Latin America and the Caribbean region has a spread ranging from 51 percent (Bolivia) to 89 percent (Brazil). Much higher rates are seen in Central Asia, with a high of 92 percent (Uzbekistan). South/Southeast Asia has lower rates, ranging from 54 percent (India) to 70 percent (Bangladesh). Yemen in the North Africa/West Asia/Europe region has the lowest rate of measles vaccination (47 percent), while in the same region, Egypt has the highest (97 percent) (Figure 3.53).

Figure 3.54 shows that in most countries, the rates of stunting are higher among children age 12-23 months who did not receive a measles vaccination than among those who did. In a few countries (Benin, Burkina Faso, Ethiopia, Togo, Uganda, and Jordan), there is little difference in stunting rates between children who were vaccinated and those who were not. Contrary to expectation, in Madagascar and Egypt, children with measles vaccinations have higher rates of stunting.

Figure 3.53  
**Percentage of children age 12-23 months with a measles vaccination, Demographic and Health Surveys, 1994-2001**

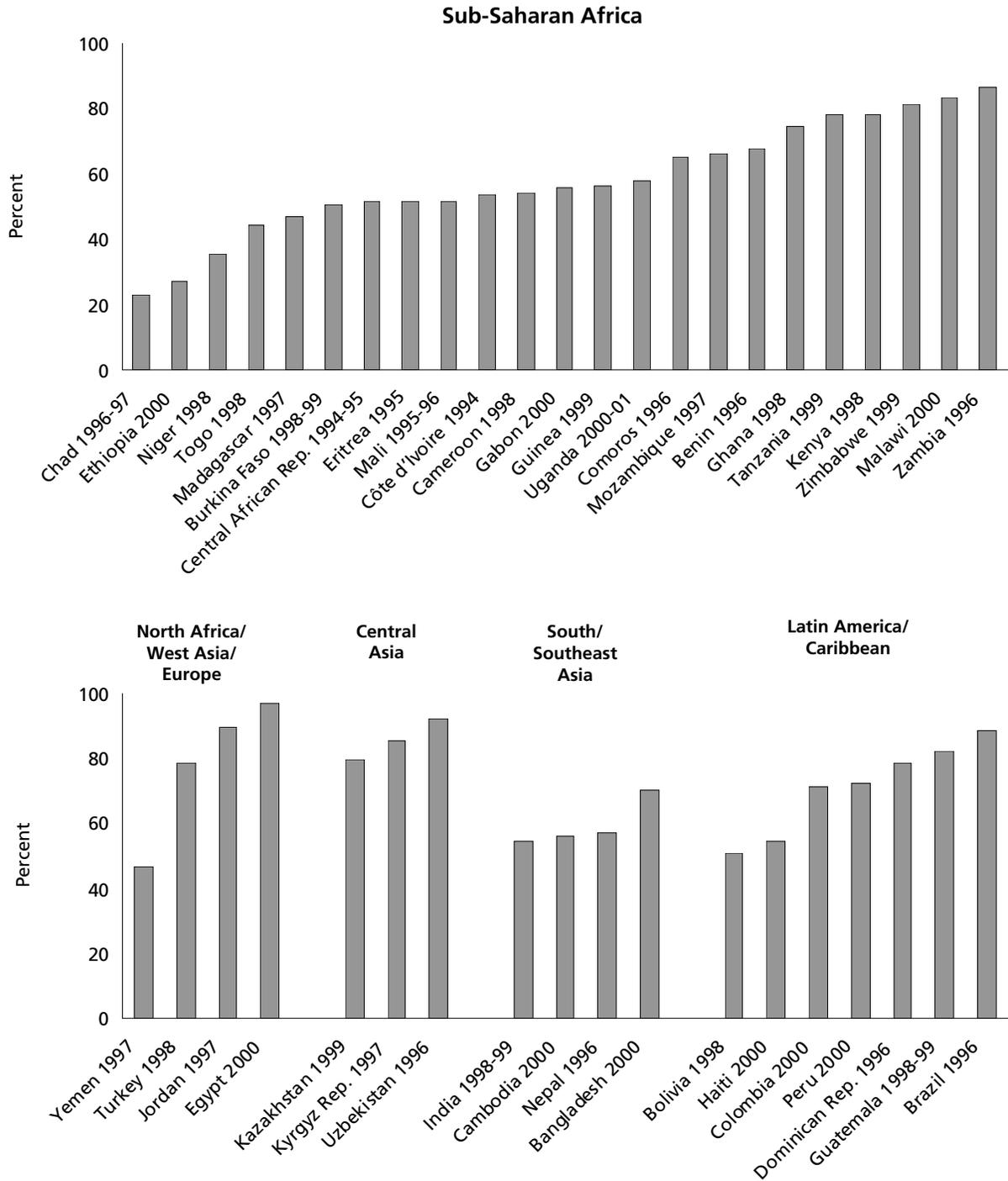


Figure 3.54  
**Levels of stunting among children age 0-35 months by measles vaccination status, Demographic and Health Surveys, 1994-2001**

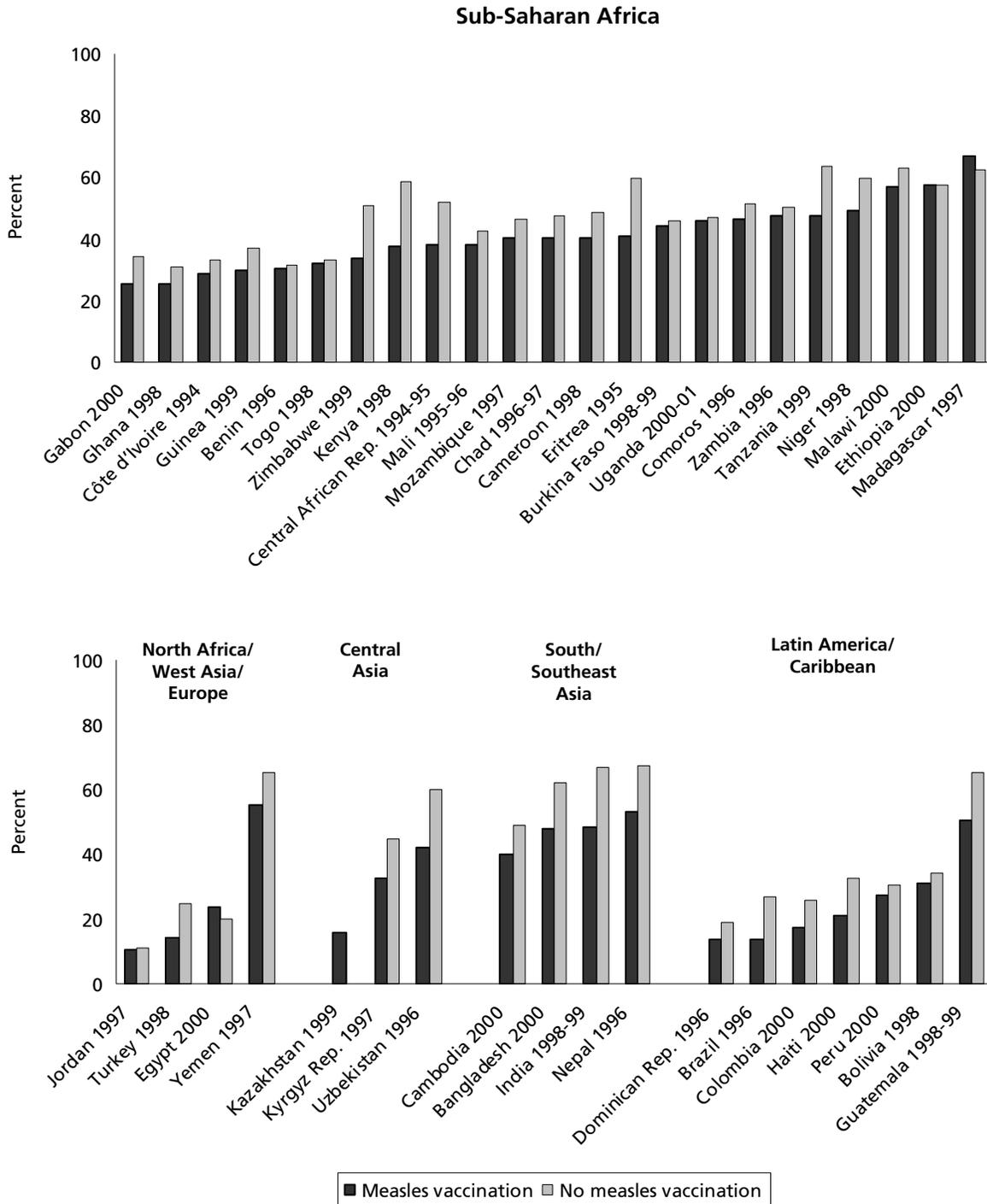
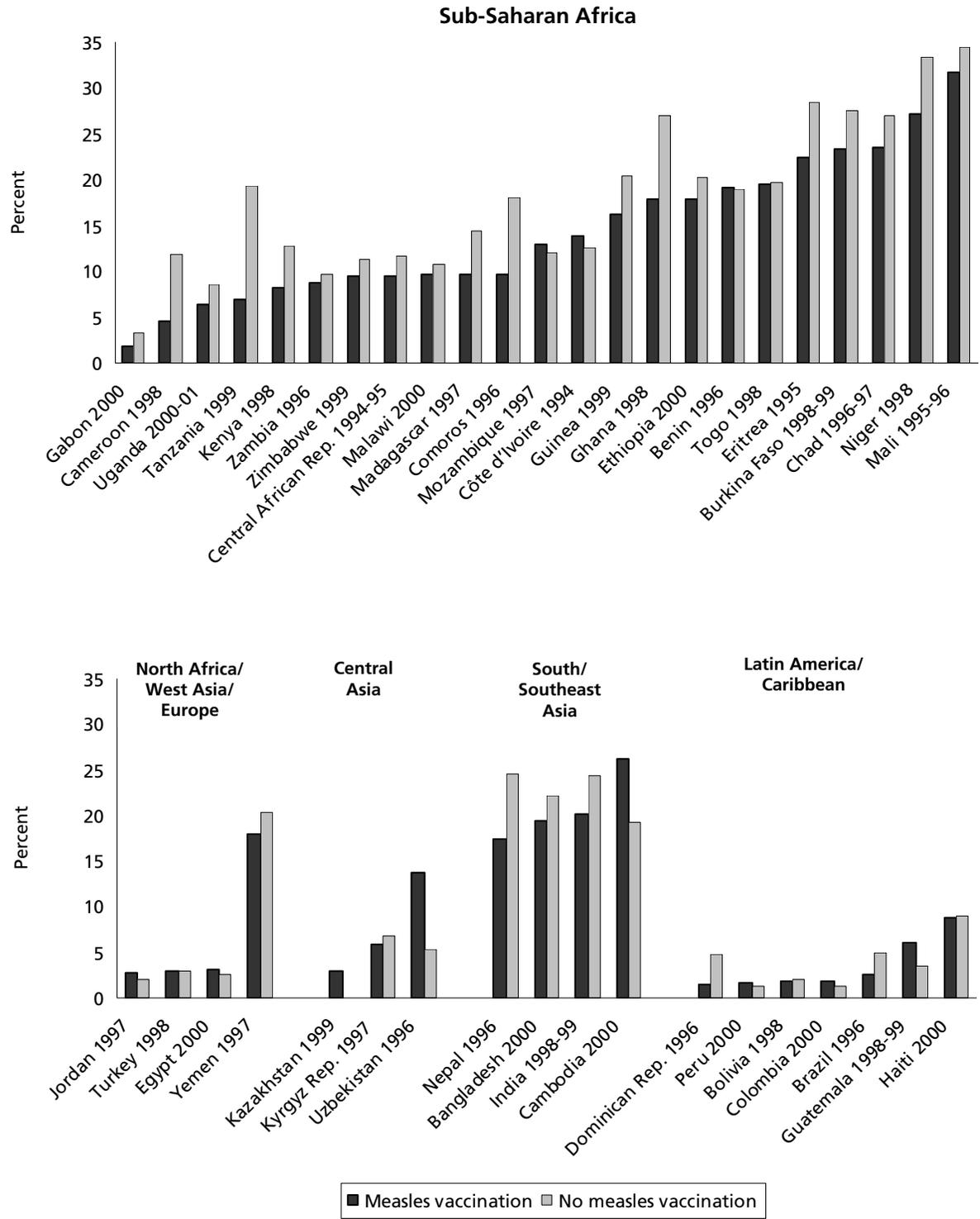


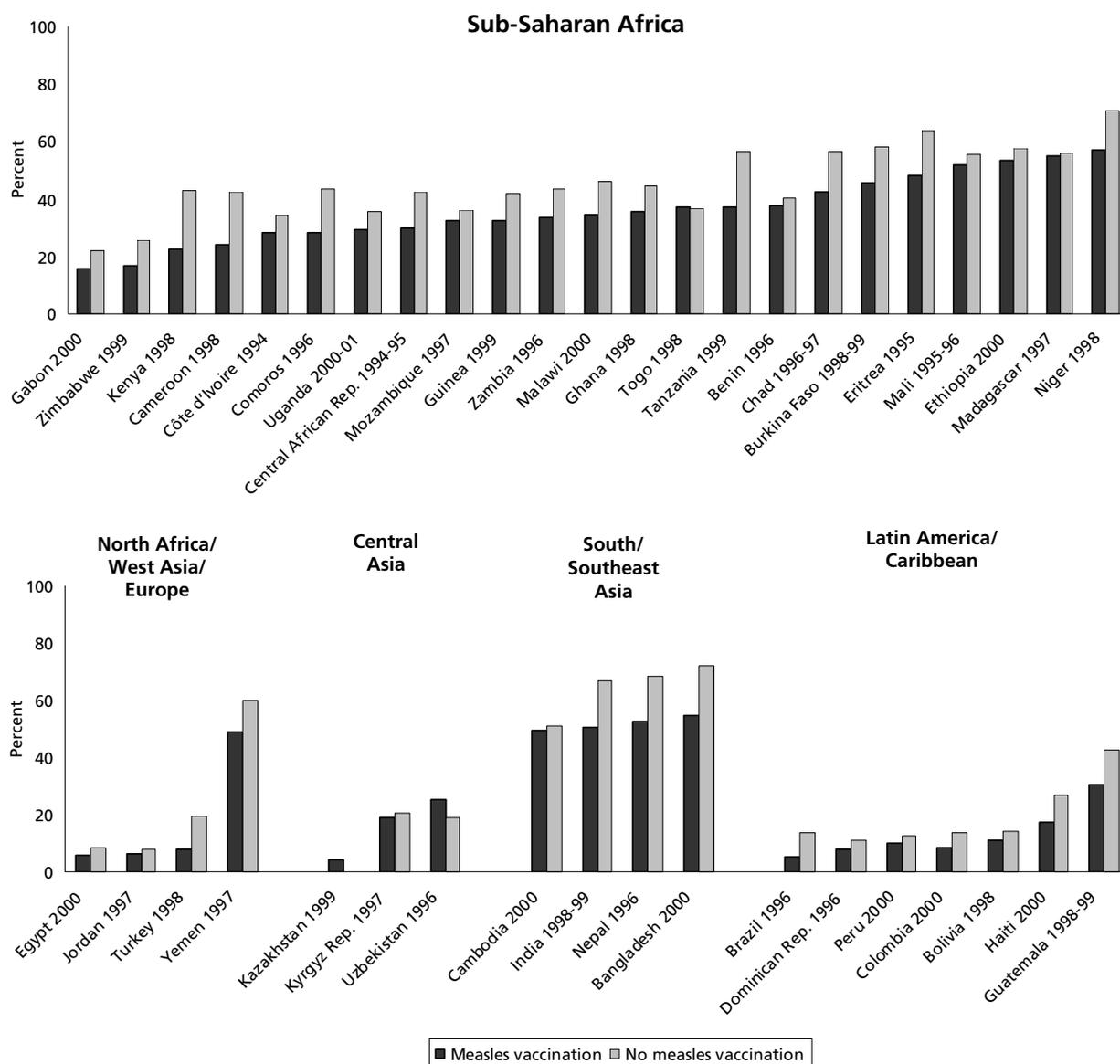
Figure 3.55  
**Levels of wasting among children age 0-35 months by measles vaccination status, Demographic and Health Surveys, 1994-2001**



Similar to stunting, the rates of wasting are generally higher among children age 12-23 months who did not receive a measles vaccination than among those who did. However, particularly puzzling are the higher wasting rates among vaccinated children in Mozambique and Côte d'Ivoire in sub-Saharan Africa, Guatemala in Latin America and the Caribbean, Uzbekistan in Central Asia, and Cambodia in South/Southeast Asia (Figure 3.55).

In most cases, underweight rates are higher among children age 12-23 months who have not been vaccinated against measles than among those who have (Figure 3.56).

**Figure 3.56**  
**Levels of underweight among children age 0-35 months by measles vaccination status, Demographic and Health Surveys, 1994-2001**



### **Other Vaccinations**

Exploring vaccination status further to see whether other vaccinations and no vaccinations make a difference in undernutrition rates, the analysis shows that the lowest rates of undernutrition are still among children who have had a measles vaccination (Table A.3.24). The highest rates are generally among those who have had no vaccinations. In the sub-Saharan region, rates of undernutrition among children with only other vaccinations tend to be lower than or equal to rates among children with no vaccinations (Figures 3.57 through 3.59).

Sample size must be scrutinized closely when analyzing vaccination data. In sub-Saharan Africa, there are six countries with less than 50 cases with no vaccinations. In North Africa/West Asia/Europe, three of the four countries have less than 50 cases of no vaccinations; hence the results of only one country (Yemen) can be discussed. In Yemen, children with a measles vaccination still have the lowest rates of stunting and underweight, but those with no vaccinations have the lowest rates of wasting. In Central Asia, two of the three countries have no cases in which children received no vaccinations; the remaining country (Kazakhstan) has less than 10 cases. Therefore, most children in Central Asia have completed vaccinations (Table A.3.24).

Five of the seven countries in the Latin America and Caribbean region have less than 50 cases with no vaccinations; therefore, only other vaccinations can be compared with measles vaccinations in these countries. In most cases, stunting and underweight rates are higher among children with only other vaccinations than among those with measles vaccinations (Figures 3.57 and 3.59, respectively). Wasting rates are generally low in this region; only Haiti has a high enough level to determine that there is no relationship between vaccination status and wasting rates in that country (Figure 3.58). In Guatemala, wasting rates are higher among children with a measles vaccination than among those with only other vaccinations. Uzbekistan in Central Asia and Cambodia in South/Southeast Asia stand out as having the highest rates of wasting among children with a measles vaccination (Figure 3.58).

Figure 3.57  
**Levels of stunting among children age 0-35 months by vaccination status, Demographic and Health Surveys, 1994-2001**

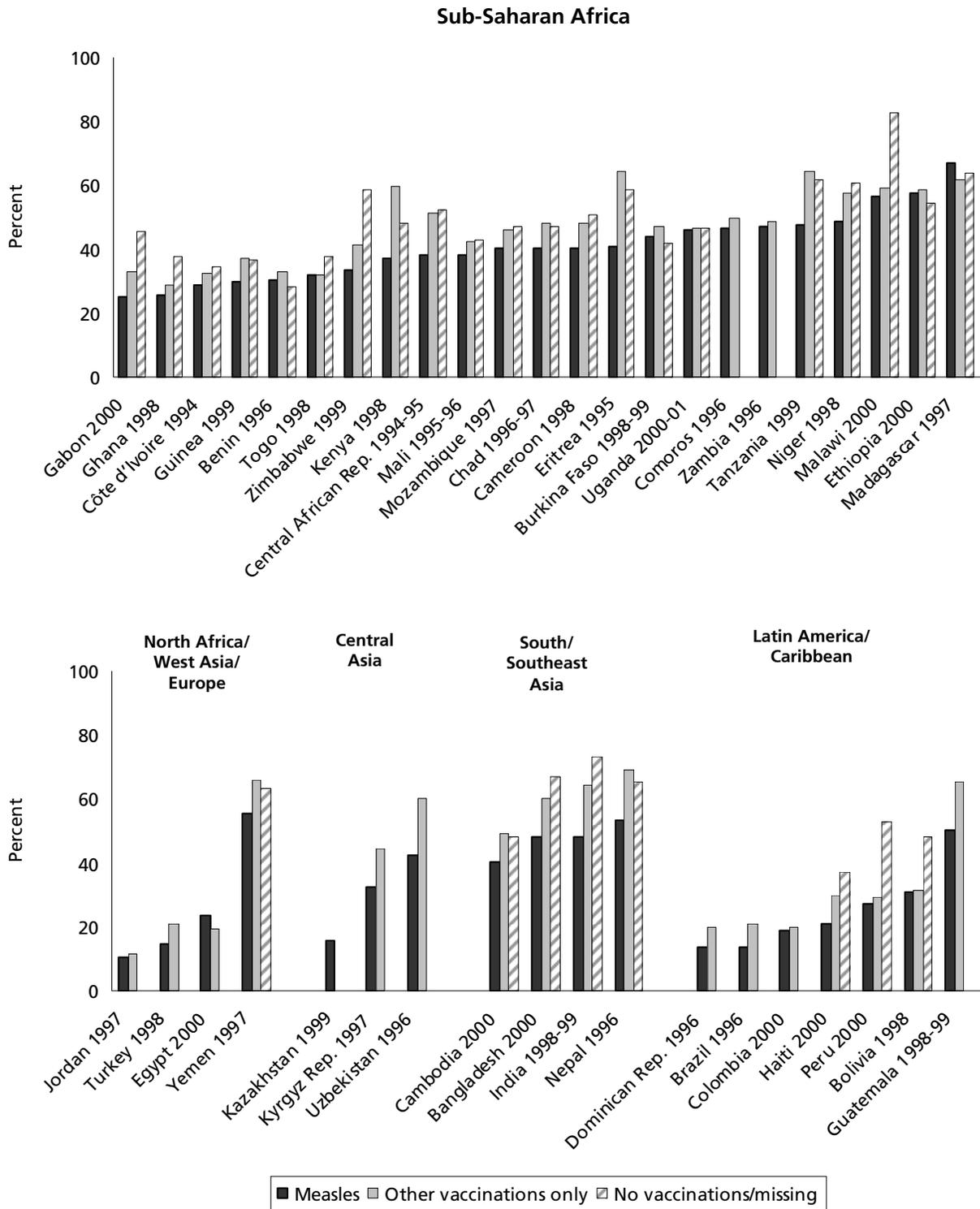


Figure 3.58  
**Levels of wasting among children age 0-35 months by vaccination status, Demographic and Health Surveys, 1994-2001**

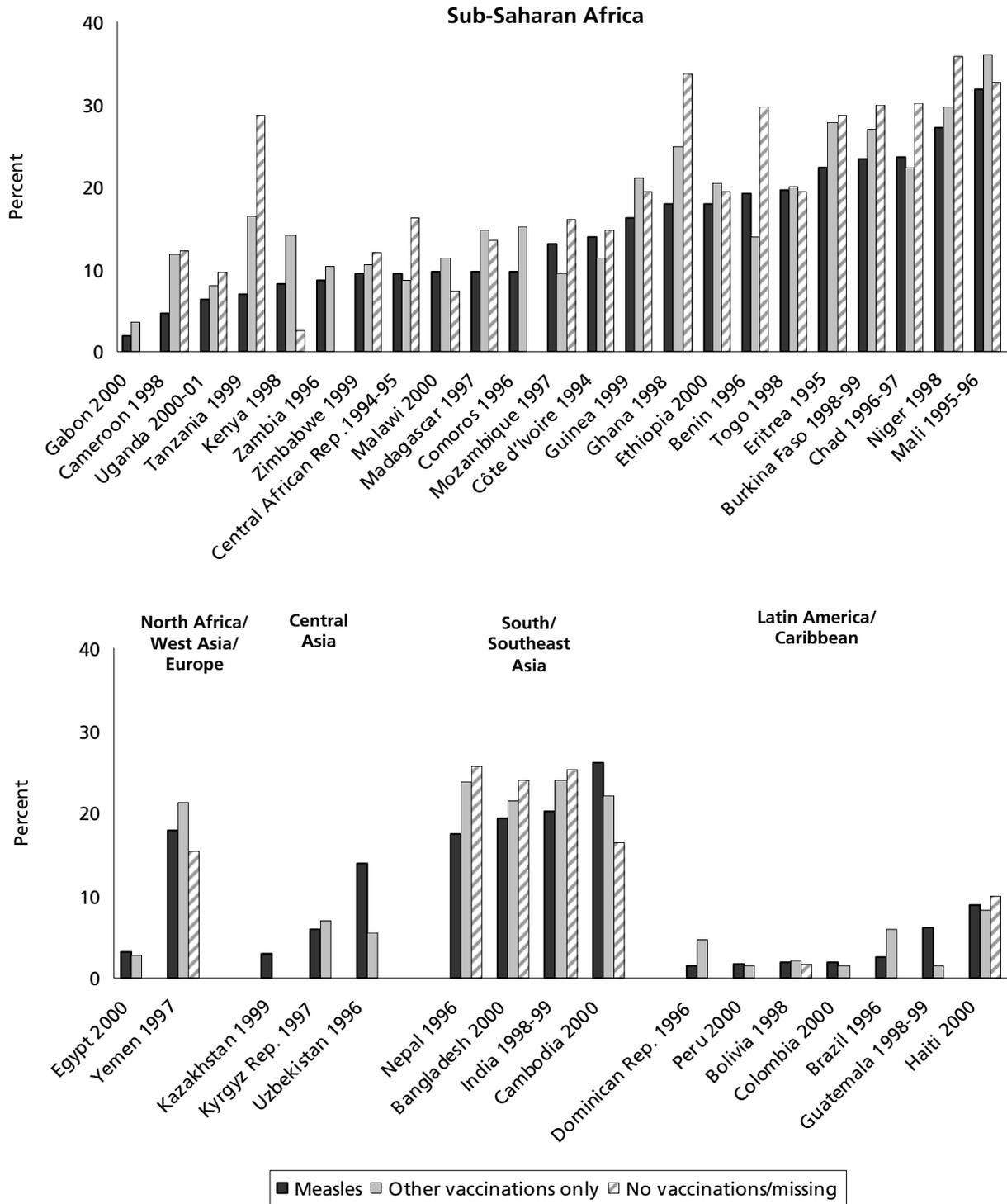
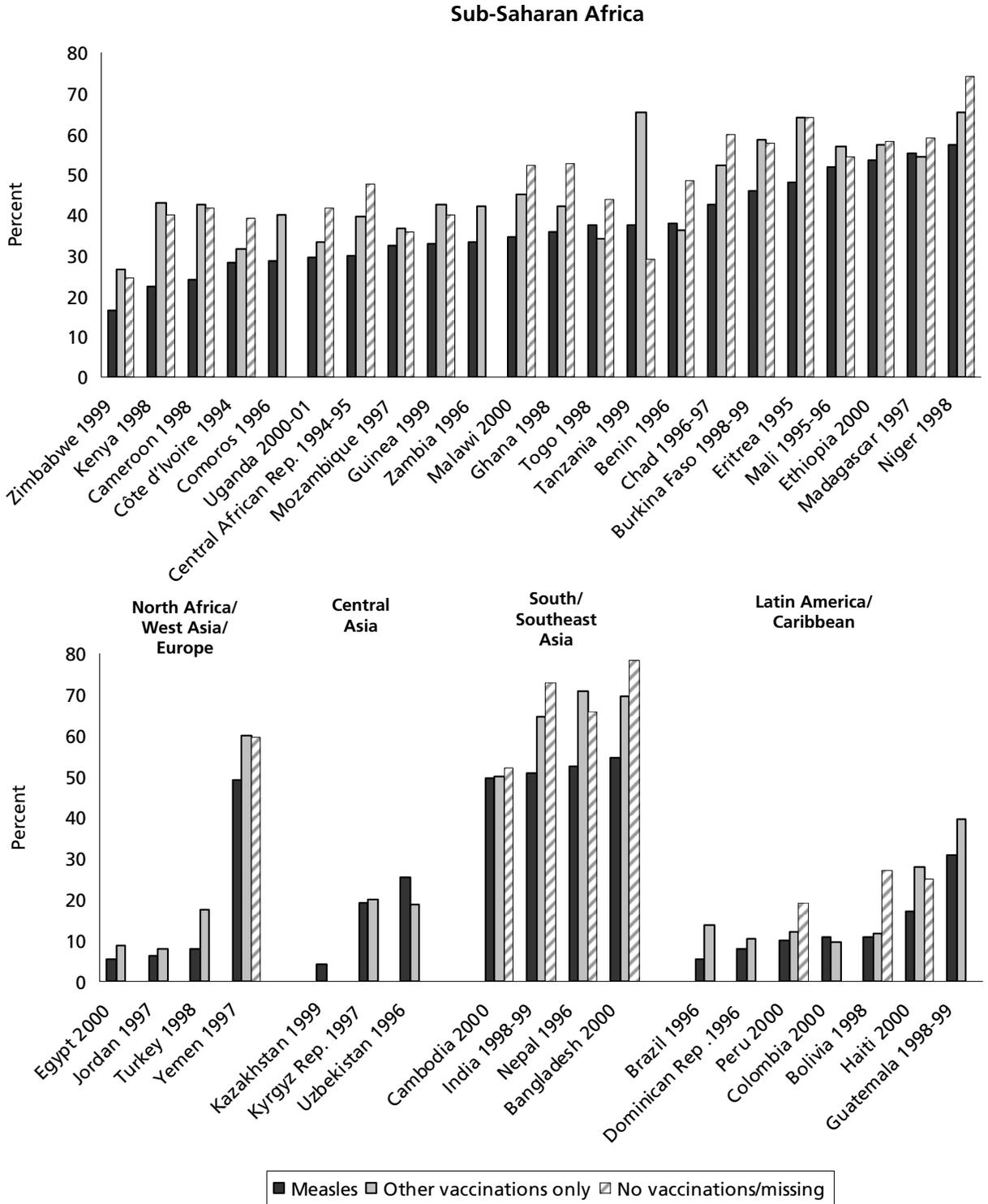


Figure 3.59  
**Levels of underweight among children age 0-35 months by vaccination status, Demographic and Health Surveys, 1994-2001**



## Feeding Practices

Infant feeding practices are important to the nutritional status of children. It is recommended that infants age 0–6 months are breastfed exclusively, followed by the timely introduction of complementary foods between the ages of 6 and 9 months.<sup>2</sup> The use of bottles for feeding infants is not recommended because poor hygienic practices can lead to the introduction of pathogens. Breastfeeding should continue into the second year of life (WHO, 2003). This report does not analyze child nutritional status by infant feeding practices. Data on infant feeding practices are based on the past 24 hours while nutritional status is based on a child's experience over time. A comparison of the two would be better served by using longitudinal data. Nevertheless, an examination of infant feeding practices in the countries included in this report provides useful information for analysis of the nutritional status of children. There are substantial variations in infant feeding practices across countries and regions, and discussion of these variations is important.

