



# Kenya 2003

## Nutrition of Young Children and Mothers



Kenya Central Bureau of Statistics



U.S. Agency for International Development



ORC Macro

AFRICA NUTRITION CHARTBOOKS

**NUTRITION OF YOUNG CHILDREN AND MOTHERS  
IN KENYA**

Findings from the 2003 Kenya Demographic and Health Survey

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# CONTENTS

<b>INTRODUCTION</b> .....	1
FIGURE 1: INFANT AND CHILD MORTALITY, KENYA COMPARED WITH OTHER SUB-SAHARAN COUNTRIES .....	2
FIGURE 2: CONTRIBUTION OF UNDERNUTRITION TO UNDER-FIVE MORTALITY, KENYA .....	4
FIGURE 3: SURVIVAL AND NUTRITIONAL STATUS OF CHILDREN, KENYA .....	6
<b>MALNUTRITION IN KENYA</b> .....	9
FIGURE 4: MALNUTRITION AMONG CHILDREN UNDER FIVE YEARS, KENYA .....	10
FIGURE 5: CHANGES IN MALNUTRITION RATES AMONG CHILDREN UNDER 5 YEARS, KENYA 1993-2003 .....	12
FIGURE 6: STUNTING, WASTING, AND UNDERWEIGHT BY AGE, KENYA .....	14
FIGURE 7: UNDERWEIGHT AMONG CHILDREN UNDER FIVE YEARS, KENYA COMPARED WITH OTHER SUB-SAHARAN COUNTRIES .....	16
FIGURE 8: STUNTING AMONG CHILDREN UNDER FIVE YEARS, KENYA COMPARED WITH OTHER SUB-SAHARAN COUNTRIES .....	18
<b>CONCEPTUAL FRAMEWORK FOR NUTRITIONAL STATUS</b> .....	20
<b>IMMEDIATE INFLUENCES OF MALNUTRITION</b> .....	23
FIGURE 9: VITAMIN A SUPPLEMENTATION AMONG MOTHERS OF CHILDREN UNDER FIVE YEARS BY REGION, KENYA .....	24
FIGURE 10: VITAMIN A SUPPLEMENTATION AMONG CHILDREN 6-59 MONTHS IN THE PAST SIX MONTHS BY REGION, KENYA .....	26
FIGURE 11: IRON SUPPLEMENTATION AMONG MOTHERS OF CHILDREN UNDER FIVE YEARS, KENYA .....	28
FIGURE 12: DIARRHOEA AND COUGH WITH RAPID BREATHING AMONG CHILDREN UNDER FIVE YEARS COMPARED WITH MALNUTRITION RATES, KENYA .....	30
<b>UNDERLYING BIOLOGICAL AND BEHAVIORAL INFLUENCES OF MALNUTRITION</b> .....	33
FIGURE 13: FERTILITY AND BIRTH INTERVALS, KENYA COMPARED WITH OTHER SUB-SAHARAN COUNTRIES .....	34
FIGURE 14: UNDERNUTRITION AMONG CHILDREN AGE 12-23 MONTHS BY MEASLES VACCINATION STATUS, KENYA .....	36
FIGURE 15: MEASLES VACCINATION COVERAGE AMONG CHILDREN AGE 12-23 MONTHS, KENYA COMPARED WITH OTHER SUB-SAHARAN COUNTRIES .....	38
FIGURE 16: FEEDING PRACTICES FOR INFANTS UNDER SIX MONTHS, KENYA .....	40
FIGURE 17: INFANTS UNDER FOUR MONTHS WHO ARE EXCLUSIVELY BREASTFED AND THOSE WHO RECEIVE A BOTTLE, KENYA COMPARED WITH OTHER SUB-SAHARAN COUNTRIES .....	42
FIGURE 18: FEEDING PRACTICES FOR INFANTS AGE 6-9 MONTHS, KENYA .....	44
FIGURE 19: INFANTS AGE 6-9 MONTHS RECEIVING SOLID FOODS IN ADDITION TO BREAST MILK, KENYA COMPARED WITH OTHER SUB-SAHARAN COUNTRIES .....	46

FIGURE 20: CHILDREN 10-23 MONTHS WHO CONTINUE TO BE BREASTFED, KENYA COMPARED WITH OTHER SUB-SAHARAN COUNTRIES.....	48
<b>UNDERLYING SOCIAL AND ECONOMIC INFLUENCES OF MALNUTRITION .....</b>	<b>51</b>
FIGURE 21: STUNTING AND WASTING AMONG CHILDREN UNDER FIVE YEARS BY MOTHER’S EDUCATION, KENYA .....	52
FIGURE 22: STUNTING AND WASTING AMONG CHILDREN UNDER FIVE YEARS BY SOURCE OF DRINKING WATER, KENYA .....	54
FIGURE 23: STUNTING AND WASTING AMONG CHILDREN UNDER FIVE YEARS BY TYPE OF TOILET, KENYA .....	56
<b>BASIC INFLUENCES .....</b>	<b>59</b>
FIGURE 24: STUNTING AND WASTING AMONG CHILDREN UNDER FIVE YEARS BY REGION, KENYA .....	60
FIGURE 25: STUNTING AND WASTING AMONG CHILDREN UNDER FIVE YEARS BY URBAN-RURAL RESIDENCE, KENYA .....	62
<b>MATERNAL NUTRITIONAL STATUS .....</b>	<b>65</b>
FIGURE 26: MALNUTRITION AMONG MOTHERS OF CHILDREN UNDER FIVE YEARS BY REGION, KENYA.....	66
FIGURE 27: MALNUTRITION AMONG MOTHERS OF CHILDREN UNDER FIVE YEARS BY RESIDENCE, KENYA .....	68
FIGURE 28: MALNUTRITION AMONG MOTHERS OF CHILDREN UNDER FIVE YEARS BY EDUCATION, KENYA .....	70
FIGURE 29: MALNUTRITION AMONG MOTHERS OF CHILDREN UNDER THREE YEARS, KENYA COMPARED WITH OTHER SUB-SAHARAN COUNTRIES .....	72
<b>APPENDICES .....</b>	<b>75</b>
APPENDIX 1 STUNTING, WASTING, UNDERWEIGHT, AND OVERWEIGHT RATES BY BACKGROUND CHARACTERISTICS KENYA 2003.....	77
APPENDIX 2 WHO/CDC/NCHS INTERNATIONAL REFERENCE POPULATION COMPARED WITH THE DISTRIBUTION OF MALNUTRITION IN KENYA .....	78

# Introduction

Malnutrition<sup>1</sup> is one of the most important health and welfare problems among infants and young children in Kenya. It is a result of both inadequate food intake and illness. Inadequate food intake is a consequence of insufficient food available at the household level, improper feeding practices, or both. Improper feeding practices include both the quality and quantity of foods offered to young children as well as the timing of their introduction. Poor sanitation puts young children at increased risk of illness, in particular diarrhoeal disease, which adversely affects their nutritional status. Both inadequate food intake and poor environmental sanitation reflect underlying social and economic conditions.

Malnutrition has significant health and economic consequences, the most serious of which is an increased risk of death. Other outcomes include an increased risk of illness and a lower level of cognitive development, which results in lower educational attainment. In adulthood, the accumulated effects of long-term malnutrition can be a reduction in workers' productivity and increased absenteeism in the workplace; these may reduce a person's lifetime earning potential and ability to contribute to the national economy. Furthermore, malnutrition can result in adverse pregnancy outcomes.

The data presented here are from the 2003 Kenya Demographic and Health Survey (KDHS 2003), a nationally representative survey of 8,561 households, implemented by the Central Bureau of Statistics (CBS) in collaboration with the Ministry of Health and the National Council for Population and Development (NCPD). The Centres for Disease Control and Prevention (CDC) assisted in training the health field workers, supported the voluntary counselling and testing of respondents who wanted to know their HIV status, and implemented the HIV testing in the laboratory. ORC Macro furnished technical assistance to the survey as part of the MEASURE *DHS+* Program, while funding was provided by the U.S. Agency for International Development (USAID). Other development partners, including the United Nations Population Fund (UNFPA), Japan International Cooperation Agency (JICA)/United Nations Development Programme (UNDP), the United Nations Children's Fund (UNICEF), the British Department for International Development (DFID), and the CDC also provided support for the survey.

Of the 6,102 children age 0-59 months who were part of the study, there were 4,885 who were alive, whose mothers were interviewed and who had complete anthropometric data. All nutritional analysis includes these children unless otherwise noted. Nutritional data collected on these children include height, weight, age, breastfeeding history, and feeding patterns. Information was also collected on the prevalence of diarrhoea and acute respiratory infection (ARI) in the two weeks prior to the survey and on relevant socio-demographic characteristics. For comparison, data are presented from Demographic and Health Surveys conducted in other sub-Saharan countries.

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<sup>1</sup> The technical method of identifying a *malnourished* population as defined by the U.S. National Centre for Health Statistics (NCHS), the Centres for Disease Control and Prevention (CDC), and the World Health Organisation (WHO) is presented in Appendix 2.

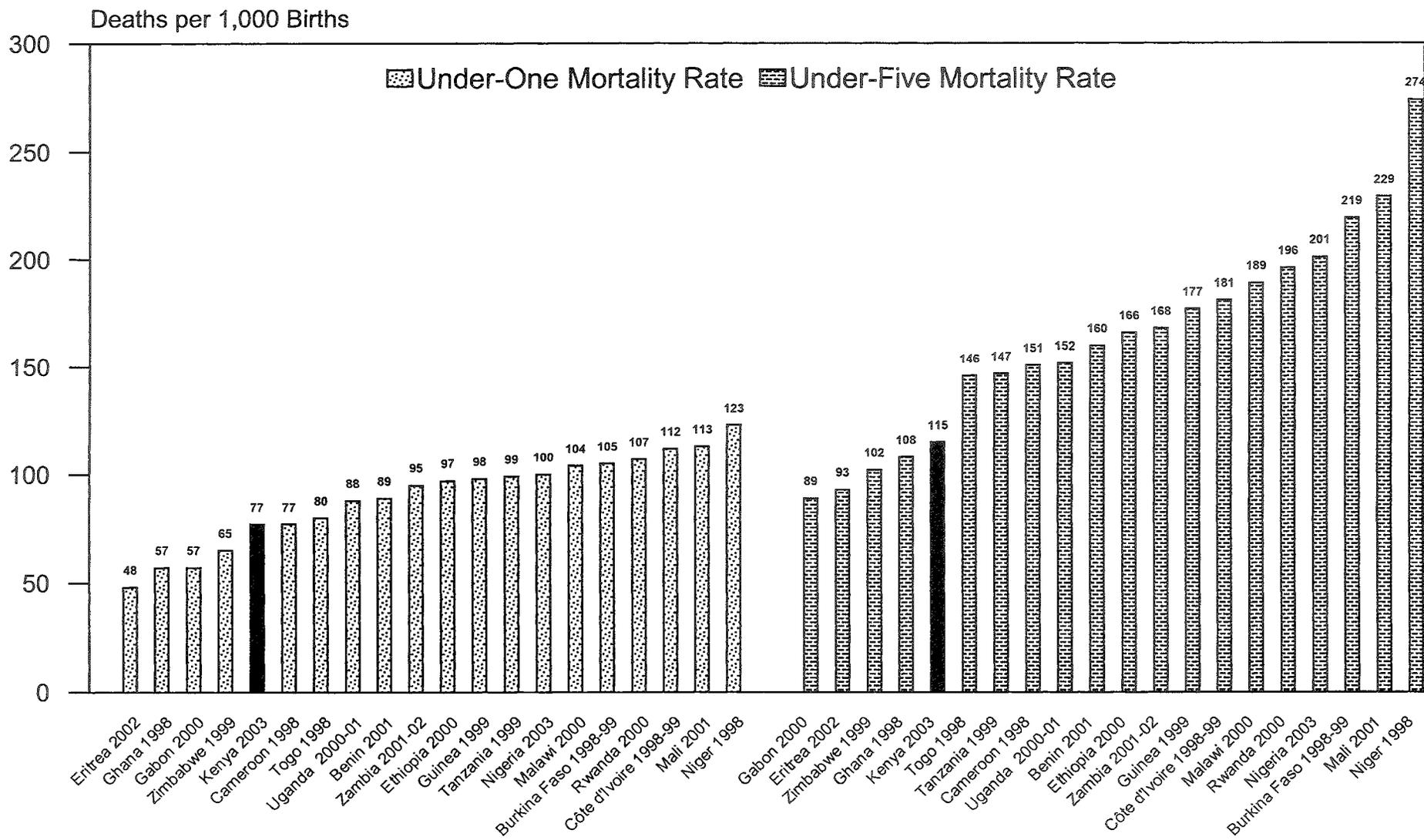
## **Figure 1: Infant and Child Mortality, Kenya Compared with Other Sub-Saharan Countries**

Malnutrition compromises child health, making children susceptible to illness and death. Infectious diseases such as acute respiratory infections, diarrhoea, and malaria account for the greatest proportion of infant and under-five mortality. The infant mortality rate (under-one rate) is a commonly used measure of infant health and is a sensitive indicator of the socio-economic conditions of a country. The under-five mortality rate is another informative indicator of infant and child survival.

- **Kenya's under-one mortality rate (77 deaths per 1,000 births) indicates that almost 8 percent of children born in Kenya will die before their first birthday.** This rate is in the lower range of all sub-Saharan countries surveyed.
- **Kenya's under-five mortality rate (115 deaths per 1,000 births) indicates that almost 12 percent of children born in Kenya will die before their fifth birthday.** This rate also places Kenya in the lower range of the sub-Saharan countries surveyed.

# Figure 1

## Infant and Child Mortality, Kenya Compared with Other Sub-Saharan Countries



## Figure 2: Contribution of Undernutrition to Under-Five Mortality, Kenya

Undernutrition is an important factor in the death of many young children. Even if a child is only mildly malnourished, the mortality risk is increased. Under-five mortality is largely a result of infectious diseases and neonatal deaths in developing countries. Respiratory infections, diarrhoea, malaria, measles, and other infectious diseases take their toll on children.

Formulas developed by Pelletier et al.<sup>1</sup> are used to quantify the contributions of moderate and severe malnutrition to under-five mortality.

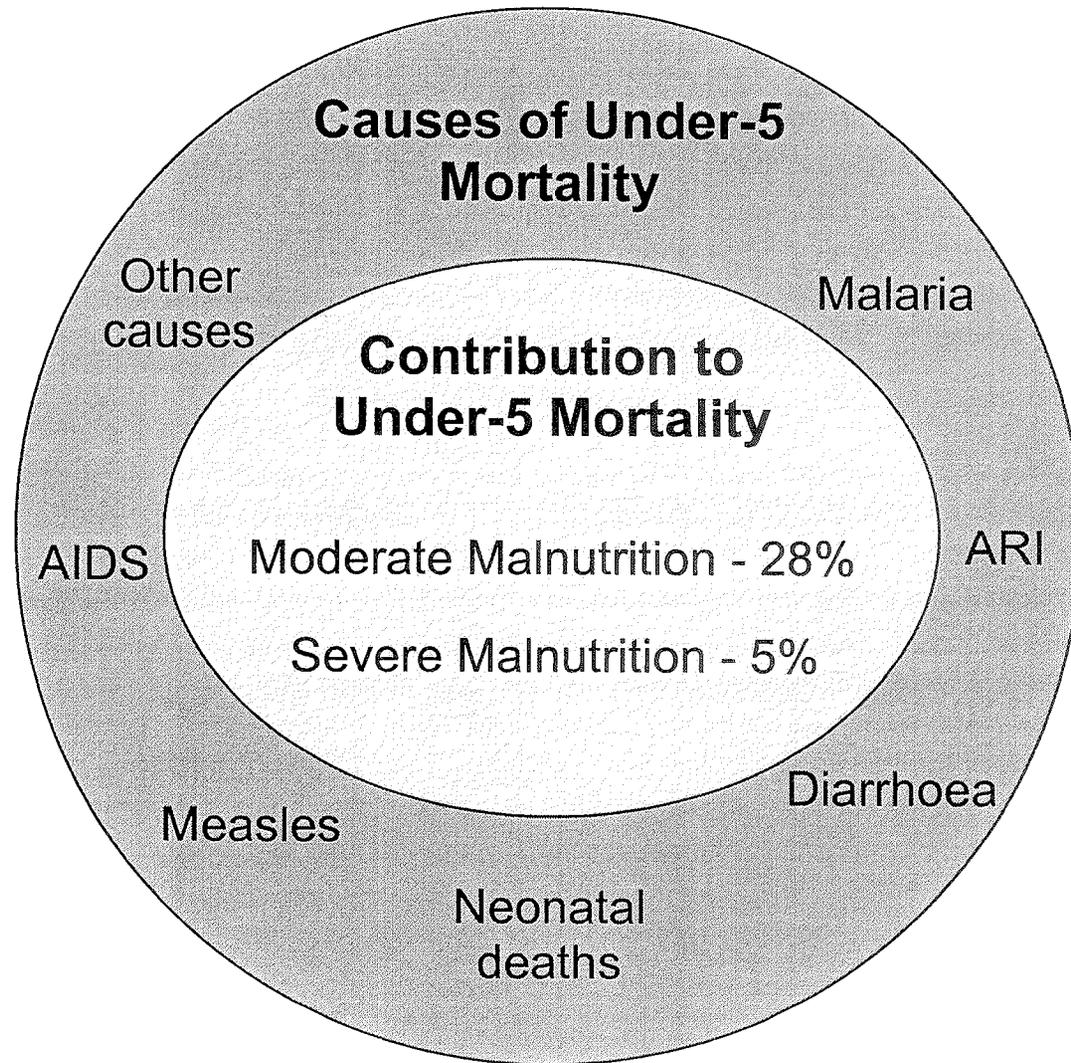
In Kenya,

- **Thirty-three percent of all deaths that occur before age five are related to malnutrition (severe and moderate malnutrition).**
- **Because of its extensive prevalence, moderate malnutrition (28 percent) contributes to more deaths than severe malnutrition (5 percent).**
- **Moderate malnutrition is implicated in 85 percent of deaths associated with malnutrition.**

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<sup>1</sup> 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.

**Figure 2**  
**Contribution of Undernutrition to Under-Five Mortality, Kenya**



Note: Calculation based on Pelletier et al., 1994.

## Figure 3: Survival and Nutritional Status of Children, Kenya

Malnutrition and mortality both take a tremendous toll on young children. This figure illustrates the proportion of children who have died or are undernourished at each month of age.

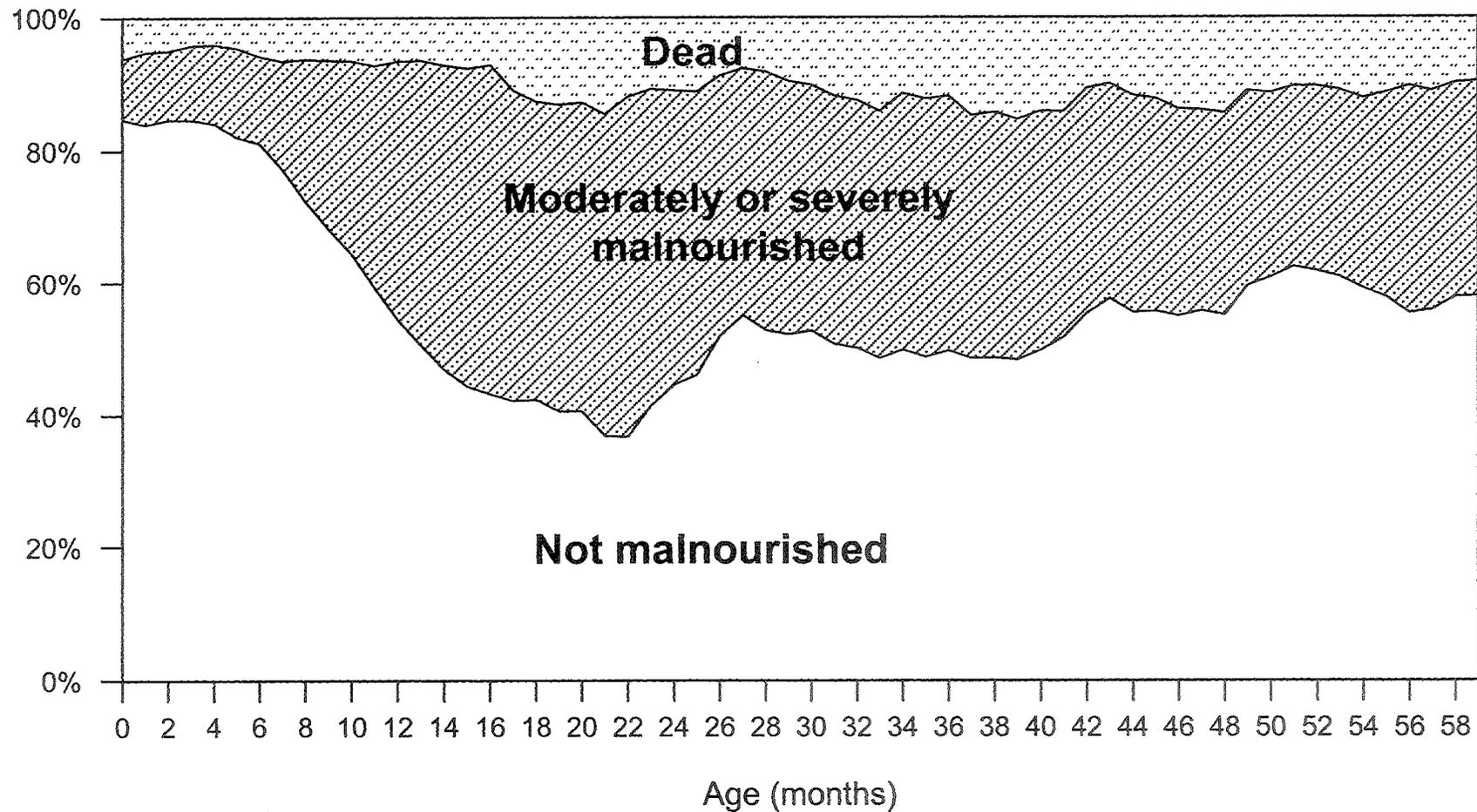
In Kenya,

- **Between birth and 22 months of age, the percentage of children who are alive and not malnourished drops rapidly from about 85 percent to 37 percent.** Thereafter, the rate averages about 50 percent until 40 months and increases to about 60 percent through 59 months.
- **Between birth and 22 months of age, the percentage of children who are moderately or severely malnourished<sup>1</sup> increases dramatically from 9 percent to 51 percent.** This percentage declines to about 32 percent through 59 months.
- **From birth until 59 months, the percentage of children who have died increases gradually, from 6 percent at birth to 15 percent at 21 months.** The percentage then varies between 10 and 15 percent through 59 months.

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<sup>1</sup> A child with a Z-score below minus three standard deviations (-3 SD) on the reference standard is considered severely malnourished, while one with a Z-score between -2 SD and -3 SD is considered moderately malnourished.

# Figure 3 Survival and Nutritional Status of Children, Kenya



Note: A child with a Z-score below -3 SD on the reference standard is considered severely malnourished (stunted, wasted, or underweight), while a child with a Z-score between -3 SD and -2 SD is considered moderately malnourished. Values have been smoothed using a five-month rolling average.



# Malnutrition in Kenya

## Figure 4: Malnutrition among Children under Five Years, Kenya

In Kenya,

- **Thirty-one percent of children age 0-59 months are chronically malnourished.** In other words, they are too short for their age, or *stunted*.<sup>1</sup> The proportion of children who are stunted is over 15 times the level expected in a healthy, well-nourished population.
- **Acute malnutrition**, manifested by *wasting*,<sup>2</sup> results in a child being too thin for his or her height. **It affects 6 percent of children**, which is 3 times the level expected in a healthy population.
- **Twenty percent of children under five years are *underweight***<sup>3</sup> for their age. This is 10 times the level expected in a healthy, well-nourished population.
- **Thirteen percent of children under five are *overweight***.<sup>4</sup> This more than three-quarters the level expected in a healthy, well-nourished population.

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<sup>1</sup> A stunted child has a height-for-age Z-score that is below -2 SD based on the NCHS/CDC/WHO reference population. Chronic malnutrition is the result of an inadequate intake of food over a long period and may be exacerbated by chronic illness.

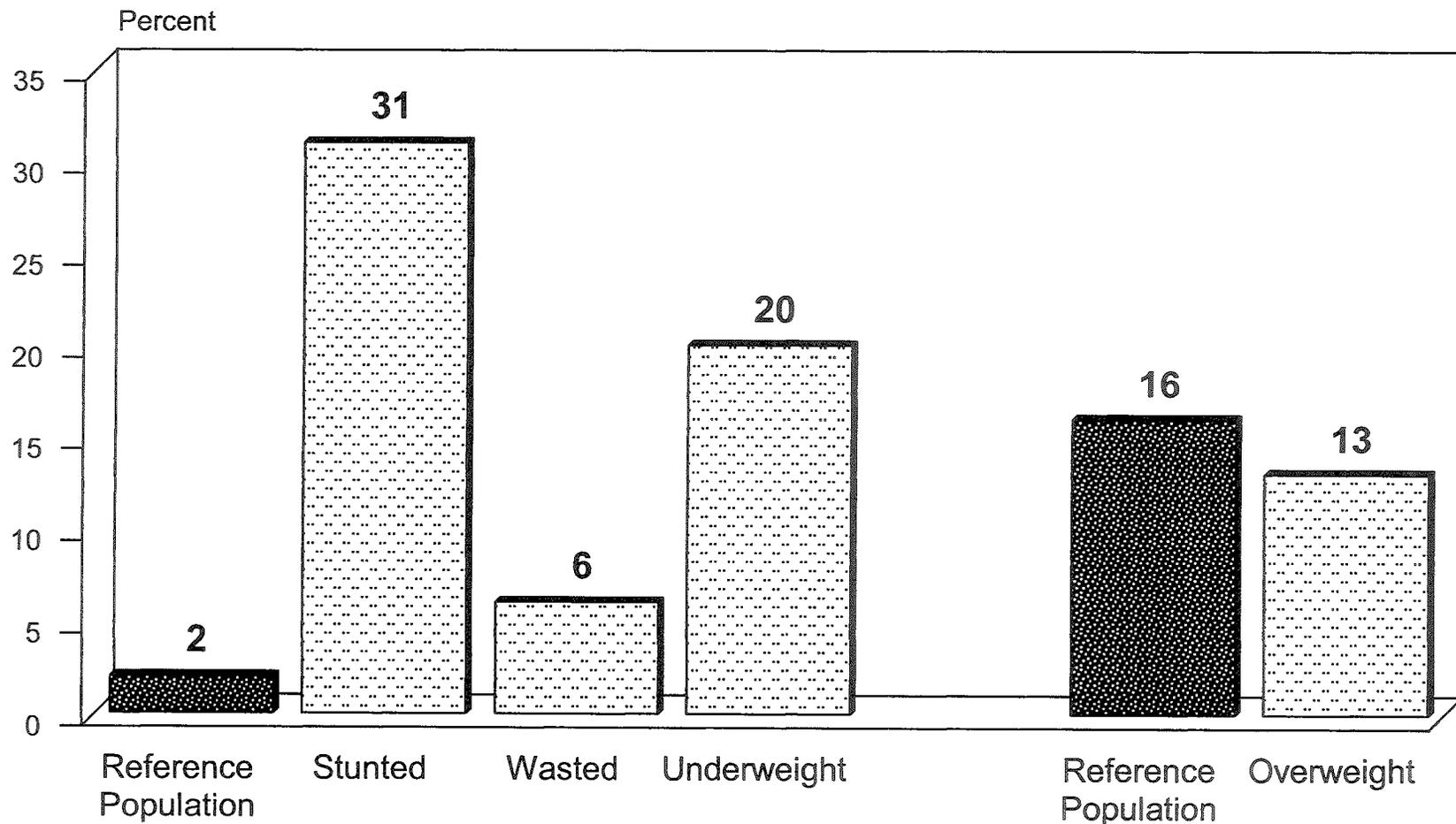
<sup>2</sup> A wasted child has a weight-for-height Z-score that is below -2 SD based on the NCHS/CDC/WHO reference population. Acute malnutrition is the result of a recent failure to receive adequate nutrition and may be affected by acute illness, especially diarrhoea.

<sup>3</sup> An underweight child has a weight-for-age Z-score that is below -2 SD based on the NCHS/CDC/WHO reference population. This condition can result from either chronic or acute malnutrition or a combination of both.

<sup>4</sup> An overweight child has a weight-for-height Z-score that is above 1 SD based on the NCHS/CDC/WHO reference population.

# Figure 4

## Malnutrition among Children under Five Years, Kenya



Note: *Stunting* reflects chronic malnutrition; *wasting* reflects acute malnutrition; *underweight* reflects chronic or acute malnutrition or a combination of both.

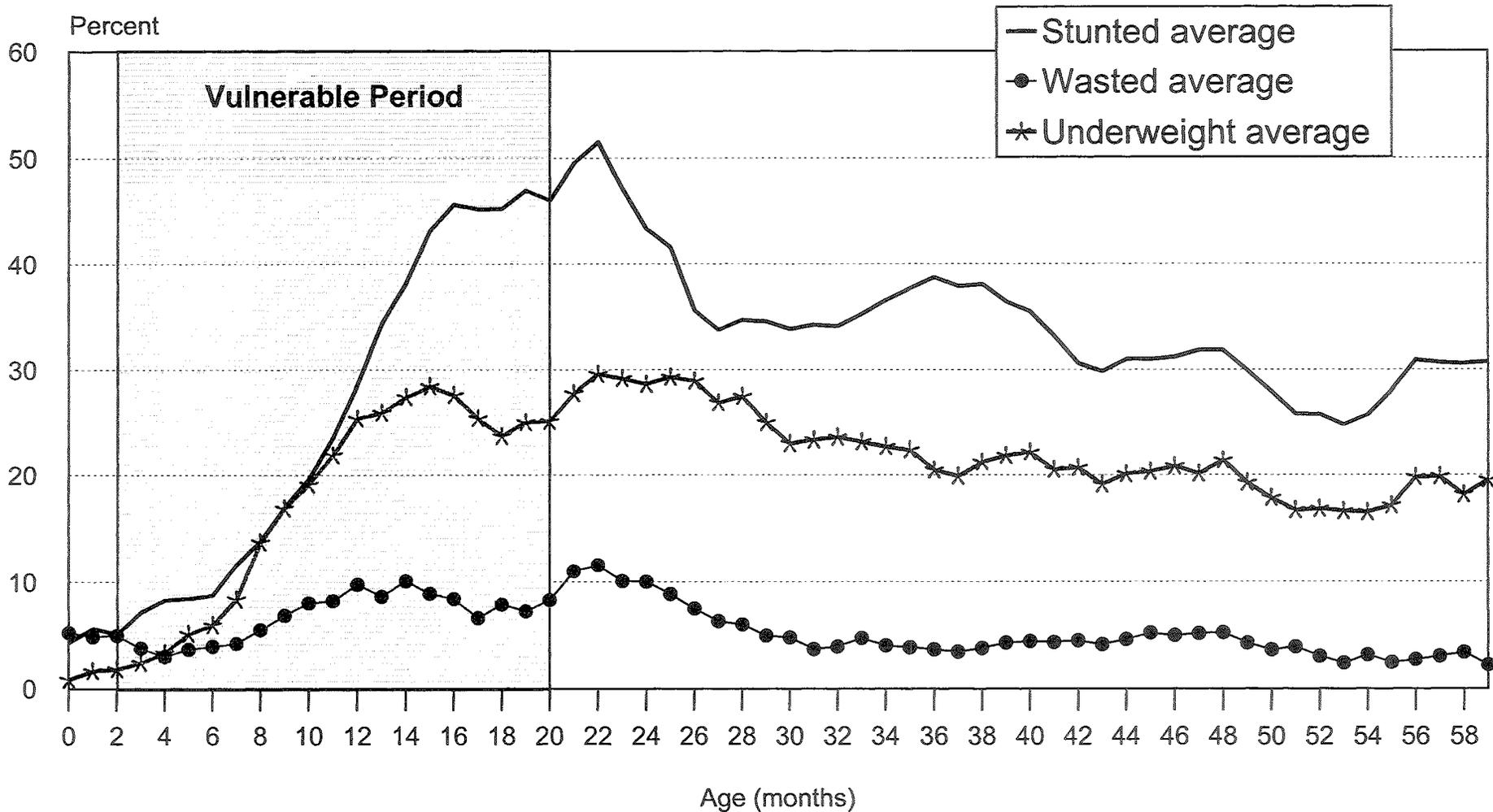
## Figure 5: Changes in Malnutrition Rates among Children under 5 Years, Kenya 1993-2003

The findings of the 2004 KDHS suggest that the nutritional status of children in Kenya has not changed significantly from previous surveys.

- From 1993 to 1998, rates of stunting, wasting and underweight did not change.
- **In 2003, rates of wasting remained the same as previous years, at 6 percent. However, both rates of stunting and underweight decreased by 2 percentage points.** Stunting decreased from 33 percent in 1998 to 31 percent in 2003, and underweight decreased from 22 percent in 1998 to 20 percent in 2003.

# Figure 6

## Stunting, Wasting, and Underweight by Age, Kenya



Note: *Stunting* reflects chronic malnutrition; *wasting* reflects acute malnutrition; *underweight* reflects chronic or acute malnutrition or a combination of both. Plotted values are smoothed by a five-month moving average.