Exclusive breastfeeding in this report is measured based on the percentage of youngest children (under 6 months of age) who have been fed only breast milk in the 24 hours preceding the survey. Breastfeeding status of children under six months of age is shown in Table A.3.25. Rates of exclusive breastfeeding in sub-Saharan Africa range from less than 1 percent in Niger to over 63 percent in Uganda (Figure 3.60).

Countries in Latin America and the Caribbean have higher rates of exclusive breastfeeding, ranging from 18 percent in the Dominican Republic to 67 percent in Peru. In South/Southeast Asia, the proportion of exclusively breastfed children ranges from 11 percent in Cambodia to 75 percent in Nepal. Exclusive breastfeeding data are available for only one country in Central Asia, Kazakhstan, where the figure is 36 percent. In North Africa/West Asia/Europe, Yemen has no data on exclusive breastfeeding, and Egypt has the highest rate for the region, 64 percent (Figure 3.60).

Bottle-feeding of children less than six months of age varies across countries and regions. In sub-Saharan Africa, six countries have bottle-feeding rates of more than 10 percent, with a high of 37 percent in Gabon. In Latin America and the Caribbean, rates of bottle-feeding reach almost 60 percent for breastfed infants in the Dominican Republic and 87 percent among nonbreastfed infants in Brazil (Table A.3.25).

Table A.3.26 shows current breastfeeding status for infants age 6–9 months. At this age, children are expected to begin eating solid (complementary) foods in addition to breast milk. In sub-Saharan Africa (Figure 3.61), timely complementary feeding of infants ranges from 28 percent in Guinea to more than 90 percent in the Central African Republic, Malawi, Zambia, and Zimbabwe. (In many of these countries, rates of complementary feeding are already high among children under six months of age.) In Latin America and the Caribbean, timely complementary feeding ranges from 31 percent in Brazil to 76 percent in Peru. North Africa/West Asia/Europe has moderate rates of complementary feeding of children age 6–9 months, ranging from 55 to 64 percent. In South/Southeast Asia, India has a low rate of 34 percent, but in the three other countries, it ranges from 59 percent in Bangladesh to 72 percent in Cambodia. Table A.3.26 shows that there are significant proportions of children still being exclusively breastfed or receiving breast milk and plain water only at age 6–9 months, when complementary feeding is considered essential to provide adequate nutrition.

---

<sup>2</sup> Since the initial preparation of this report, recommendations for complementary feeding have been greatly expanded (PAHO, 2003, WHO, 2005). Comparative DHS data on the new complementary feeding indicators can be found in the Infant and Young Child Feeding Update (Mukuria et al., 2006).

Figure 3.60  
**Exclusive Breastfeeding status of children under 6 months, Demographic and Health Surveys, 1994-2001**

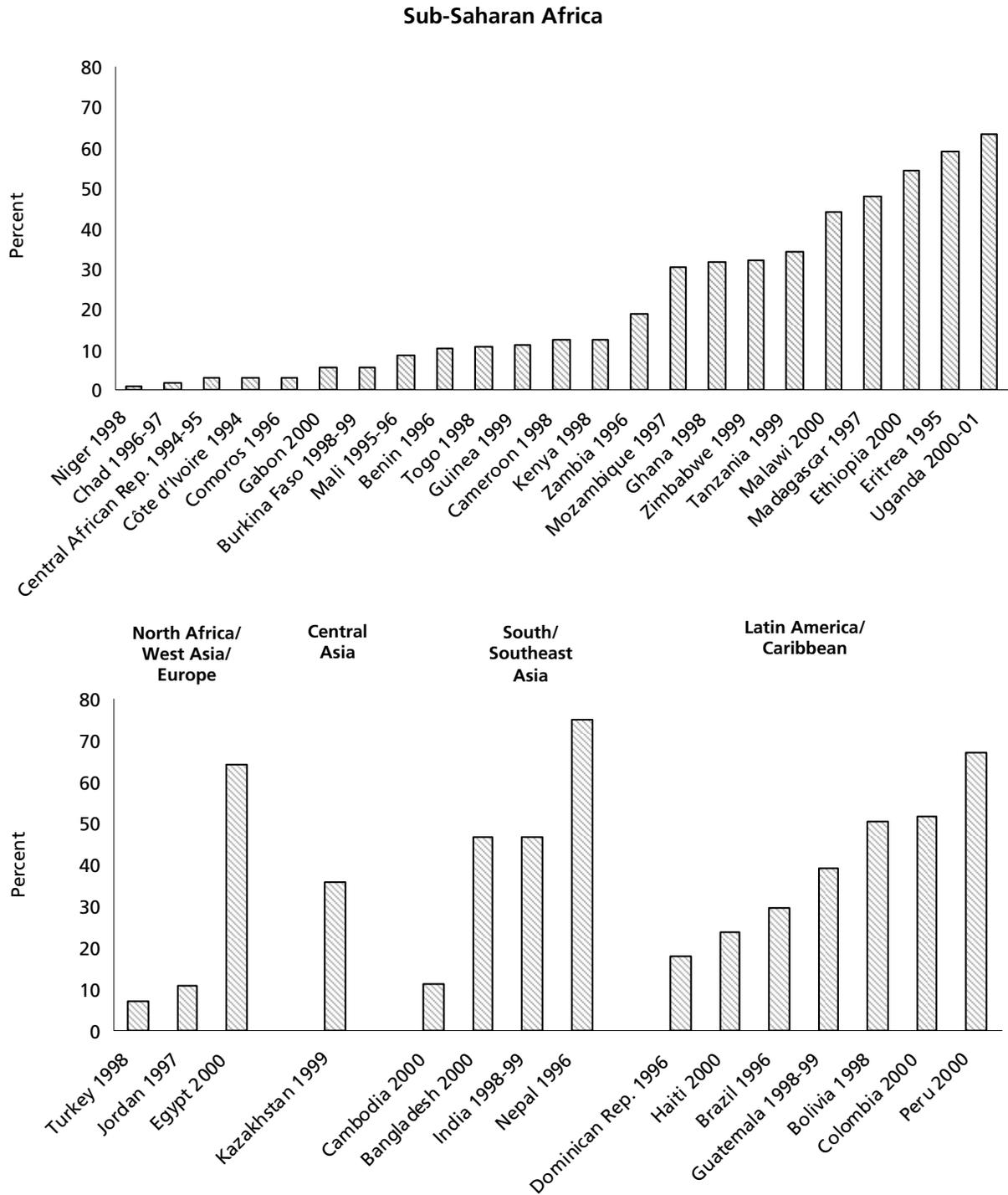
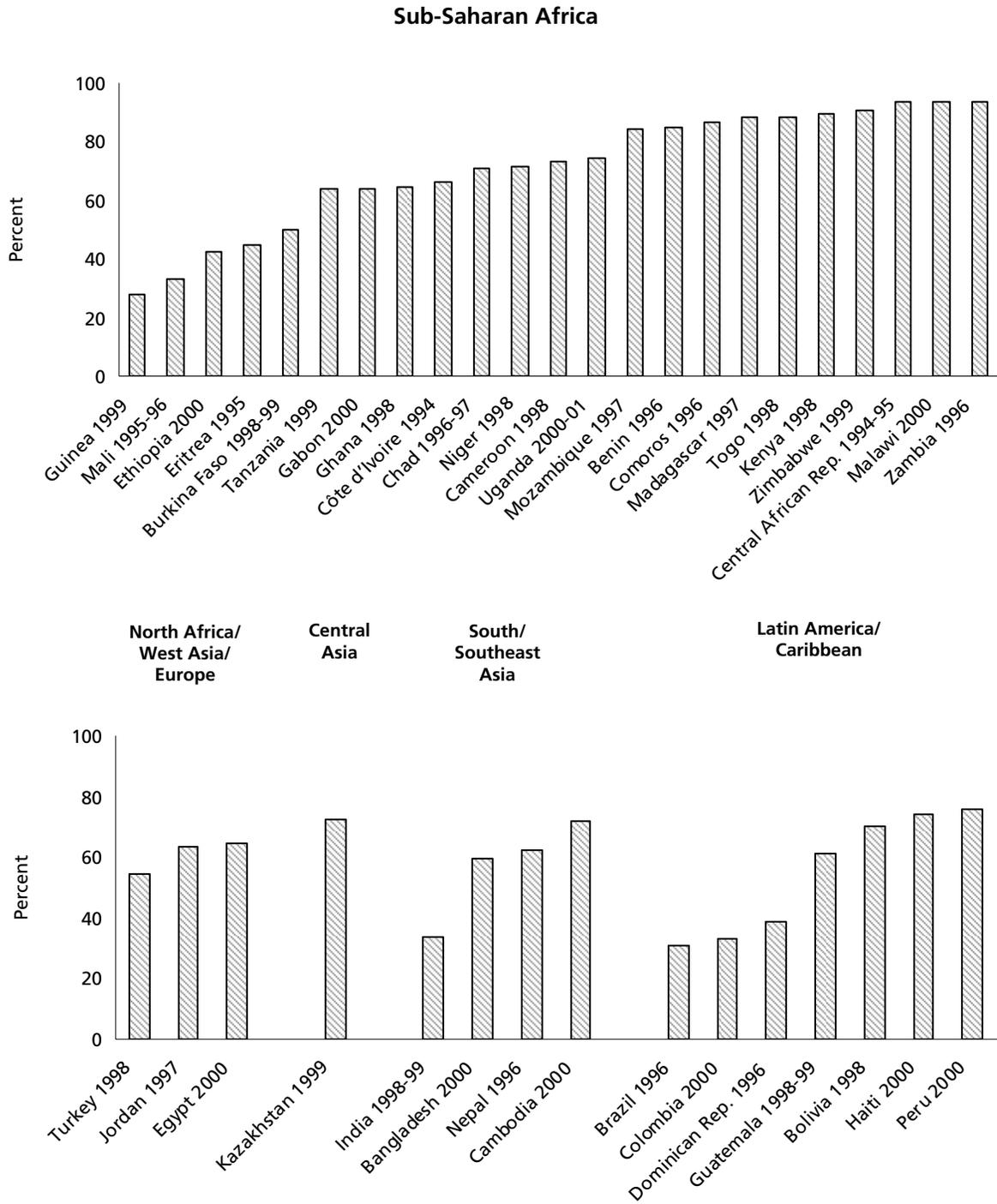


Figure 3.61  
**Complementary feeding status of children age 6-9 months, Demographic and Health Surveys, 1994-2001**

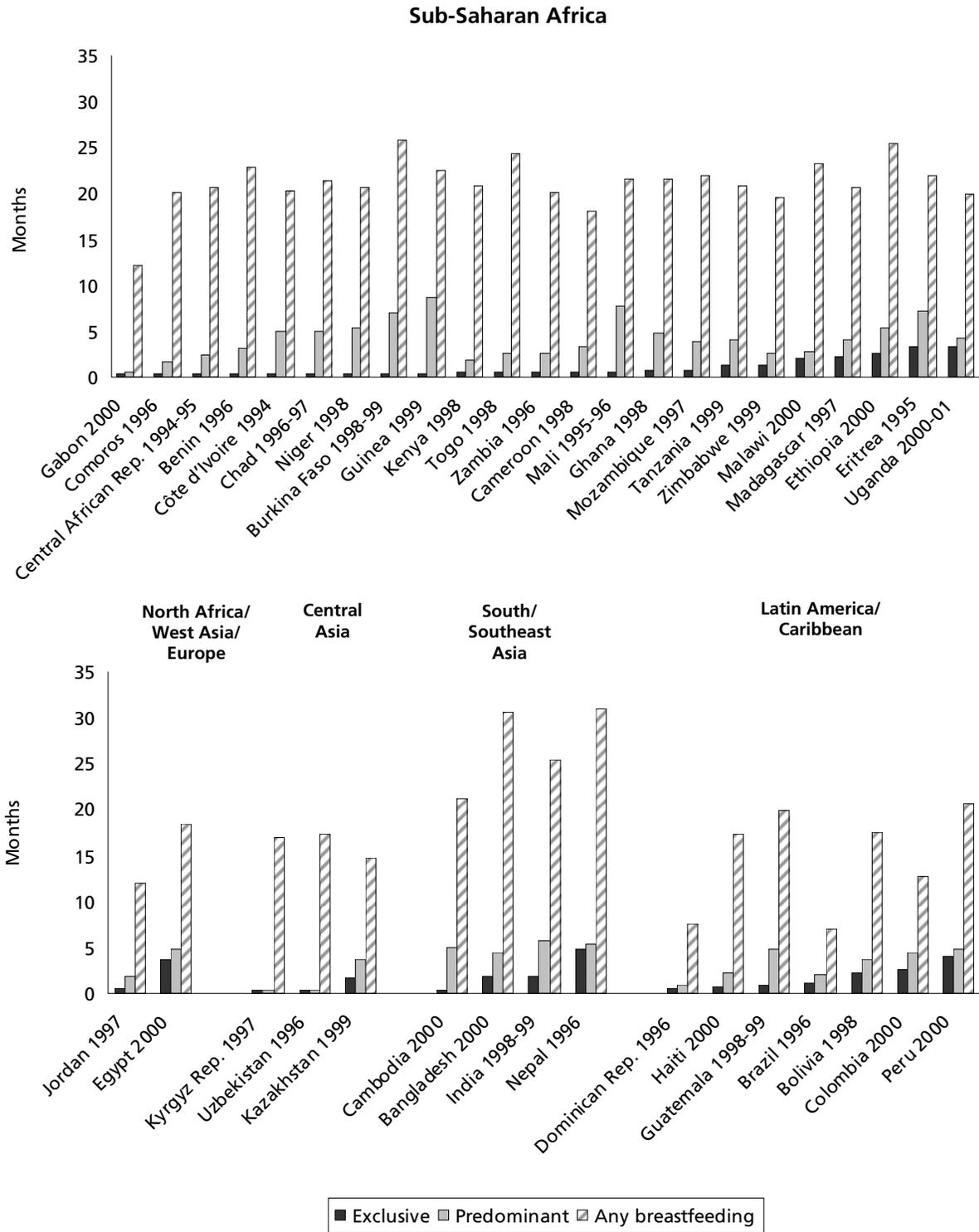


WHO recommends that breastfeeding should continue through the second year of life. Table A.3.27 shows the median duration of any breastfeeding, exclusive breastfeeding, and predominant breastfeeding among children born in the three years preceding the survey. DHS calculates the median duration of breastfeeding from current breastfeeding status data. For each month of age, the percentage of children who are breastfeeding is derived by dividing the number of children breastfeeding by the total number of children born the same number of months ago. The median is derived (usually through interpolation) by identifying the age at which 50 percent of the sample children are no longer breastfeeding. This method is preferred over mothers' reports of breastfeeding duration among fully weaned children because of biases in recall (Haggerty and Rutstein, 1999).

In sub-Saharan Africa, the median duration of any breastfeeding ranges from 12 months in Gabon to 26 months in Burkina Faso and Ethiopia. In North Africa/West Asia/Europe, it ranges from 12 months in Jordan and Turkey to 18 months in Yemen and Egypt. Among all the countries surveyed, Brazil (7 months) and the Dominican Republic (8 months) in Latin America and the Caribbean have the shortest median duration of any breastfeeding. Central Asia has a median duration of about 16 months. In South/Southeast Asia, the median duration of breastfeeding ranges from 21 months in Cambodia to 31 months in Bangladesh and Nepal (Figure 3.62 and Table A.3.27).

The median duration of predominant breastfeeding (breast milk and other nonmilk liquids) is longer than that of exclusive breastfeeding in most countries. In three countries (Yemen, the Kyrgyz Republic, and Uzbekistan), the median durations of predominant and exclusive breastfeeding are the same (0.4 month). The longest median duration of exclusive breastfeeding is found in Nepal (4.7 months). Short median durations of exclusive breastfeeding (less than 1 month) are reported for 16 of 23 countries in sub-Saharan Africa, 3 of 4 countries in North Africa/West Asia/Europe, 2 of 3 countries in Central Asia, 1 of 4 countries in South/Southeast Asia, and 3 of 7 countries in Latin America and the Caribbean (Figure 3.62 and Table A.3.27).

Figure 3.62  
**Median duration of exclusive breastfeeding, predominant breastfeeding, and any breastfeeding, Demographic and Health Surveys, 1994-2001**



### 3.4.3.3 Immediate Influences

#### Recent Illnesses

The interaction of undernutrition and infection is the leading cause of morbidity and mortality in most developing countries. In a vicious cycle, infections make undernutrition worse and poor nutrition increases the susceptibility to and severity of infectious diseases. Acute respiratory infection (ARI) and diarrhea are the most prevalent infections in the developing world.

#### Acute Respiratory Infection

ARI is one of the leading causes of childhood morbidity and mortality in the developing world. Acute lower respiratory infections (primarily pneumonia) are the cause of a significant proportion (19 percent) of infant and childhood deaths (WHO, 2005). Programs for the early identification and antibiotic treatment of pneumonia are being implemented in many countries. To estimate the proportion of children who show symptoms consistent with ARI, DHS surveys asked mothers the following questions:

“Has (NAME) had an illness with a cough at any time in the last two weeks?”

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

Table A.3.28 shows the prevalence of ARI in the two weeks preceding the survey among children age 4-23 months by nutritional status.

In sub-Saharan Africa, the prevalence of ARI ranges from 6 percent in Niger to 21 percent in the Central African Republic. In North Africa/West Asia/Europe, the range is relatively small—from 7 percent in Jordan to 12 percent in Yemen. Countries in Central Asia have a very low prevalence of ARI, from 1 percent in Uzbekistan to 4 percent in the Kyrgyz Republic. In South/Southeast Asia, the prevalence ranges from 13 percent (Cambodia) to 20 percent (Nepal). In Latin America and the Caribbean, the lowest rate of ARI reported is in Peru (15 percent), and the highest rate is in Haiti (25 percent).

Figures 3.63 through 3.65 show the prevalence of ARI by nutritional status. There is not as much elevation in ARI rates due to undernutrition as might be expected. In most countries, ARI rates for children that are stunted and those that are not are about the same or slightly higher or lower. There are no clear regional differences. The illness actually consists of lower respiratory infection, which includes pneumonia and poses a serious public health risk, and upper respiratory infection, which is common and poses less of a risk to children (Mishra et al., 2005). It has been suggested that the way ARI is assessed in DHS surveys may not be sensitive enough to distinguish between upper and lower respiratory infections, and this may account for the lack of a clear relationship between nutritional status and ARI.

Figure 3.63  
**Prevalence of ARI among children age 4-23 months by stunting, Demographic and Health Surveys, 1994-2001**

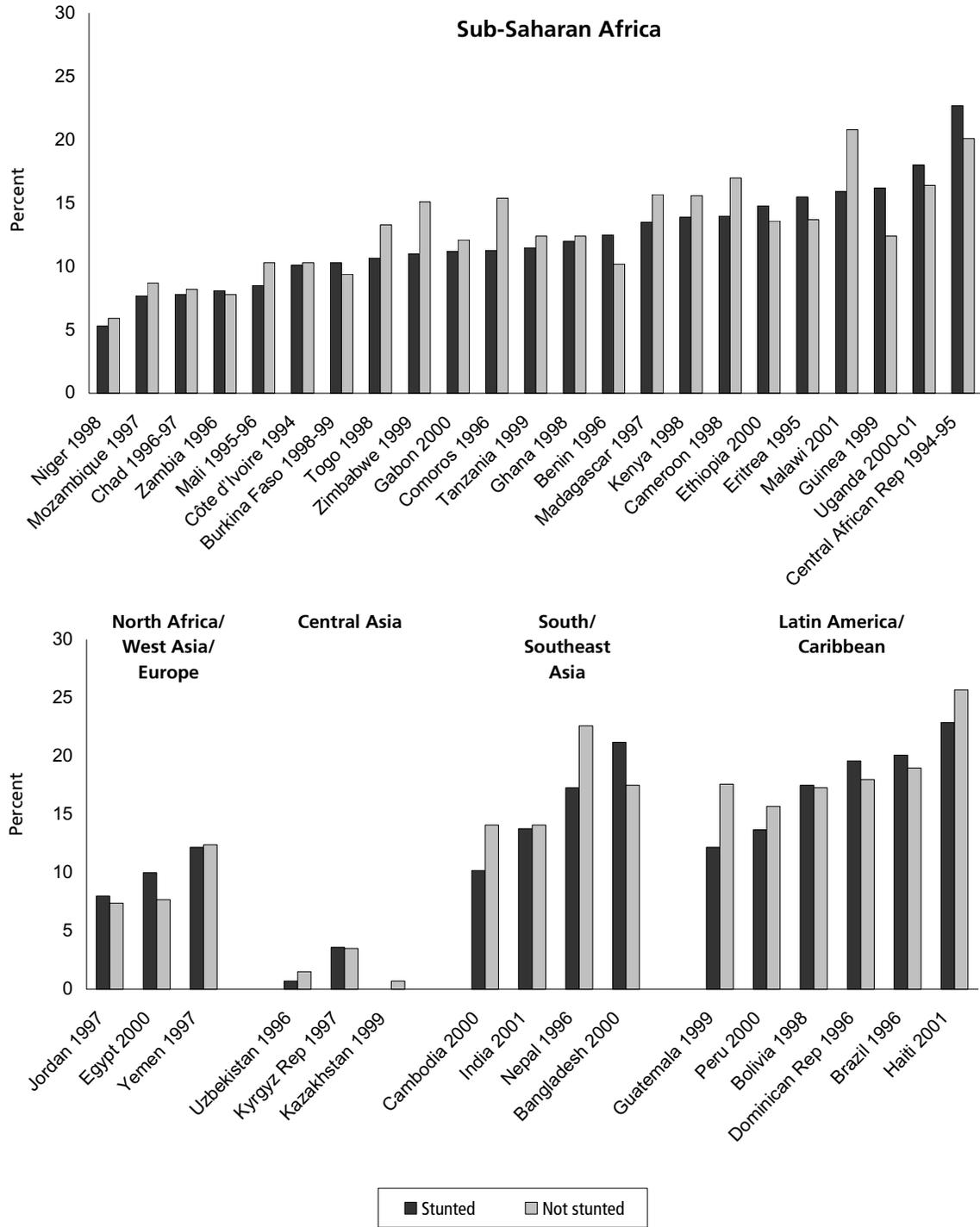


Figure 3.64  
**Prevalence of ARI among children age 4-23 months by wasting, Demographic and Health Surveys, 1994-2001**

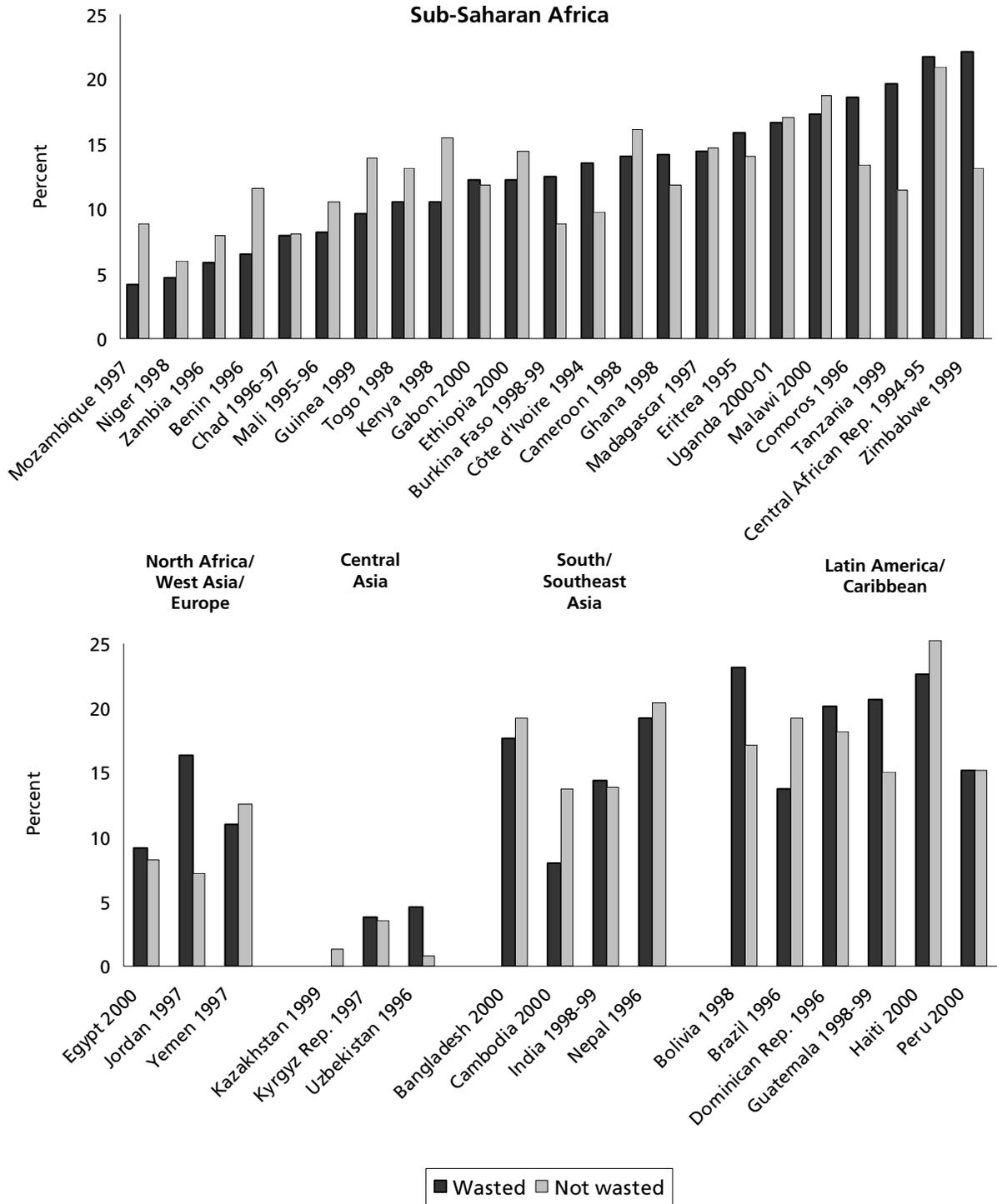
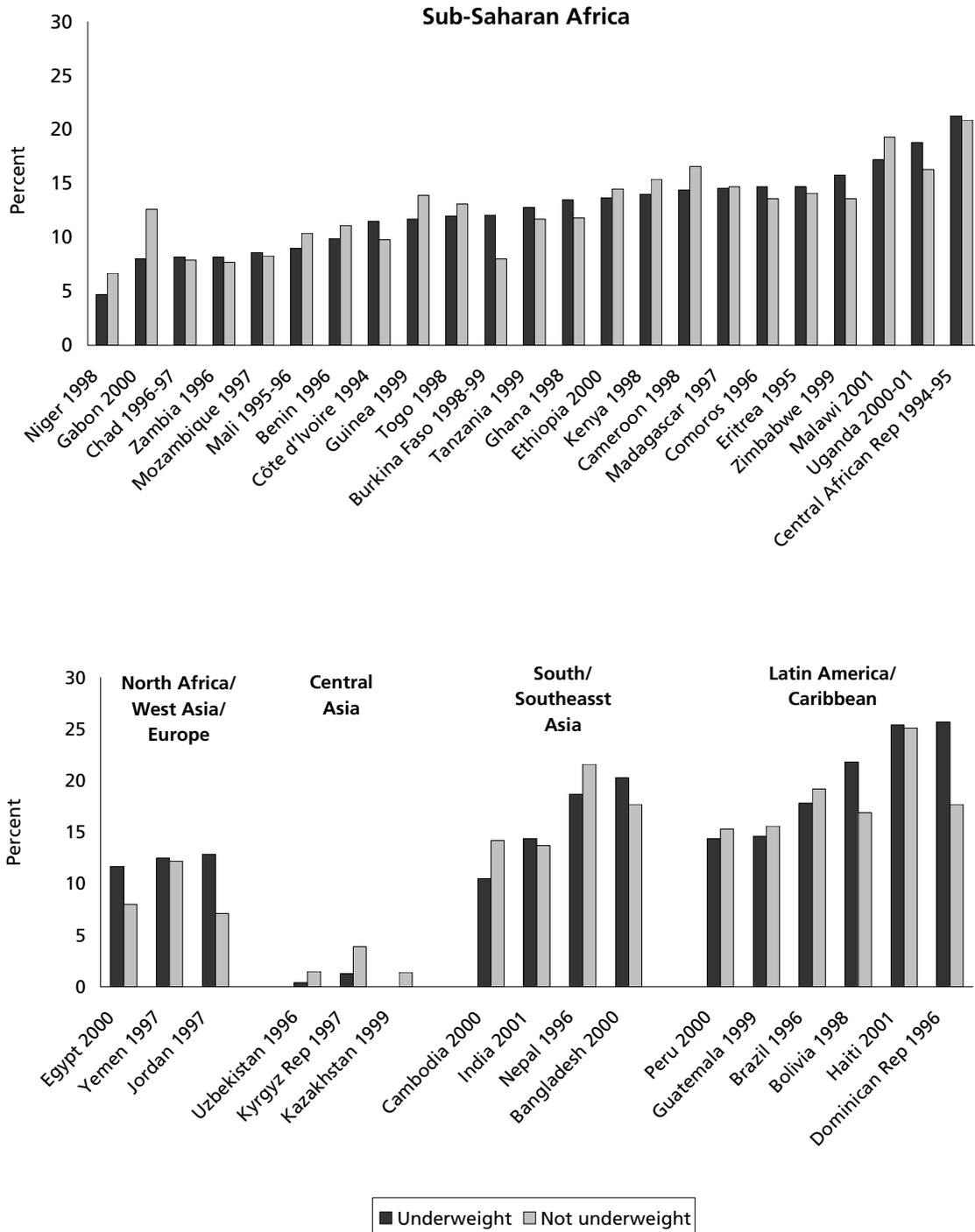


Figure 3.65  
**Prevalence of ARI among children age 4-23 months by underweight, Demographic and Health Surveys, 1994-2001**



## Diarrhea

Diarrhea is an important contributor to child morbidity and mortality. Mothers were asked to report the occurrence of diarrhea in their children. The following question was asked in DHS surveys:

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

Table A.3.29 shows the overall prevalence of diarrhea in the two weeks preceding the survey among children age 4-23 months and the prevalence of diarrhea by nutritional status of children. Overall, diarrhea rates in sub-Saharan Africa range from 23 percent in Kenya and Tanzania to 44 percent in Niger. In North Africa/West Asia/Europe, the range is broader, from 12 percent in Egypt to 44 percent in Turkey. In Central Asia, Uzbekistan has the lowest prevalence (7 percent) and the Kyrgyz Republic has the highest prevalence (24 percent). In South/Southeast Asia, the prevalence ranges from 11 percent in Bangladesh to 34 percent in Nepal. In Latin America and the Caribbean, the lowest rate reported is in Brazil (20 percent), and the highest is in Haiti (43 percent).