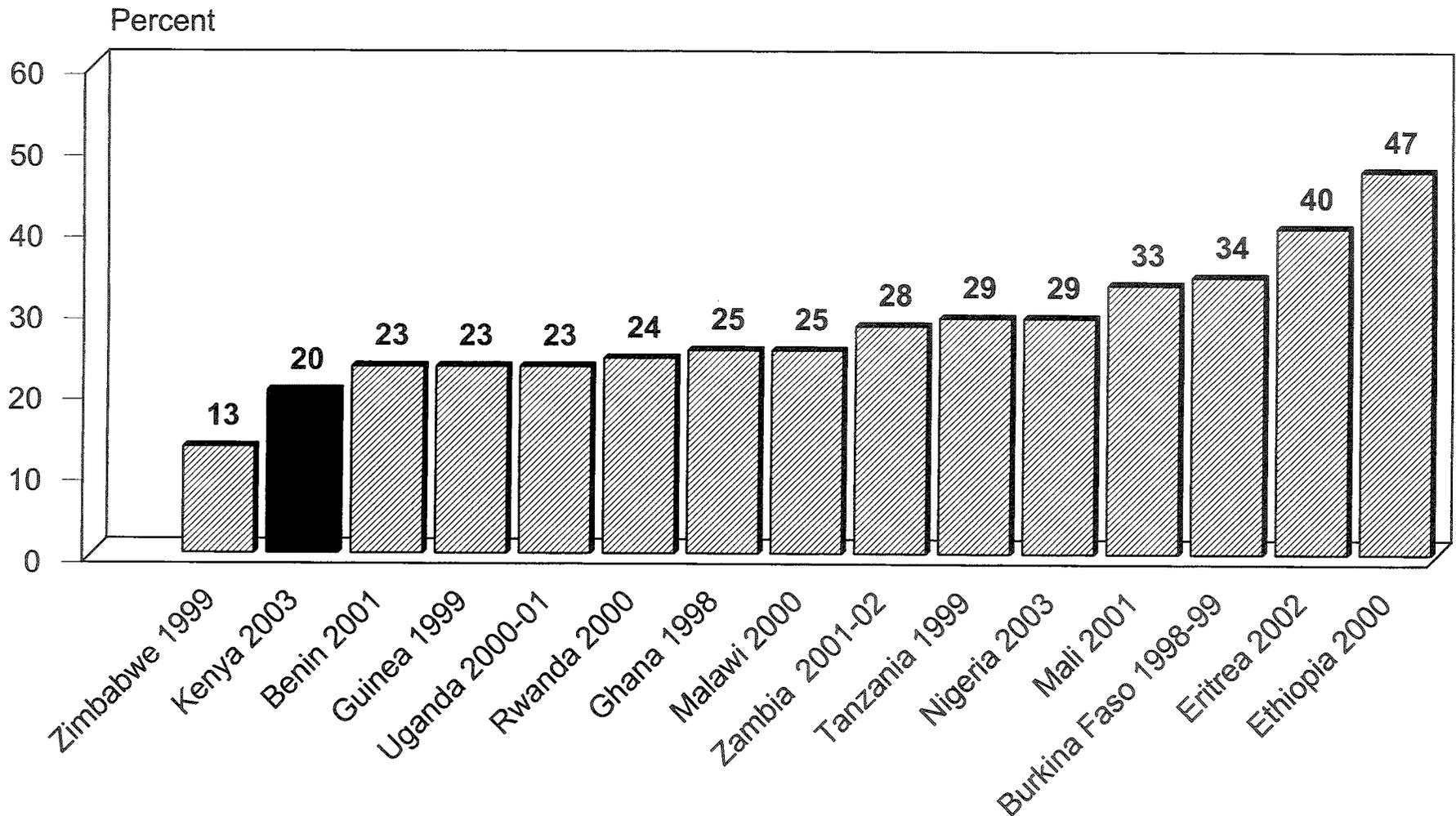
## Figure 7: Underweight among Children under Five Years, Kenya Compared with Other Sub-Saharan Countries

Among the sub-Saharan countries surveyed,

- The percentage of children **under five years** who are *underweight* ranges from 13 to 47 percent. **With 20 percent of children under five years being underweight, Kenya is second lowest among the sub-Saharan countries surveyed.** Underweight status is indicative of children who suffer from chronic or acute malnutrition, or both, and may be influenced by both short- and long-term determinants of malnutrition. Underweight is often used as a general indicator of a population's health status.

## Figure 7

### Underweight among Children under Five Years, Kenya Compared with Other Sub-Saharan Countries



Note: *Underweight* reflects chronic or acute malnutrition or a combination of both.

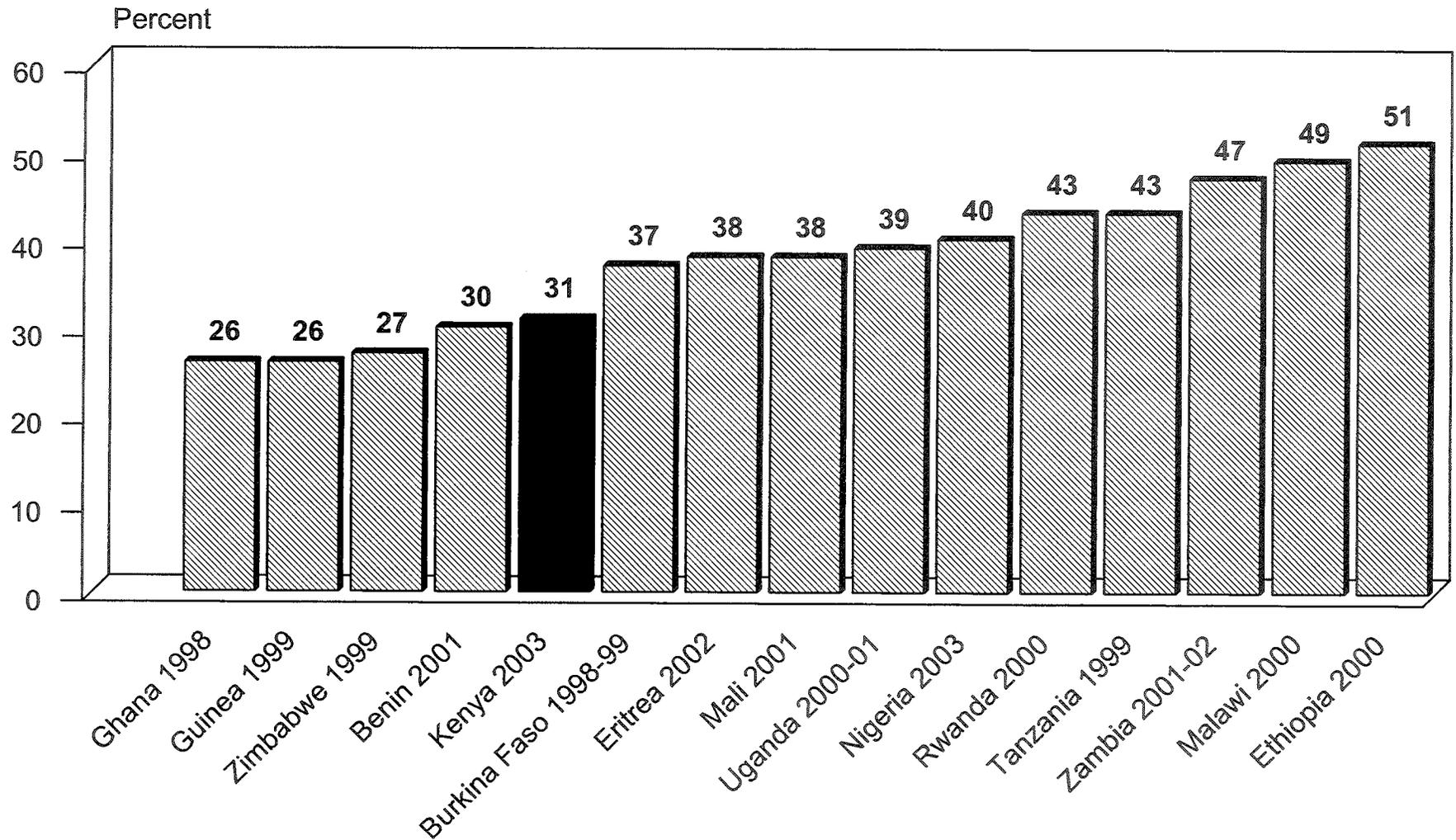
## Figure 8: Stunting among Children under Five Years, Kenya Compared with Other Sub-Saharan Countries

Among the sub-Saharan countries surveyed,

- The percentage of children **under five years** who are *stunted* ranges from 26 to 51 percent. **At 31 percent, the proportion of children under five years who are stunted in Kenya is in the lower third of the sub-Saharan countries surveyed.** Stunting is a good long-term indicator of the nutritional status of a population because it is not markedly affected by short-term factors such as season of data collection, epidemic illnesses, acute food shortages, and recent shifts in social or economic policies.

## Figure 8

### Stunting among Children under Five Years, Kenya Compared with Other Sub-Saharan Countries



Note: *Stunting* reflects chronic malnutrition.

# Conceptual Framework for Nutritional Status

Nutrition is directly related to food intake and infectious diseases such as diarrhoea, acute respiratory infection, malaria, and measles. Both food intake and infectious diseases reflect underlying social and economic conditions at the household, community, and national levels that are supported by political, economic, and ideological structures within a country.

The following diagram is a conceptual framework for nutrition adapted from UNICEF.<sup>1</sup> It reflects relationships among factors and their influences on children's nutritional status. Although political, socio-economic, environmental, and cultural factors (at the national and community levels) and poverty (at the household level) affect the nutritional status of women and children, the only variables included in this chartbook are those that can be collected as part of a national household survey. The highlighted areas of the framework depict selected factors.

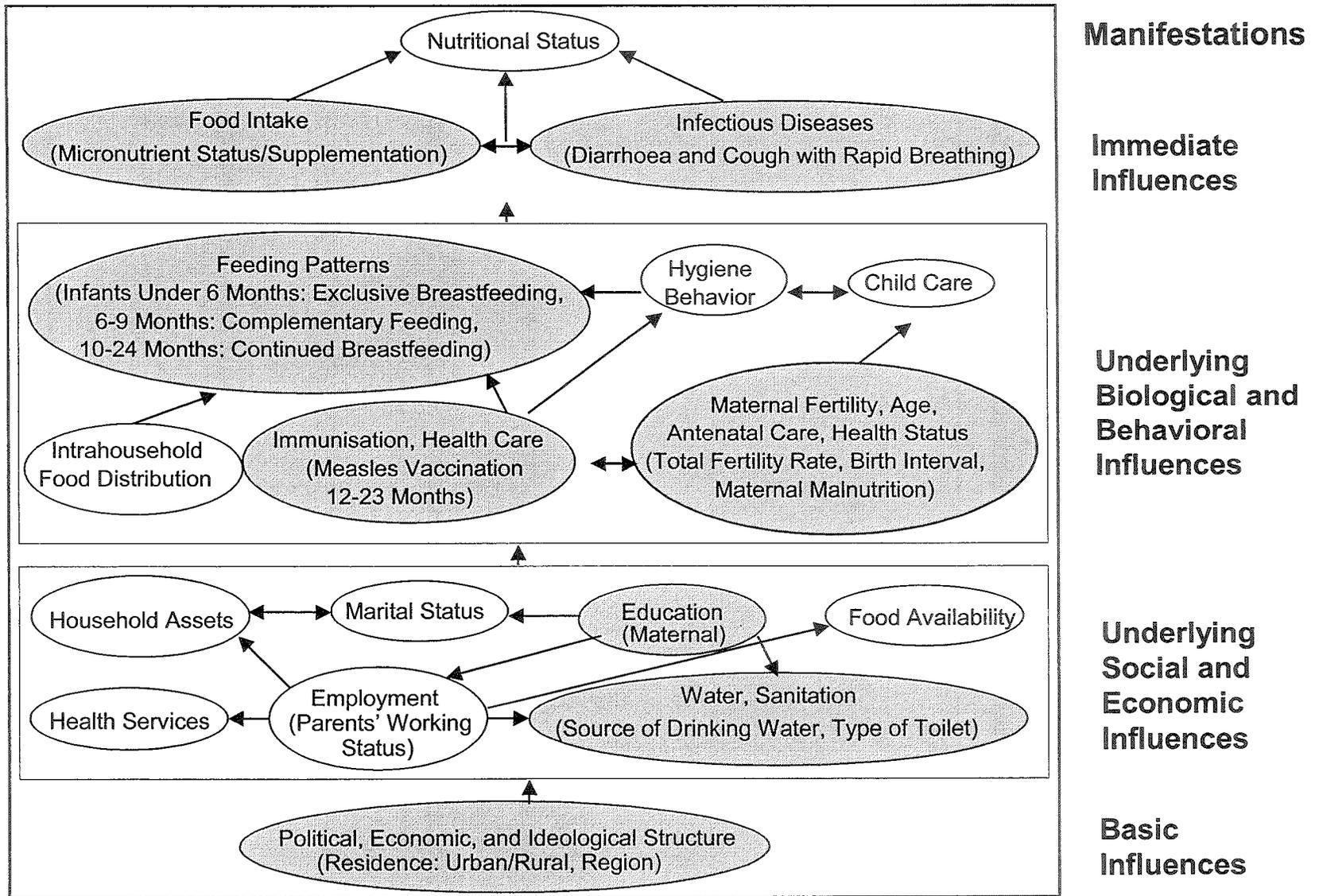
These factors are:

- **Immediate influences**, such as food intake (micronutrient status and supplementation) and infectious diseases (diarrhoea and respiratory infections)
- **Underlying biological and behavioral influences**, such as maternal fertility, measles vaccinations, and feeding patterns of children under two years
- **Underlying social and economic influences**, such as maternal education, drinking water, and sanitation
- **Basic influences**, such as area of residence.

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<sup>1</sup> State of the World's Children, 1998

# Conceptual Framework for Nutritional Status





# Immediate Influences of Malnutrition

## **Figure 9: Vitamin A Supplementation among Mothers of Children under Five Years by Region, Kenya**

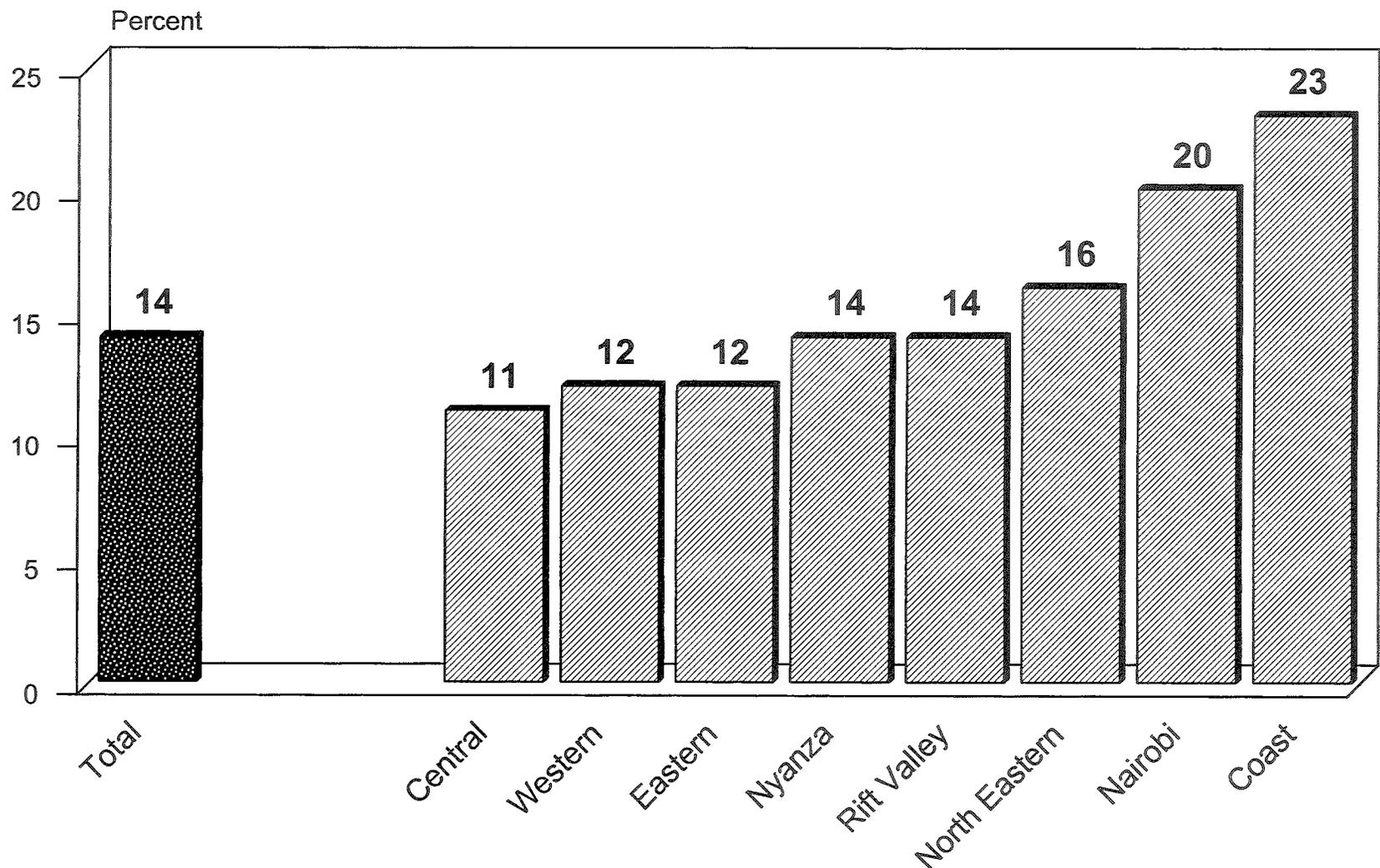
Recent studies show that pregnant women who are vitamin A deficient are at a greater risk of dying during or shortly after delivery of the child. Pregnancy and lactation strain women's nutritional status and their vitamin A stores. For women who have just given birth, vitamin A supplementation helps to bring their level of vitamin A storage back to normal, aiding recovery and avoiding illness.

Vitamin A supplementation also benefits children who are breastfed. If mothers have vitamin A deficiency, their children can be born with low stores of vitamin A. Low birth weight babies are especially at risk. Additionally, infants often do not receive an adequate amount of vitamin A from breast milk when mothers are vitamin A deficient. Therefore, supplementation is important for postpartum women within the first eight weeks after childbirth.

In Kenya,

- **Fourteen percent of mothers received vitamin A supplements within two months after delivery.**
- **Vitamin A supplementation of mothers varies by region.** Only 11 percent of mothers in the Central region received vitamin A, while 23 percent of mothers in the Coast region did.

**Figure 9**  
**Vitamin A Supplementation among Mothers of Children under Five Years by Region, Kenya**



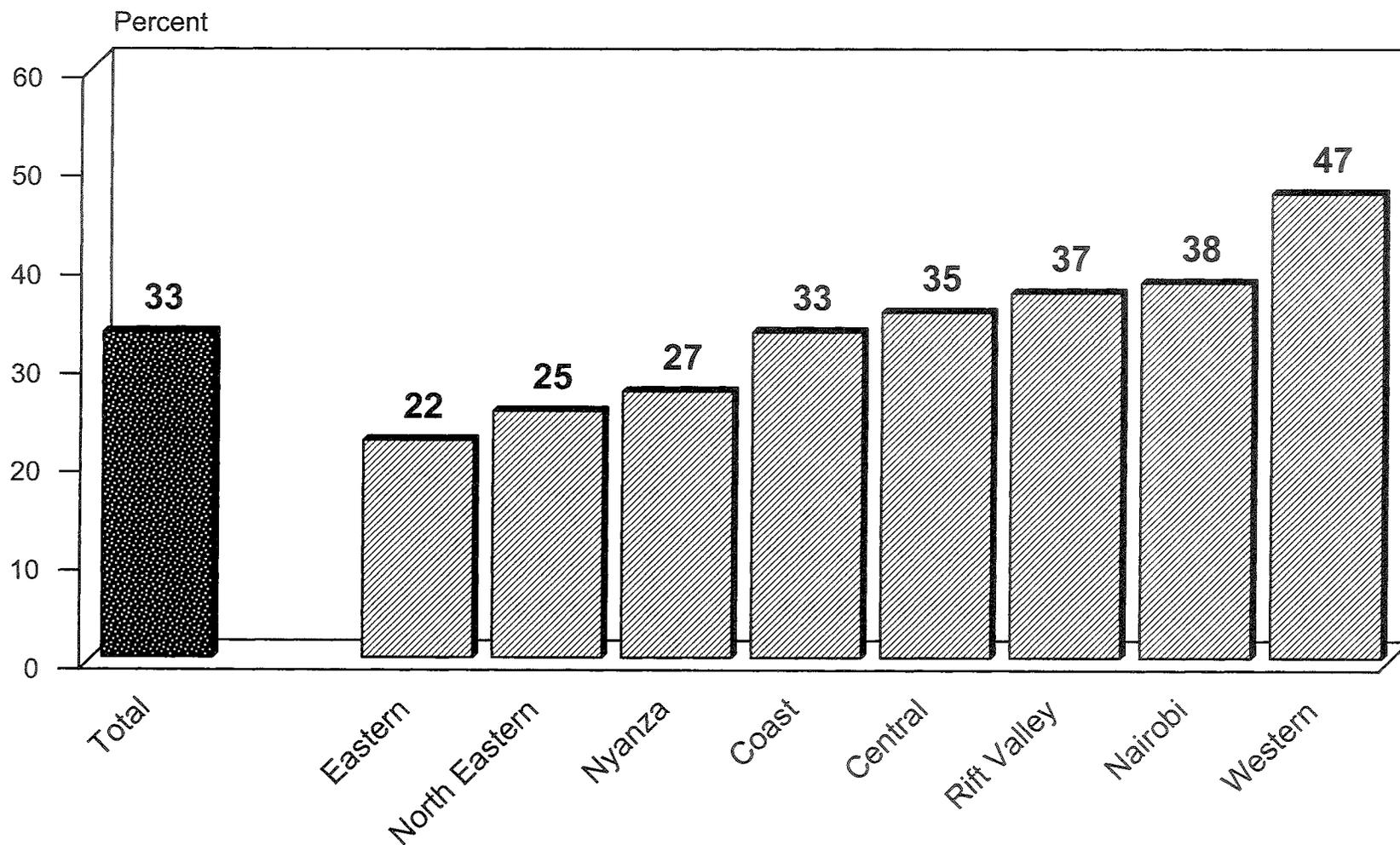
## **Figure 10: Vitamin A Supplementation among Children 6-59 Months in the Past Six Months by Region, Kenya**

Vitamin A deficiency (VAD) is common in dry environments where fresh fruits and vegetables are not readily available. Vitamin A is found in breast milk, other milks, liver, eggs, fish, butter, red palm oil, mangos, papayas, carrots, pumpkin, and dark leafy greens. Unlike iron or folate, vitamin A is a fat-soluble vitamin, which means that consumption of oils or fats are necessary for its absorption into the body. The liver can store an adequate amount of the vitamin for four to six months. Periodic dosing (every four to six months) with vitamin A supplements is a rapid, low-cost method of ensuring children at risk do not develop VAD. National Immunisation Days for polio or measles vaccinations reach large number of children with vitamin A supplements as well.

In Kenya,

- **Thirty-three percent of children under 6-59 months received a vitamin A dose in the last six months.**
- **The rate of vitamin A supplementation of children varies throughout Kenya.** The rates of supplementation were lowest in the Eastern region (22 percent) and highest in the Western region (47 percent).

**Figure 10**  
**Vitamin A Supplementation among Children 6-59 Months in the Past Six Months by Region, Kenya**



Note: The table includes all living children of interviewed mothers, with or without complete anthropometric measurements.

## **Figure 11: Iron Supplementation among Mothers of Children under Five Years, Kenya**

Anaemia is the lack of an adequate amount of hemoglobin in the blood. It can be caused by several different health conditions; iron and folate deficiencies are some of the most prevalent conditions related to anaemia. Vitamin B<sub>12</sub> deficiency, protein deficiency, sickle cell disease, malaria, and parasite infection also cause anaemia.

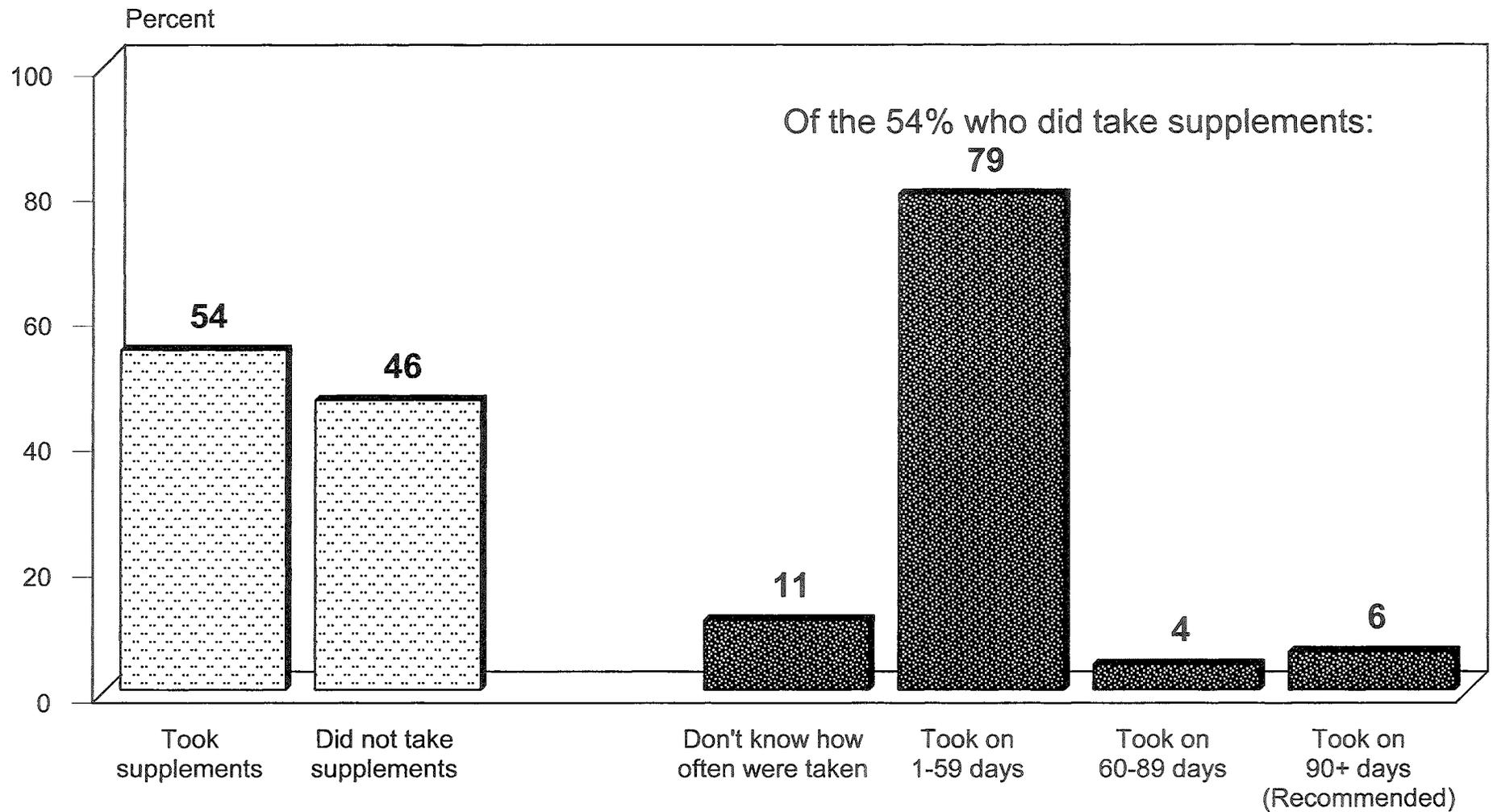
Iron-deficiency anaemia is the most common form of nutritional deficiency worldwide. This type of nutritional deficiency develops slowly and does not manifest symptoms until anaemia becomes severe. Diets that are heavily dependent on one grain or starch as the major staple often lack sufficient iron intake. Iron is found in meats, poultry, fish, grains, some cereals, and dark leafy greens (such as spinach). Foods rich in vitamin C increase absorption of iron into the blood. Tea, coffee, and whole-grain cereals can inhibit iron absorption. Anaemia is common in children 6-24 months of age who consume purely a milk diet and in women during pregnancy and lactation. Iron-deficiency anaemia is related to decreased cognitive development in children, decreased work capacity in adults, and limited chances of child survival. Severe cases are associated with low birth weight of babies, perinatal mortality, and maternal mortality.

In Kenya,

- **Fifty-four percent of mothers received some iron supplementation during pregnancy.**
- **Of those women who received iron supplementation, only 6 percent reported taking iron the recommended minimum number of days during their pregnancy (90 or more days).**

# Figure 11

## Iron Supplementation among Mothers of Children under Five Years, Kenya



## **Figure 12: Diarrhoea and Cough with Rapid Breathing among Children under Five Years Compared with Malnutrition Rates, Kenya**

Acute respiratory infection and dehydration due to diarrhoea are major causes of morbidity and mortality in most sub-Saharan countries. To estimate the prevalence of ARI, mothers were asked whether their children under five years had been ill with coughing accompanied by short, rapid breathing in the past two weeks. For diarrhoea, mothers were asked whether their children under five years had symptoms of diarrhoea in the past two weeks. Early diagnosis and rapid treatment can reduce the rates of illness or death caused by these conditions.

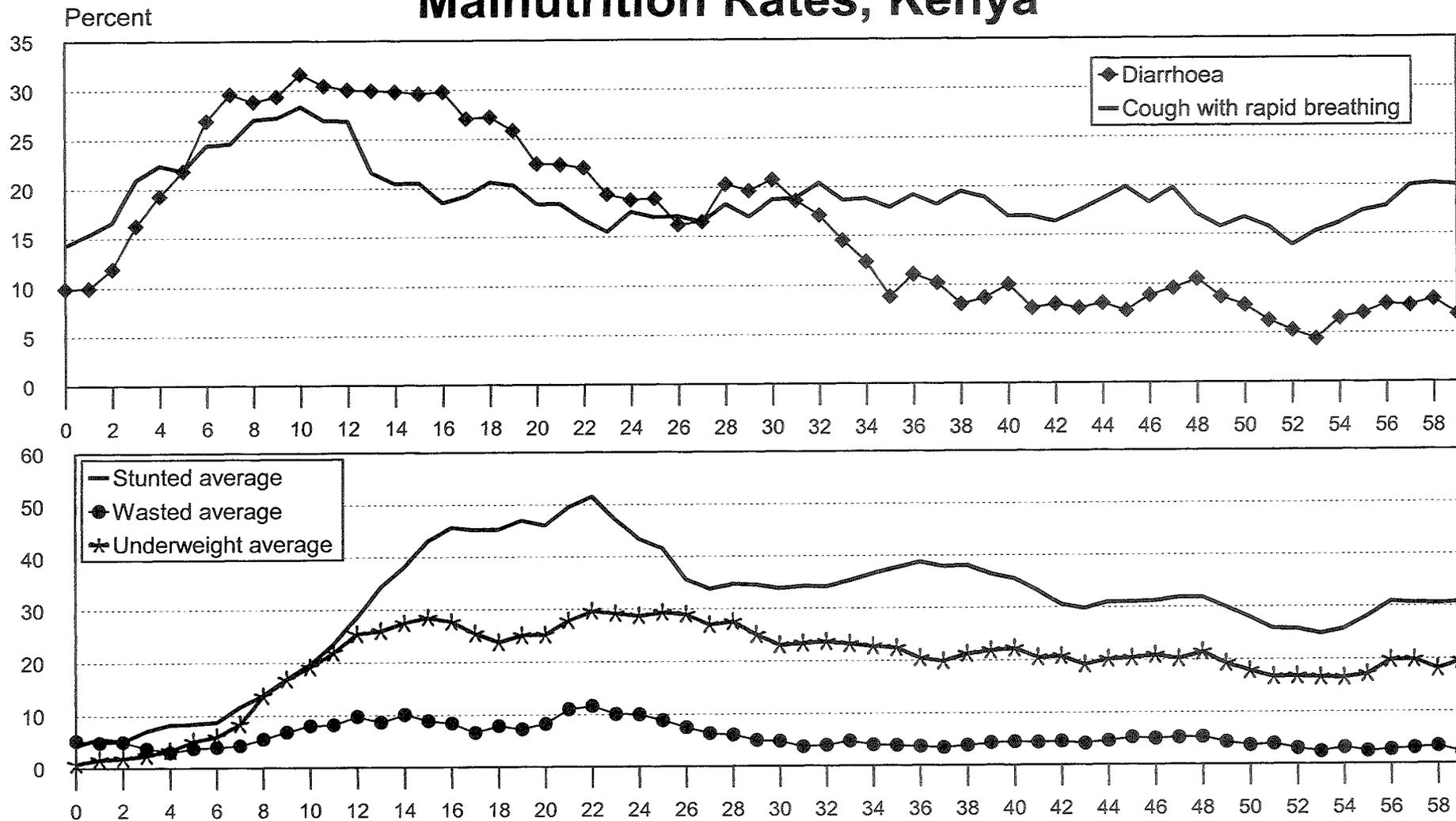
In Kenya,

- **Sixteen percent of children under five years of age experienced diarrhoea in the two weeks preceding the survey.** Kenya's prevalence of diarrhoea increases from 15 percent to 31 percent in the first ten months. The rate then declines to 16 percent at 26 months, increases slightly to 20 percent at 28 months and then declines sharply to 7 percent by 59 months.
- **Nineteen percent of children under five years of age had cough with rapid breathing in the two weeks preceding the survey.** The prevalence of cough with rapid breathing increases rapidly from birth to 10 months when it reaches 28 percent, declining to 15 percent at 23 months. The rate then varies between 15 and 20 percent through 59 months.

The rapid rise in the prevalence of diarrhoea during infancy reflects the increased risk of pathogen contamination associated with the early introduction of water, other liquids, and solid foods. In addition, when infants begin to crawl and move around, they tend to put objects in their mouth, again increasing the risk of pathogen contamination.

# Figure 12

## Diarrhoea and Cough with Rapid Breathing among Children under Five Years Compared with Malnutrition Rates, Kenya



Note: Plotted values are smoothed by a five-month moving average.