Figures 3.66 through 3.68 show the prevalence of diarrhea by nutritional status. Unlike ARI rates, diarrhea rates in most countries are higher among children who are stunted, wasted, or underweight. There are a few exceptions, particularly among stunted children in sub-Saharan Africa, where the rates of diarrhea are not affected by nutritional status. Wasting and underweight are better covariates of increased levels of diarrhea than stunting. As a measure of acute and generalized undernutrition, wasting could be the result of diarrhea or another recent childhood illness, whereas stunting is a long-term adaptation, less affected by acute illness in the past two weeks.

Figure 3.66  
**Prevalence of diarrhea among children age 4-23 months by stunting, Demographic and Health Surveys, 1994-2001**

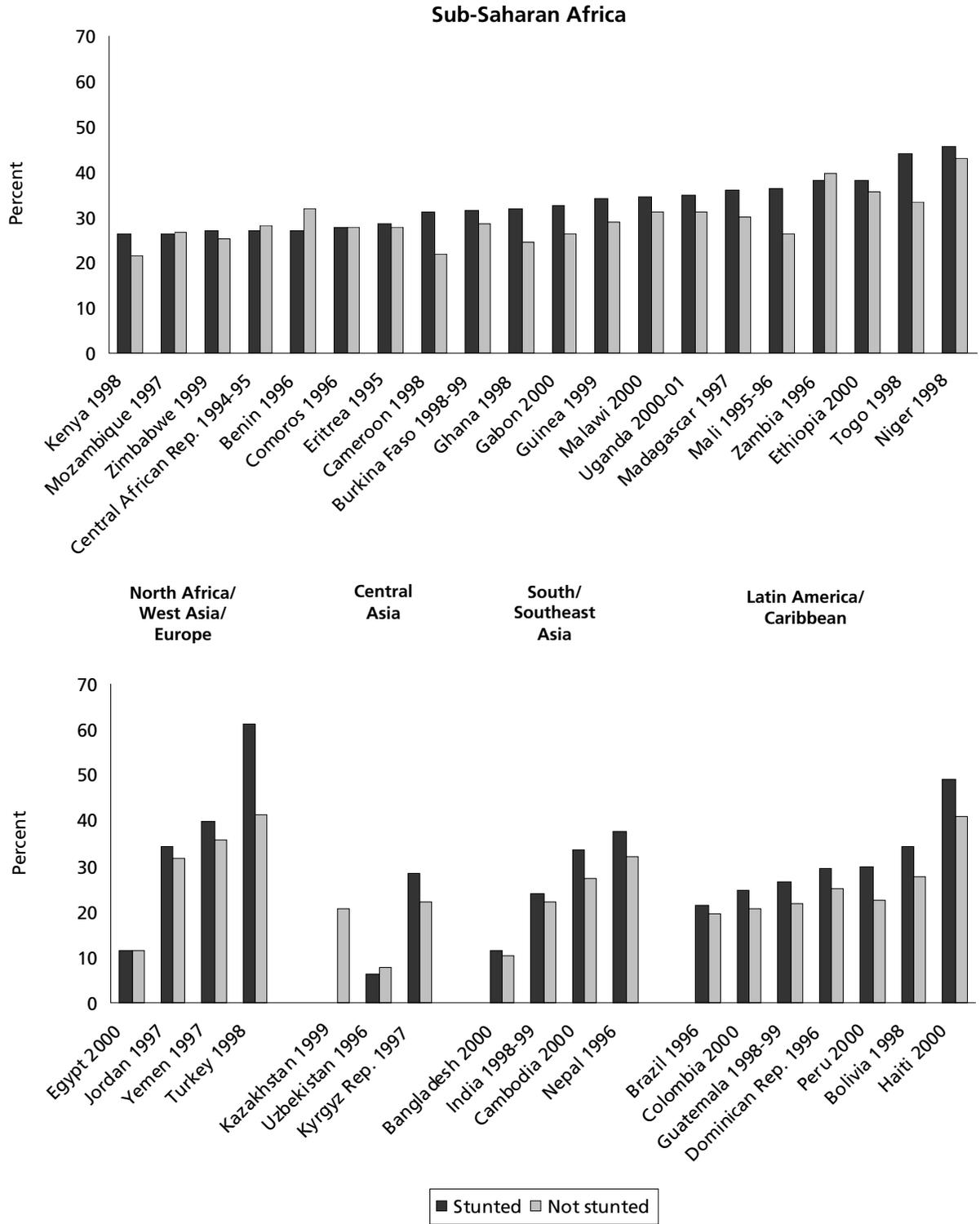


Figure 3.67  
**Prevalence of diarrhea among children age 4-23 months by wasting, Demographic and Health Surveys, 1994-2001**

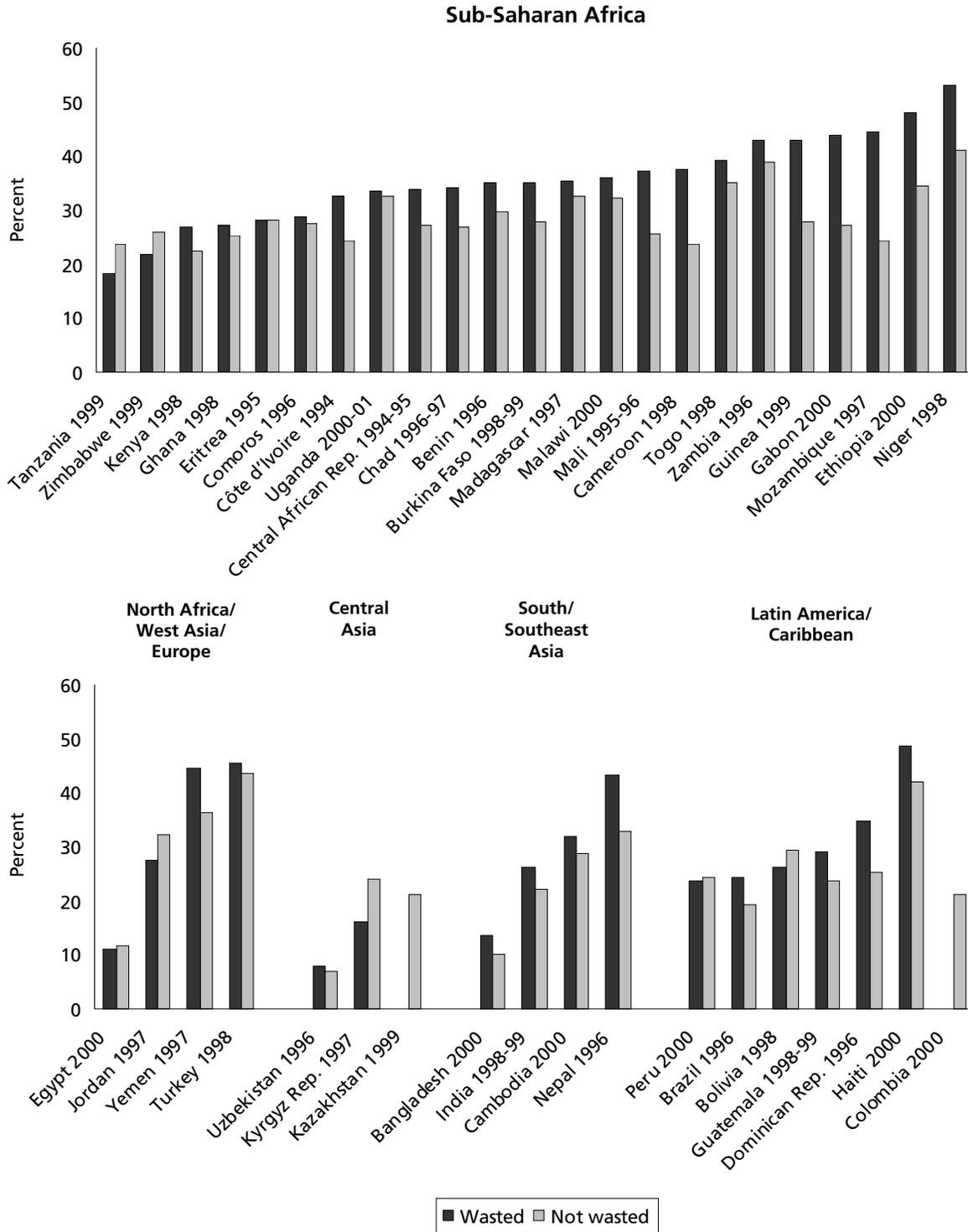
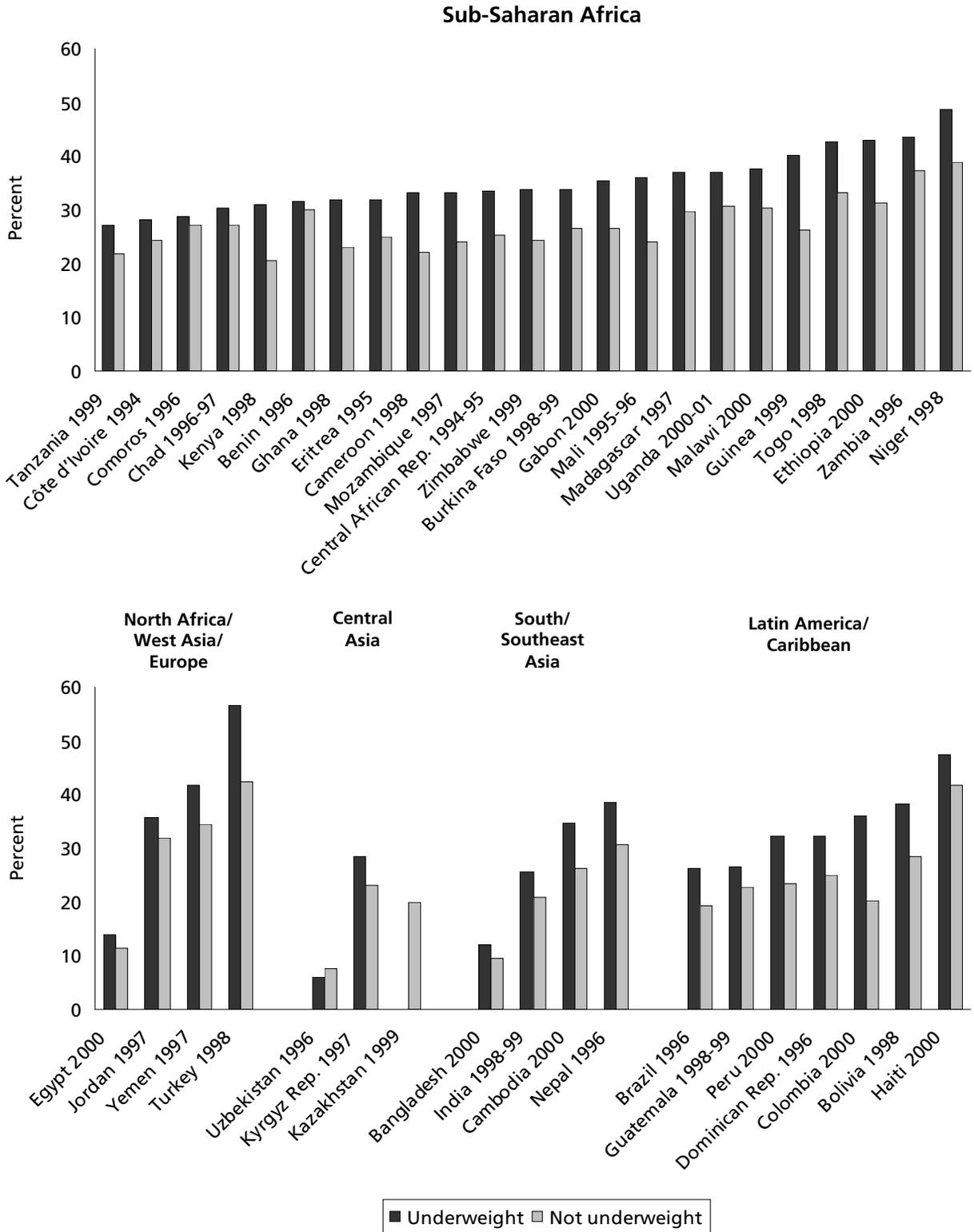


Figure 3.68  
**Prevalence of diarrhea among children age 4-23 months by underweight, Demographic and Health Surveys, 1994-2001**





---

# 4

---

## Summary and Conclusions

Undernutrition remains high in most developing countries. Underweight rates for children are 25 percent or more in most of sub-Saharan Africa and over 40 percent in South/Southeast Asia and in Yemen in North Africa/West Asia/Europe. Underweight rates are less than 10 percent in most countries in Latin America and the Caribbean (except Guatemala and Haiti), in most of North Africa/West Asia/Europe, and in Kazakhstan in Central Asia. Overweight rates, although generally low in most countries, should be monitored in Latin America and the Caribbean and in Central Asia, where rates are higher. Monitoring the nutritional status of children worldwide should continue to identify populations and subpopulations where malnutrition is increasing. Undernutrition is age dependent and related to place of residence; the highest rates are found among children age 6-23 months and among children who live in rural areas. Underlying influences that measure social and economic pressures on families and communities are more closely associated with stunting and underweight than with wasting.

Biological and behavioral influences related to maternal and child demographic characteristics and utilization of health services produce differentials in child undernutrition; however, all indicators of undernutrition in children are higher for children whose mothers are undernourished. Mother's age at delivery is an important variable that operates differently in different regions. Higher rates of undernutrition are observed for children of younger mothers (under 20 years) and/or older mothers (35 years or more). Use of antenatal services is negatively related to undernutrition in children.

Certain characteristics of children, such as size at birth, sex, birth order, and preceding birth interval, are related to stunting and underweight but less so to wasting. All indicators of undernutrition are higher for children who were perceived to be very small at birth. Males have slightly higher rates of undernutrition than females in all regions except South/Southeast Asia. However, even in South/Southeast Asia, wasting is higher among males than females. In general, the higher the birth order and the smaller the birth interval, the higher the rates of stunting and underweight.

Infant feeding practices vary by region and country along with levels of undernutrition. While breastfeeding duration is longest in South/Southeast Asia and sub-Saharan Africa, these regions also have the highest rates of undernutrition. On the other hand, these rates would probably be even higher if the children were not able to benefit from the protective effects and additional nutrients provided by breastfeeding and the nonuse of bottles.

Immediate influences, such as recent episodes of diarrhea, are better predictors of wasting than any of the other factors and are less likely to be associated with stunting and underweight. ARI was not clearly related to undernutrition.

Therefore, this report concludes that improved health services, water sources, and sanitation facilities, as well as immunizations, are important for the prevention and treatment of childhood illness and the improvement of the nutritional status of children. Although developing regions of the world share similar problems related to poverty and illiteracy, there are significant regional differences in the prevalence of

undernutrition and the factors that influence child nutritional status. Of course, to gain a better understanding of how these factors interact and operate to cause undernutrition, multivariate analyses of the individual country data sets and/or smaller groups of countries in selected regions should be carried out. This report provides comparative data that can be used for policymaking, program planning, and monitoring the nutritional status of children.

## References

- Begin, F., E.A. Frongillo, Jr., and H. Delisle. 1999. Caregiver behaviors and resources influence child height-for-age in rural Chad. *Journal of Nutrition* 129(3): 680-686.
- Black, R. 1999. *Reducing perinatal and neonatal mortality. Report of a meeting, Baltimore, Maryland, May 10-12, 1999.* Child Health Research Project Special Report, Vol. 3, No. 1. Baltimore, Maryland: Johns Hopkins University. Available at <http://www.reproline.jhu.edu/english/2mnh/perinatal.pdf>.
- Boerma, J.T., and G.T. Bicego. 1992. Preceding birth intervals and child survival: searching for pathways of influence. *Studies in Family Planning* 23(4): 243-256.
- Brown, K., K. Dewey, and L. Allen. 1998. Complementary feeding of young children in developing countries: a review of current scientific knowledge. Geneva: World Health Organization.
- Fikree, F.F., and H.W. Berendes. 1994. Risk factors for term intrauterine growth retardation: a community-based study in Karachi. *Bulletin of the World Health Organization* 72(4): 581-587.
- Haggerty, P.A., and S.O. Rutstein. 1999. *Breastfeeding and complementary infant feeding, and the postpartum effects of breastfeeding.* DHS Comparative Studies, No. 3. Calverton, Maryland: Macro International Inc. p. 39.
- Karim, E., and C.G. Mascie-Taylor. 1997. The association between birthweight, sociodemographic variables and maternal anthropometry in an urban sample from Dhaka, Bangladesh. *Annals of Human Biology* 24(5): 387-401.
- Lamontagne, J.F., P.L. Engle, and M.F. Zeitlin. 1998. Maternal employment, child care, and nutritional status of 12-18-month-old children in Managua, Nicaragua. *Social Science and Medicine* 46(3): 403-414.
- Mahy, M. 2003. *Child mortality in the developing world: a review of evidence from the Demographic and Health Surveys.* DHS Comparative Reports, No. 4. Calverton, Maryland: Macro International Inc. p. 4.
- Mishra, V., K.R. Smith, and R.D. Retherford. 2005. Effects of cooking smoke and environmental tobacco smoke on acute respiratory infections in young Indian children. *Population and Environment* 26(5).
- Mozumder, A.B., Barkat-E-Khuda, T.T. Kane, A. Levin, and S. Ahmed. 2000. The effect of birth interval on malnutrition in Bangladeshi infants and young children. *Journal of Biological Science* 32(3): 289-300.
- Mukuria, A., M. Kothari, and N. Abderrahim. 2006. *Infant and young child feeding update.* Calverton, Maryland, USA: ORC Macro.
- Mukuria, A., C. Aboulaflia, and A. Themme. 2005. *The context of women's health: Results from the Demographic and Health Surveys 1994-2001.* DHS Comparative Studies, No. 11. Calverton, Maryland: ORC Macro.

Pan American Health Organization (PAHO). 2003. *Guiding principles for complementary feeding of the breastfed child*. Washington, D.C.: PAHO/World Health Organization, Division of Health Promotions and Protection, Food and Nutrition Program.

Pelletier, D.L., E.A. Frongillo, and J.P. Habicht. 1993. Epidemiological evidence for a potentiating effect of malnutrition on child mortality. *American Journal of Public Health* 83: 1130-1133.

Pelletier, D.L., E.A. Frongillo, Jr., D.G. Schroeder, and J.P. Habicht. 1994. A methodology for estimating the contribution of malnutrition to child mortality in developing countries. *Journal of Nutrition* 124(10 Suppl.): 2106S-2122S.

Rafalimanana, H., and C.F. Westoff. 2000. Potential effects on fertility and child health and survival of birth-spacing preferences in sub-Saharan Africa. *Studies in Family Planning* 31(2): 99-110.

Ramakrishnan, U., R. Martorell, D. Schroeder, and R. Flores. 1999. Role of intergenerational effects on linear growth. *Journal of Nutrition* 129(2S Suppl.): 544S-549S.

Rice, A.L., L. Sacco, A. Hyder, and R.E. Black. 2000. Malnutrition as an underlying cause of childhood deaths associated with infectious diseases in developing countries. *Bulletin of the World Health Organization* 78(10): 1207-1221.

Rutstein, S.O. 2000. Factors associated with trends in infant and child mortality in developing countries during the 1990s. *Bulletin of the World Health Organization* 78(10): 1256-1270.

Rutstein, S.O. 2002. *Fertility levels, trends, and differentials 1995-1999*. DHS Comparative Reports, No. 3. Calverton, Maryland: Macro International Inc.

Rutstein, S.O., and K. Johnson. 2004. *The DHS Wealth Index*. DHS Comparative Reports, No. 6. Calverton, Maryland: Macro International Inc.

Scrimshaw, N.S., C.E. Taylor, and J.E. Gordon. 1968. *Interaction of nutrition and infection*. World Health Organization Monograph Series, No. 57. Geneva: World Health Organization.

Sharmanov, T.S., N.M. Karsybekova, T.T. Bekbocynov, A.P. Sarsembaeva, and Z.K. Kudalbergeno. 1997. Nutritional status of early age children in Kazakhstan [in Russian] *Voprosy Pitaniia* (4)23-25.

Smith, L.C., M.T. Ruel, and A. Ndiaye. 2004. *Why is child malnutrition lower in urban than rural areas? Evidence from 36 developing countries*. Discussion Paper No. 176. Washington, DC: International Food Policy Research Institute.

Stephensen, C.B. 1999. Burden of infection on growth failure, Symposium: Causes and Etiology of Stunting, April, 1998, San Francisco, California. *Journal of Nutrition* 129 (2S Suppl.) 534S-538S.

Tomkins, A. and F. Watson. 1993. *Malnutrition and infection: a review*. United Nations Administrative Committee on Coordination/Subcommittee on Nutrition State-of-the-Art Series, Nutrition Policy Discussion Paper, No. 5. Geneva: ACC/SCN.

Toyama, N., S. Wakai, Y. Nakamura, and A. Arifin. 2001. Mother's working status and nutritional status of children under the age of 5 in urban low-income community, Surabaya, Indonesia. *Journal of Tropical Pediatrics* 47: 179-181.

United Nations Children's Fund (UNICEF). 1998. *The state of the world's children 1998*. New York: Oxford University Press.

World Health Organization (WHO). 2003. *Global strategy for infant young child feeding*. Geneva: WHO.

World Health Organization (WHO). 2005. *Guiding principles for feeding non-breastfed children 6-24 months of age*. Geneva: WHO.

World Health Organization (WHO). 2005. Proportional mortality among under fives worldwide, 2001. Available at [http://www.who.int/child-adolescent-health/OVERVIEW/CHILD\\_HEALTH/map\\_01\\_world.jpg](http://www.who.int/child-adolescent-health/OVERVIEW/CHILD_HEALTH/map_01_world.jpg).

World Health Organization (WHO) and United Nations Children's Fund (UNICEF). 2000. *Global water supply and sanitation assessment 2000 report*. Geneva: WHO and UNICEF.

World Health Organization (WHO) and United Nations Children's Fund (UNICEF). 2003. *Antenatal care in developing countries: promises, achievements and missed opportunities: an analysis of trends, levels and differentials, 1990-2001*. Geneva: WHO.



## Appendix A

**Table A.3.1  
Infant and under-five mortality rates, Demographic and Health  
Surveys, 1994-2001**

Country	Infant mortality rate	Under-five mortality rate
<b>Sub-Saharan Africa</b>		
Benin 1996	94	167
Burkina Faso 1998-99	105	219
Cameroon 1998	77	151
Central African Republic 1994-95	97	157
Chad 1996-97	103	194
Comoros 1996	77	104
Côte d'Ivoire 1994	89	150
Eritrea 1995	97	166
Ethiopia 2000	66	136
Gabon 2000	57	89
Ghana 1998	57	108
Guinea 1999	98	177
Kenya 1998	74	112
Madagascar 1997	96	159
Malawi 2000	104	189
Mali 1995-96	123	238
Mozambique 1997	135	201
Niger 1998	123	274
Tanzania 1999	99	147
Togo 1998	80	146
Uganda 2000-01	88	146
Zambia 1996	109	197
Zimbabwe 1999	65	102
<b>North Africa/West Asia/Europe</b>		
Egypt 2000	54	44
Jordan 1997	29	34
Turkey 1998	43	52
Yemen 1997	75	105
<b>Central Asia</b>		
Kazakhstan 1999	62	71
Kyrgyz Republic 1997	61	72
Uzbekistan 1996	49	59
<b>South/Southeast Asia</b>		
Bangladesh 2000	66	94
Cambodia 2000	95	124
India 1998-99	68	95
Nepal 1996	79	118
<b>Latin America/Caribbean</b>		
Bolivia 1998	67	92
Brazil 1996	39	49
Colombia 2000	21	25
Dominican Republic 1996	47	57
Guatemala 1998-99	45	59
Haiti 2000	80	119
Peru 2000	33	47

Table A.3.2

**Contribution of undernutrition to under-five mortality**

Percentage of deaths among children age 0–59 months due to moderate or severe undernutrition, Demographic and Health Surveys, 1994-2001

Country	Percentage of deaths due to total undernutrition	Percentage of deaths due to moderate or severe undernutrition	
		Moderate undernutrition	Severe undernutrition
<b>Sub-Saharan Africa</b>			
Benin 1996	46 <sup>a</sup>	38	8
Burkina Faso 1998-99	37	28	9
Cameroon 1998	30 <sup>a</sup>	25	5
Central African Republic 1994-95	38 <sup>a</sup>	26	12
Chad 1996-97	52	38	14
Comoros 1996	42	29	13
Côte d'Ivoire 1994	40 <sup>a</sup>	34	6
Eritrea 1995	61 <sup>a</sup>	46	15
Ethiopia 2000	57	43	14
Gabon 2000	25	21	4
Ghana 1998	39	33	6
Guinea 1999	37	30	7
Kenya 1998	32 <sup>a</sup>	27	5
Madagascar 1997	54 <sup>a</sup>	42	12
Malawi 2000	37	31	6
Mali 1995-96	57 <sup>a</sup>	42	15
Mozambique 1997	44 <sup>a</sup>	33	11
Niger 1998	57	41	16
Tanzania 1999	40	34	6
Togo 1998	38 <sup>a</sup>	32	6
Uganda 2000-01	34	29	5
Zambia 1996	38	35	3
Zimbabwe 1999	28	27	<1
<b>North Africa/West Asia/Europe</b>			
Egypt 2000	9	8	1
Jordan 1997	11	10	<1
Turkey 1998	17	15	2
Yemen 1997	56	43	13
<b>Central Asia</b>			
Kazakhstan 1999	10	9	1
Kyrgyz Republic 1997	18	17	1
Uzbekistan 1996	32	23	9
<b>South/Southeast Asia</b>			
Bangladesh 2000	55	47	8
Cambodia 2000	56	43	13
India 1998-99	72	51	21
Nepal 1996	57	44	13
<b>Latin America/Caribbean</b>			
Bolivia 1998	16	14	2
Brazil 1996	11	10	1
Colombia 2000	12	11	1
Dominican Republic 1996	16	14	2
Guatemala 1998-99	37	32	5
Haiti 2000	30	26	4
Peru 2000	15	14	1

Note: calculations are based on a formula developed by Pelletier et al. to quantify the contribution of moderate and severe undernutrition to under-five mortality (Pelletier et al., 1994).