# Underlying Biological and Behavioral Influences of Malnutrition

## Figure 13: Fertility and Birth Intervals, Kenya Compared with Other Sub-Saharan Countries

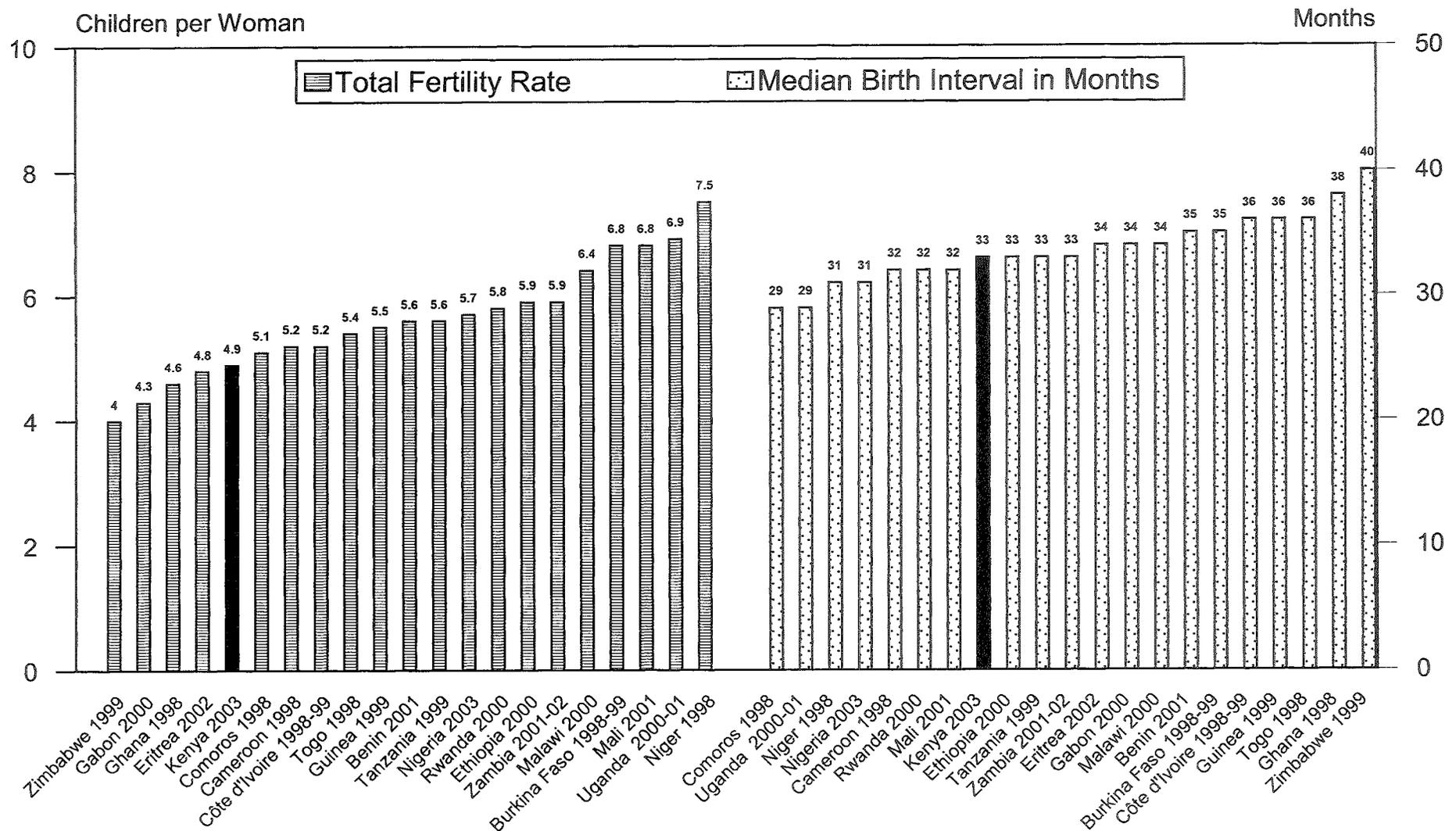
High fertility rates, especially when accompanied by short birth intervals, are detrimental to children's nutritional status. In most countries in sub-Saharan Africa, families have scarce resources to provide adequate nutrition and health care for their children. As the number of children per woman increases, fewer household resources are available for each child. High fertility also has a negative impact on maternal health, thus influencing a mother's ability to adequately care for her children. The most widely used measure of current fertility is the total fertility rate, which is defined as the number of children a woman would have by the end of her childbearing years if she were to pass through those years bearing children at the currently observed age-specific rates.

Information on the length of birth intervals provides insight into birth spacing patterns. Research has shown that children born too soon after a previous birth are at increased risk of poor nutrition and health and increased risk of mortality, particularly when that interval is less than 24 months. The odds of stunting and underweight have been shown to be higher when birth intervals are less than 36 months. Short birth intervals are associated with small birth size and low birth weight, both of which are precursors to poor nutritional status in early childhood.

- **At current fertility rates, a woman in Kenya will have an average of 4.9 children by the end of her childbearing years.** This rate is in the lower third of the sub-Saharan countries surveyed between 1998 and 2003.
- **Kenya's mothers have a median birth interval of 33 months.** This interval is in the middle third of the countries surveyed.

# Figure 13

## Fertility and Birth Intervals, Kenya Compared with Other Sub-Saharan Countries



## **Figure 14: Undernutrition among Children Age 12-23 Months by Measles Vaccination Status, Kenya**

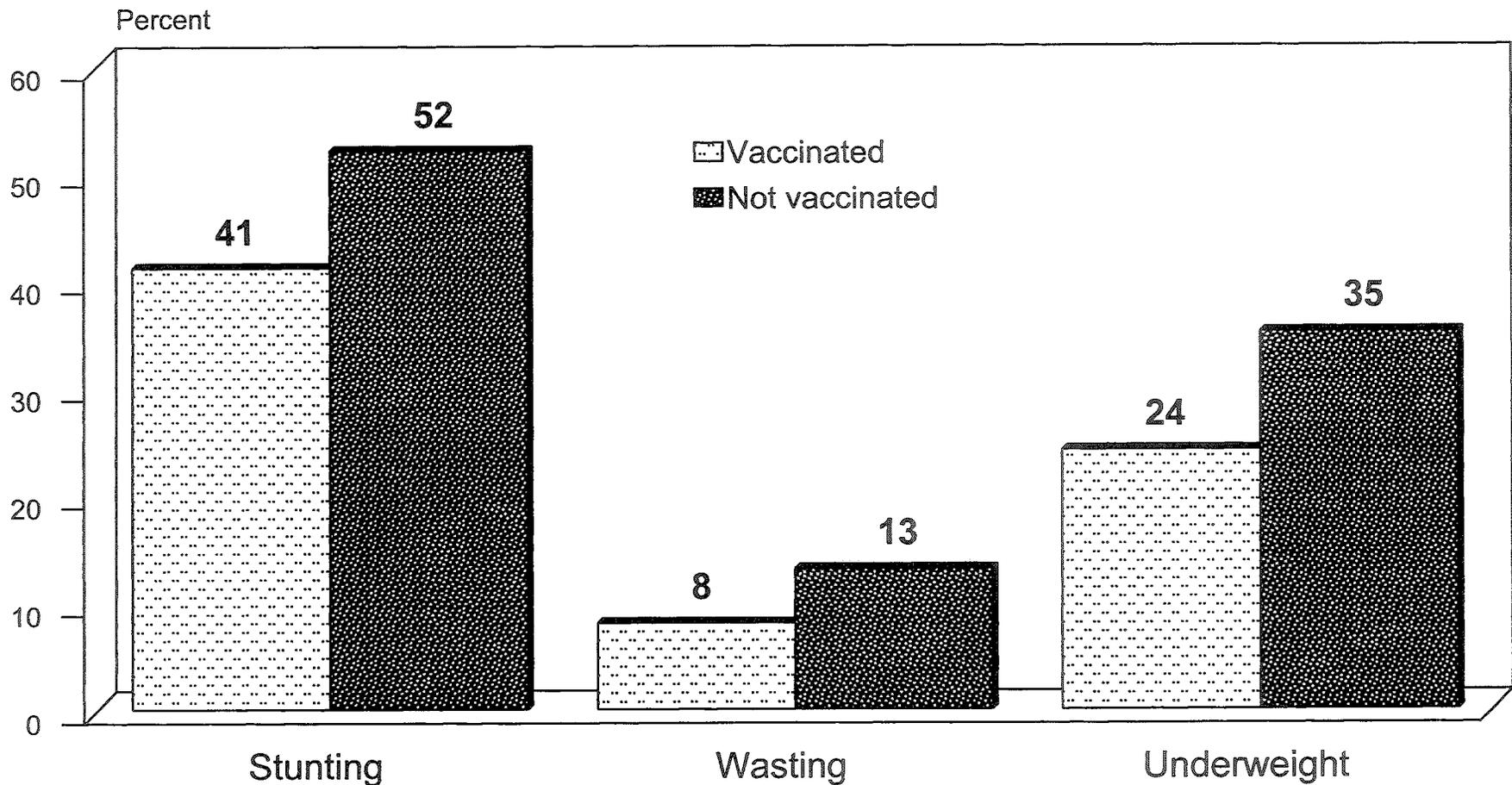
Measles is estimated to kill two million children a year, all in developing countries. It is one of the most common diseases during childhood in areas with low immunisation coverage. Measles not only increases the risk of death but is also a direct cause of malnutrition. The occurrence of measles in poor environments is associated with faltering growth, vitamin A deficiency, and immune suppression. Although infants are not protected from measles after birth by their mother's breast milk, they are protected while in the womb by their mother's measles antibodies. These antibodies can last up to 15 months in infants, but due to malnutrition, last only eight or nine months in children in developing countries. Therefore, measles vaccination is an important child health strategy.

In Kenya,

- **Non-vaccinated children are more likely to be stunted (52 percent, compared with 41 percent stunting in those who had been vaccinated).**
- **Non-vaccinated children are more likely to be wasted (13 percent, compared with 8 percent wasting in those who had been vaccinated).**
- **Non-vaccinated children are more likely to be underweight (35 percent, compared with 24 percent underweight in those who had been vaccinated).**

## Figure 14

### Undernutrition among Children Age 12-23 Months by Measles Vaccination Status, Kenya



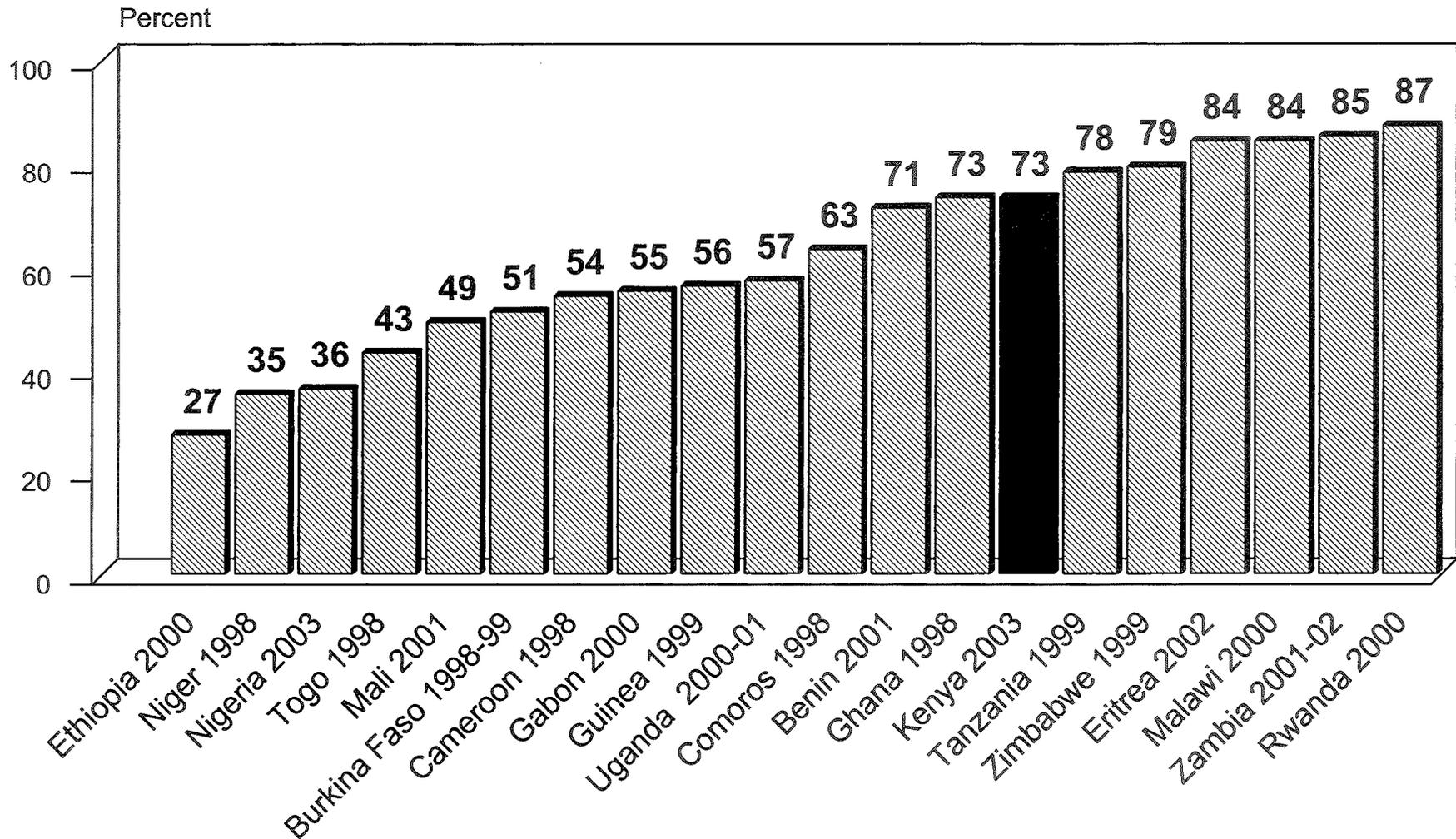
Note: *Stunting* reflects chronic malnutrition; *wasting* reflects acute malnutrition; *underweight* reflects chronic or acute malnutrition or a combination of both.

## **Figure 15: Measles Vaccination Coverage among Children Age 12-23 Months, Kenya Compared with Other Sub-Saharan Countries**

- Measles vaccination ranges from 27 to 87 percent among the sub-Saharan countries surveyed.
- **In Kenya, 73 percent of children 12-23 months of age have been vaccinated against measles.** This places Kenya in the mid to high range of measles vaccination among the sub-Saharan countries surveyed.

# Figure 15

## Measles Vaccination Coverage among Children Age 12-23 Months, Kenya Compared with Other Sub-Saharan Countries



## Figure 16: Feeding Practices for Infants under Six Months, Kenya

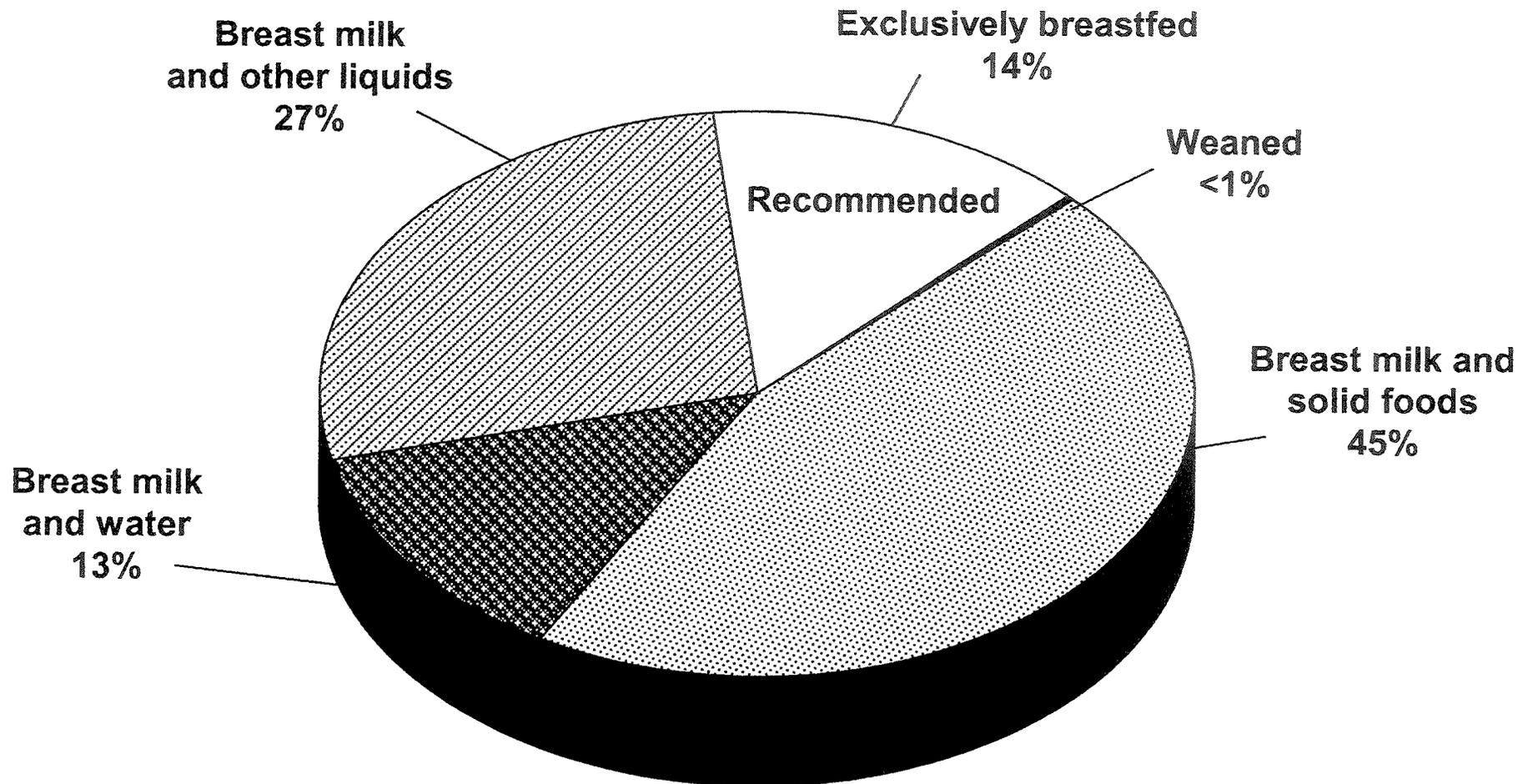
Improper feeding practices, in addition to diarrhoeal disease, are important determinants of malnutrition. WHO and UNICEF recommend that *all infants be exclusively breastfed from birth until six months of age*. In other words, infants should be fed only breast milk during the first six months of life.

In Kenya, the introduction of liquids, such as water, sugar water, and juice; formula; and solid foods takes place earlier than the recommended age of about six months. This practice has a deleterious effect on nutritional status for a number of reasons. First, the liquids and solid foods offered are nutritionally inferior to breast milk. Second, the consumption of liquids and solid foods decreases the infant's intake of breast milk, which in turn reduces the mother's supply of milk. (Breast milk production is determined, in part, by the frequency and intensity of suckling.) Third, feeding young infants liquids and solid foods increases their exposure to pathogens, thus putting them at greater risk of diarrhoeal disease.

- **In Kenya, 14 percent of children under the age of six months are exclusively breastfed, as is recommended by WHO and UNICEF.**
- **Thirteen percent of infants under six months of age are given a combination of breast milk and water only. Additionally, 72 percent of infants under six months old are given some form of liquid or solid food other than breast milk and/or water.**
- **Less than 1 percent of infants under six months are fully weaned.**

# Figure 16

## Feeding Practices for Infants under Six Months, Kenya



Note: WHO and UNICEF recommend that all infants be breastfed exclusively up to six months of age.

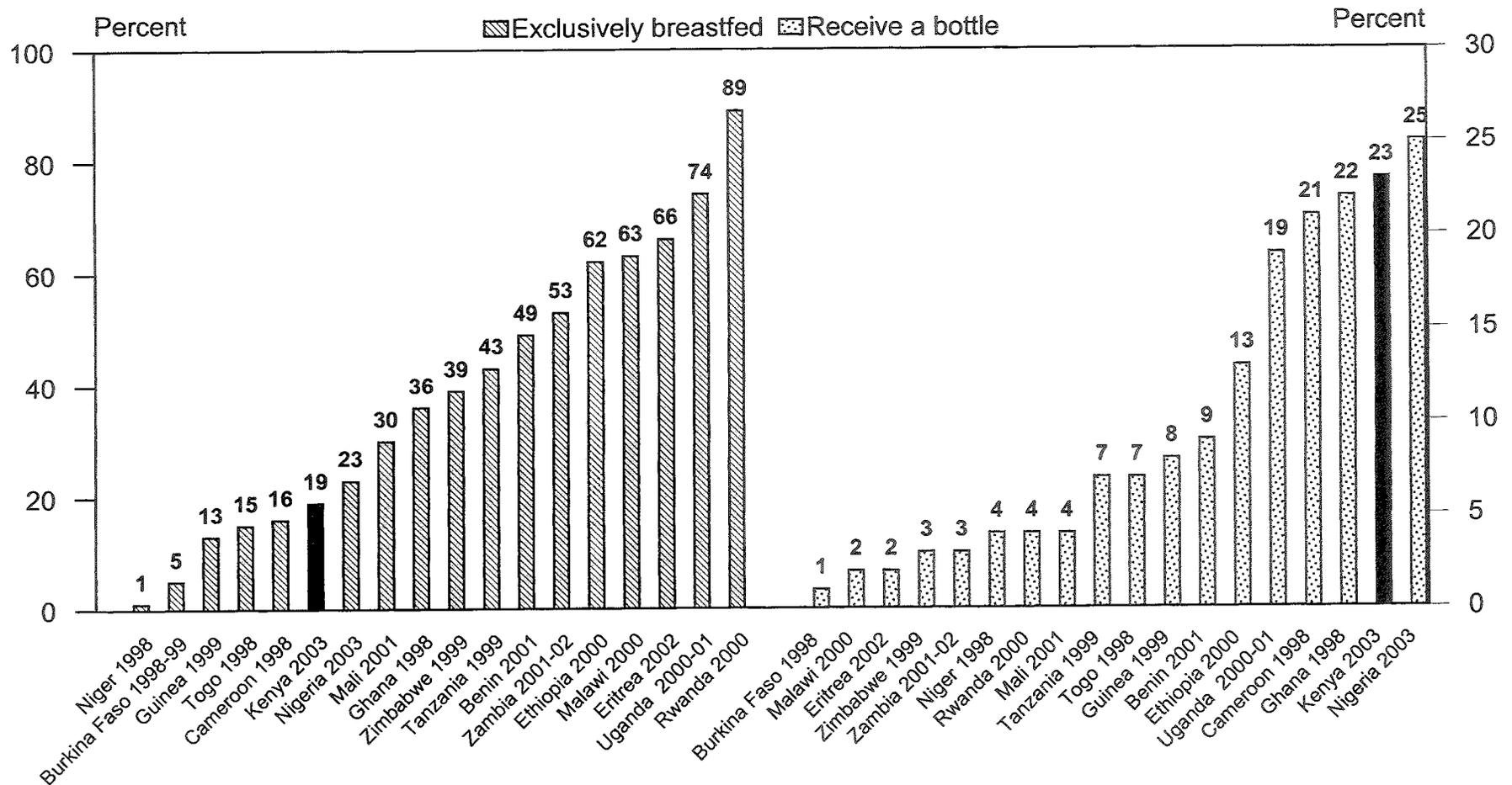
## **Figure 17: Infants under Four Months Who Are Exclusively Breastfed and Those Who Receive a Bottle, Kenya Compared with Other Sub-Saharan Countries**

The failure to exclusively breastfeed young infants and the introduction of liquids and solid foods at too early an age increases the risk of diarrhoeal disease, an important cause of mortality in Africa.

- In most of the sub-Saharan countries surveyed, relatively few mothers of infants under four months follow the recommended practice of breastfeeding exclusively. **In Kenya, 19 percent of these mothers breastfeed their young infants exclusively.** This puts Kenya in the lower third of the sub-Saharan countries surveyed.
- **Bottle-feeding is practiced by 23 percent of mothers of infants under four months in Kenya,** making it the country with the second-highest rate among sub-Saharan countries surveyed. **Bottle-feeding is not generally recommended** because improper sanitation and formula preparation with bottle-feeding can introduce pathogens to the infant, putting the child at a greater risk of illness and malnutrition.

# Figure 17

## Infants under Four Months Who Are Exclusively Breastfed and Those Who Receive a Bottle, Kenya Compared with Other Sub-Saharan Countries



Note: Information on feeding practices is based on the 24 hours before the survey. WHO and UNICEF recommend that all infants should receive nothing but breast milk up to six months of age.

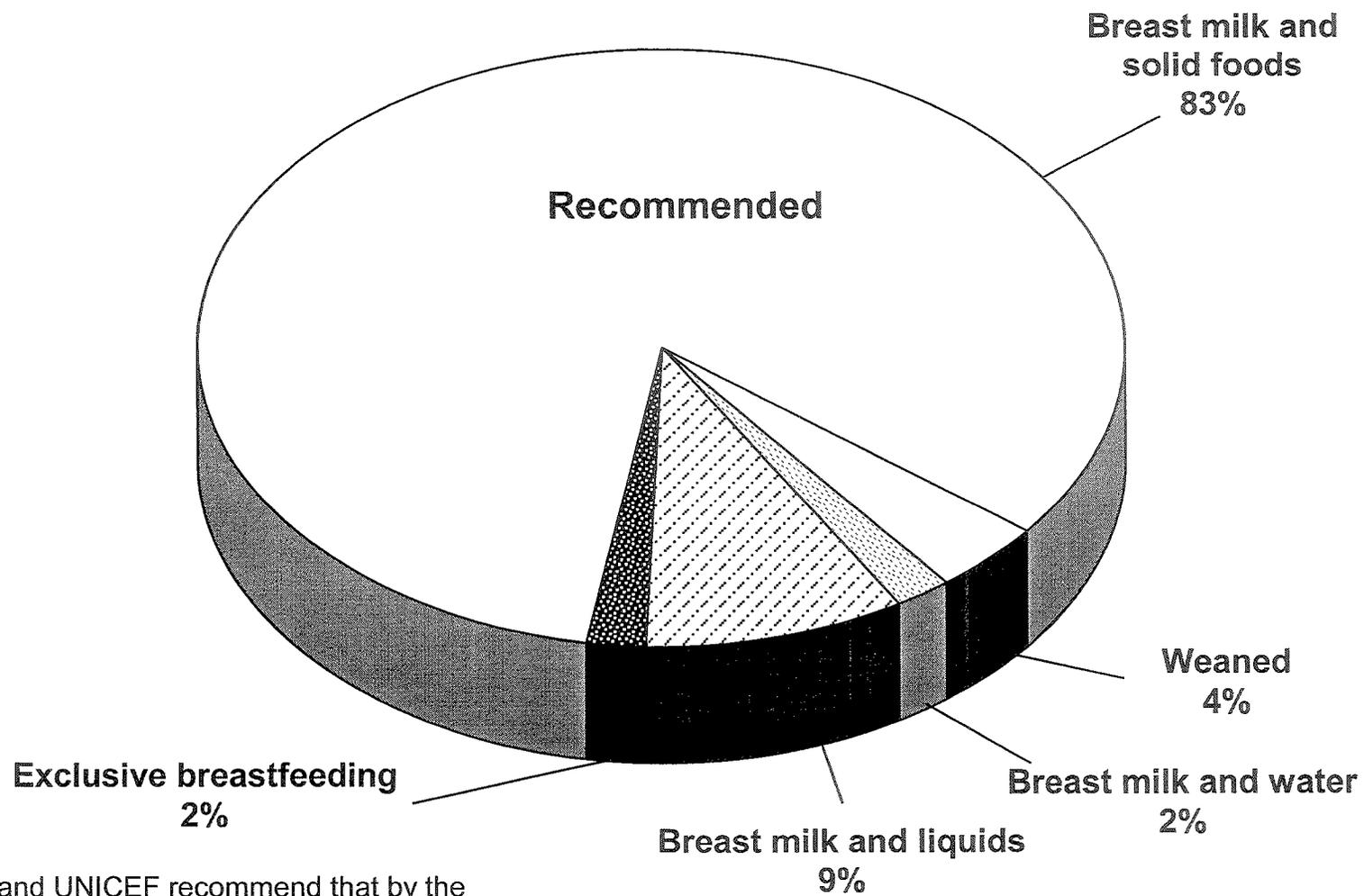
## Figure 18: Feeding Practices for Infants Age 6-9 Months, Kenya

UNICEF and WHO recommend that solid foods be introduced to infants around the age of six months because breast milk alone is no longer sufficient to maintain a child's optimal growth. Thus, *all infants over six months of age should receive solid foods* along with breast milk.

- **In Kenya, 83 percent of infants age 6-9 months are fed solid foods in addition to breast milk.** This means that over four-fifths of all infants age 6-9 months are fed according to the recommended practice.
- **Thirteen percent of infants age 6-9 months are not fed solid foods in addition to breast milk, putting these children at risk of malnutrition.**
- **Four percent of infants are fully weaned** and are thus not receiving the additional nutritional and emotional support of breastfeeding.

# Figure 18

## Feeding Practices for Infants Age 6-9 Months, Kenya



Note: WHO and UNICEF recommend that by the age of six months all infants should receive solid foods and liquids in addition to breast milk.

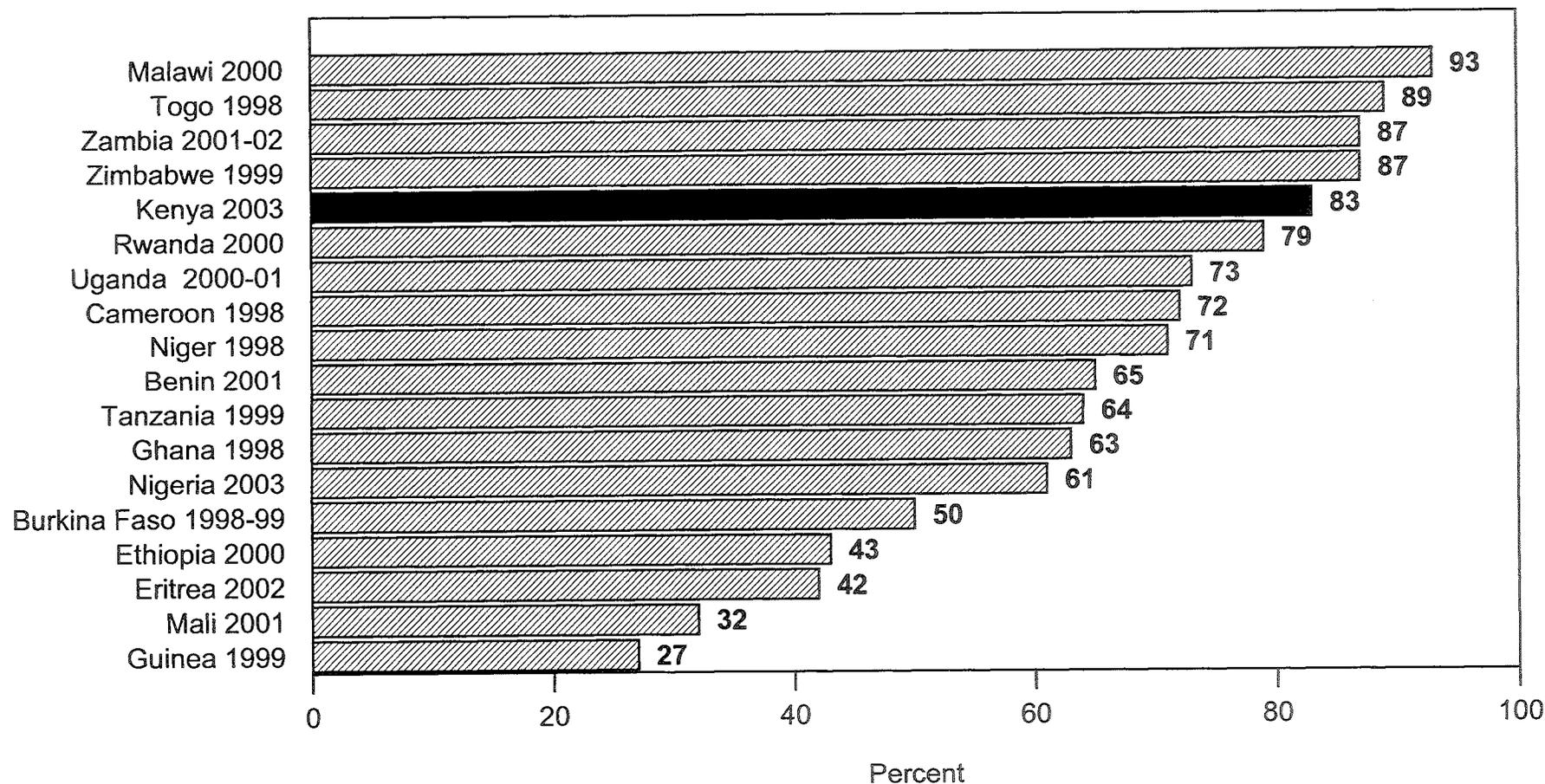
## **Figure 19: Infants Age 6-9 Months Receiving Solid Foods in Addition to Breast Milk, Kenya Compared with Other Sub-Saharan Countries**

Optimal infant feeding practices include the introduction of complementary foods at about six months of age. The introduction of complementary feeding is necessary because breast milk is no longer sufficient to satisfy the developing infant's energy, protein, and micronutrient needs. All infants age 6-9 months should receive complementary foods in addition to breast milk.

- The percentage of infants 6-9 months receiving solid food in addition to breast milk ranges from 27 to 93 percent among the sub-Saharan countries surveyed.
- In Kenya, **83 percent of infants age 6-9 months receive solid food in addition to breast milk.** This is in the top third of all sub-Saharan countries surveyed.

# Figure 19

## Infants Age 6-9 Months Receiving Solid Foods in Addition to Breast Milk, Kenya Compared with Other Sub-Saharan Countries



Note: WHO and UNICEF recommend that by the age of six months all infants should receive solid foods and liquids in addition to breast milk.

## **Figure 20: Children 10-23 Months Who Continue to Be Breastfed, Kenya Compared with Other Sub-Saharan Countries**

For older infants and toddlers, breast milk continues to be an important source of energy, protein, and micronutrients. Studies have shown that, in some populations, breast milk is the most important source of vitamin A and fat among children over 12 months of age. Breastfeeding older infants also reduces their risk of infection, especially diarrhoea.

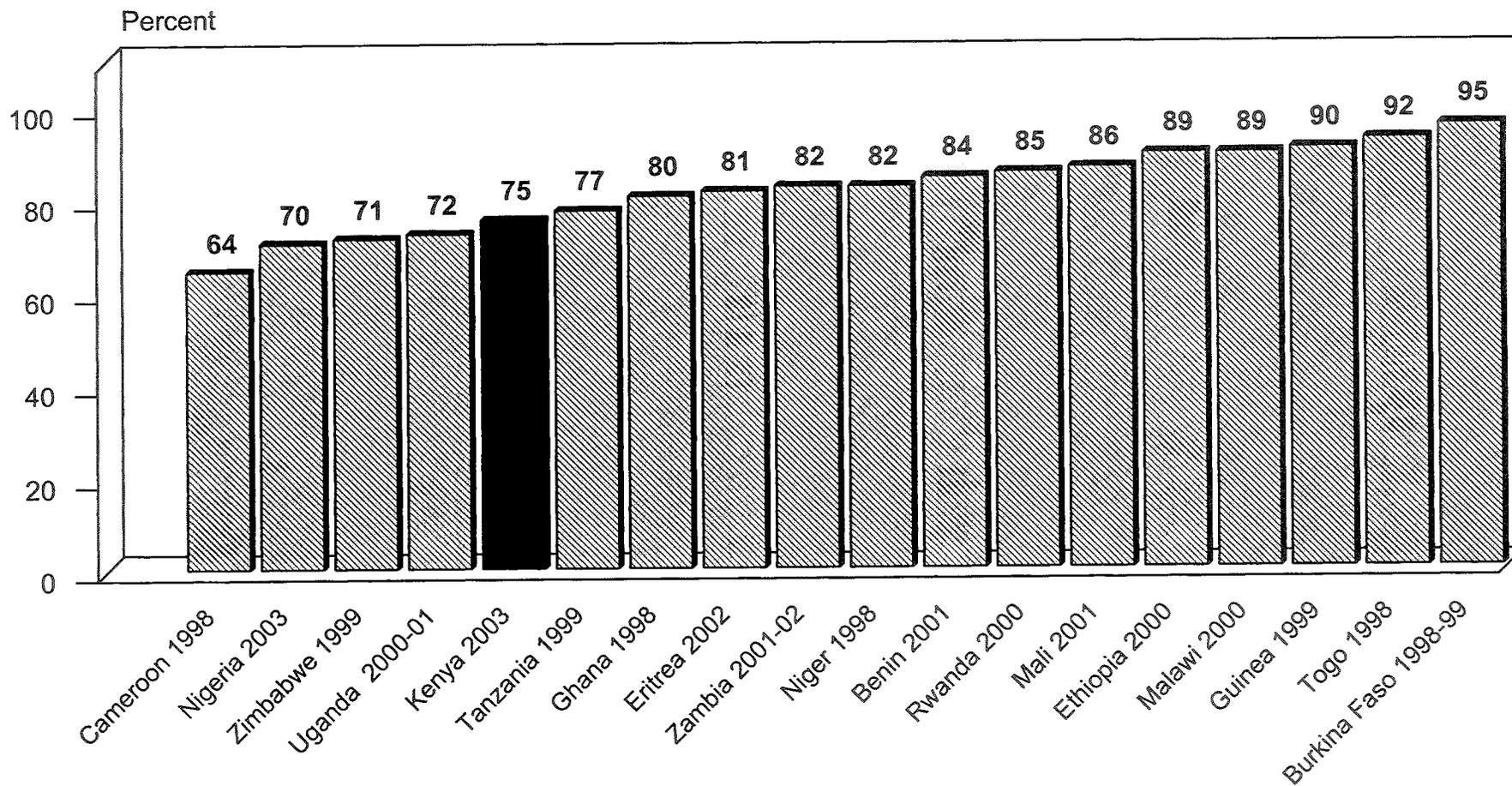
Additionally, breastfeeding up to 24 months can help reduce a woman's fertility, especially in areas where contraception is limited. Women who breastfeed for longer periods have lower fertility rates than women who breastfeed for shorter periods.