<sup>a</sup>Data where collected only on children age 0-35 months.

Country	Stunted	Wasted	Underweight	Number of children
<b>Sub-Saharan Africa</b>				
Benin 1996	25.0	14.3	29.2	2,273
Burkina Faso 1998-99	30.9	17.7	36.3	2,530
Cameroon 1998	29.3	5.9	22.2	1,923
Central African Republic 1994-95	33.6	7.1	27.3	2,310
Chad 1996-97	34.9	17.9	39.1	3,541
Comoros 1996	33.8	8.3	25.8	921
Côte d'Ivoire 1994	24.4	8.3	23.8	3,341
Eritrea 1995	38.4	16.4	43.7	2,269
Ethiopia 2000	44.9	12.9	45.3	5,905
Gabon 2000	20.5	3.1	12.9	2,013
Ghana 1998	20.0	12.9	24.9	1,638
Guinea 1999	23.2	11.7	25.4	2,067
Kenya 1998	30.9	6.9	21.5	2,821
Madagascar 1997	48.3	7.4	40.0	3,080
Malawi 2000	44.0	7.5	27.8	6,073
Mali 1995-96	30.1	23.3	40.0	4,678
Mozambique 1997	35.9	7.9	26.1	2,837
Niger 1998	41.1	20.7	49.6	4,022
Tanzania 1999	37.9	6.5	30.3	1,674
Togo 1998	21.7	12.3	25.1	3,260
Uganda 2000-01	35.5	5.3	24.7	3,584
Zambia 1996	38.9	5.4	25.3	3,588
Zimbabwe 1999	26.4	7.2	13.7	1,587
<b>North Africa/West Asia/Europe</b>				
Egypt 2000	19.3	3.2	4.5	6,235
Jordan 1997	7.2	2.1	4.9	3,266
Turkey 1998	12.0	2.5	7.6	1,610
Yemen 1997	45.7	15.0	43.7	4,966
<b>Central Asia</b>				
Kazakhstan 1999	9.5	1.9	4.6	354
Kyrgyz Republic 1997	24.8	3.4	11.0	1,015
Uzbekistan 1996	31.3	11.6	18.8	989
<b>South/Southeast Asia</b>				
Bangladesh 2000	40.2	11.4	45.7	3,306
Cambodia 2000	37.3	16.3	40.1	1,842
India 1998-99	44.9	15.7	46.7	24,143
Nepal 1996	48.4	11.2	46.9	3,705
<b>Latin America/Caribbean</b>				
Bolivia 1998	24.2	1.9	9.0	3,451
Brazil 1996	10.3	2.9	5.5	2,306
Colombia 2000	12.8	1.0	7.2	2,498
Dominican Republic 1996	11.0	1.6	6.3	2,131
Guatemala 1998-99	41.9	3.2	23.9	2,149
Haiti 2000	18.9	5.7	16.3	3,389
Peru 2000	21.7	1.1	7.7	6,070

Table A.3.4

**Height-for-age Z-scores among young children**

Percent distribution of height-for-age Z-scores among children age 0–35 months based on the standard deviation (SD) categories of the International Reference Population, Demographic and Health Surveys, 1994-2001

Country	Height for age Z scores							Total	Number
	Below -3.00 SD	-3.00 to -2.01 SD	-2.00 to -1.01 SD	-1.00 to -0.01 SD	0.00 to 1.00 SD	1.01 to 2.00 SD	Above 2.00 SD		
<b>Sub-Saharan Africa</b>									
Benin 1996	7.8	17.2	27.2	25.7	14.6	5.7	1.9	100.0	2,273
Burkina Faso 1998-99	13.9	17.0	25.2	23.5	12.3	5.2	2.9	100.0	2,530
Cameroon 1998	10.7	18.6	25.8	22.8	14.1	5.2	2.9	100.0	1,923
Central African Republic									
1994-95	14.3	19.4	26.4	22.3	12.2	4.0	1.4	100.0	2,310
Chad 1996-97	16.7	18.2	21.2	20.9	12.8	6.5	3.7	100.0	3,541
Comoros 1996	13.4	20.4	24.5	26.1	11.6	2.6	1.4	100.0	921
Côte d'Ivoire 1994	8.4	16.1	27.8	27.5	13.0	5.7	1.6	100.0	3,341
Eritrea 1995	18.3	20.1	27.5	18.8	11.0	2.9	1.4	100.0	2,269
Ethiopia 2000	22.0	22.9	27.5	16.1	7.7	2.5	1.4	100.0	5,905
Gabon 2000	6.5	14.0	24.9	29.0	15.8	6.1	3.8	100.0	2,013
Ghana 1998	5.9	14.1	28.5	25.9	16.7	7.1	1.8	100.0	1,638
Guinea 1999	8.9	14.3	24.6	25.0	16.5	6.4	4.2	100.0	2,067
Kenya 1998	11.4	19.5	26.1	21.9	12.7	4.5	3.7	100.0	2,821
Madagascar 1997	21.6	26.7	24.8	17.5	6.9	1.6	0.9	100.0	3,080
Malawi 2000	21.8	22.2	23.7	17.1	9.4	3.3	2.5	100.0	6,073
Mali 1995-96	14.5	15.6	23.8	22.3	14.9	6.3	2.6	100.0	4,678
Mozambique 1997	15.7	20.2	25.5	20.5	12.7	3.3	2.2	100.0	2,837
Niger 1998	19.5	21.6	25.6	19.2	9.8	2.9	1.4	100.0	4,022
Tanzania 1999	13.9	24.0	31.3	21.0	7.6	1.7	0.5	100.0	1,674
Togo 1998	7.0	14.8	27.6	29.0	14.3	5.1	2.2	100.0	3,260
Uganda 2000-01	13.6	22.0	29.4	22.7	8.8	2.3	1.3	100.0	3,584
Zambia 1996	15.8	23.1	28.1	20.3	8.7	2.6	1.3	100.0	3,588
Zimbabwe 1999	10.0	16.4	25.2	23.1	13.1	6.9	5.2	100.0	1,587
<b>North Africa/West Asia/Europe</b>									
Egypt 2000	6.9	12.4	26.8	30.8	14.0	5.2	3.8	100.0	6,235
Jordan 1997	1.8	5.5	22.7	36.7	24.1	7.1	2.2	100.0	3,266
Turkey 1998	4.0	8.0	22.3	30.8	23.0	9.2	2.6	100.0	1,610
Yemen 1997	23.2	22.5	23.7	17.0	8.8	2.8	2.0	100.0	4,966
<b>Central Asia</b>									
Kazakhstan 1999	2.7	6.7	25.4	33.4	21.4	7.5	2.8	100.0	354
Kyrgyz Republic 1997	6.0	18.8	31.5	24.7	14.2	3.6	1.2	100.0	1,015
Uzbekistan 1996	14.0	17.3	22.1	21.7	10.4	7.2	7.4	100.0	989
<b>South/Southeast Asia</b>									
Bangladesh 2000	15.1	25.1	30.5	19.3	7.6	1.7	0.7	100.0	3,306
Cambodia 2000	15.2	22.1	25.1	19.8	10.6	4.4	2.8	100.0	1,842
India 1998-99	22.6	22.4	25.1	17.5	8.2	2.7	1.6	100.0	24,143
Nepal 1996	20.2	28.2	29.7	15.6	4.9	1.1	0.3	100.0	3,705
<b>Latin America/Caribbean</b>									
Bolivia 1998	8.3	15.9	27.0	26.2	15.4	4.7	2.4	100.0	3,451
Brazil 1996	2.5	7.8	19.7	32.3	24.3	8.9	4.6	100.0	2,306
Colombia 2000	2.7	10.1	27.1	36.7	19.1	3.7	0.5	100.0	2,498
Dominican Republic 1996	2.6	8.4	21.7	32.8	23.9	8.2	2.4	100.0	2,131
Guatemala 1998-99	17.2	24.7	29.4	19.1	7.4	1.8	0.5	100.0	2,149
Haiti 2000	6.5	12.3	25.8	31.6	16.1	5.4	2.1	100.0	3,389
Peru 2000	6.3	15.4	29.1	28.9	14.7	3.9	1.7	100.0	6,070

Table A.3.5

**Weight-for-height Z-scores among young children**

Percent distribution of weight-for-height Z-scores among children age 0-35 months based on the standard deviation (SD) categories of the international Reference Population, Demographic and Health Surveys, 1994-2001

Country	Weight-for-height Z scores							Total	Number
	Below -3.00 SD	-3.00 to -2.01 SD	-2.00 to -1.01 SD	-1.00 to -0.01 SD	0.00 to 1.00 SD	1.01 to 2.00 SD	Above 2.00 SD		
<b>Sub-Saharan Africa</b>									
Benin 1996	2.7	11.6	28.8	32.7	18.3	4.6	1.3	100.0	2,273
Burkina Faso 1998-99	3.5	14.2	31.9	29.1	16.9	3.3	1.1	100.0	2,530
Cameroon 1998	0.8	5.2	20.9	28.7	27.3	12.2	5.0	100.0	1,923
Central African Republic 1994-95	1.1	6.1	23.0	35.3	25.1	7.1	2.3	100.0	2,310
Chad 1996-97	3.3	14.6	29.7	29.7	17.4	3.7	1.6	100.0	3,541
Comoros 1996	2.0	6.3	22.7	28.7	27.7	8.9	3.8	100.0	921
Côte d'Ivoire 1994	1.2	7.1	26.3	34.6	23.1	6.2	1.5	100.0	3,341
Eritrea 1995	3.1	13.3	33.3	30.8	14.8	3.8	0.9	100.0	2,269
Ethiopia 2000	1.8	11.1	30.5	34.0	16.7	4.0	1.9	100.0	5,905
Gabon 2000	0.4	2.7	16.0	33.3	31.3	12.1	4.3	100.0	2,013
Ghana 1998	1.8	11.1	29.6	32.5	18.4	4.4	2.1	100.0	1,638
Guinea 1999	2.7	9.0	24.2	30.5	21.8	8.7	3.0	100.0	2,067
Kenya 1998	1.5	5.5	21.0	31.5	25.4	10.1	5.1	100.0	2,821
Madagascar 1997	0.9	6.5	26.4	35.7	21.8	6.7	2.0	100.0	3,080
Malawi 2000	1.5	5.9	17.0	28.4	29.8	12.6	4.7	100.0	6,073
Mali 1995-96	6.2	17.1	32.1	26.1	13.6	3.6	1.3	100.0	4,678
Mozambique 1997	2.1	5.8	21.7	31.1	26.6	9.3	3.4	100.0	2,837
Niger 1998	3.7	17.0	33.8	29.2	12.9	2.6	0.8	100.0	4,022
Tanzania 1999	0.6	5.9	22.8	34.1	25.5	9.0	2.1	100.0	1,674
Togo 1998	2.1	10.1	28.1	33.9	19.1	5.1	1.5	100.0	3,260
Uganda 2000-01	0.7	4.6	19.5	33.7	29.1	9.0	3.4	100.0	3,584
Zambia 1996	0.8	4.6	18.9	34.9	27.9	9.3	3.7	100.0	3,588
Zimbabwe 1999	1.9	5.3	17.0	26.1	29.0	12.3	8.5	100.0	1,587
<b>North Africa/West</b>									
<b>Asia/Europe</b>									
Egypt 2000	0.6	2.6	6.6	22.4	33.3	21.3	13.2	100.0	6,235
Jordan 1997	0.1	1.9	13.4	35.7	34.6	10.6	3.6	100.0	3,266
Turkey 1998	0.5	2.0	14.3	34.2	35.8	10.5	2.8	100.0	1,610
Yemen 1997	3.2	11.8	28.3	31.9	17.6	4.8	2.3	100.0	4,966
<b>Central Asia</b>									
Kazakhstan 1999	0.3	1.5	11.6	33.7	36.5	13.4	3.0	100.0	354
Kyrgyz Republic 1997	0.7	2.8	11.4	23.8	38.6	16.4	6.3	100.0	1,015
Uzbekistan 1996	2.8	8.8	13.7	24.7	23.1	12.5	14.4	100.0	989
<b>South/Southeast Asia</b>									
Bangladesh 2000	1.2	10.2	37.1	33.7	14.5	2.8	0.5	100.0	3,306
Cambodia 2000	3.7	12.7	32.4	28.9	15.2	4.6	2.6	100.0	1,842
India 1998-99	2.8	12.9	32.8	30.6	14.8	3.9	2.2	100.0	24,143
Nepal 1996	1.7	9.6	33.2	35.2	16.9	3.0	0.5	100.0	3,705
<b>Latin America/Caribbean</b>									
Bolivia 1998	0.5	1.5	7.6	26.6	39.0	17.3	7.5	100.0	3,451
Brazil 1996	0.6	2.2	10.5	31.0	35.4	14.8	5.4	100.0	2,306
Colombia 2000	0.1	1.0	9.5	31.6	38.7	14.9	4.3	100.0	2,498
Dominican Republic 1996	0.1	1.5	12.4	32.3	34.9	14.0	4.7	100.0	2,131
Guatemala 1998-99	1.4	1.7	11.5	33.4	33.1	13.6	5.3	100.0	2,149
Haiti 2000	0.6	5.1	20.4	33.5	29.6	8.5	2.3	100.0	3,389
Peru 2000	0.3	0.9	6.1	23.7	40.6	20.3	8.1	100.0	6,070

Table A.3.6

**Weight-for-age Z-scores among young children**

Percent distribution of weight-for-age Z-scores among children age 0-35 months based on the standard deviation (SD) categories of the International Reference Population, Demographic and Health Surveys, 1994-2001

Country	Weight-for-age Z scores							Total	Number
	Below -3.00 SD	-3.00 to -2.01 SD	-2.00 to -1.01 SD	-1.00 to -0.01 SD	0.00 to 1.00 SD	1.01 to 2.00 SD	Above 2.00 SD		
<b>Sub-Saharan Africa</b>									
Benin 1996	7.4	21.8	31.6	23.9	11.2	3.4	0.7	100.0	2,273
Burkina Faso 1998-99	13.6	22.8	29.5	19.7	9.9	3.4	1.1	100.0	2,530
Cameroon 1998	4.8	17.4	26.1	24.0	16.0	8.4	3.3	100.0	1,923
Central African Republic 1994-95	7.5	19.8	29.7	24.9	13.3	3.4	1.4	100.0	2,310
Chad 1996-97	15.4	23.7	25.2	18.9	10.9	4.1	1.8	100.0	3,541
Comoros 1996	7.9	17.9	29.9	24.5	13.5	4.6	1.7	100.0	921
Côte d'Ivoire 1994	6.3	17.5	30.4	27.4	13.1	3.9	1.3	100.0	3,341
Eritrea 1995	17.0	26.8	28.3	16.9	7.5	2.7	0.9	100.0	2,269
Ethiopia 2000	16.5	28.8	28.5	16.5	6.5	2.1	1.2	100.0	5,905
Gabon 2000	2.4	10.5	25.3	29.6	21.1	7.2	3.8	100.0	2,013
Ghana 1998	5.7	19.2	32.9	23.4	13.2	4.4	1.3	100.0	1,638
Guinea 1999	6.2	19.3	26.1	24.2	15.1	5.0	4.1	100.0	2,067
Kenya 1998	5.4	16.1	30.1	25.5	14.0	6.1	2.8	100.0	2,821
Madagascar 1997	12.8	27.2	29.4	18.6	8.5	2.4	1.1	100.0	3,080
Malawi 2000	7.2	20.6	29.6	24.1	12.6	4.1	1.8	100.0	6,073
Mali 1995-96	16.5	23.5	26.9	19.8	9.4	2.6	1.2	100.0	4,678
Mozambique 1997	9.1	17.1	30.2	26.0	12.3	4.2	1.2	100.0	2,837
Niger 1998	20.2	29.4	25.8	15.4	6.8	1.6	0.8	100.0	4,022
Tanzania 1999	7.3	23.1	32.9	21.3	10.9	3.6	0.9	100.0	1,674
Togo 1998	6.7	18.4	31.1	26.1	13.0	3.4	1.2	100.0	3,260
Uganda 2000-01	5.8	18.9	30.8	26.1	13.2	4.1	1.1	100.0	3,584
Zambia 1996	6.4	18.9	32.9	23.2	13.6	3.8	1.2	100.0	3,588
Zimbabwe 1999	2.0	11.7	29.5	26.4	18.4	8.0	4.0	100.0	1,587
<b>North Africa/West Asia/Europe</b>									
Egypt 2000	0.7	3.8	17.8	35.3	25.8	11.5	5.1	100.0	6,235
Jordan 1997	0.6	4.3	21.8	36.3	26.4	8.1	2.4	100.0	3,266
Turkey 1998	1.6	6.0	21.6	32.3	25.6	9.6	3.3	100.0	1,610
Yemen 1997	15.5	28.2	30.6	17.3	6.0	1.7	0.7	100.0	4,966
<b>Central Asia</b>									
Kazakhstan 1999	0.7	3.9	21.4	36.4	25.7	8.5	3.5	100.0	354
Kyrgyz Republic 1997	1.7	9.4	26.5	30.6	20.0	8.2	3.6	100.0	1,015
Uzbekistan 1996	5.0	13.8	26.1	24.7	15.5	8.1	6.8	100.0	989
<b>South/Southeast Asia</b>									
Bangladesh 2000	13.4	32.3	30.1	16.7	6.2	1.2	0.2	100.0	3,306
Cambodia 2000	11.8	28.3	29.6	20.3	6.5	2.3	1.1	100.0	1,842
India 1998-99	17.7	29.0	28.7	16.1	6.1	1.5	0.8	100.0	2,4143
Nepal 1996	16.1	30.8	31.4	15.9	4.9	0.7	0.2	100.0	3,705
<b>Latin America/Caribbean</b>									
Bolivia 1998	1.6	7.4	22.4	31.6	23.9	9.0	4.1	100.0	3,451
Brazil 1996	0.8	4.6	17.6	32.9	28.5	10.9	4.7	100.0	2,306
Colombia 2000	1.1	6.1	21.3	34.1	26.3	8.2	2.8	100.0	2,498
Dominican Republic 1996	1.2	5.1	20.6	30.3	27.8	10.4	4.5	100.0	2,131
Guatemala 1998-99	6.0	17.9	29.2	26.6	15.1	3.5	1.7	100.0	2,149
Haiti 2000	3.6	12.7	28.3	29.2	17.9	5.9	2.4	100.0	3,389
Peru 2000	1.1	6.6	21.0	30.4	25.5	11.3	4.1	100.0	6,070

Table A.3.7

**Undernutrition by child's age group**

Percentage of children age 0 to 35 months who are stunted, wasted, or underweight by age group in months, Demographic and Health Surveys, 1994-2000

Country	Percent stunted					Percent wasted					Percent underweight					Number of children				
	0-5	6-9	10-12	13-24	25+	0-5	6-9	10-12	13-24	25+	0-5	6-9	10-12	13-24	25+	0-5	6-9	10-12	13-24	25+
<b>Sub-Saharan Africa</b>																				
Benin 1996	8.5	12.5	16.9	31.6	39.0	6.2	17.1	26.0	17.8	10.1	6.5	23.0	39.8	37.3	35.6	448	297	213	756	559
Burkina Faso 1998-99	5.0	13.5	19.8	48.7	45.7	6.9	20.2	31.1	24.2	12.4	4.1	29.3	48.6	51.2	45.0	544	339	255	766	626
Cameroon 1998	5.5	14.9	31.2	43.6	34.2	1.9	9.7	9.6	7.5	4.0	1.9	15.4	33.0	31.3	25.0	365	242	156	652	508
Central African Republic 1994-95	5.6	16.9	30.1	45.3	46.3	2.8	8.8	10.3	10.4	4.4	3.6	18.0	34.8	35.9	33.7	415	274	222	742	658
Chad 1996-97	5.7	15.8	28.0	48.6	54.9	6.9	20.2	27.8	24.8	13.8	4.3	26.1	49.2	53.8	53.3	738	491	309	1,107	896
Comoros 1996	5.5	20.2	33.7	49.8	38.5	4.3	7.9	7.4	12.7	5.6	5.5	20.2	29.5	34.3	29.9	163	114	95	315	234
Côte d'Ivoire 1994	6.0	12.0	17.0	32.1	35.2	3.5	9.3	12.3	12.5	4.9	4.6	18.9	33.1	30.3	28.4	615	418	269	1,087	953
Ethiopia 2000	10.8	25.1	39.7	58.4	55.7	3.9	13.5	17.3	18.3	9.7	6.2	32.1	52.6	55.8	55.7	882	698	525	2,031	1,770
Eritrea 1995	4.4	17.3	26.2	51.0	57.3	6.5	12.5	22.3	24.2	14.4	6.2	26.4	55.1	55.4	57.7	403	284	191	687	704
Gabon 2000	3.8	14.1	16.3	31.2	22.0	2.5	5.7	4.0	2.9	2.3	1.9	11.8	19.6	19.0	11.3	360	243	158	686	567
Ghana 1998	2.9	7.7	18.7	26.6	28.0	3.3	13.8	24.1	19.6	6.6	0.5	14.5	37.4	36.6	25.7	259	233	109	592	445
Guinea 1999	7.0	10.8	23.3	34.6	32.0	6.8	13.2	20.5	17.5	5.9	5.9	18.8	41.8	37.0	29.1	487	298	143	636	503
Kenya 1998	7.1	14.1	30.3	42.1	37.3	5.2	6.2	10.1	9.3	4.4	2.3	11.3	24.3	27.1	28.1	427	350	243	990	810
Madagascar 1997	14.0	31.1	47.3	65.2	59.9	2.7	5.7	8.9	12.0	4.7	4.8	29.5	49.3	54.6	47.8	573	393	292	1,065	757
Malawi 2000	11.4	26.4	34.6	59.5	55.8	5.8	8.9	11.5	9.5	4.3	5.9	23.9	33.7	35.5	31.3	1,005	739	591	1,976	1,762
Mali 1995-96	5.3	11.3	19.6	43.8	46.8	12.3	25.2	35.8	31.7	17.9	9.7	28.1	47.7	54.1	51.0	964	624	434	1,348	1,308
Mozambique 1997	13.6	24.8	26.0	45.6	51.4	2.8	7.6	12.1	13.2	3.6	4.7	21.2	32.3	35.8	31.7	578	403	230	947	678
Niger 1998	6.8	22.3	39.5	58.0	56.0	6.7	18.8	33.6	30.5	14.7	6.7	38.5	66.2	66.4	60.6	792	512	393	1,310	1,016
Tanzania 1999	9.4	21.0	28.9	52.9	48.1	3.4	6.3	4.8	9.6	5.4	3.3	18.6	35.6	39.8	39.8	301	206	133	569	465
Togo 1998	3.6	7.9	17.1	33.9	28.8	6.0	11.1	20.5	18.4	7.5	3.3	16.6	33.2	36.3	29.0	610	446	303	999	903
Uganda 2000-01	7.9	22.9	33.4	47.3	41.1	2.5	5.2	8.9	7.6	2.3	2.8	22.0	34.8	32.7	23.6	538	436	331	1,331	948
Zambia 1996	10.4	20.5	29.9	50.6	51.6	2.3	6.3	7.3	8.8	2.2	3.7	17.6	31.0	34.7	27.4	597	379	364	1,236	1,012
Zimbabwe 1999	6.0	14.3	19.8	39.1	29.1	7.2	4.2	11.6	9.3	4.4	1.9	7.8	17.3	18.0	16.6	272	158	132	563	463
<b>North Africa/West Asia/Europe</b>																				
Egypt 2000	10.7	17.6	22.9	23.4	19.2	5.3	3.4	5.0	3.0	1.7	1.4	6.2	7.1	5.6	3.7	1,007	747	487	2,044	1,951
Jordan 1997	3.3	5.8	6.7	10.5	5.9	1.0	1.8	1.7	2.8	1.9	0.8	3.4	7.7	6.3	4.8	420	396	303	1,133	1,014
Turkey 1998	2.0	2.7	10.1	17.9	16.5	2.1	1.3	7.1	2.7	1.5	1.7	3.8	12.8	10.6	7.8	285	207	146	534	437
Yemen 1997	16.4	32.4	35.8	63.2	58.3	10.9	18.2	22.5	17.6	10.0	12.9	39.3	48.2	54.8	54.0	944	733	504	1,521	1,265
<b>Central Asia</b>																				
Kazakhstan 1999	5.5	2.8	8.9	15.7	7.0	1.7	3.5	0.0	2.3	1.4	4.0	4.5	4.3	5.9	3.4	48	39	32	119	116
Kyrgyz Republic 1997	5.4	12.4	30.8	33.5	29.3	1.9	3.8	6.1	5.7	1.1	0.3	4.7	17.6	19.4	8.7	174	111	84	330	315
Uzbekistan 1996	8.4	26.9	29.1	41.8	31.3	17.1	14.9	8.0	11.8	9.3	6.0	13.4	24.4	25.0	17.2	123	115	107	335	310
<b>South/Southeast Asia</b>																				
Bangladesh 2000	13.9	21.4	36.6	53.3	49.5	3.1	5.7	17.9	18.3	8.6	8.1	32.1	60.5	58.6	55.2	627	320	286	1,137	937
Cambodia 2000	14.1	24.4	28.6	45.9	49.9	8.7	8.5	24.8	21.4	16.6	6.7	21.2	47.9	51.4	54.2	331	232	150	572	556
India 1998-99	15.2	27.7	39.1	57.8	55.8	9.6	11.6	18.3	22.2	12.9	11.9	32.4	50.7	58.6	57.9	4,104	2,875	1,850	8,037	7,276
Nepal 1996	14.9	24.8	38.3	61.8	64.3	3.8	5.7	10.2	21.3	6.0	8.8	31.2	48.5	61.4	56.9	594	431	367	1,270	1,043
<b>Latin America/Caribbean</b>																				
Bolivia 1998	6.2	12.0	21.5	33.9	28.6	2.5	2.8	2.3	1.9	1.1	1.6	6.5	10.8	12.6	9.3	524	440	311	1,155	1,023
Brazil 1996	3.4	11.0	9.9	14.9	8.9	3.0	3.8	5.5	2.3	2.1	0.4	7.1	6.1	6.3	6.5	380	256	243	752	675
Colombia 2000	4.1	7.9	8.2	20.3	12.7	0.8	0.5	0.0	1.9	0.8	1.1	2.9	3.2	11.1	9.2	400	319	220	817	742
Dominican Republic 1996	5.0	3.3	13.7	15.5	10.8	1.4	2.4	1.0	2.2	1.1	1.2	1.6	9.3	8.1	7.6	310	236	211	725	649
Guatemala 1998-99	15.3	23.6	31.4	54.0	50.2	1.5	4.6	2.1	5.1	1.5	3.3	17.7	23.1	34.3	24.3	314	248	168	754	665
Haiti 2000	4.4	7.5	20.7	25.4	23.2	1.5	6.0	6.3	9.3	3.2	4.1	7.7	17.8	21.6	19.6	499	451	284	1,141	1,015
Peru 2000	3.9	10.1	14.4	29.2	27.1	1.0	1.2	1.6	1.5	0.7	1.0	3.5	9.6	10.1	8.9	854	626	545	2,113	1,932

Table A.3.8

**Nutritional status of young children**

Mean Z-scores and standard deviations for height-for-age, weight-for-height, and weight-for-age among children age 0–35 months, Demographic and Health Surveys, 1994-2001