In Kenya,

- **Seventy-five percent of children age 10-23 months are still given breast milk.** This is in the bottom third of the sub-Saharan countries surveyed.

# Figure 20

## Children 10-23 Months Who Continue to Be Breastfed, Kenya Compared with Other Sub-Saharan Countries



Note: Information on feeding practices is based on the 24 hours before the survey. WHO and UNICEF recommend that all children should continue to be breastfed up to 24 months of age.



# Underlying Social and Economic Influences of Malnutrition

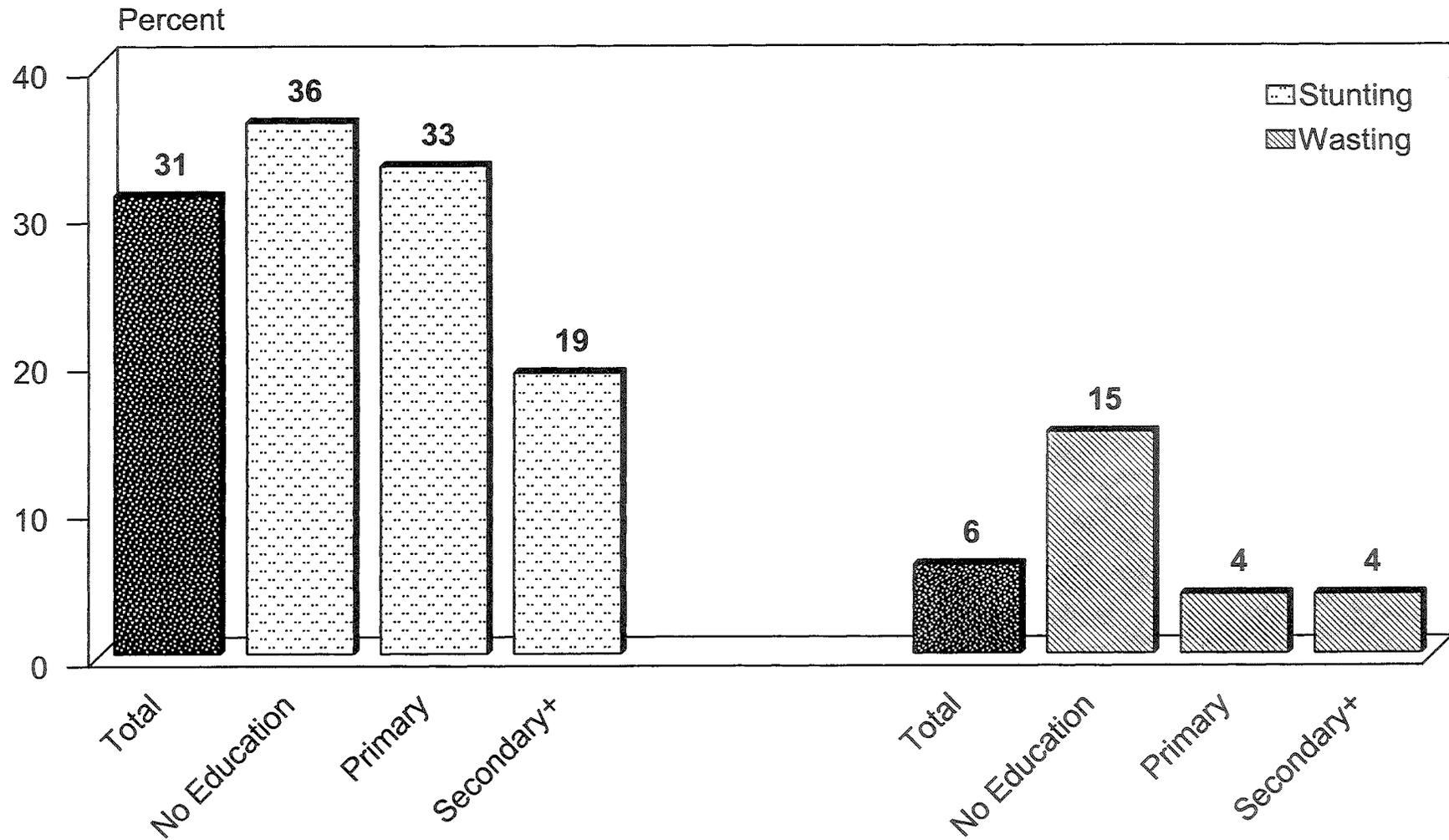
## Figure 21: Stunting and Wasting among Children under Five Years by Mother's Education, Kenya

Maternal education is related to knowledge of good child care practices and to household wealth. In Kenya, 14 percent of the mothers of children under five years of age have never attended school, while 63 percent have some primary education, 19 percent have a secondary education and 4 percent have higher education. There are variations in school attendance, especially between urban and rural areas. In the rural areas, 16 percent of the mothers have never attended school, 66 percent have attended primary school, 16 percent have gone to secondary school and 2 percent have had higher education. In contrast, only 8 percent of mothers in urban areas have never attended school, while 51 percent have gone to primary school, 31 percent have gone to secondary school and 11 percent have had higher education. Nairobi had the highest percentage of mothers receiving higher education (15 percent) followed by 6 percent in the Central region, compared to 2 or 3 percent in the rest of Kenya's regions.

- Maternal education has an inverse relationship with stunting and wasting in Kenya. **As the level of maternal education increases, the level of stunting and wasting decreases.**
- The difference in the level of stunting between children of mothers with no education and those whose mothers have a primary education is 3 percent. The difference between children of mothers with no education and children of mothers with a secondary education or higher is 17 percent.
- The difference in the level of wasting between children of mothers with no education and those whose mothers have a primary education is 11 percent. The difference between children of mothers with no education and children of mothers with a secondary education or higher is 11 percent.

# Figure 21

## Stunting and Wasting among Children under Five Years by Mother's Education, Kenya



Note: *Stunting* reflects chronic malnutrition; *wasting* reflects acute malnutrition

## **Figure 22: Stunting and Wasting among Children under Five Years by Source of Drinking Water, Kenya**

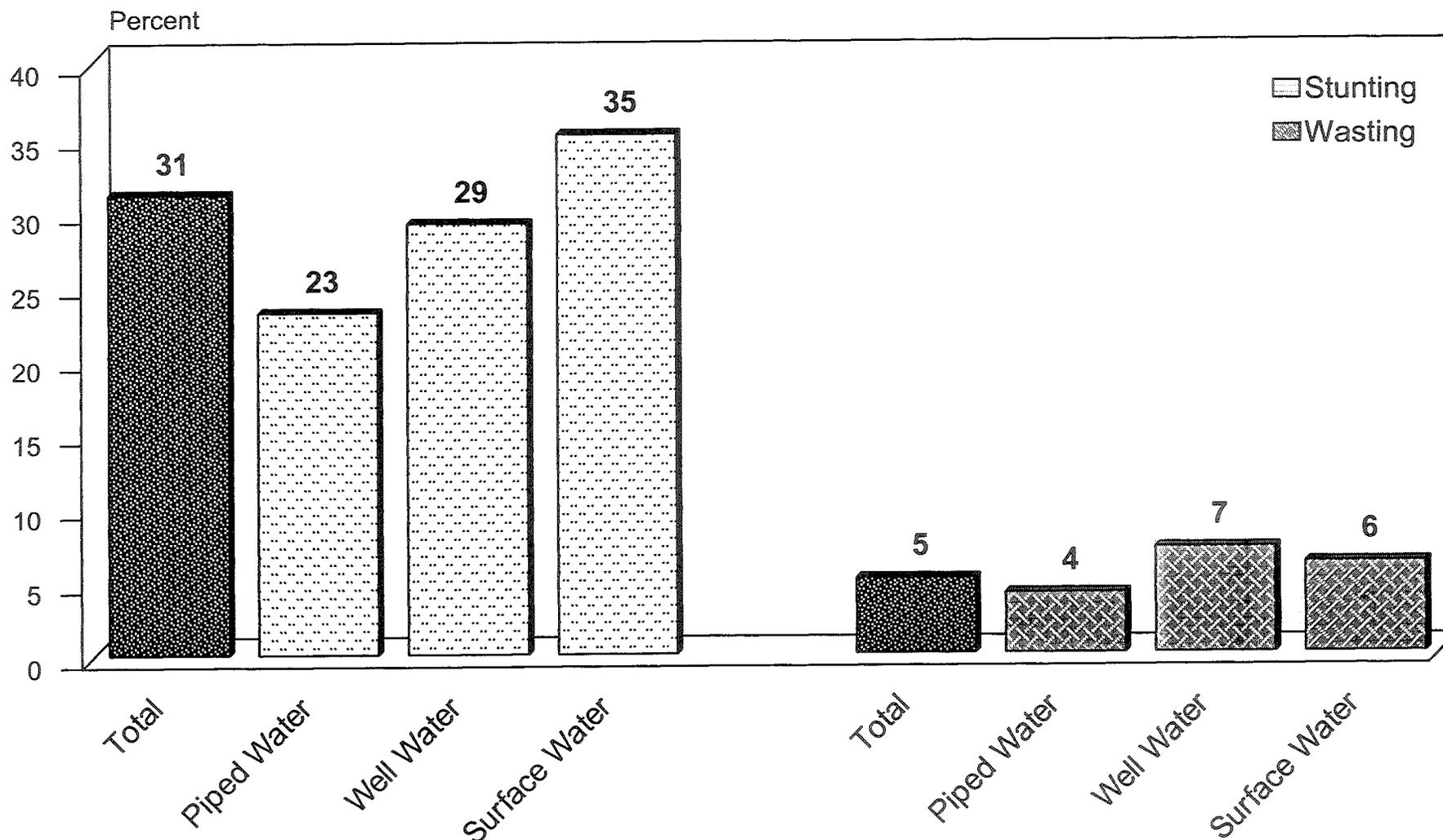
A household's source of drinking water is linked with its socio-economic status. Poor households are more likely to obtain drinking water from contaminated sources such as surface water or open wells. Without an adequate supply of good-quality water, the risks of food contamination, diarrhoeal disease, and malnutrition rise. Infants and children from households that do not have a private tap are at greater risk of being malnourished than those from households with this amenity. Among the households surveyed with children under five years, 29 percent use piped water, 21 percent obtain their drinking water from a well, 50 percent use surface water, and 6 percent use tanker truck or bottled water.

In Kenya,

- **Children whose drinking water is well water or surface water are more likely to be stunted (29 and 35 percent, respectively) than children who have access to piped water (23 percent).**
- **Children whose drinking water is well water or surface water are more likely to be wasted (6 and 7 percent, respectively) than children who have access to piped water (4 percent).**

## Figure 22

### Stunting and Wasting among Children under Five Years by Source of Drinking Water, Kenya



Note: *Stunting* reflects chronic malnutrition; *wasting* reflects acute malnutrition.

## **Figure 23: Stunting and Wasting among Children under Five Years by Type of Toilet, Kenya**

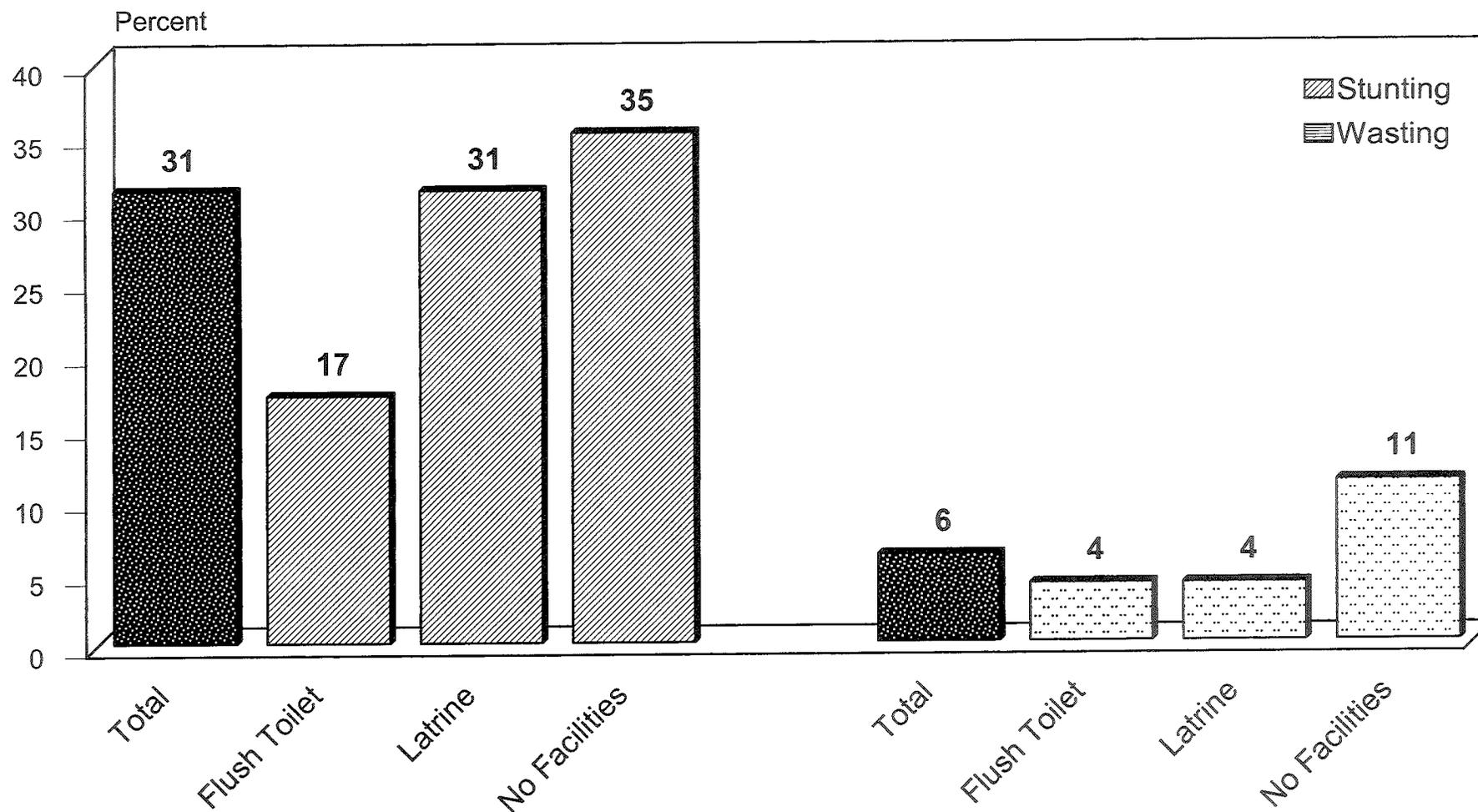
The type of toilet used by a household reflects its wealth, and poor households are less likely to have adequate toilet facilities. Inadequate sanitation facilities result in an increased risk of diarrhoeal disease, which contributes to malnutrition. Infants and children from households that do not have ready access to a flush toilet are at greater risk of being malnourished than children from households with this amenity. In Kenya, only 71 percent of households surveyed with at least one child under five years have access to a latrine, 20 percent have no facilities, and 9 percent of surveyed households have access to a flush toilet.

In Kenya,

- **Children who have no access to toilet facilities or those who have access to a latrine are more likely to be stunted (35 percent and 31 percent are stunted, respectively) than children with access to a flush toilet (17 percent).**
- **Children who have no access to toilet facilities are more likely to be wasted (11 percent) than children with access to a flush toilet or a latrine (4 percent).**

### Figure 23

## Stunting and Wasting among Children under Five Years by Type of Toilet, Kenya



Note: *Stunting* reflects chronic malnutrition; *wasting* reflects acute malnutrition.