Country	Height-for-age Z-score		Weight-for-height Z-score		Weight-for-age Z-score		Number of children
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	
<b>Sub-Saharan Africa</b>							
Benin 1996	-1.1	1.4	-0.8	1.2	-1.4	1.2	2,088
Burkina 1998-99	-1.4	1.6	-1.1	1.2	-1.7	1.3	2,315
Cameroon 1998	-1.3	1.6	-0.2	1.3	-1.0	1.4	1,759
Central African Republic 1994-95	-1.5	1.5	-0.5	1.1	-1.3	1.3	2,122
Chad 1996-97	-1.4	1.8	-1.0	1.2	-1.6	1.5	3,227
Comoros 1996	-1.5	1.5	-0.4	1.3	-1.3	1.3	844
Côte d'Ivoire 1994	-1.2	1.4	-0.6	1.1	-1.2	1.3	3,069
Eritrea 1995	-1.7	1.5	-1.0	1.1	-1.9	1.3	2,080
Ethiopia 2000	-2.0	1.5	-0.9	1.1	-1.9	1.2	5,532
Gabon 2000	-0.9	1.5	-0.1	1.1	-0.6	1.3	1,861
Ghana 1998	-1.0	1.4	-0.8	1.2	-1.2	1.3	1,530
Guinea 1999	-1.0	1.6	-0.7	1.3	-1.1	1.4	1,847
Kenya 1998	-1.3	1.6	-0.3	1.3	-1.0	1.4	2,649
Madagascar 1997	-2.0	1.4	-0.6	1.1	-1.7	1.2	2,839
Malawi 2000	-1.8	1.7	-0.2	1.3	-1.3	1.3	5,665
Mali 1995-96	-1.3	1.7	-1.2	1.3	-1.7	1.4	4,258
Mozambique 1997	-1.5	1.6	-0.5	1.3	-1.3	1.3	2,577
Niger 1998	-1.8	1.5	-1.2	1.1	-2.1	1.2	3,679
Tanzania 1999	-1.8	1.3	-0.4	1.1	-1.4	1.2	1,536
Togo 1998	-1.1	1.4	-0.8	1.1	-1.3	1.2	3,012
Uganda 2000-01	-1.6	1.4	-0.3	1.1	-1.2	1.2	3,380
Zambia 1996	-1.7	1.4	-0.3	1.2	-1.3	1.3	3,331
Zimbabwe 1999	-1.1	1.7	0.0	1.4	-0.7	1.3	1,460
<b>North Africa/West Asia/Europe</b>							
Egypt 2000	-0.9	1.5	0.6	1.3	-0.2	1.2	5,759
Jordan 1997	-0.5	1.2	0.0	1.0	-0.4	1.1	3,095
Turkey 1998	-0.6	1.3	-0.1	1.0	-0.4	1.2	1,488
Yemen 1997	-1.9	1.6	-0.8	1.3	-1.9	1.2	4,571
<b>Central Asia</b>							
Kazakhstan 1999	-0.6	1.2	0.0	1.0	-0.4	1.1	331
Kyrgyz Republic 1997	-1.2	1.3	0.2	1.2	-0.6	1.2	938
Uzbekistan 1996	-1.1	2.0	0.1	1.8	-0.7	1.7	937
<b>South/Southeast Asia</b>							
Bangladesh 2000	-1.8	1.3	-1.0	1.0	-1.9	1.1	3,027
Cambodia 2000	-1.6	1.6	-0.9	1.3	-1.7	1.2	1,695
India 1998-99	-1.9	1.6	-0.9	1.2	-1.9	1.3	22,723
Nepal 1996	-2.0	1.3	-0.9	1.0	-2.0	1.1	3,472
<b>Latin America/Caribbean</b>							
Bolivia 1998	-1.1	1.5	0.3	1.1	-0.5	1.3	3,244
Brazil 1996	-0.4	1.4	0.1	1.2	-0.2	1.2	2,146
Colombia 2000	-0.8	1.1	0.2	1.0	-0.4	1.2	2,333
Dominican Republic 1996	-0.5	1.3	0.1	1.1	-0.3	1.3	1,992
Guatemala 1998-99	-1.8	1.4	0.0	1.2	-1.1	1.3	2,033
Haiti 2000	-0.9	1.4	-0.3	1.1	-0.9	1.3	3,189
Peru 2000	-1.1	1.3	0.5	1.1	-0.3	1.3	5,716

**Table A.3.9**  
**Overweight children**  
 Percentage of overweight (weight-for-height) children age 0–35 months, Demographic and Health Surveys, 1994-2001

Country	Overweight (above 2 SD)	Number of children
<b>Sub-Saharan Africa</b>		
Benin 1996	1.3	2,273
Burkina 1998-99	1.1	2,530
Cameroon 1998	5.1	1,923
Central African Republic 1994-95	2.4	2,310
Chad 1996-97	1.6	3,541
Comoros 1996	3.9	921
Côte d'Ivoire 1994	1.5	3,341
Eritrea 1995	0.9	2,269
Ethiopia 2000	1.9	5,905
Gabon 2000	4.3	2,013
Ghana 1998	2.1	1,638
Guinea 1999	3.1	2,067
Kenya 1998	5.3	2,821
Madagascar 1997	2.0	3,080
Malawi 2000	4.8	6,073
Mali 1995-96	1.3	4,678
Mozambique 1997	3.6	2,837
Niger 1998	0.8	4,022
Tanzania 1999	2.1	1,674
Togo 1998	1.5	3,260
Uganda 2000-01	3.5	3,584
Zambia 1996	3.7	3,588
Zimbabwe 1999	8.5	1,587
<b>North Africa/West Asia/Europe</b>		
Egypt 2000	13.4	6,235
Jordan 1997	3.6	3,266
Turkey 1998	2.9	1,610
Yemen 1997	2.4	4,966
<b>Central Asia</b>		
Kazakhstan 1999	3.0	354
Kyrgyz Republic 1997	6.3	1,015
Uzbekistan 1996	14.4	989
<b>South/Southeast Asia</b>		
Bangladesh 2000	0.5	3,306
Cambodia 2000	2.6	1,842
India 1998-99	2.2	24,143
Nepal 1996	0.5	3,705
<b>Latin America/Caribbean</b>		
Bolivia 1998	7.7	3,451
Brazil 1996	5.5	2,306
Colombia 2000	4.3	2,498
Dominican Republic 1996	4.7	2,131
Guatemala 1998-99	5.4	2,149
Haiti 2000	2.3	3,389
Peru 2000	8.3	6,070

Table A.3.10

**Undernutrition by urban-rural residence**

Percentage of children age 0–35 months who are stunted, wasted, or underweight by urban-rural residence, Demographic and Health Surveys, 1994-2001

Country	Percent stunted		Percent wasted		Percent underweight		Number of children	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
<b>Sub-Saharan Africa</b>								
Benin 1996	21.4	26.6	12.1	15.3	24.4	31.3	709	1,564
Burkina 1998-99	20.4	32.4	13.0	18.4	24.6	38.0	306	2,224
Cameroon 1998	22.3	31.8	4.9	6.3	14.3	25.0	508	1,415
Central African Republic 1994-95	28.6	37.2	5.8	8.1	22.2	30.8	949	1,361
Chad 1996-97	27.6	36.8	15.8	18.5	32.9	40.8	747	2,794
Comoros 1996	29.9	35.0	10.3	7.6	25.0	26.1	224	697
Côte d'Ivoire 1994	15.3	29.2	7.9	8.4	16.2	27.7	1,134	2,206
Ethiopia 2000	32.8	46.2	8.0	13.5	31.8	46.8	585	5,320
Eritrea 1995	28.7	40.9	12.8	17.4	31.0	47.1	473	1,796
Gabon 2000	18.1	26.4	3.1	3.1	10.9	18.1	1,431	582
Ghana 1998	11.4	22.9	8.9	14.3	16.9	27.6	418	1,220
Guinea 1999	17.3	25.7	11.3	11.9	21.7	27.0	613	1,454
Kenya 1998	22.7	32.7	5.0	7.4	11.5	23.6	500	2,321
Madagascar 1997	44.6	49.2	5.3	7.9	35.6	41.0	600	2,481
Malawi 2000	29.2	46.3	6.2	7.7	12.0	30.2	800	5,274
Mali 1995-96	21.8	33.1	23.3	23.3	31.7	43.0	1,235	3,443
Mozambique 1997	27.3	38.9	10.4	7.1	20.0	28.2	713	2,124
Niger 1998	31.2	43.0	13.3	22.1	35.3	52.4	656	3,366
Tanzania 1999	19.7	42.0	6.0	6.6	18.7	32.9	308	1,366
Togo 1998	14.8	23.9	9.1	13.3	16.1	27.9	770	2,490
Uganda 2000-01	26.9	36.5	3.7	5.4	13.7	25.9	354	3,230
Zambia 1996	30.1	44.5	4.4	6.1	17.9	29.9	1,382	2,206
Zimbabwe 1999	22.1	28.5	3.8	8.8	7.8	16.5	505	1,082
<b>North Africa/West Africa/Europe</b>								
Egypt 2000	14.6	22.4	2.9	3.4	3.2	5.4	2,454	3,782
Jordan 1997	5.9	12.9	2.0	2.4	4.3	7.8	2,659	607
Turkey 1998	9.2	16.8	2.2	2.9	5.8	10.6	1,010	600
Yemen 1997	34.3	49.6	11.5	16.2	32.7	47.4	1,260	3,706
<b>Central Asia</b>								
Kazakhstan 1999	6.8	11.1	1.9	1.8	6.0	3.7	136	219
Kyrgyz Republic 1997	14.8	27.7	4.3	3.2	5.9	12.5	228	787
Uzbekistan 1996	32.6	30.7	10.2	12.2	16.6	19.7	285	704
<b>South/Southeast Asia</b>								
Bangladesh 2000	33.2	41.6	10.7	11.5	38.6	47.0	540	2,767
Cambodia 2000	35.1	37.6	12.3	17.0	32.3	41.4	260	1,582
India 1998-99	35.2	48.0	13.3	16.5	38.2	49.3	5,689	18,454
Nepal 1996	35.4	49.3	5.8	11.6	29.8	48.1	237	3,468
<b>Latin America/Caribbean</b>								
Bolivia 1998	17.4	33.6	1.5	2.4	5.9	13.3	2,004	1,448
Brazil 1996	7.4	19.2	2.8	3.0	4.1	9.7	1,750	556
Colombia 2000	10.2	18.5	0.9	1.3	6.3	9.1	1,703	795
Dominican Republic 1996	7.5	15.6	1.7	1.5	4.1	9.3	1,204	927
Guatemala 1998-99	31.2	48.2	2.2	3.7	14.5	29.4	797	1,352
Haiti 2000	11.2	22.5	6.8	5.2	13.1	17.7	1,074	2,315
Peru 2000	11.1	34.5	0.9	1.4	3.4	12.8	3,319	2,751

Table A.3.11

**Undernutrition by mother's education**

Percentage of children age 0–35 months who are stunted, wasted, or underweight by mother's education, Demographic and Health Surveys, 1994–2001

Country	Percent stunted			Percent wasted			Percent underweight			Number of children		
	No education <sup>1</sup>	Primary	Secondary									
<b>Sub-Saharan Africa</b>												
Benin 1996	26.1	23.6	13.3	14.5	13.2	15.3	30.6	25.5	20.3	1,762	391	120
Burkina Faso 1998-99	31.4	33.9	12.4	18.2	15.7	8.6	37.3	34.6	14.0	2,269	178	83
Cameroon 1998	38.2	27.0	21.6	8.0	5.8	3.5	35.1	18.2	12.0	644	773	507
Central Afr. Rep. 1994-95	37.2	32.4	24.1	7.7	7.0	5.2	30.9	25.4	19.1	1,138	867	305
Chad 1996-97	37.1	28.5	19.7	19.3	13.4	12.2	42.2	29.6	23.4	2,727	702	112
Comoros 1996	38.2	27.4	25.0	8.4	8.7	7.1	28.4	25.0	16.4	573	208	140
Côte d'Ivoire 1994	26.7	22.3	13.0	9.2	6.9	4.9	25.9	22.6	11.6	2,228	825	288
Eritrea 1995	41.8	29.2	22.9	17.3	14.6	11.7	47.2	36.3	24.3	1,735	364	170
Ethiopia 2000	46.5	43.2	25.7	13.6	10.2	9.0	47.8	38.3	26.3	4,790	774	341
Gabon 2000	21.8	24.9	16.4	4.5	3.3	2.7	17.4	16.5	9.2	139	875	999
Ghana 1998	23.7	22.3	15.8	15.7	11.9	11.2	30.2	24.8	20.5	584	344	709
Guinea 1999	24.8	17.3	13.0	12.1	12.3	7.3	26.8	20.7	16.4	1,720	192	155
Kenya 1998	42.9	34.0	18.3	9.7	7.7	3.9	34.4	23.7	10.7	303	1,786	732
Madagascar 1997	48.5	51.3	40.5	7.5	8.1	5.3	42.3	43.0	29.9	632	1,764	684
Malawi 2001	49.5	43.5	26.3	9.2	6.7	7.0	31.6	27.9	11.2	1,859	3,761	454
Mali 1995-96	31.7	24.3	14.7	24.0	19.3	20.5	41.9	32.0	24.5	3,944	516	218
Mozambique 1997	40.8	34.8	9.1	7.5	7.7	14.6	30.4	24.1	17.3	1,040	1,678	119
Niger 1998	42.3	35.5	23.6	21.2	20.0	8.9	50.7	46.6	28.7	3,536	354	132
Tanzania 1999	41.3	37.9	15.7	8.8	5.7	4.4	34.9	29.5	11.9	463	1,143	67
Togo 1998	25.5	17.6	12.0	14.2	9.6	9.5	30.1	19.1	14.2	1,915	1,047	299
Uganda 2000-01	39.6	35.4	27.4	7.3	4.8	3.6	30.7	23.8	17.3	854	2,321	410
Zambia 1996	47.4	40.5	28.9	8.1	5.5	3.6	33.9	26.8	15.6	503	2,292	793
Zimbabwe 1999	32.7	30.9	21.7	11.7	8.2	5.8	26.4	17.3	9.0	110	682	796
<b>North Africa/West Africa/Europe</b>												
Egypt 2000	23.2	21.2	15.6	3.2	2.9	3.2	6.1	4.4	3.3	2,355	925	2,955
Jordan 1997	22.7	11.3	5.6	4.1	1.8	1.9	13.2	7.8	4.0	178	375	2,713
Turkey 1998	27.4	9.8	3.8	4.3	2.1	1.6	18.7	5.5	2.7	325	943	342
<b>South/Southeast Asia</b>												
Bangladesh 2000	48.1	41.1	25.3	13.3	11.1	8.4	53.7	46.6	30.4	1,508	947	851
Cambodia 2000	42	37	27.4	18.9	16.3	10.5	47	38.3	31.1	597	983	261
India 1998-99	54.5	44.3	30.2	17.6	15.9	12.7	55.1	48.6	32.6	12,300	3,995	7,847
Nepal 1996	52.4	40.1	24.7	12.2	8.4	6.9	51.1	36.2	25.0	2,924	441	340
<b>Latin America/Caribbean</b>												
Bolivia 1998	41.4	30.3	13.1	2.7	2.2	1.4	18.9	10.8	4.5	353	1,653	1,445
Brazil 1996	20.8	14.8	5.9	4.6	3.1	2.5	9.0	8.3	3.0	145	899	1,263
Colombia 2000	26.0	17.8	8.6	3.2	0.8	1.1	14.2	9.4	5.3	80	1,002	1,417
Dominican Rep 1996	22.3	13.2	5.1	1.5	1.7	1.6	15.3	7.1	3.0	192	1,159	780
Guatemala 1999	58.9	40.4	11.3	3.6	3.3	1.6	35.0	22.4	5.5	696	1,122	331
Haiti 2000	24.6	18.3	7.1	5.8	4.9	7.6	18.8	15.1	13.7	1,239	1,621	528
Peru 2000	48.5	31.8	10.8	2.9	1.5	0.6	20.0	11.6	3.2	431	2,372	3,267

<sup>1</sup> Includes missing cases

Table A.3.12

**Undernutrition by mother's work status**

Percentage of children age 0 to 35 months who are stunted, wasted, or underweight by mother's work status, Demographic and Health Surveys, 1994-2001

Country	Percent stunted		Percent wasted		Percent underweight		Number of children	
	Mother working	Not working <sup>1</sup>	Mother working	Not working <sup>1</sup>	Mother working	Not working <sup>1</sup>	Mother working	Not working <sup>1</sup>
<b>Sub-Saharan Africa</b>								
Benin 1996	25.7	18.8	14.4	13.8	29.6	25.2	2,045	228
Burkina Faso 1998-99	31.2	30.5	18.8	15.3	38.3	32.1	1,718	811
Cameroon 1998	30.7	24.9	6.1	5.4	23.4	18.6	1,451	472
Central African Republic 1994-95	35.2	27.2	7.4	5.9	29.0	20.3	1,852	457
Chad 1996-97	33.7	35.8	17.3	18.3	38.8	39.4	1,513	2,028
Comoros 1996	32.9	34.4	7.7	8.6	25.2	26.3	389	532
Côte d'Ivoire 1994	25.8	20.3	8.2	8.4	24.4	22.1	2,497	844
Eritrea 1995	38.6	38.3	15.4	16.8	41.5	44.5	579	1,690
Ethiopia 2000	46.0	43.5	13.8	11.9	46.1	44.2	3,294	2,610
Gabon 2000	20.7	20.4	3.0	3.2	11.7	13.7	717	1,296
Ghana 1998	20.2	19.2	13.0	12.7	25.0	24.1	1,332	306
Guinea 1999	24.1	19.4	11.8	11.5	25.7	24.2	1,680	387
Kenya 1998	30.3	31.6	7.2	6.6	21.5	21.4	1,533	1,288
Madagascar 1997	50.0	41.8	7.6	6.6	41.0	35.7	2,464	616
Malawi 2000	44.7	43.1	7.2	7.9	29.5	25.5	3,513	2,561
Mali 1995-96	30.0	30.3	22.6	24.2	39.7	40.4	2,489	2,189
Mozambique 1997	38.9	31.7	6.6	9.7	29.1	21.8	1,666	1,171
Niger 1998	42.7	39.3	22.1	19.1	52.1	46.8	2,100	1,922
Tanzania 1999	40.6	29.1	5.5	10.0	31.6	25.9	1,283	391
Togo 1998	21.6	22.5	12.0	13.6	25.1	25.4	2,730	530
Uganda 2000-01	36.4	32.3	5.2	5.5	26.3	19.1	2,789	796
Zambia 1996	40.9	37.1	4.8	6.0	27.2	23.6	1,726	1,863
Zimbabwe 1999	24.6	28.1	8.1	6.3	13.1	14.3	763	825
<b>North Africa/West Asia/Europe</b>								
Egypt 2000	18.9	19.4	3.5	3.1	3.8	4.6	817	5,419
Jordan 1997	6.2	7.3	1.9	2.1	5.9	4.8	346	2,920
Turkey 1998	11.2	12.3	1.6	2.8	6.8	7.8	397	1,213
Yemen 1997	48.7	44.7	13.4	15.5	46.0	42.9	1,239	3,728
<b>Central Asia</b>								
Kazakhstan 1999	4.7	10.4	2.1	1.8	2.4	5.0	58	296
Kyrgyz Republic 1997	26.5	24.4	3.2	3.5	11.8	10.8	224	791
Uzbekistan 1996	36.6	29.2	9.0	12.6	20.4	18.2	272	717
<b>South/Southeast Asia</b>								
Bangladesh 2000	42.0	39.9	11.2	11.4	48.6	45.1	508	2,798
Cambodia 2000	38.6	34.3	18.1	12.3	44.2	31.0	1,272	570
India 1998-99	51.8	42.1	19.2	14.3	55.6	43.0	7,123	17,020
Nepal 1996	51.5	39.0	12.0	8.8	50.1	37.3	2,786	919
<b>Latin America/Caribbean</b>								
Bolivia 1998	25.1	23.5	2.1	1.7	8.5	9.4	1,614	1,838
Brazil 1996	8.6	11.2	2.7	2.9	4.1	6.2	819	1,487
Colombia 2000	12.8	12.8	1.3	0.9	7.1	7.3	922	1,576
Dominican Republic 1996	6.1	13.1	0.8	2.0	3.5	7.5	626	1,505
Guatemala 1998-99	38.5	42.9	2.4	3.4	21.1	24.7	488	1,661
Haiti 2000	18.7	19.1	5.8	5.6	15.5	17.0	1,655	1,734
Peru 2000	25.0	18.3	1.0	1.3	8.6	6.7	3,077	2,993

<sup>1</sup> Includes missing cases

Table A.3.13

**Undernutrition by flooring status**

Percentage of children age 0 to 35 months who are stunted, wasted, or underweight by flooring in residence, Demographic and Health Surveys, 1994-2001

Country	Percent stunted		Percent wasted		Percent underweight		Number of children	
	Finished flooring	Unfinished flooring <sup>1</sup>	Finished flooring	Unfinished flooring <sup>1</sup>	Finished flooring	Unfinished flooring <sup>1</sup>	Finished flooring	Unfinished flooring <sup>1</sup>
<b>Sub-Saharan Africa</b>								
Benin 1996	22.6	27.2	11.8	16.6	23.9	34.0	1,090	1,184
Burkina Faso 1998-99	25.5	32.8	14.2	18.9	28.2	39.1	636	1,894
Cameroon 1998	22.3	33.5	4.0	7.1	14.6	26.8	727	1,196
Central African Rep. 1994-95	27.0	35.1	4.9	7.6	20.4	28.8	406	1,904
Chad 1996-97	26.0	35.3	11.4	18.2	30.3	39.5	158	3,384
Comoros 1996	25.8	40.1	6.4	9.7	19.7	30.7	407	514
Côte d'Ivoire 1994	21.7	32.1	7.6	10.1	21.5	30.2	2,460	881
Eritrea 1995	25.0	40.5	9.4	17.5	25.2	46.7	315	1,955
Ethiopia 2000	26.9	45.6	9.3	13.1	24.1	46.1	222	5,683
Gabon 2000	16.9	28.2	3.1	3.1	10.8	17.6	1,371	642
Ghana 1998	18.5	27.1	12.2	16.4	23.1	33.2	1,354	284
Guinea 1999	20.2	25.8	11.5	11.9	22.1	28.3	950	1,117
Kenya 1998	20.7	35.0	5.1	7.7	11.8	25.3	801	2,020
Madagascar 1997	41.4	49.4	5.6	7.6	33.2	41.0	397	2,683
Malawi 2000	29.4	46.9	6.4	7.7	12.7	30.7	998	5,075
Mali 1995-96	19.6	32.9	21.6	23.8	27.8	43.2	964	3,715
Mozambique 1997	20.7	40.8	8.6	7.7	15.9	29.3	682	2,155
Niger 1998	30.0	42.8	12.7	21.9	33.8	52.1	555	3,467
Tanzania 1999	18.9	41.1	6.8	6.5	21.0	31.8	238	1,436
Togo 1998	19.8	26.2	12.0	13.0	23.6	28.5	2,257	1,003
Uganda 2000-01	26.6	37.0	2.6	5.7	12.8	26.7	521	3,064
Zambia 1996	29.1	45.8	4.4	6.1	17.1	31.0	1,471	2,117
Zimbabwe 1999	22.7	32.3	6.6	8.1	10.8	18.4	972	615
<b>North Africa/West Asia/Europe</b>								
Egypt 2000	17.1	25.3	3.1	3.5	3.6	7.1	4,565	1,670
Jordan 1997	7.1	*	2.0	*	4.8	*	3,251	15
Turkey 1998	11.9	12.6	2.8	1.4	7.1	9.0	1,202	408
Yemen 1997	41.3	50.4	12.2	17.9	38.2	49.4	2,541	2,425
<b>Central Asia</b>								
Kazakhstan 1999	3.3	10.7	3.5	1.5	5.9	4.3	59	295
Kyrgyz Republic 1997	10.2	26.0	0.8	3.6	3.2	11.6	74	941
Uzbekistan 1996	23.6	31.7	9.2	11.8	11.1	19.2	55	934
<b>South/Southeast Asia</b>								
Bangladesh 2000	22.7	42.9	7.2	12.1	26.3	48.5	436	2,871
Cambodia 2000	14.0	38.5	17.8	16.2	20.2	41.2	94	1,748
Nepal 1996	23.6	49.5	4.4	11.6	23.8	48.0	165	3,540
<b>Latin America/Caribbean</b>								
Bolivia 1998	16.4	31.9	1.5	2.3	5.4	12.5	1,712	1,740
Brazil 1996	8.1	22.1	2.7	3.9	4.2	12.1	1,942	364
Colombia 2000	10.7	22.5	0.9	1.4	6.0	12.7	2,042	456
Dominican Rep. 1996	9.2	24.0	1.3	3.6	4.8	17.2	1,868	263
Guatemala 1998-99	28.4	55.5	2.8	3.5	15.5	32.3	1,081	1,069
Haiti 2001	13.5	23.6	6.1	5.3	12.0	20.0	1,583	1,806
Peru 2000	8.4	30.1	0.5	1.5	2.3	11.1	2,359	3,712

Note: An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

<sup>1</sup> Rudimentary and natural flooring

Table A.3.14

**Undernutrition by type of sanitation facility**

Percentage of children age 0–35 months who are stunted, wasted, or underweight by type of household sanitation facilities, Demographic and Health Surveys, 1994–2001

Country	Percent stunted		Percent wasted		Percent underweight		Number of children	
	Improved <sup>1</sup>	Unimproved <sup>2</sup>						
<b>Sub-Saharan Africa</b>	18.5	26.2	11.3	14.9	20.6	30.6	345	1,904
Benin 1996	25.6	32.9	13.7	18.9	29.5	38.5	508	1,930
Burkina Faso 1998-99	27.9	38.0	5.2	8.4	20.3	37.8	1,607	198
Cameroon 1998	31.0	41.9	6.8	7.9	24.8	34.8	1,733	570
<b>Central African</b>								
Republic 1994-95	29.5	36.9	15.9	18.7	32.9	41.6	1,001	2,528
Chad 1996-97	34.0	*	8.4	*	26.0	*	909	4
Comoros 1996	19.7	29.7	6.8	10.0	19.9	28.1	1,767	1,559
Côte d'Ivoire 1994	25.3	40.3	11.9	17.1	26.3	46.3	291	1,973
Ethiopia 2000	34.5	46.8	8.5	13.8	36.3	47.0	812	4,892
Eritrea 1995	20.2	22.6	3.3	1.4	13.3	10.2	1,808	194
Gabon 2000	19.3	21.3	13.3	12.2	23.4	28.1	1,135	501
Ghana 1998	16.0	25.0	11.0	11.8	20.2	26.7	418	1,607
Guinea 1999	28.3	42.9	6.7	8.1	18.2	35.7	2,276	522
Kenya 1998	52.0	46.3	6.0	8.1	38.8	40.6	1,088	1,990
Madagascar 1997	42.5	50.8	7.0	9.6	25.8	36.1	4,804	1,094
Malawi 2000	28.8	33.7	22.6	24.7	37.7	46.5	3,399	1,249
Mali 1995-96	32.0	39.7	8.0	7.9	21.1	30.6	1,332	1,469
Mozambique 1997	31.6	43.1	13.7	22.3	36.3	52.6	735	3,272
Niger 1998	37.5	40.2	6.7	5.5	30.9	27.9	1,303	270
Tanzania 1999	14.4	24.2	10.2	12.8	17.4	27.9	797	2,375
Togo 1998	34.9	38.6	4.8	5.9	23.6	28.3	2,812	584
Uganda 2000-01	36.8	44.0	5.3	5.7	23.6	29.3	2,587	970
Zambia 1996	24.7	31.4	6.1	10.2	11.6	19.1	1,042	472
Zimbabwe 1999	18.5	26.2	11.3	14.9	20.6	30.6	345	1,904
<b>North Africa/West Asia/Europe</b>								
Egypt 2000	19.0	30.1	3.2	3.3	4.4	11.1	5,819	167
Jordan 1997	7.1	*	2.0	*	4.9	*	3,251	14
Turkey 1998	10.3	21.4	2.2	3.9	6.1	15.1	1,321	271
Yemen 1997	42.6	50.1	12.4	18.5	40.0	48.8	2,879	2,083
<b>Central Asia</b>								
Kazakhstan 1999	10.1	*	1.7	*	4.5	*	331	23
Kyrgyz Republic 1997	24.9	*	3.5	*	11.1	*	1,011	2
Uzbekistan 1996	31.3	*	11.6	*	18.8	*	988	1
<b>South/Southeast Asia</b>								
Bangladesh 2000	35.2	46.6	11.1	11.7	40.7	51.8	1,831	1,466
Cambodia 2000	27.1	39.1	11.7	17.0	25.7	42.5	267	1,561
India 1998-99	31.5	50.6	11.6	17.4	32.5	52.6	7,192	17,195
Nepal 1996	34.4	50.6	8.3	11.7	36.0	48.7	507	3,191
<b>Latin America/Caribbean</b>								
Bolivia 1998	16.9	30.6	1.9	1.9	6.5	11.2	1,587	1,854
Brazil 1996	7.7	22.1	2.6	3.8	4.3	11.1	1,883	411
Colombia 2000	11.3	23.9	0.9	2.0	6.3	13.6	2,190	307
Dominican Rep 1996	7.5	18.6	1.7	1.5	4.5	10.2	1,437	679
Guatemala 1998-99	39.5	53.7	2.7	5.4	21.5	35.4	1,768	374
Haiti 2001	15.4	23.2	5.6	5.8	14.5	18.6	1,826	1,525
Peru 2000	15.5	34.9	0.8	1.9	5.3	12.8	3,988	1,917

Note: An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

<sup>1</sup>Flush toilet, pit latrine, VIP latrine<sup>2</sup>No facility, open pit, service or bucket latrine, public latrine

Table A.3.15

**Undernutrition by source of drinking water**

Percentage of children age 0-35 months who are stunted, wasted, or underweight, by source of drinking water, Demographic and Health Surveys, 1994-2001

Country	Percent stunted		Percent wasted		Percent underweight		Number of children	
	Improved <sup>1</sup>	Unimproved <sup>2</sup>						
<b>Sub-Saharan Africa</b>								
Benin 1996	22.0	29.4	13.8	15.3	26.9	32.4	1,363	900
Burkina Faso 1998-99	30.2	32.3	17.8	17.8	34.0	38.9	1,177	1,271
Cameroon 1998	26.9	30.3	5.4	5.7	19.4	24.1	754	1,050
Central African Republic 1994-95	27.4	37.1	6.2	7.7	22.1	30.5	837	1,454
Chad 1996-97	34.7	35.0	19.3	17.4	38.6	39.4	1,007	2,522
Comoros 1996	32.9	(36.7)	8.3	(4.1)	25.1	(28.6)	853	49
Côte d'Ivoire 1994	19.3	27.9	8.2	8.3	20.0	26.3	1,363	1,965
Eritrea 1995	31.6	40.0	12.8	17.3	34.4	45.9	433	1,832
Ethiopia 2000	39.1	46.7	11.5	13.5	39.8	47.0	1,189	4,513
Gabon 2000	17.9	26.7	3.1	3.0	11.6	16.0	1,432	574
Ghana 1998	17.9	22.4	10.9	15.2	21.7	28.5	882	753
Guinea 1999	20.5	23.9	11.0	12.1	25.3	25.5	487	1,559
Kenya 1998	24.3	33.9	5.8	7.3	15.1	24.3	782	1,986
Madagascar 1997	41.5	49.5	5.7	7.7	34.0	41.0	453	2,626
Malawi 2000	40.7	49.9	7.1	8.1	24.4	33.4	3,745	2,158
Mali 1995-96	28.2	30.9	23.0	23.4	36.8	41.4	1,402	3,255
Mozambique 1997	27.1	39.3	9.0	7.6	17.2	29.5	763	2,046
Niger 1998	38.0	42.9	18.6	21.9	45.4	52.1	1,353	2,620
Tanzania 1999	33.3	45.5	6.7	6.2	28.9	32.7	973	600
Togo 1998	20.1	23.4	10.7	14.0	22.7	27.5	1,575	1,656
Uganda 2000-01	31.6	39.6	4.7	5.7	21.4	27.9	1,717	1,699
Zambia 1996	30.7	45.7	5.0	5.6	19.0	30.4	1,598	1,954
Zimbabwe 1999	25.2	32.6	7.1	8.1	13.4	15.7	1,196	318
<b>North Africa/West Asia/Europe</b>								
Egypt 2000	19.5	14.0	3.2	3.4	4.7	3.1	5,782	204
Jordan 1997	6.9	12.2	2.0	2.6	4.8	5.7	3,086	176
Turkey 1998	10.1	17.7	2.5	2.4	7.2	8.5	1,153	436
Yemen 1997	41.3	49.2	13.0	16.5	38.0	48.0	2,167	2,793
<b>Central Asia</b>								
Kazakhstan 1999	6.3	12.1	1.7	2.0	5.4	3.9	172	176
Kyrgyz Republic 1997	21.0	33.4	2.8	4.9	9.3	14.8	698	315
Uzbekistan 1996	30.7	32.6	9.3	16.6	17.6	21.4	678	311
<b>South/Southeast Asia</b>								
Bangladesh 2000	40.1	43.2	11.6	7.1	45.6	47.5	3,183	118
Cambodia 2000	35.3	37.7	14.0	17.1	37.8	40.8	533	1,228
India 1998-99	44.5	46.2	15.1	18.0	45.9	49.5	19,054	5,254
Nepal 1996	45.6	52.9	11.0	11.6	45.5	49.1	2,352	1,285
<b>Latin America/Caribbean</b>								
Bolivia 1998	20.0	33.7	1.8	2.2	6.9	13.7	2,364	1,023
Brazil 1996	7.3	16.9	2.3	3.4	3.8	9.1	1,594	602
Colombia 2000	11.7	19.2	1.1	0.9	6.6	10.2	2,111	375
Dominican Republic 1996	11.3	9.7	1.8	1.4	6.5	5.6	1,374	729
Guatemala 1998-99	45.0	26.1	3.5	1.7	25.8	14.4	1,773	370
Haiti 2001	17.4	21.2	5.5	6.1	14.5	19.0	1,968	1,385
Peru 2000	16.9	31.9	0.7	2.0	5.3	12.7	3,853	1,931

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

<sup>1</sup>Piped water into residence, piped public tap, protected well water, rainwater<sup>2</sup>Unprotected well or spring, surface water, vendor, bottled water, tanker truck

Table A.3.16

**Undernutrition by mother's nutritional status**

Percentage of children age 0–35 months who are stunted, wasted, or underweight by mother's nutritional status (eligible women BMI &lt;=60.0), Demographic and Health Surveys, 1994–2001

Country	Percent stunted			Percent wasted			Percent underweight			Number of children		
	<18.5	18.5-24.9	≥25.0	<18.5	18.5-24.9	≥25.0	<18.5	18.5-24.9	≥25.0	<18.5	18.5-24.9	≥25.0
<b>Sub-Saharan Africa</b>												
Benin 1996	26.1	25.8	15.3	21.8	14.4	8.5	40.9	30.2	17.5	268	1,470	191
Burkina 1998-99	32.1	30.2	31.2	31.3	17.1	13.4	49.5	35.8	28.1	260	1,831	111
Cameroon 1998	37.5	31.4	20.8	14.1	5.5	4.1	44.0	24.2	10.2	121	1,130	326
Central African												
Republic 1994-95	39.4	32.4	25.8	11.5	6.7	4.1	37.5	26.0	14.4	299	1,448	134
Chad 1996-97	42.1	33.5	25.3	28.1	16.9	14.6	54.4	37.1	24.9	594	2,193	139
Comoros 1996	42.7	34.3	24.8	14.7	8.1	8.1	30.7	27.5	18.8	75	530	149
Côte d'Ivoire 1994	30.5	25.2	16.9	13.6	9.0	5.0	43.4	24.9	12.0	222	2,209	382
Eritrea 1995	43.9	34.4	24.3	22.0	13.7	7.4	52.5	39.4	22.8	745	1,049	75
Ethiopia 2000	46.4	44.8	38.5	18.0	12.0	9.2	53.9	44.3	21.8	1,217	3,691	86
Gabon 2000	25.4	22.6	13.4	3.4	3.3	2.5	23.6	14.6	8.7	121	1,116	478
Ghana 1998	21.6	21.5	13.0	20.3	13.3	6.3	34.5	26.5	15.3	173	1,026	232
Guinea 1999	32.7	24.2	17.2	16.3	12.5	10.2	40.4	26.5	16.6	187	1,377	203
Kenya 1998	37.8	31.8	17.2	10.0	7.1	4.1	34.0	20.8	10.8	298	1,822	310
Madagascar 1997	53.6	48.1	29.5	14.9	6.0	3.6	51.6	38.5	15.3	496	1,949	91
Malawi 2000	48.3	44.5	37.3	9.8	8.0	4.5	40.3	28.5	15.9	317	4,279	546
Mali 1995-96	36.4	29.4	18.3	31.2	23.1	22.4	52.9	39.8	27.8	592	2,881	330
Mozambique 1997	37.7	37.4	18.9	14.4	8.7	4.2	34.2	28.2	8.5	233	1,945	242
Niger 1998	43.7	41.7	22.2	31.2	19.9	11.0	59.3	49.7	28.4	656	2,359	255
Togo 1998	26.4	22.0	14.0	22.5	12.5	7.0	38.0	25.6	13.7	306	2,208	322
Uganda 2000-01	39.0	34.8	25.3	10.9	5.4	3.2	40.3	25.2	12.7	263	2,265	308
Zambia 1996	49.1	38.3	31.6	6.9	5.7	2.6	36.4	26.7	10.7	259	2,390	343
Zimbabwe 1999	31.2	29.3	18.6	10.2	6.9	6.0	24.0	14.1	8.1	68	1,008	315
<b>North Africa/West Africa/Europe</b>												
Egypt 2000	21.7	14.1	18.7	2.7	1.7	2.9	4.7	3.5	4.9	958	311	1,917
Jordan 1997	8.7	8.9	6.4	3.1	3.0	1.2	7.1	6.5	3.9	68	1,018	1,506
Turkey 1998	(14.1)	12.8	9.9	(1.4)	3.3	1.8	(11.1)	8.7	5.9	36	629	726
Yemen 1997	48.8	45.0	35.4	24.0	13.9	8.9	53.4	41.9	31.8	947	2,347	577
<b>Central Asia</b>												
Kazakhstan 1999	(0.0)	13.1	4.2	(4.9)	2.0	0.0	(4.9)	5.3	0.0	28	231	66
Kyrgyz Republic 1997	32.4	24.6	20.1	12.6	3.6	0.9	29.2	11.4	6.0	63	658	161
Uzbekistan 1996	31.0	30.3	35.7	13.1	11.6	6.2	13.6	20.3	16.4	116	631	125
<b>South/Southeast Asia</b>												
Bangladesh 2000	45.6	38.3	19.6	14.9	9.0	5.7	57.4	37.8	18.9	1,376	1,443	101
Cambodia 2000	43.7	35.6	31.9	21.4	14.5	7.0	51.6	36.6	28.2	324	1,122	77
India 1998-99	50.2	42.3	23.9	19.8	12.9	8.5	57.3	40.5	21.4	8,821	11,037	949
Nepal 1996	51.1	46.4	31.0	16.4	9.8	7.3	56.6	43.7	21.9	891	2,278	52
<b>Latin America/Caribbean</b>												
Bolivia 1998	(34.0)	24.9	22.5	(0.0)	2.0	1.6	(11.2)	9.4	7.8	25	1,666	1,279
Brazil 1996	15.2	9.8	7.8	5.1	3.3	1.8	10.4	5.3	3.1	132	1,209	636
Colombia 2000	17.9	13.3	10.1	3.1	1.2	0.8	16.7	8.0	4.5	72	1,290	830
Dominican Republic 1996	18.6	11.7	6.5	1.9	1.8	0.5	15.6	5.7	3.4	130	1,052	606
Guatemala 1998-99	(61.0)	45.2	32.4	(10.6)	3.6	2.6	(49.3)	28.8	16.3	41	1,031	755
Haiti 2000	23.9	19.2	11.6	9.6	5.4	4.6	25.9	16.4	10.5	257	1,975	663
Peru 2000	(28.0)	24.6	17.0	(4.6)	1.5	0.5	(22.8)	9.5	4.5	47	3,000	2,413

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

Table A.3.17

**Undernutrition by antenatal care visits**

Percentage of children age 0-35 months who are stunted, wasted, or underweight by whether the mother had one or more antenatal visits, Demographic and Health Surveys, 1994-2001

Country	Percent stunted		Percent wasted		Percent underweight		Number of children	
	One or more antenatal visits	None <sup>1</sup>	One or more antenatal visits	None <sup>1</sup>	One or more antenatal visits	None <sup>1</sup>	One or more antenatal visits	None <sup>1</sup>
<b>Sub-Saharan Africa</b>								
Benin 1996	24.4	27.8	13.5	18.3	27.9	35.9	1,904	370
Burkina Faso 1998-99	29.6	33.6	17.2	18.7	34.8	39.2	1,665	865
Cameroon 1998	26.7	38.4	5.4	7.7	18.8	34.3	1,498	425
Central African Republic 1994-95	31.3	40.9	6.9	7.8	25.0	34.6	1,751	559
Chad 1996-97	29.2	38.3	14.3	20.1	32.2	43.4	1,339	2,202
Comoros 1996	32.7	40.5	8.0	9.9	24.1	36.6	790	131
Côte d'Ivoire 1994	23.2	31.5	7.9	10.4	22.4	31.9	2,837	504
Eritrea 1995	33.3	43.6	15.7	17.2	40.2	47.3	1,142	1,127
Ethiopia 2000	39.7	46.5	12.2	13.2	39.9	47.0	1,435	4,469
Gabon 2000	19.5	25.1	2.7	5.0	12.2	16.4	1,666	347
Ghana 1998	19.7	22.2	12.3	18.3	24.5	27.6	1,458	180
Guinea 1999	22.9	24.6	11.4	13.0	24.5	29.3	1,670	397
Kenya 1998	30.7	33.2	6.9	7.3	21.0	27.2	2,616	205
Madagascar 1997	49.1	44.3	7.3	8.1	40.1	39.1	2,613	467
Malawi 2000	42.2	55.2	7.7	6.2	26.7	34.2	5,210	863
Mali 1995-96	25.2	34.6	21.8	24.7	34.2	45.2	2,211	2,467
Mozambique 1997	33.8	41.3	8.3	6.8	25.5	27.6	2,021	816
Niger 1998	35.5	45.0	17.6	22.8	44.1	53.4	1,661	2,361
Tanzania 1999	35.9	51.3	6.3	8.1	29.1	38.1	1,458	216
Togo 1998	20.7	26.3	11.9	13.9	23.9	30.9	2,688	572
Uganda 2000-01	34.5	39.5	5.5	4.2	25.0	23.7	2,830	754
Zambia 1996	38.6	44.6	5.5	5.0	24.9	31.6	3,388	200
Zimbabwe 1999	25.0	31.0	7.1	7.4	12.9	16.4	1,218	369
<b>North Africa/West Asia/Europe</b>								
Egypt 2000	17.7	21.1	3.3	3.1	4.0	5.1	3,316	2,920
Jordan 1997	6.9	16.9	2.0	2.4	4.7	10.8	3,148	118
Turkey 1998	7.7	22.7	2.1	3.5	4.9	14.0	1,141	469
Yemen 1997	39.7	49.5	12.9	16.3	36.0	48.5	1,913	3,053
<b>Central Asia</b>								
Kazakhstan 1999	9.3	10.0	1.6	3.2	4.6	4.5	294	60
Kyrgyz Republic 1997	24.4	28.7	3.8	0.0	11.4	8.3	908	107
Uzbekistan 1996	31.2	31.6	11.2	14.8	18.4	21.3	863	125
<b>South/Southeast Asia</b>								
Bangladesh 2000	32.4	44.7	11.2	11.5	39.2	49.3	1,201	2,105
Cambodia 2000	31.8	41.1	14.8	17.4	33.9	44.5	763	1,079
India 1998-99	39.7	57.4	15.4	16.4	42.8	56.1	17,013	7,130
Nepal 1996	43.4	52.1	10.9	11.5	43.8	49.2	1,580	2,125
<b>Latin America/Caribbean</b>								
Bolivia 1998	19.7	35.5	1.5	3.0	6.6	14.8	2,455	997
Brazil 1996	7.9	26.5	2.9	2.5	4.3	13.5	2,013	293
Colombia 2000	10.9	21.1	1.1	0.9	5.9	12.6	2,022	476
Dominican Republic 1996	10.8	23.1	1.6	3.4	6.1	18.1	2,091	40
Guatemala 1998-99	41.2	47.2	3.1	3.5	23.7	24.9	1,913	236
Haiti 2000	15.2	27.1	5.4	6.2	13.4	22.6	2,343	1,046
Peru 2000	17.7	36.5	1.0	1.7	6.0	13.8	4,776	1,294

<sup>1</sup> Includes missing cases

Table A.3.18

**Undernutrition by mother's age at delivery**

Percentage of children 0-35 months who are stunted, wasted, or underweight by mother's age at delivery, Demographic and Health Surveys, 1994-2001

Country	Percent stunted			Percent wasted			Percent underweight			Number of children		
	< 20	20-34	35+	< 20	20-34	35+	< 20	20-34	35+	< 20	20-34	35+
<b>Sub-Saharan Africa</b>												
Benin 1996	30.9	24.2	23.8	14.7	14.0	15.2	33.5	28.3	29.4	297	1,584	392
Burkina Faso 1998-99	36.7	30.6	27.7	13.9	17.6	20.9	38.2	35.5	37.8	355	1,712	462
Cameroon 1998	32.9	28.5	27.2	6.4	5.7	6.7	26.9	20.2	25.0	406	1,279	238
Central African Rep. 1994-95	33.4	34.0	31.8	9.0	6.5	7.6	25.1	27.3	30.7	456	1,593	261
Chad 1996-97	36.8	34.4	34.1	17.4	17.4	22.1	36.6	39.5	42.2	771	2,387	384
Comoros 1996	37.6	33.9	30.5	10.9	8.4	5.8	34.7	25.7	20.8	101	666	154
Côte d'Ivoire 1994	31.2	22.6	24.3	9.4	7.8	9.0	28.5	22.3	24.9	646	2,287	408
Eritrea 1995	40.6	35.4	45.3	15.8	16.9	15.3	40.9	43.0	48.0	370	1,413	486
Ethiopia 2000	45.6	45.0	43.8	10.5	13.3	13.5	42.7	44.9	49.0	812	4,121	972
Gabon 2000	22.4	19.8	20.5	2.6	2.9	5.2	15.5	12.1	12.1	504	1,302	207
Ghana 1998	21.5	19.9	19.4	12.3	12.6	14.7	28.1	23.9	26.5	195	1,160	283
Guinea 1999	24.6	22.8	23.0	9.0	12.7	11.3	23.4	26.4	24.1	423	1,365	279
Kenya 1998	33.2	30.2	32.1	9.1	6.4	7.5	23.5	20.3	26.2	460	2,041	320
Madagascar 1997	49.8	47.1	52.4	8.2	7.0	8.0	41.1	38.5	45.6	637	2,038	405
Malawi 2000	46.0	42.8	47.5	8.1	7.0	9.2	30.3	26.4	31.4	1,153	4,128	793
Mali 1995-96	28.5	30.6	29.8	21.2	23.6	24.5	39.9	39.7	41.4	760	3,166	752
Mozambique 1997	42.6	35.1	29.5	8.1	7.1	11.7	32.1	25.0	22.0	600	1,871	366
Niger 1998	43.5	40.0	41.9	19.8	20.1	24.4	50.8	48.4	53.1	870	2,560	592
Tanzania 1999	43.6	36.3	40.4	7.2	5.6	10.5	35.2	28.8	32.7	260	1,202	212
Togo 1998	27.5	21.0	21.0	13.9	11.6	14.0	29.0	24.5	25.3	354	2,370	537
Uganda 2000-01	42.5	34.1	33.9	3.7	5.0	8.9	25.7	23.7	29.0	620	2,505	459
Zambia 1996	43.5	37.3	40.5	6.0	5.1	6.5	29.0	23.9	27.2	703	2,451	434
Zimbabwe 1999	26.1	25.8	30.3	7.7	6.8	8.4	12.6	13.8	15.0	318	1,074	196
<b>North Africa/West Asia/Europe</b>												
Egypt 2000	22.5	18.6	21.7	3.0	3.2	3.1	5.3	4.3	5.3	661	4,935	640
Jordan 1997	9.3	6.8	8.6	2.8	2.0	1.7	6.5	4.8	4.8	260	2,578	427
Turkey 1998	15.2	11.3	14.0	3.8	2.3	1.6	9.4	7.4	5.9	229	1,255	126
Yemen 1997	49.9	45.4	43.1	13.1	15.2	15.9	44.9	43.3	44.2	713	3,458	795
<b>Central Asia</b>												
Kazakhstan 1999	(12.7)	8.2	(17.0)	(1.0)	2.2	(0.0)	(1.8)	4.8	(5.9)	39	284	31
Kyrgyz Rep. 1997	27.9	24.0	28.7	2.0	3.1	9.1	10.3	10.2	20.1	123	810	82
Uzbekistan 1996	27.8	31.0	43.2	10.1	11.3	20.8	10.8	19.3	28.4	114	824	51
<b>South/Southeast Asia</b>												
Bangladesh 2000	46.2	36.3	52.2	10.0	11.9	13.6	49.1	43.0	57.6	1,021	2,102	183
Cambodia 2000	38.6	36.2	40.3	15.4	15.6	19.1	40.1	39.1	43.4	167	1,279	396
India 1998-99	50.0	43.2	47.6	16.2	15.5	16.5	50.7	45.2	52.4	5,532	17,710	901
Nepal 1996	45.5	48.3	54.2	10.8	11.2	12.3	45.1	46.6	52.9	654	2,695	355
<b>Latin America/Caribbean</b>												
Bolivia 1998	20.0	23.6	30.0	1.8	1.9	2.1	7.2	8.9	10.9	475	2,396	580
Brazil 1996	10.9	10.1	10.5	3.1	2.6	3.8	5.8	5.3	5.9	450	1,627	229
Colombia 2000	13.5	12.4	14.3	0.7	1.1	1.3	5.0	7.7	8.0	508	1,736	253
Dominican Rep. 1996	13.8	9.9	15.3	3.2	1.2	1.0	10.4	4.7	12.6	441	1,578	112
Guatemala 1998-99	43.5	40.1	49.1	2.4	2.8	5.9	21.1	22.3	34.8	344	1,510	295
Haiti 2000	19.1	18.5	20.2	4.5	5.9	5.8	14.3	16.1	18.2	467	2,264	658
Peru 2000	22.8	20.1	27.6	1.3	1.1	1.3	9.3	6.8	10.1	892	4,218	960

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

Table A.3.19

**Undernutrition by mother's perceived size of child at birth**

Percentage of children age 0–35 months who are stunted, wasted, or underweight by mother's perceived size of child at birth, Demographic and Health Surveys, 1994-2001

Country	Percent stunted			Percent wasted			Percent underweight			Number of children		
	Very Small	Smaller than average	Average or larger	Very Small	Smaller than average	Average or larger	Very Small	Smaller than average	Average or larger	Very Small	Smaller than average	Average or larger
<b>Sub-Saharan Africa</b>												
Benin 1996	43.2	32.9	23.1	23.7	14.4	13.9	55.7	39.0	26.7	83	266	1,919
Burkina Faso 1998-99	36.1	37.5	29.9	27.6	18.2	16.9	53.7	44.8	34.2	158	245	2,119
Cameroon 1998	40.6	33.3	28.1	10.0	5.8	5.8	45.2	25.5	20.5	81	215	1,622
Central African Republic 1994-95	50.4	44.0	31.2	9.1	11.0	6.5	43.7	35.5	25.3	91	285	1,887
Chad 1996-97	40.7	38.6	32.6	26.2	22.5	14.8	52.9	45.8	34.3	520	653	2,355
Comoros 1996	54.3	38.5	30.5	14.9	8.5	7.3	39.4	32.3	23.1	94	130	685
Côte d'Ivoire 1994	40.0	30.4	22.5	14.7	11.1	7.4	43.7	32.8	21.2	194	378	2,767
Eritrea 1995	47.3	39.3	36.4	22.6	22.2	14.0	55.1	51.8	40.0	371	238	1,622
Ethiopia 2000	51.2	50.6	41.5	17.6	12.5	12.7	52.7	51.4	41.6	371	1,804	3,721
Gabon 2000	36.7	28.3	18.6	7.4	2.8	2.9	26.4	20.8	11.1	80	168	1,728
Ghana 1998	(32.7)	31.0	18.3	(14.6)	18.8	12.1	(53.9)	39.6	22.3	27	189	1,418
Guinea 1999	29.2	24.2	22.8	22.8	13.8	11.0	43.4	32.0	23.7	80	183	1,782
Kenya 1998	38.0	39.0	29.4	5.8	7.1	7.0	33.2	27.9	19.9	130	306	2,375
Madagascar 1997	59.8	53.3	45.5	10.7	10.3	6.4	54.2	48.9	36.0	372	394	2,297
Malawi 2000	52.8	55.7	42.0	8.1	11.0	7.0	43.7	39.7	25.4	223	719	5,110
Mali 1995-96	41.3	36.0	29.0	35.2	27.8	22.3	58.4	48.4	38.1	179	475	3,975
Mozambique 1997	(14.6)	44.0	34.5	(42.1)	6.6	7.7	(51.6)	31.5	24.5	39	466	2,298
Niger 1998	49.4	42.5	38.6	27.4	23.4	18.2	57.4	57.0	45.3	621	831	2,556
Tanzania 1999	(55.0)	43.6	36.9	(5.6)	15.3	5.7	(55.9)	36.0	29.0	47	137	1,490
Togo 1998	34.7	28.4	19.6	19.9	18.1	10.7	44.1	38.5	21.5	242	368	2,647
Uganda 2000-01	44.9	43.9	33.5	9.8	7.2	4.5	40.2	33.8	21.9	250	452	2,837
Zambia 1996	63.1	47.9	37.2	12.7	9.4	4.8	51.4	39.9	22.9	99	343	3,145
Zimbabwe 1999	40.9	29.2	25.5	8.1	5.5	7.4	36.1	15.8	12.4	70	181	1,326
<b>North Africa/West Asia/Europe</b>												
Egypt 2000	26.3	24.8	18.4	3.2	3.8	3.1	11.4	6.4	4.0	197	700	5,318
Jordan 1997	19.5	13.4	5.7	5.8	1.6	1.9	16.3	10.0	3.6	174	329	2,762
Turkey 1998	22.6	16.1	9.7	4.3	2.0	2.3	17.5	6.9	6.3	174	260	1,169
Yemen 1997	53.1	49.9	43.5	18.5	17.7	13.7	54.1	49.4	40.5	487	1,032	3,441
<b>Central Asia</b>												
Kazakhstan 1999	*	11.9	7.8	*	8.2	0.8	*	13.1	2.5	12	53	289
Kyrgyz Republic 1997	*	45.7	22.5	*	3.4	3.4	*	20.4	9.8	20	100	887
Uzbekistan 1996	*	37.4	30.7	*	17.6	10.4	*	29.2	17.1	5	108	865
<b>South/Southeast Asia</b>												
Bangladesh 2000	56.9	48.2	37.7	16.3	14.5	10.5	68.2	55.3	42.4	175	491	2,638
Cambodia 2000	51.0	43.6	35.9	16.2	24.0	15.3	47.2	52.7	38.2	76	191	1,559
India 1998-99	57.1	50.0	42.9	21.0	20.5	14.2	61.9	54.5	43.8	1,101	4,642	18,360
Nepal 1996	64.4	57.3	44.8	15.5	16.5	9.5	62.6	60.7	42.1	188	757	2,759
<b>Latin America/Caribbean</b>												
Bolivia 1998	37.6	33.9	21.5	3.5	2.6	1.6	16.0	16.1	7.3	269	401	2,773
Brazil 1996	31.0	18.0	7.1	6.8	4.5	2.2	20.3	8.2	3.9	93	460	1,744
Dominican Republic 1996	29.8	19.0	8.3	2.0	1.3	1.7	27.1	12.1	3.9	96	355	1,675
Guatemala 1998-99	52.5	49.7	38.0	2.6	3.4	2.9	30.0	30.1	20.8	204	426	1,501
Haiti 2000	26.4	16.9	16.6	6.0	8.0	5.1	25.0	21.4	12.2	775	428	2,186

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.

Table A.3.20

**Undernutrition by sex of child**

Percentage of children age 0–35 months who are stunted, wasted, or underweight by sex of child, Demographic and Health Surveys, 1994–2001

Country	Percent stunted		Percent wasted		Percent underweight		Number of children	
	Male	Female	Male	Female	Male	Female	Male	Female
<b>Sub-Saharan Africa</b>								
Benin 1996	27.2	22.7	16.0	12.6	32.1	26.2	1,145	1,128
Burkina Faso 1998-99	32.8	29.1	19.3	16.1	35.9	36.8	1,272	1,258
Cameroon 1998	31.5	27.0	7.0	4.9	24.0	20.4	962	961
Central African Republic 1994-95	35.5	31.8	7.6	6.6	29.1	25.4	1,171	1,139
Chad 1996-97	35.7	34.1	19.8	16.0	40.6	37.7	1,760	1,781
Comoros 1996	35.7	31.7	9.4	7.0	27.6	24.0	479	442
Côte d'Ivoire 1994	25.2	23.6	9.7	6.7	26.4	21.1	1,705	1,636
Eritrea 1995	36.4	40.5	16.2	16.7	42.3	45.2	1,162	1,107
Ethiopia 2000	46.5	43.2	14.6	11.2	47.2	43.3	2,991	2,914
Gabon 2000	22.7	18.2	3.2	3.0	14.0	11.9	1,010	1,003
Ghana 1998	21.1	19.0	14.5	11.4	24.4	25.3	807	830
Guinea 1999	24.9	21.4	12.0	11.4	24.6	26.3	1,075	992
Kenya 1998	33.8	27.9	7.1	6.8	22.9	20.0	1,440	1,380
Madagascar 1997	51.8	44.8	8.2	6.5	42.2	37.7	1,553	1,528
Malawi 2000	46.1	41.9	6.9	8.1	27.9	27.6	3,032	3,042
Mali 1995-96	31.0	29.2	24.5	22.2	39.7	40.3	2,288	2,390
Mozambique 1997	36.1	35.8	8.0	7.7	28.2	24.0	1,450	1,387
Niger 1998	42.5	39.5	20.6	20.7	48.9	50.3	2,108	1,914
Tanzania 1999	38.4	37.4	6.4	6.6	29.8	30.8	863	811
Togo 1998	23.4	20.1	11.4	13.1	25.8	24.5	1,603	1,657
Uganda 2000-01	37.3	33.7	6.6	3.9	26.3	23.1	1,783	1,802
Zambia 1996	40.4	37.5	6.5	4.4	27.1	23.6	1,767	1,822
Zimbabwe 1999	27.4	25.3	7.5	6.9	14.6	12.8	821	767
<b>North Africa/West Asia/Europe</b>								
Egypt 2000	20.5	18.0	3.7	2.6	5.2	3.8	3,209	3,027
Jordan 1997	8.0	6.4	2.1	2.0	4.6	5.2	1,668	1,598
Turkey 1998	12.6	11.4	2.8	2.0	8.3	6.7	866	744
Yemen 1997	46.4	45.1	15.9	14.1	44.0	43.4	2,526	2,440
<b>Central Asia</b>								
Kazakhstan 1999	7.8	10.9	3.3	0.6	5.2	4.0	166	188
Kyrgyz Republic 1997	28.0	21.5	4.2	2.6	13.4	8.6	519	496
Uzbekistan 1996	33.9	28.5	12.6	10.6	20.7	16.8	509	480
<b>South/Southeast Asia</b>								
Bangladesh 2000	39.4	41.0	11.6	11.2	44.4	47.0	1,684	1,623
Cambodia 2000	36.2	38.4	17.1	15.5	39.8	40.4	949	893
India 1998-99	43.6	46.4	16.0	15.4	45.0	48.5	12,574	11,569
Nepal 1996	46.6	50.2	12.3	10.2	45.8	48.0	1,887	1,817
<b>Latin America/Caribbean</b>								
Bolivia 1998	25.5	22.9	2.2	1.6	9.4	8.6	1,742	1,709
Brazil 1996	11.2	9.4	2.8	2.9	6.4	4.5	1,144	1,162
Colombia 2000	13.6	12.1	0.8	1.2	7.0	7.4	1,285	1,214
Dominican Republic 1996	12.5	9.4	2.1	1.1	7.0	5.6	1,099	1,031
Guatemala 1998-99	45.1	38.6	3.6	2.8	27.6	20.0	1,093	1,057
Haiti 2000	20.4	17.3	4.8	6.6	16.1	16.4	1,726	1,663
Peru 2000	21.4	22.0	1.1	1.2	7.9	7.5	3,075	2,995

Table A.3.21

**Undernutrition by birth order**

Percentage of children age 0–35 months who are stunted, wasted, or underweight by birth order, Demographic and Health Surveys, 1994–2001

Country	Percent stunted				Percent wasted				Percent underweight				Number of children			
	1st Birth	Birth 2-3	Birth 4-5	Birth 6+	1st Birth	Birth 2-3	Birth 4-5	Birth 6+	1st Birth	Birth 2-3	Birth 4-5	Birth 6+	1st Birth	Birth 2-3	Birth 4-5	Birth 6+
<b>Sub-Saharan Africa</b>																
Benin 1996	26.8	24.8	24.6	24.2	13.9	14.6	12.7	15.6	30.8	27.6	31.0	28.4	442	725	500	606
Burkina Faso 1998-99	35.8	28.9	30.3	30.9	15.2	17.2	17.7	19.9	37.7	34.3	34.2	39.6	435	799	595	701
Cameroon 1998	30.8	27.5	29.7	29.9	5.0	5.6	6.0	7.3	21.7	19.2	23.4	25.6	419	617	435	452
Central African Republic 1994-95	31.5	35.2	33.2	33.8	6.0	8.8	6.2	6.6	23.6	28.6	27.6	28.3	466	775	527	541
Chad 1996-97	33.4	34.0	36.3	35.6	17.4	15.4	18.2	20.9	36.1	35.3	42.5	42.6	652	1,081	869	939
Comoros 1996	29.8	33.9	33.2	36.5	8.9	6.3	8.9	9.4	23.8	25.9	25.3	27.4	168	286	190	277
Côte d'Ivoire 1994	27.6	23.7	22.0	25.4	8.7	7.2	8.7	8.9	25.0	22.5	23.9	24.6	630	1,072	828	811
Eritrea 1995	35.2	33.8	40.9	44.5	16.5	15.8	17.6	16.1	37.5	41.0	46.7	49.9	499	703	496	570
Ethiopia 2000	42.1	43.8	45.6	47.3	8.2	13.2	14.8	14.1	37.5	43.1	49.1	49.5	1,056	1,847	1,286	1,716
Gabon 2000	19.5	20.7	17.9	23.9	3.5	2.5	3.4	3.3	12.7	14.4	10.6	13.3	508	683	411	411
Ghana 1998	18.4	19.8	17.9	24.5	13.4	11.9	13.1	14.1	24.7	22.9	24.4	29.2	390	592	332	324
Guinea 1999	21.6	24.0	22.9	23.8	9.5	10.7	14.5	11.9	22.1	24.9	26.5	27.5	386	652	519	510
Kenya 1998	27.2	29.5	34.3	34.4	5.5	7.6	7.8	6.8	16.8	20.6	23.6	26.3	685	998	545	593
Madagascar 1997	49.1	44.3	46.8	54.2	6.3	7.1	8.6	7.7	36.6	37.6	41.0	45.2	678	996	650	756
Malawi 2000	43.8	43.1	42.8	47.0	7.4	7.3	7.8	7.6	29.7	26.0	27.2	29.4	1,327	2,177	1,275	1,295
Mali 1995-96	29.3	26.3	30.4	33.4	20.3	21.2	23.6	26.3	37.9	35.7	39.0	45.2	690	1,313	1,080	1,595
Mozambique 1997	40.1	38.6	33.4	29.2	6.3	8.1	6.6	11.0	25.6	27.9	26.1	23.1	577	1,067	673	520
Niger 1998	40.6	40.2	42.5	41.1	19.4	18.4	20.6	23.0	48.1	45.9	49.7	53.1	670	1,073	883	1,396
Tanzania 1999	40.5	32.2	39.0	43.3	7.1	6.4	5.1	7.4	32.3	29.2	27.8	32.5	367	577	361	369
Togo 1998	21.0	20.6	22.5	22.9	12.4	11.7	10.7	14.6	24.3	24.8	25.0	26.4	622	1,031	820	788
Uganda 2000-01	37.0	35.5	36.6	33.8	4.2	4.2	5.5	6.9	21.4	22.7	26.6	27.3	555	1,171	860	999
Zambia 1996	41.7	37.2	37.3	40.6	5.1	5.9	4.7	5.8	26.4	24.2	24.7	26.5	723	1,195	805	866
Zimbabwe 1999	23.4	26.3	29.5	30.3	6.0	7.1	8.3	8.8	11.8	13.7	14.4	17.7	507	618	243	221
<b>North Africa/West Asia/Europe</b>																
Egypt 2000	18.5	17.9	20.1	25.2	3.4	2.8	3.8	3.1	4.4	3.2	5.5	8.0	1,693	2,654	1,152	737
Jordan 1997	5.9	6.3	7.4	9.7	2.8	2.3	2.0	1.1	4.9	3.5	5.8	6.3	608	1,181	766	711
Turkey 1998	9.9	10.5	13.3	27.4	2.3	2.4	3.2	2.3	6.6	6.4	9.6	14.7	582	698	194	136
Yemen 1997	44.9	42.6	47.1	47.5	14.7	14.9	15.2	15.0	40.6	40.7	45.2	46.4	843	1,317	974	1,832
<b>Central Asia</b>																
Kazakhstan 1999	7.3	7.9	18.6	*	3.6	1.1	1.0	*	5.3	3.6	7.5	*	118	170	51	16
Kyrgyz Republic 1997	21.7	23.9	25.9	40.2	4.4	2.5	3.8	4.8	9.8	10.2	9.9	23.4	287	468	184	76
Uzbekistan 1996	27.4	30.7	37.4	40.7	9.0	11.6	13.0	22.8	11.8	20.0	23.4	35.1	313	465	154	56
<b>South/Southeast Asia</b>																
Bangladesh 2000	40.6	36.6	44.8	46.4	9.4	10.7	15.9	12.5	45.8	41.8	50.6	53.0	936	1,439	574	358
Cambodia 2000	35.3	35.3	37.5	41.8	16.8	13.2	16.4	20.6	39.5	35.4	42.3	45.8	336	649	445	411
India 1998-99	39.2	43.8	52.1	55.9	14.6	15.2	17.2	18.8	40.7	45.9	52.9	58.3	7,092	10,769	4,127	2,154
Nepal 1996	40.9	48.4	49.9	56.4	8.3	10.2	13.5	14.8	39.5	45.4	51.3	54.7	819	1,469	823	594
<b>Latin America/Caribbean</b>																
Bolivia 1998	14.6	21.3	30.0	35.4	2.0	2.0	1.2	2.3	5.3	7.8	10.4	14.2	834	1,246	690	681
Brazil 1996	6.9	8.5	14.8	27.6	2.5	2.6	3.8	4.4	3.9	3.4	11.0	14.6	819	1,007	289	192
Colombia 2000	10.0	12.1	17.0	29.9	0.6	0.9	2.1	2.8	4.9	7.0	9.8	19.3	931	1,118	319	130
Dominican Republic 1996	7.4	9.8	17.7	19.8	1.9	1.0	3.1	1.2	4.6	4.9	11.2	12.5	665	975	327	164
Guatemala 1998-99	34.2	36.1	47.8	53.6	2.9	3.0	2.8	4.1	16.1	19.6	26.0	37.0	502	730	458	460
Haiti 2000	13.7	15.6	20.2	27.2	3.9	6.2	6.5	6.0	13.0	13.4	16.0	23.5	798	1,109	655	827
Peru 2000	14.2	18.3	28.3	41.0	0.8	1.2	1.4	1.5	4.8	6.1	10.2	16.2	1,866	2,426	961	816

Note: An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

Table A.3.22

**Undernutrition by length of preceding birth interval**

Percentage of children age 0–35 months who are stunted, wasted, or underweight by length of preceding birth interval in months, Demographic and Health Surveys, 1994-2001

Country	Percent stunted				Percent wasted				Percent underweight				Number of children			
	First birth <sup>1</sup>	< 24	24-47	48+	First birth <sup>1</sup>	< 24	24-47	48+	First birth <sup>1</sup>	< 24	24-47	48+	First birth <sup>1</sup>	< 24	24-47	48+
<b>Sub-Saharan Africa</b>																
Benin 1996	26.9	33.6	23.6	23.2	14.1	20.0	14.4	11.2	30.9	38.0	27.9	27.2	445	176	1,322	331
Burkina Faso 1998-99	36.0	35.8	29.4	28.8	15.2	21.0	17.5	19.1	37.6	46.4	35.3	33.8	436	218	1,406	470
Cameroon 1998	30.8	35.6	28.3	24.7	5.2	7.4	6.0	5.5	22.3	22.6	24.1	15.5	423	257	948	295
Central African Republic 1994-95	31.4	40.8	34.2	27.4	5.9	10.2	5.9	9.6	23.5	34.9	25.8	29.4	467	353	1,155	335
Chad 1996-97	33.3	46.0	33.6	28.9	17.6	18.3	17.7	18.5	36.2	46.9	38.0	38.5	654	559	1,855	473
Comoros 1996	30.8	38.8	32.7	33.3	8.7	8.5	8.9	4.9	24.4	34.3	22.6	25.2	172	201	425	123
Côte d'Ivoire 1994	27.6	27.7	24.9	17.9	8.6	5.3	8.8	8.1	24.9	24.4	25.2	18.4	633	353	1,742	613
Eritrea 1995	35.1	46.6	40.0	28.4	16.4	18.3	15.7	16.9	37.3	50.8	46.4	36.5	501	347	1,116	304
Ethiopia 2000	42.3	52.7	45.8	37.7	8.2	12.2	14.5	13.7	37.8	51.1	46.3	45.2	1,064	831	3,078	931
Gabon 2000	19.7	26.8	22.0	13.3	3.4	4.3	2.3	3.1	12.7	16.5	13.8	8.5	514	331	769	399
Ghana 1998	18.3	26.3	22.5	15.3	13.4	15.1	12.0	13.4	24.6	32.7	26.3	20.1	392	135	706	405
Guinea 1999	21.9	29.1	24.2	19.4	9.9	9.4	12.2	13.4	22.7	26.6	25.4	27.5	390	194	1,036	447
Kenya 1998	27.0	31.0	35.1	27.2	5.7	10.4	7.2	5.1	16.7	28.1	22.8	19.2	691	458	1,118	554
Madagascar 1997	49.2	49.9	49.0	42.7	6.3	8.8	7.6	6.6	36.8	43.4	41.0	37.1	681	524	1,442	433
Malawi 2000	44.2	48.9	43.0	43.1	7.5	8.1	6.7	9.0	30.0	30.5	25.4	29.3	1,340	782	2,837	1,115
Mali 1995-96	29.4	38.3	30.1	22.4	20.3	24.2	23.4	25.4	38.2	48.0	39.1	36.9	695	709	2,582	693
Mozambique 1997	40.0	40.5	36.7	28.1	6.3	5.3	8.2	9.8	25.4	32.3	28.4	18.5	580	246	1,433	578
Niger 1998	40.5	50.2	39.7	35.0	19.3	23.5	20.1	21.1	48.1	59.0	48.5	43.3	673	672	2,232	444
Tanzania 1999	40.5	42.0	36.2	37.0	7.1	1.5	7.6	5.9	32.3	32.5	31.2	24.0	367	185	819	303
Togo 1998	20.8	26.8	22.9	17.8	12.4	12.8	12.4	11.6	24.5	30.3	26.3	20.9	627	252	1,702	679
Uganda 2000-01	36.9	39.9	34.8	28.6	4.1	5.3	5.4	6.1	21.2	26.9	25.7	20.7	558	775	1,835	417
Zambia 1996	41.6	39.9	38.5	35.6	5.1	4.7	5.5	6.5	26.3	24.9	25.0	25.4	725	539	1,845	478
Zimbabwe 1999	23.5	29.2	27.3	28.1	5.9	4.7	7.8	8.6	12.0	16.7	15.1	13.2	511	112	576	389
<b>North Africa/West Asia/Europe</b>																
Egypt 2000	18.6	23.3	18.7	18.2	3.4	4.1	3.1	2.2	4.4	6.8	4.3	3.3	1,713	1,011	2,231	1,280
Jordan 1997	6.1	8.6	8.1	2.8	2.7	2.6	1.5	1.0	4.8	6.0	5.0	2.0	617	1,143	1,087	419
Turkey 1998	9.8	19.8	14.0	8.8	2.5	4.1	2.1	1.8	6.8	12.7	8.4	4.9	590	233	395	393
Yemen 1997	45.0	50.9	45.2	38.1	14.7	14.3	15.6	15.0	40.7	47.7	44.3	37.7	845	1,374	2,047	700
<b>Central Asia</b>																
Kazakhstan 1999	7.3	12.0	13.2	7.6	3.6	0.0	2.6	0.5	5.3	9.1	4.9	0.0	118	72	68	96
Kyrgyz Republic 1997	21.7	28.4	29.2	18.7	4.4	2.4	3.0	3.8	9.7	12.8	13.4	7.4	288	192	333	202
Uzbekistan 1996	27.4	33.6	31.5	36.7	9.0	13.9	13.8	8.7	11.8	28.0	20.9	16.4	314	196	348	131
<b>South/Southeast Asia</b>																
Bangladesh 2000	40.9	48.9	42.8	32.2	9.7	11.0	12.3	12.4	46.1	53.1	46.8	40.4	942	379	1,129	856
Cambodia 2000	35.3	50.2	38.2	29.8	16.8	11.0	17.5	16.8	39.5	47.9	41.1	34.5	336	255	792	458
India 1998-99	39.3	50.3	48.3	41.7	14.6	16.1	15.9	16.7	40.9	52.0	49.7	44.8	7,124	3,805	9,513	3,701
Nepal 1996	40.9	51.2	50.8	48.9	8.3	13.2	11.2	13.5	39.4	49.0	49.2	48.8	823	604	1,737	541
<b>Latin America/Caribbean</b>																
Bolivia 1998	14.6	29.8	30.7	18.3	2.0	1.0	2.1	2.4	5.3	9.8	12.2	6.8	838	704	1,249	660
Brazil 1996	6.9	19.6	12.4	6.6	2.5	3.1	4.5	1.6	3.9	10.7	8.1	1.5	820	405	514	567
Colombia 2000	10.0	20.1	16.4	9.3	0.6	1.8	1.1	1.1	4.8	12.7	10.5	4.3	937	407	542	613
Dominican Republic 1996	7.4	18.1	12.5	5.4	1.9	1.5	1.3	1.9	4.5	9.5	6.6	4.9	668	475	647	340
Guatemala 1998-99	34.2	50.1	46.6	26.8	2.9	3.2	3.8	1.9	16.1	27.4	29.2	15.1	502	500	862	286
Haiti 2000	13.8	26.4	20.6	12.9	4.2	5.2	6.0	7.6	13.3	20.6	17.4	12.5	802	651	1,398	539
Peru 2000	14.4	34.1	29.8	15.8	0.8	1.0	1.4	1.3	4.9	13.5	10.5	5.3	1,873	717	1,807	1,673

<sup>1</sup> Includes all children from multiple first births

Table A.3.23

**Undernutrition by measles vaccination status**

Percentage of children age 12-23 months who are stunted, wasted, or underweight by measles vaccination status, Demographic and Health Surveys, 1994-2001

Country	Percentage of children age 12-23 months with a measles vaccination	Percent stunted		Percent wasted		Percent underweight		Number of children	
		Measles vaccination	No measles vaccination						
<b>Sub-Saharan Africa</b>									
Benin 1996	67.5	30.2	31.6	19.1	19.0	37.8	40.2	515	248
Burkina Faso 1998-99	50.6	44.1	46.0	23.3	27.5	45.7	58.2	407	397
Cameroon 1998	54.4	40.5	48.8	4.6	11.9	24.0	42.3	355	297
Central African Republic 1994-95	51.6	38.1	51.9	9.5	11.6	29.9	42.5	384	360
Chad 1996-97	22.7	40.4	47.6	23.5	26.9	42.6	56.6	254	866
Comoros 1996	65.1	46.4	51.4	9.7	18.0	28.5	43.2	207	111
Côte d'Ivoire 1994	53.5	28.7	33.4	13.8	12.5	28.2	34.4	577	502
Ethiopia 2000	27.1	57.5	57.6	17.9	20.2	53.6	57.5	551	1,479
Eritrea 1995	51.6	40.7	59.8	22.4	28.4	48.1	64.0	357	335
Gabon 2000	55.5	25.2	34.2	1.9	3.3	15.9	22.1	381	306
Ghana 1998	74.4	25.6	31.1	17.8	27.0	35.8	44.5	439	151
Guinea 1999	56.3	29.9	37.1	16.2	20.5	32.7	41.7	360	279
Kenya 1998	78.2	37.3	58.3	8.2	12.7	22.5	42.7	766	213
Madagascar 1997	46.8	66.8	62.6	9.7	14.4	55.0	55.9	505	574
Malawi 2000	83.5	56.8	62.8	9.7	10.7	34.7	46.1	1,688	334
Mali 1995-96	51.7	38.3	42.8	31.7	34.5	51.7	55.7	719	672
Mozambique 1997	66.4	40.3	46.4	13.0	12.0	32.5	36.3	636	322
Niger 1998	35.5	48.9	59.4	27.1	33.3	57.3	70.6	472	859
Tanzania 1999	78.0	47.4	63.8	6.9	19.4	37.3	56.5	435	122
Togo 1998	44.1	32.0	33.4	19.5	19.7	37.3	36.6	442	559
Uganda 2000-01	57.9	46.0	46.7	6.3	8.5	29.5	35.6	769	558
Zambia 1996	86.5	47.3	50.2	8.7	9.6	33.4	43.2	1,087	170
Zimbabwe 1999	81.4	33.7	50.9	9.4	11.3	16.5	25.4	458	105
<b>North Africa/West Asia/Europe</b>									
Egypt 2000	97.1	23.6	20.2	3.1	2.5	5.6	8.2	1,992	60
Jordan 1997	89.7	10.5	11.3	2.8	2.1	6.4	7.8	1,016	116
Turkey 1998	78.7	14.4	24.8	2.9	2.9	7.9	19.7	430	116
Yemen 1997	46.8	55.5	65.4	17.9	20.3	49.1	59.8	726	827
<b>Central Asia</b>									
Kazakhstan 1999	79.4	15.9	*	3.0	*	4.2	*	94	24
Kyrgyz Rep 1997	85.1	32.5	45.0	5.9	6.8	19.1	20.6	292	51
Uzbekistan 1996	92.4	42.2	(60.0)	13.8	(5.4)	25.3	(18.8)	309	25
<b>South/Southeast Asia</b>									
Bangladesh 2000	70.2	48.1	62.3	19.4	22.2	54.7	72.0	804	341
Cambodia 2000	56.0	40.2	48.8	26.2	19.3	49.4	51.0	310	244
India 1998-99	54.2	48.3	66.7	20.2	24.3	50.7	66.7	4,403	3,726
Nepal 1996	57.0	53.3	67.4	17.4	24.6	52.4	68.5	736	554
<b>Latin America/Caribbean</b>									
Bolivia 1998	50.9	31.0	34.0	1.8	2.1	10.8	14.0	588	567
Brazil 1996	88.6	13.6	27.0	2.6	5.0	5.4	13.9	681	88
Colombia 2000	71.0	17.5	25.6	1.8	1.2	8.5	13.5	584	239
Dominican Republic 1996	78.5	13.6	19.2	1.4	4.8	8.1	10.8	576	157
Guatemala 1998-99	82.0	50.4	65.2	6.1	3.4	30.7	42.5	598	132
Haiti 2000	54.6	20.9	32.7	8.8	8.9	17.2	26.8	624	519
Peru 2000	72.3	27.4	30.5	1.6	1.3	10.0	12.4	1,556	595

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.

Table A.3.24

**Undernutrition by vaccination status**

Among all children age 12–23 months, the percentage who are stunted, wasted, or underweight by vaccination status (according to vaccination card or mother's report), Demographic and Health Surveys, 1994–2001

Country	Percent stunted			Percent wasted			Percent underweight			Number of children		
	Measles	Other vaccinations only	No vaccinations <sup>1</sup>	Measles	Other vaccinations only	No vaccinations <sup>1</sup>	Measles	Other vaccinations only	No vaccinations <sup>1</sup>	Measles	Other vaccinations only	No vaccinations <sup>1</sup>
<b>Sub-Saharan Africa</b>												
Benin 1996	30.2	33.1	28.2	19.1	14.0	29.6	37.8	36.4	48.3	515	168	79
Burkina Faso 1998-99	44.1	47.0	41.9	23.3	26.9	29.8	45.7	58.4	57.6	407	319	78
Cameroon 1998	40.5	48.0	51.0	4.6	11.8	12.2	24.0	42.6	41.5	355	217	80
Central African Republic 1994-95	38.1	51.5	52.5	9.5	8.7	16.3	29.9	39.5	47.5	384	225	135
Chad 1996-97	40.4	48.1	47.2	23.5	22.4	30.1	42.6	52.2	59.7	254	365	501
Comoros 1996	46.4	49.5	*	9.7	15.1	*	28.5	39.8	*	207	93	18
Côte d'Ivoire 1994	28.7	32.7	34.7	13.8	11.3	14.7	28.2	31.7	39.1	577	319	183
Ethiopia 2000	57.5	58.6	54.2	17.9	20.5	19.4	53.6	57.4	57.9	551	1,142	337
Eritrea 1995	40.7	64.3	58.4	22.4	27.8	28.6	48.1	64.2	64.0	357	78	257
Gabon 2000	25.2	33.0	(45.7)	1.9	3.6	(0.0)	15.9	21.5	(28.1)	381	278	28
Ghana 1998	25.6	29.0	(37.7)	17.8	24.9	(33.6)	35.8	41.9	(52.5)	439	114	37
Guinea 1999	29.9	37.4	36.5	16.2	21.1	19.4	32.7	42.5	40.2	360	185	95
Kenya 1998	37.3	59.7	(48.3)	8.2	14.1	(2.6)	22.5	43.1	(40.0)	766	186	27
Madagascar 1997	66.8	61.9	64.0	9.7	14.8	13.4	55.0	54.4	58.8	505	375	198
Malawi 2000	56.8	59.1	82.7	9.7	11.4	7.4	34.7	45.0	52.1	1,688	282	52
Mali 1995-96	38.3	42.5	43.1	31.7	36.1	32.6	51.7	56.7	54.5	719	359	313
Mozambique 1997	40.3	46.0	47.1	13.0	9.5	15.9	32.5	36.8	35.6	636	196	127
Niger 1998	48.9	57.6	60.5	27.1	29.6	35.8	57.3	65.4	73.9	472	334	524
Tanzania 1999	47.4	64.4	(61.7)	6.9	16.5	(28.6)	37.3	65.2	(28.9)	435	93	29
Togo 1998	32.0	31.8	37.7	19.5	19.9	19.4	37.3	34.0	44.0	442	412	148
Uganda 2000-01	46.0	46.7	46.7	6.3	8.0	9.7	29.5	33.1	41.8	769	398	161
Zambia 1996	47.3	48.6	*	8.7	10.3	*	33.4	42.2	*	1,087	147	23
Zimbabwe 1999	33.7	(41.5)	58.9	9.4	(10.6)	11.9	16.5	(26.7)	24.3	458	48	57
<b>North Africa/West Asia/Europe</b>												
Egypt 2000	23.6	19.2	*	3.1	2.7	*	5.6	8.7	*	1,992	56	4
Jordan 1997	10.5	11.3	*	2.8	2.1	*	6.4	7.8	*	1,016	116	0
Turkey 1998	14.4	20.7	*	2.9	2.8	*	7.9	17.6	*	430	99	18
Yemen 1997	55.5	65.8	63.3	17.9	21.3	15.4	49.1	59.8	59.4	726	683	144
<b>Central Asia</b>												
Kazakhstan 1999	15.9	*	*	3.0	*	*	4.2	*	*	94	18	6
Kyrgyz Republic 1997	32.5	44.7	*	5.9	6.9	*	19.1	20.2	*	292	51	0
Uzbekistan 1996	42.2	(60.0)	*	13.8	(5.4)	*	25.3	(18.8)	*	309	25	0
<b>South/Southeast Asia</b>												
Bangladesh 2000	48.1	60.4	67.2	19.4	21.5	24.1	54.7	69.6	78.5	804	249	92
Cambodia 2000	40.2	49.2	48.3	26.2	22.2	16.4	49.4	50.0	52.2	310	124	120
India 1998-99	48.3	64.3	73.5	20.2	24.0	25.3	50.7	64.6	72.8	4,403	2,774	952
Nepal 1996	53.3	69.0	65.6	17.4	23.8	25.6	52.4	70.8	65.9	736	298	257
<b>Latin America/Caribbean</b>												
Bolivia 1998	31.0	31.3	48.3	1.8	2.2	1.7	10.8	11.6	27.0	588	477	90
Brazil 1996	13.6	20.7	*	2.6	6.0	*	5.4	13.9	*	681	74	14
Colombia 2000	19.0	19.8	*	2.0	1.5	*	10.7	9.6	*	210	604	10
Dominican Republic 1996	13.6	19.9	*	1.4	4.7	*	8.1	10.5	*	576	146	11
Guatemala 1998-99	50.4	65.4	*	6.1	1.4	*	30.7	39.7	*	598	108	24
Haiti 2001	20.9	30.1	37.3	8.8	8.3	9.8	17.2	27.8	25.1	624	330	189
Peru 2000	27.4	29.3	(53.0)	1.6	1.4	(0.0)	10.0	12.0	(19.1)	1,556	565	30

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.

<sup>1</sup> Includes missing cases

Table A.3.25

**Breastfeeding status of children under 6 months**

Percent distribution of youngest children under 6 months living with the mother by breastfeeding status and percentage of children under 6 months using a bottle with a nipple according to age in months, Demographic and Health Surveys, 1994-2001

Country	Exclusive breast-feeding <sup>1</sup>	Breast-milk and plain water	Fully breastfed <sup>2</sup>	Predominantly breastfed <sup>3</sup>	Predominantly or fully breastfed <sup>4</sup>	Received milk <sup>5</sup>	Received complementary foods <sup>6</sup>	Breastfed and used bottle	Not breastfed	Not breastfed and used bottle	Number of children
<b>Sub-Saharan Africa</b>											
Benin 1996	10.1	14.8	25.0	35.7	60.7	2.0	37.0	5.8	0.3	u	505
Burkina Faso 1998-99	5.5	29.2	34.6	53.5	88.2	2.3	9.4	1.0	0.1	u	639
Cameroon 1998	12.2	32.4	44.6	16.2	60.8	7.9	30.1	19.3	1.3	4.0	422
Central African Republic 1994-95	3.0	40.8	43.8	6.6	50.4	0.5	49.0	2.0	0.2	u	456
Chad 1996-97	1.9	51.7	53.6	23.1	76.8	8.3	14.2	3.6	0.7	1.1	808
Comoros 1996	3.2	21.5	24.7	14.0	38.7	23.1	37.1	22.6	1.1	1.0	186
Côte d'Ivoire 1994	3.0	60.4	63.4	11.8	75.2	2.2	21.7	4.6	0.9	4.3	663
Ethiopia 2000	54.3	15.2	69.5	8.0	77.5	16.9	4.7	14.6	0.9	4.7	1,070
Eritrea 1995	58.9	17.0	76.0	13.7	89.7	6.8	3.2	3.1	0.3	1.5	448
Gabon 2000	5.4	22.5	27.9	1.5	29.4	41.7	15.1	37.0	13.8	34.8	401
Ghana 1998	31.5	33.9	65.4	11.4	76.8	6.8	16.3	23.1	u	u	291
Guinea 1999	11.2	53.7	64.9	16.8	81.7	7.2	10.0	7.8	1.1	0.0	662
Kenya 1998	12.6	9.5	22.1	15.1	37.2	20.0	42.2	24.7	0.6	0.9	517
Madagascar 1997	47.9	9.4	57.3	14.1	71.4	2.9	25.1	2.8	0.7	1.3	663
Malawi 2000	44.0	12.0	56.1	0.6	56.7	1.0	42.3	2.3	u	0.3	1,257
Mali 1995-96	8.4	66.9	75.3	13.0	88.3	6.5	4.9	3.2	0.4	1.3	1,039
Mozambique 1997	30.3	34.1	64.5	3.1	67.6	2.3	26.7	u	3.4	u	757
Niger 1998	0.8	51.1	51.9	28.5	80.3	6.9	12.1	3.9	0.6	u	856
Tanzania 1999	34.2	21.4	55.6	14.7	70.3	21.4	5.9	9.1	2.5	u	326
Togo 1998	10.5	27.8	38.4	14.1	52.4	2.0	44.6	6.9	0.9	u	657
Uganda 2000-01	63.2	3.8	67.0	3.9	70.9	17.1	11.3	4.7	0.6	1.1	705
Zambia 1996	18.8	34.2	53.0	3.1	56.1	3.0	40.3	3.2	0.7	1.7	655
Zimbabwe 1999	31.9	22.3	54.2	0.4	54.6	2.0	43.3	4.6	u	u	342
<b>North Africa/West Asia/Europe</b>											
Egypt 2000	64.0	0.3	64.3	14.2	78.5	3.8	14.1	16.4	3.7	36.8	1,191
Jordan 1997	11.0	10.2	21.2	21.3	42.5	19.6	30.2	35.1	7.7	35.0	490
Turkey 1998	7.1	24.8	31.9	14.9	46.8	20.0	23.6	35.8	9.6	29.9	357
<b>Central Asia</b>											
Kazakhstan 1999	35.8	18.9	54.7	11.0	65.7	11.1	17.6	26.0	5.6	6.4	113
<b>South/Southeast Asia</b>											
Bangladesh 2000	46.5	9.9	56.4	9.8	66.2	13.9	19.5	19.8	0.4	0.9	765
Cambodia 2000	11.4	64.6	76.0	3.2	79.2	3.6	16.1	11.1	1.0	4.4	800
India 1998-99	46.8	24.5	71.3	2.6	73.9	18.2	5.9	11.6	1.9	80.1	5,495
Nepal 1996	74.8	3.4	78.1	0.5	78.7	10.7	10.3	2.7	0.3	1.5	678
<b>Latin America and the Caribbean</b>											
Bolivia 1998	50.6	3.2	53.8	9.7	63.5	20.1	13.7	29.4	2.7	15.8	600
Brazil 1996	29.4	4.4	33.8	9.3	43.1	15.6	17.2	37.2	24.1	87.0	433
Colombia 2000	51.7	7.5	59.2	3.0	62.2	20.0	8.6	52.7	9.3	0.0	427
Dominican Republic 1996	18.0	4.4	22.5	9.9	32.4	32.4	17.4	58.6	17.8	68.6	384
Guatemala 1998-99	39.2	4.6	43.8	21.3	65.1	16.2	15.4	36.0	3.2	13.7	462
Haiti 2001	23.7	16.0	39.7	9.2	48.8	15.6	34.5	33.3	1.1	6.0	531
Peru 2000	67.2	3.9	71.0	5.8	76.8	13.4	7.4	21.3	2.4	24.0	1,025

u = Unknown (not available)

<sup>1</sup> Breast milk only

<sup>2</sup> Exclusive breastfeeding or breast milk and plain water

<sup>3</sup> Breast milk predominantly, with other non-milk liquids

<sup>4</sup> Combines full and predominant breastfeeding

<sup>5</sup> Receive breast milk plus other milks or formula

<sup>6</sup> Breast milk plus solid or semisolid foods

Table A.3.26

**Breastfeeding status of children age 6–9 months**

Percent distribution of youngest children age 6–9 months living with the mother by breastfeeding status and percentage of children age 6 to 9 months using a bottle with a nipple, according to age in months, Demographic and Health Surveys, 1994-2001

Country	Exclusive breast-feeding <sup>1</sup>	Breast-milk and plain water	Fully breastfed <sup>2</sup>	Pre-dominantly breast-fed <sup>3</sup>	Predominantly or fully breastfed <sup>4</sup>	Received milk <sup>5</sup>	Received complementary foods <sup>6</sup>	Breastfed and used bottle	Not breast-fed	Not breastfed and used bottle	Number of children
<b>Sub-Saharan Africa</b>											
Benin 1996	0.0	2.7	2.7	10.0	12.8	1.8	84.8	3.1	0.7	0.0	325
Burkina Faso 1998-99	1.7	20.5	22.2	26.6	48.8	1.3	49.8	0.6	0.2	0.0	366
Cameroon 1998	1.2	11.3	12.5	7.5	20.0	5.0	73.0	17.8	2.0	1.8	263
Central African Rep. 1994-95	0.0	5.1	5.1	0.8	5.9	0.3	93.4	0.0	0.3	0.0	289
Chad 1996-97	0.4	16.9	17.3	6.4	23.7	3.9	71.2	2.1	1.1	1.2	506
Comoros 1996	0.0	1.6	1.6	0.8	2.5	5.7	86.9	18.9	4.9	2.0	122
Côte d'Ivoire 1994	0.6	25.7	26.4	5.6	32.0	1.3	66.2	0.8	0.6	2.0	425
Ethiopia 2000	12.8	14.7	27.5	8.1	35.6	21.0	42.4	13.5	1.0	4.9	724
Eritrea 1995	15.6	17.9	33.5	13.0	46.5	7.9	44.9	4.4	0.6	1.3	290
Gabon 2000	0.3	3.3	3.6	0.7	4.3	13.5	63.9	25.8	18.3	28.4	259
Ghana 1998	4.8	12.0	16.8	10.4	27.2	7.3	64.5	22.6	1.0	0.0	232
Guinea 1999	7.5	36.4	43.9	21.4	65.3	5.3	27.9	7.9	1.5	0.9	328
Kenya 1998	0.9	1.2	2.1	1.4	3.5	3.3	89.6	23.0	3.6	7.6	378
Madagascar 1997	2.8	3.1	5.9	4.3	10.3	0.5	88.4	3.0	0.8	3.4	412
Malawi 2000	2.6	3.1	5.6	0.6	6.2	0.2	93.4	2.3	0.1	0.7	799
Mali 1995-96	3.1	46.4	49.5	9.1	58.5	8.1	33.0	2.4	0.4	0.2	659
Mozambique 1997	2.2	9.3	11.5	1.3	12.8	0.8	84.5	0.0	1.9	0.0	458
Niger 1998	0.2	9.2	9.4	15.5	24.9	3.4	71.5	3.8	0.2	0.0	536
Tanzania 1999	2.2	5.8	8.0	11.3	19.3	14.0	63.8	10.0	2.8	0.1	205
Togo 1998	0.3	5.3	5.6	4.0	9.6	1.2	88.6	4.2	0.6	1.2	468
Uganda 2000-01	6.8	2.1	8.9	6.5	15.4	8.7	74.6	5.4	1.2	1.3	488
Zambia 1996	0.7	2.8	3.5	1.0	4.5	0.8	93.6	3.6	1.2	2.8	392
Zimbabwe 1999	0.5	4.0	4.5	2.6	7.1	0.0	90.6	13.1	2.4	2.9	209
<b>North Africa/West Asia/Europe</b>											
Egypt 2000	16.4	0.4	16.8	4.6	21.3	4.4	64.4	14.5	9.8	57.1	800
Jordan 1997	0.3	3.3	3.5	3.0	6.5	2.6	63.7	15.5	27.2	103.8	439
Turkey 1998	0.0	5.0	5.0	3.7	8.7	2.8	54.5	30.3	34.0	76.1	245
<b>Central Asia</b>											
Kazakhstan 1999	2.3	2.1	4.4	3.1	7.5	3.1	72.7	37.0	16.7	12.3	88
<b>South/Southeast Asia</b>											
Bangladesh 2000	7.6	11.2	18.8	7.2	25.9	11.9	59.4	20.4	2.8	8.9	352
Cambodia 2000	1.8	19.4	21.2	0.7	21.9	0.1	71.9	13.4	6.2	24.7	527
India 1998-99	12.7	23.5	36.2	4.1	40.3	21.8	33.6	15.2	4.3	116.9	3,484
Nepal 1996	21.4	7.1	28.5	0.6	29.1	7.5	62.5	5.2	0.8	1.5	437
<b>Latin America and the Caribbean</b>											
Bolivia 1998	9.7	0.7	10.4	3.7	14.1	6.0	70.3	32.8	9.7	43.3	469
Brazil 1996	8.6	2.1	10.8	4.1	14.9	5.2	31.0	29.0	48.9	120.7	290
Colombia 2000	31.5	1.2	32.7	0.7	33.5	2.8	33.3	48.6	30.4	0.0	334
Dominican Rep. 1996	1.8	1.6	3.3	1.7	5.1	7.3	38.5	43.9	49.1	124.9	255
Guatemala 1998-99	10.6	2.2	12.9	11.7	24.6	3.4	61.2	34.5	10.8	31.4	292
Haiti 2001	3.2	7.4	10.7	2.5	13.2	7.2	74.1	25.1	5.5	21.4	458
Peru 2000	9.4	1.1	10.5	3.4	13.9	3.1	75.6	27.8	7.4	47.8	681

<sup>1</sup> Breast milk only<sup>2</sup> Exclusive breastfeeding or breast milk and plain water<sup>3</sup> Breast milk predominantly, with other non-milk liquids<sup>4</sup> Combines full and predominant breastfeeding<sup>5</sup> Receive breast milk plus other milks or formula<sup>6</sup> Breast milk plus solid or semisolid foods

Table A.3.27

**Median duration and frequency of breastfeeding**

Median duration of any breastfeeding, exclusive breastfeeding, and predominant breastfeeding among children born in the three years preceding the survey, Demographic and Health Surveys, 1994-2001

Country	Any breast-feeding	Exclusive breastfeeding <sup>1</sup>	Predominant breastfeeding <sup>2</sup>	Number of children
<b>Sub-Saharan Africa</b>				
Benin 1996	22.8	0.4	3.2	2,939
Burkina Faso 1998-99	25.8	0.4	7.0	3,622
Cameroon 1998	18.1	0.5	3.3	2,469
Central African Republic 1994-95	20.6	0.4	2.4	2,836
Chad 1996-97	21.4	0.4	5.0	4,450
Comoros 1996	20.1	0.4	1.7	1,145
Côte d'Ivoire 1994	20.3	0.4	4.9	3,989
Ethiopia 2000	25.5	2.5	5.3	7,165
Eritrea 1995	22.0	3.3	7.1	2,580
Gabon 2000	12.1	0.4	0.6	2,482
Ghana 1998	21.5	0.7	4.8	1,927
Guinea 1999	22.4	0.4	8.7	3,427
Kenya 1998	20.9	0.5	1.9	3,464
Madagascar 1997	20.7	2.2	4.1	3,893
Malawi 2000	23.3	2.0	2.7	7,758
Mali 1995-96	21.6	0.5	7.8	6,019
Mozambique 1997	22.0	0.8	3.9	4,207
Niger 1998	20.6	0.4	5.3	5,007
Tanzania 1999	20.9	1.3	4.1	2,029
Togo 1998	24.4	0.5	2.5	3,978
Uganda 2000-01	19.9	3.4	4.2	4,681
Zambia 1996	20.0	0.5	2.6	4,449
Zimbabwe 1999	19.6	1.3	2.6	2,191
<b>North Africa/West Asia/Europe</b>				
Egypt 2000	18.4	3.7	4.8	7,026
Jordan 1997	11.9	0.5	1.9	3,817
Turkey 1998	12.0	0.4	2.2	2,108
Yemen 1997	17.8	0.4	0.4	7,706
<b>Central Asia</b>				
Kazakhstan 1999	14.7	1.7	3.7	827
Kyrgyz Rep 1997	16.9	0.4	0.4	1,172
Uzbekistan 1996	17.3	0.4	0.4	1,392
<b>South/Southeast Asia</b>				
Bangladesh 2000	30.5	1.8	4.4	4,214
Cambodia 2000	21.2	0.4	4.9	4,657
India 1998-99	25.4	1.9	5.8	32,393
Nepal 1996	31.0	4.7	5.4	4,375
<b>Latin America/Caribbean</b>				
Bolivia 1998	17.5	2.3	3.7	4,106
Brazil 1996	7.0	1.1	2.0	2,865
Colombia 2000	12.8	2.6	4.4	2,775
Dominican Republic 1996	7.6	0.6	0.9	2,654
Guatemala 1998-99	19.9	0.9	4.8	2,751
Haiti 2001	17.3	0.7	2.2	3,985
Peru 2000	20.6	4.0	4.8	7,013
<sup>1</sup> Breast milk only				
<sup>2</sup> Breast milk predominantly, with other non-milk liquids				

Table A.3.28

**Undernutrition by ARI status**

Prevalence of ARI (cough with rapid breathing) with no diarrhea in malnourished children age 4–23 months, Demographic and Health Surveys, 1994-2001

Country	Percentage of children age 4-23 months with ARI	Percentage with ARI						Total number of children						
		Stunted	Not stunted	Wasted	Not wasted	Under-weight	Not under-weight	Stunted	Not stunted	Wasted	Not wasted	Under-weight	Not under-weight	All children
<b>Sub-Saharan Africa</b>														
Benin 1996	10.7	12.5	10.2	6.5	11.6	9.9	11.1	313	1,061	244	1,130	434	940	1,374
Burkina Faso 1998-99	9.7	10.3	9.4	12.5	8.8	12.1	8.0	449	1,058	344	1,163	598	909	1,507
Cameroon 1998	16.1	14.0	17.0	14.1	16.2	14.4	16.6	358	763	86	1,035	282	838	1,121
Central African Republic 1994-95	21.0	22.7	20.1	21.7	20.9	21.3	20.9	431	882	124	1,189	380	933	1,312
Chad 1996-97	8.1	7.8	8.2	7.9	8.1	8.2	7.9	654	1,411	467	1,598	830	1,235	2,065
Comoros 1996	13.9	11.3	15.4	18.6	13.4	14.7	13.6	203	350	59	494	156	397	553
Côte d'Ivoire 1994	10.2	10.1	10.3	13.6	9.8	11.5	9.8	433	1,484	210	1,707	484	1,433	1,917
Ethiopia 2000	14.1	14.8	13.6	12.3	14.5	13.7	14.5	1,528	1,895	563	2,860	1,573	1,850	3,423
Eritrea 1995	14.4	15.5	13.7	15.9	14.0	14.7	14.1	433	804	249	988	544	694	1,238
Gabon 2000	11.9	11.2	12.1	(12.3)	11.8	8.0	12.6	257	918	39	1,136	181	994	1,175
Ghana 1998	12.3	12.0	12.4	14.2	11.9	13.5	11.8	186	793	170	809	281	698	979
Guinea 1999	13.3	16.2	12.4	9.6	13.9	11.7	13.9	281	924	186	1,019	341	864	1,205
Kenya 1998	15.1	13.9	15.6	10.6	15.5	14.0	15.4	509	1,132	137	1,503	342	1,298	1,641
Madagascar 1997	14.6	13.5	15.7	14.4	14.7	14.6	14.7	937	934	179	1,692	811	1,060	1,871
Malawi 2000	18.7	15.9	20.8	17.3	18.8	17.2	19.3	1,550	2,004	328	3,227	1,060	2,494	3,555
Mali 1995-96	9.8	8.5	10.3	8.2	10.5	9.0	10.4	712	1,944	765	1,891	1,098	1,559	2,656
Mozambique 1997	8.4	7.7	8.7	4.2	8.9	8.6	8.3	576	1,156	173	1,559	477	1,255	1,732
Niger 1998	5.7	5.3	5.9	4.7	6.0	4.7	6.7	976	1,377	619	1,734	1,260	1,093	2,353
Tanzania 1999	12.0	11.5	12.4	19.7	11.4	12.8	11.7	376	585	72	889	300	660	960
Togo 1998	12.8	10.7	13.3	10.5	13.2	12.0	13.1	405	1,481	299	1,587	515	1,371	1,886
Uganda 2000-01	17.0	18.0	16.4	16.7	17.0	18.8	16.3	815	1,411	152	2,074	625	1,601	2,226
Zambia 1996	7.9	8.1	7.8	5.9	8.0	8.2	7.7	783	1,312	160	1,934	592	1,502	2,094
Zimbabwe 1999	13.9	11.0	15.1	22.2	13.1	15.8	13.6	260	626	76	811	127	760	886
<b>North Africa/West Asia/Europe</b>														
Egypt 2000	8.2	10.0	7.7	9.1	8.2	11.7	8.0	733	2,730	114	3,349	195	3,268	3,463
Jordan 1997	7.4	8.0	7.4	(16.4)	7.2	12.9	7.1	156	1,746	44	1,858	104	1,797	1,902
Yemen 1997	12.3	12.2	12.4	11.0	12.6	12.5	12.2	1,348	1,598	546	2,401	1,354	1,593	2,946
<b>Central Asia</b>														
Kazakhstan 1999	1.3	*	0.7	*	1.3	*	1.4	24	175	4	195	12	187	199
Kyrgyz Republic 1997	3.5	3.6	3.5	3.8	3.5	1.3	3.9	150	417	30	537	83	484	567
Uzbekistan 1996	1.2	0.7	1.5	4.6	0.8	0.4	1.5	205	372	71	506	122	454	576
<b>South/Southeast Asia</b>														
Bangladesh 2000	19.0	21.2	17.5	17.7	19.2	20.3	17.7	758	1,079	272	1,565	899	938	1,837
Cambodia 2000	12.8	10.2	14.1	8.0	13.8	10.5	14.2	344	680	179	844	381	643	1,024
India 1998-99	14.0	13.8	14.1	14.4	13.9	14.4	13.7	6,176	7,637	2,512	11,300	6,507	7,306	13,812
Nepal 1996	20.2	17.3	22.6	19.2	20.4	18.7	21.6	997	1,198	320	1,875	1,040	1,155	2,195
<b>Latin America/Caribbean</b>														
Bolivia 1998	17.3	17.5	17.3	(23.2)	17.2	21.8	16.9	493	1,547	43	1,997	199	1,841	2,040
Brazil 1996	19.2	20.1	19.0	(13.8)	19.3	17.8	19.2	160	1,175	45	1,290	75	1,260	1,335
Dominican Republic 1996	18.2	19.6	18.0	(20.1)	18.2	25.7	17.7	141	1,074	26	1,189	84	1,131	1,215
Guatemala 1998-99	15.3	12.2	17.6	20.7	15.1	14.6	15.6	510	714	55	1,170	320	904	1,224
Haiti 2001	25.1	22.9	25.7	22.6	25.3	25.4	25.1	376	1,597	140	1,833	319	1,654	1,973
Peru 2000	15.2	13.7	15.7	(15.2)	15.2	14.4	15.3	725	2,717	48	3,394	276	3,166	3,442

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.

Table A.3.29

**Undernutrition by diarrhea status**

Prevalence of diarrhea in malnourished children age 4-23 months, Demographic and Health Survey 1994-2001

Country	Percentage of children age 4-23 months with diarrhea	Percentage with diarrhea						Total number of children						All Children
		Stunted	Not stunted	Wasted	Not wasted	Under-weight	Not under-weight	Stunted	Not stunted	Wasted	Not wasted	Under-weight	Not under-weight	
<b>Sub-Saharan Africa</b>														
Benin 1996	30.6	27.0	31.7	34.9	29.7	31.7	30.1	313	1,061	244	1,130	434	940	1,374
Burkina Faso 1998-99	29.4	31.5	28.6	35.1	27.8	33.9	26.5	449	1,058	344	1,163	598	909	1,507
Cameroon 1998	24.9	31.2	21.9	37.6	23.8	33.1	22.1	358	763	86	1,035	282	838	1,121
<b>Central African Rep</b>														
1994-95	27.8	27.0	28.2	33.9	27.2	33.5	25.4	431	882	124	1,189	380	933	1,312
Chad 1996-97	28.4	26.1	29.5	34.2	26.7	30.4	27.1	654	1,411	467	1,598	830	1,235	2,065
Comoros 1996	27.7	27.6	27.7	28.8	27.5	28.8	27.2	203	350	59	494	156	397	553
Côte d'Ivoire 1994	25.2	26.1	25.0	32.5	24.4	28.1	24.3	433	1,484	210	1,707	484	1,433	1,917
Ethiopia 2000	36.7	38.3	35.4	48.0	34.5	43.0	31.4	1,528	1,895	563	2,860	1,573	1,850	3,423
Eritrea 1995	28.2	28.6	27.9	28.2	28.1	32.0	25.1	433	804	249	988	544	694	1,238
Gabon 2000	27.8	32.6	26.4	(44.0)	27.2	35.4	26.4	257	918	39	1,136	181	994	1,175
Ghana 1998	25.7	31.7	24.3	27.1	25.4	32.0	23.2	186	793	170	809	281	698	979
Guinea 1999	30.1	33.9	28.9	43.0	27.7	40.1	26.1	281	924	186	1,019	341	864	1,205
Kenya 1998	22.8	26.3	21.3	26.7	22.5	31.1	20.6	509	1,132	137	1,503	342	1,298	1,641
Madagascar 1997	32.8	35.8	29.9	35.4	32.6	36.8	29.8	937	934	179	1,692	811	1,060	1,871
Malawi 2001	32.5	34.3	31.1	35.9	32.1	37.6	30.3	1,550	2,004	328	3,227	1,060	2,494	3,555
Mali 1995-96	28.9	36.3	26.2	37.4	25.5	36.1	23.9	712	1,944	765	1,891	1,098	1,559	2,656
Mozambique 1997	26.4	26.3	26.5	44.6	24.4	33.2	23.9	576	1,156	173	1,559	477	1,255	1,732
Niger 1998	44.1	45.7	43.0	52.9	41.0	48.6	38.9	976	1,377	619	1,734	1,260	1,093	2,353
Tanzania 1999	23.4	24.4	22.8	18.4	23.8	27.2	21.7	376	585	72	889	300	660	960
Togo 1998	35.8	44.2	33.5	39.2	35.1	42.6	33.2	405	1,481	299	1,587	515	1,371	1,886
Uganda 2000-01	32.5	34.9	31.1	33.6	32.4	37.1	30.7	815	1,411	152	2,074	625	1,601	2,226
Zambia 1996	39.2	38.2	39.7	42.9	38.8	43.6	37.4	783	1,312	160	1,934	592	1,502	2,094
Zimbabwe 1999	25.6	26.9	25.1	21.9	26.0	33.8	24.3	260	626	76	811	127	760	886
<b>North Africa/West Asia/Europe</b>														
Egypt 2000	11.6	11.5	11.6	11.0	11.6	14.0	11.5	733	2,730	114	3,349	195	3,268	3,463
Jordan 1997	32.0	34.3	31.8	(27.6)	32.1	35.8	31.8	156	1,746	44	1,858	104	1,797	1,902
Turkey 1998	43.6	61.1	41.4	(45.5)	43.6	56.5	42.4	108	835	29	914	82	861	943
Yemen 1997	37.7	39.9	35.9	44.4	36.2	41.7	34.4	1,348	1,598	546	2,401	1,354	1,593	2,946
<b>Central Asia</b>														
Kazakhstan 1999	22.1	*	20.8	*	21.2	*	19.9	24	175	4	195	12	187	199
Kyrgyz Rep 1997	23.7	28.5	22.0	(16.2)	24.1	28.5	22.9	150	417	30	537	83	484	567
Uzbekistan 1996	7.2	6.3	7.7	7.9	7.1	6.0	7.5	205	372	71	506	122	454	576
<b>South/Southeast Asia</b>														
Bangladesh 2000	10.7	11.5	10.2	13.6	10.2	11.9	9.6	758	1,079	272	1,565	899	938	1,837
Cambodia 2000	29.3	33.6	27.1	32.0	28.7	34.6	26.2	344	680	179	844	381	643	1,024
India 2001	23.0	24.1	22.1	26.3	22.2	25.6	20.7	6,176	7,637	2,512	11,300	6,507	7,306	13,812
Nepal 1996	34.4	37.4	31.9	43.2	32.9	38.6	30.6	997	1,198	320	1,875	1,040	1,155	2,195
<b>Latin America/Caribbean</b>														
Bolivia 1998	29.4	34.3	27.8	(26.3)	29.5	38.3	28.4	493	1,547	43	1,997	199	1,841	2,040
Brazil 1996	19.6	21.2	19.4	(24.4)	19.4	26.3	19.2	160	1,175	45	1,290	75	1,260	1,335
Colombia 2000	21.2	24.7	20.6	*	21.1	35.9	20.1	209	1,233	15	1,427	100	1,342	1,442
Dominican Rep 1996	25.6	29.3	25.1	(34.6)	25.4	32.3	25.1	141	1,074	26	1,189	84	1,131	1,215
Guatemala 1999	23.8	26.6	21.8	29.1	23.6	26.5	22.8	510	714	55	1,170	320	904	1,224
Haiti 2001	42.5	49.0	41.0	48.5	42.0	47.3	41.6	376	1,597	140	1,833	319	1,654	1,973
Peru 2000	24.2	30.0	22.6	(23.6)	24.2	32.3	23.5	725	2,717	48	3,394	276	3,166	3,442

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.





## **DHS Comparative Reports Series**

1. Westoff, Charles F. 2001. **Unmet Need at the End of the Century.**
2. Westoff, Charles F. and Akinrinola Bankole. 2002. **Reproductive Preferences in Developing Countries at the Turn of the Century.**
3. Rutstein, Shea O. 2002. **Fertility Levels, Trends, and Differentials 1995-1999.**
4. Mahy, Mary. 2003. **Childhood Mortality in the Developing World: A Review of Evidence from the Demographic and Health Surveys.**
5. Westoff, Charles F. 2003. **Trends in Marriage and Early Childbearing in Developing Countries.**
6. Rutstein, Shea O. and Kiersten Johnson. 2004. **The DHS Wealth Index.**
7. Yoder, P. Stanley, Nouredine Abderrahim, and Arlinda Zhuzhuni. 2004. **Female Genital Cutting in the Demographic and Health Surveys: A Critical and Comparative Analysis.**
8. Stallings, Rebecca. 2004. **Child Morbidity and Treatment Patterns.**
9. Rutstein, Shea O. and Iqbal H. Shah. 2004. **Infecundity, Infertility, and Childlessness in Developing Countries.**
10. Mukuria, Altrena, Jeanne Cushing, and Jasbir Sangha. 2005. **Nutritional Status of Children: Results from the Demographic and Health Surveys, 1994–2001.**
11. Mukuria, Altrena, Casey Aboulaafia, and Albert Themme. 2005. **The Context of Women’s Health: Results from the Demographic and Health Surveys, 1994-2001.**