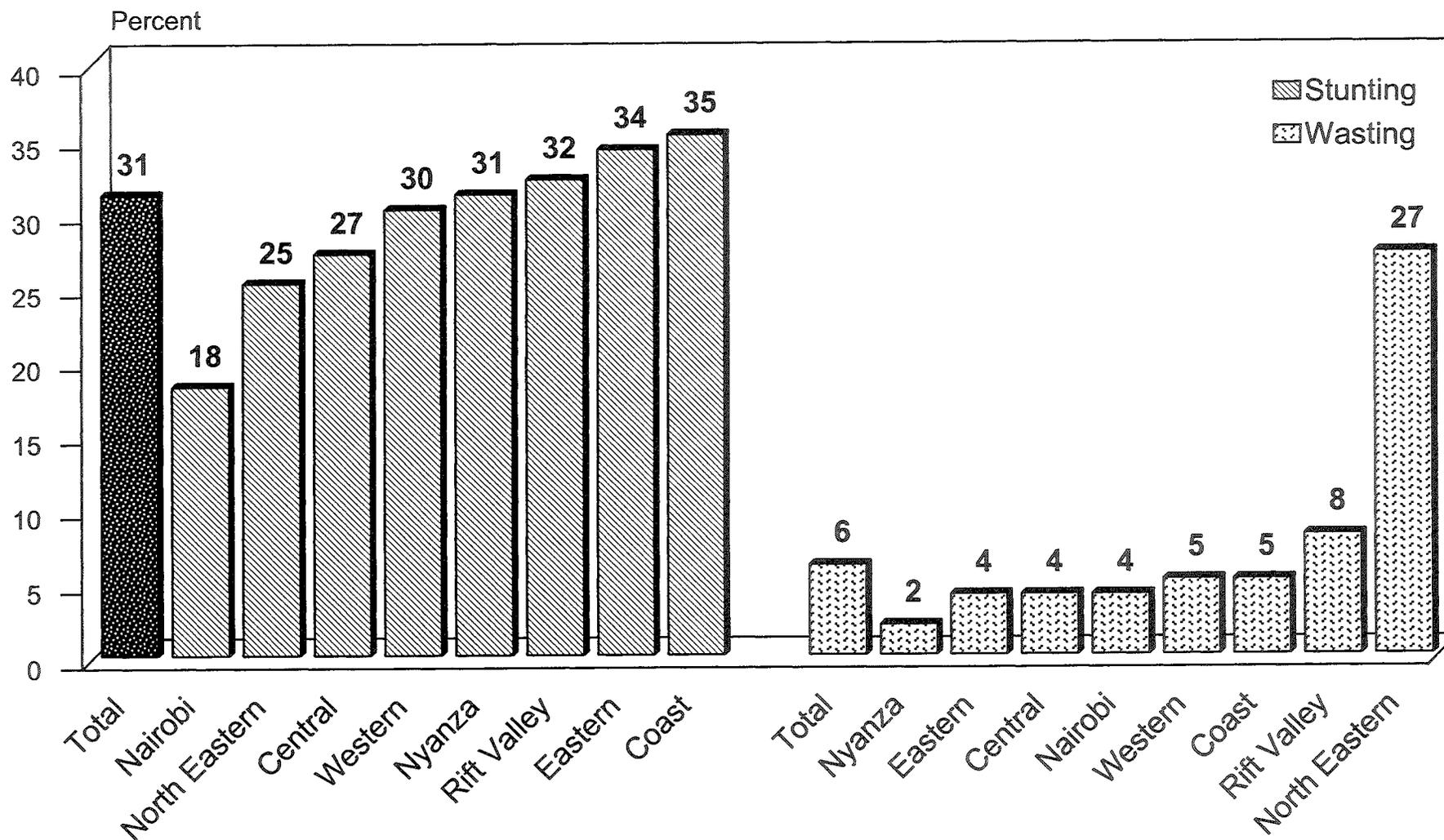
# Basic Influences

## **Figure 24: Stunting and Wasting among Children under Five Years by Region, Kenya**

In Kenya,

- **Stunting ranges from 18 to 35 percent among children in the eight regions.** Stunting rates are the lowest in the Nairobi (18 percent) and highest in the Coast region (35 percent).
- **Wasting ranges from 2 to 27 percent among children in the eight regions.** Wasting rates are the lowest in the Nyanza region (2 percent) and highest by a wide margin in the North Eastern region (27 percent).

### Figure 24 Stunting and Wasting among Children under Five Years by Region, Kenya



Note: *Stunting* reflects chronic malnutrition; *wasting* reflects acute malnutrition.

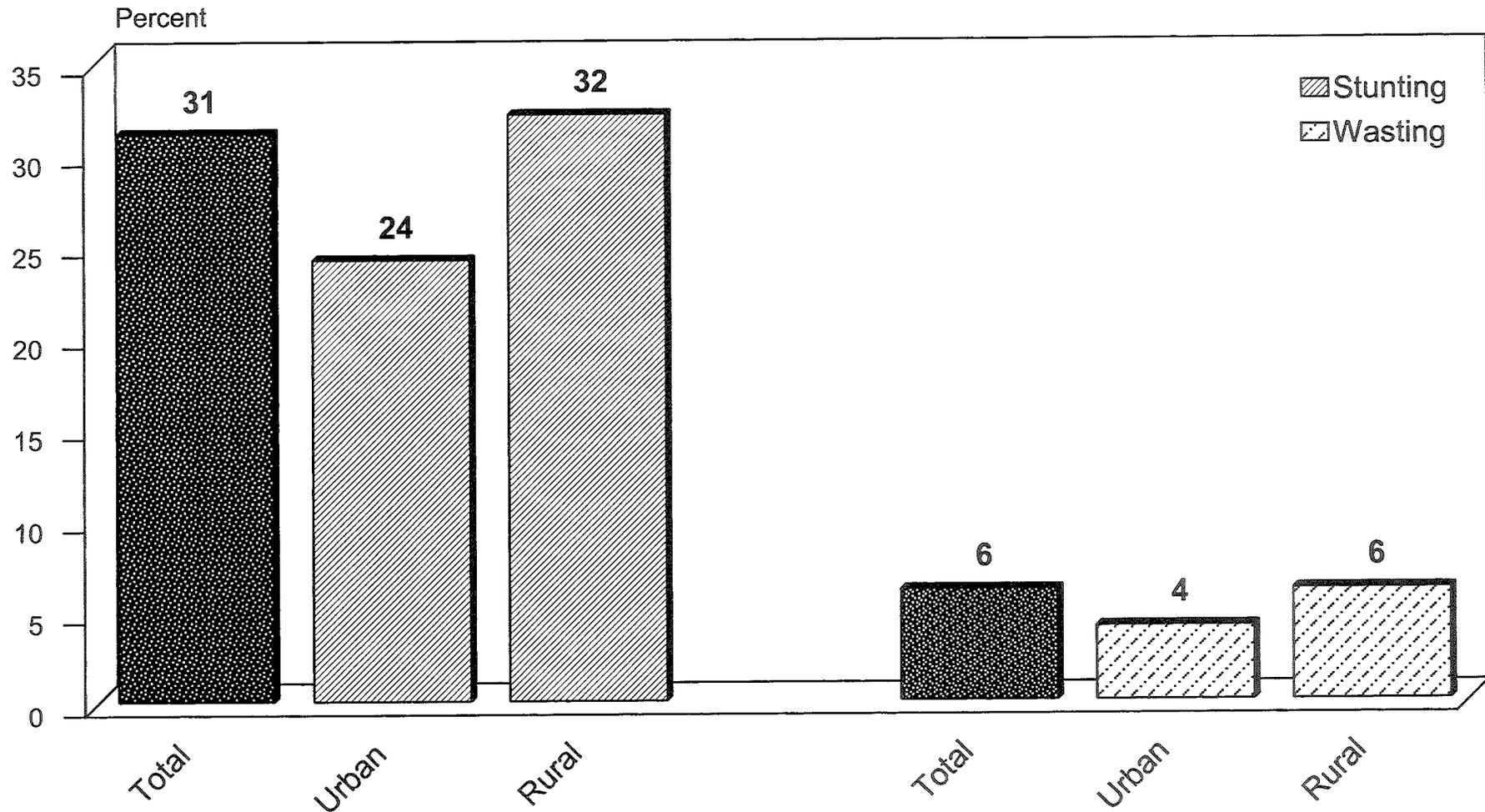
## **Figure 25: Stunting and Wasting among Children under Five Years by Urban-Rural Residence, Kenya**

In Kenya,

- **Thirty-two percent of rural children are stunted.** In urban areas, the stunting rate is lower, at 24 percent.
- **Six percent of rural children are wasted,** compared with 4 percent of urban children.

# Figure 25

## Stunting and Wasting among Children under Five Years by Urban-Rural Residence, Kenya



Note: *Stunting* reflects chronic malnutrition; *wasting* reflects acute malnutrition.



# Maternal Nutritional Status

## Figure 26: Malnutrition among Mothers of Children under Five Years by Region, Kenya

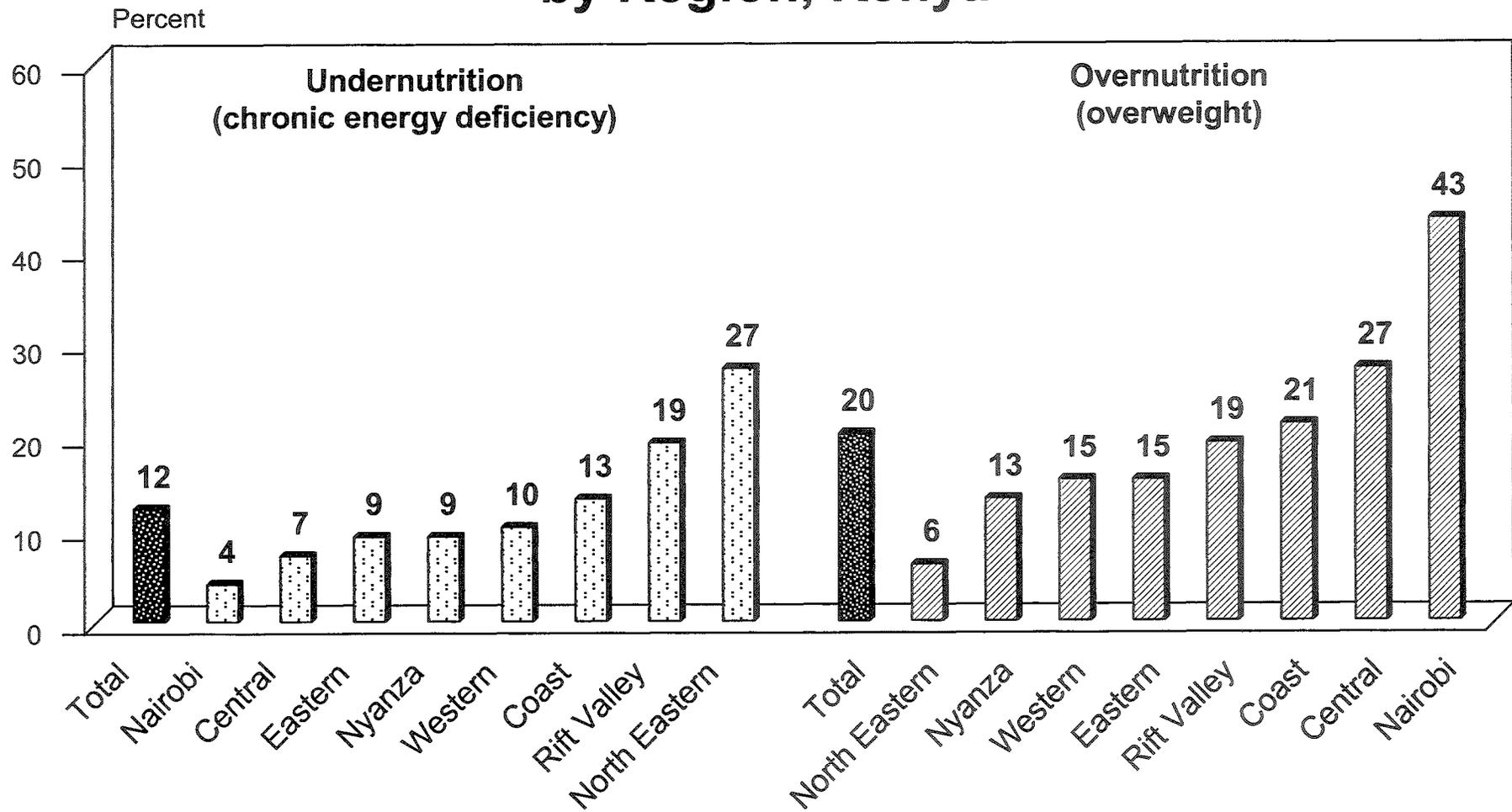
Besides being of concern in its own right, a mother's nutritional status affects her ability to successfully carry, deliver, and care for her children. There are generally accepted standards for indicators of malnutrition among adult women that can be applied.

Malnutrition in women can be assessed using the body mass index (BMI), which is defined as a woman's weight in kilograms divided by the square of her height in metres. Thus,  $BMI = \text{kg}/\text{m}^2$ . When the BMI is below the suggested cutoff point of 18.5, this indicates chronic energy deficiency or undernutrition for non-pregnant, non-lactating women. When the BMI is above 25, women are considered overweight.

- **Twelve percent of mothers of children under age five in Kenya are undernourished.** The highest level of maternal undernutrition is in the North Eastern region (27 percent). The lowest level is in Nairobi (4 percent).
- **Twenty percent of mothers of children under five are overweight.** The lowest levels of maternal overnutrition are in the North Eastern region (6 percent). The highest level is in Nairobi (43 percent).

# Figure 26

## Malnutrition among Mothers of Children under Five Years by Region, Kenya



Note: Maternal undernutrition is the percentage of mothers whose BMI (kg/m<sup>2</sup>) is less than 18.5. Maternal overnutrition is the percentage of mothers whose BMI is greater than 25.

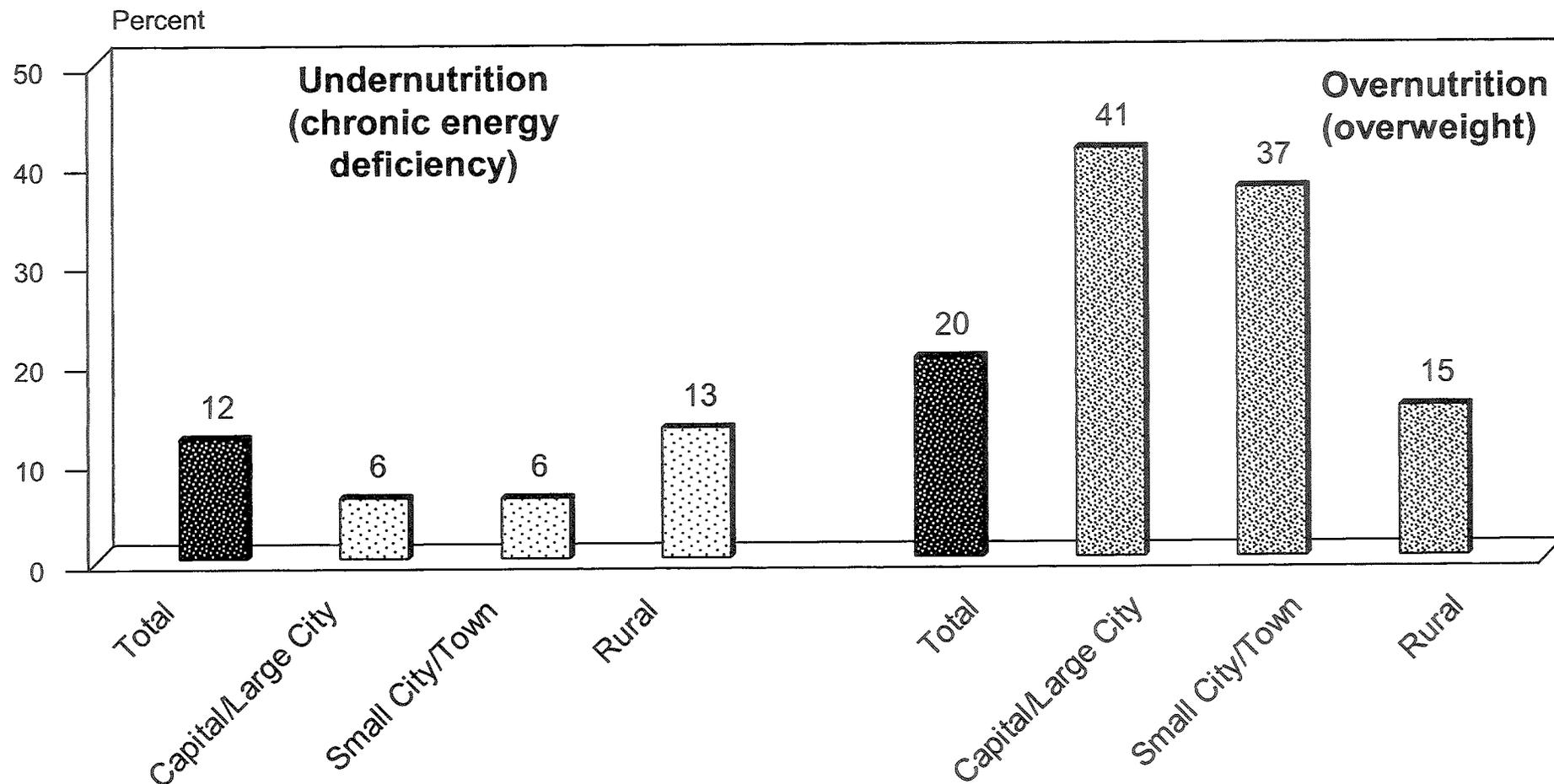
## **Figure 27: Malnutrition among Mothers of Children under Five Years by Residence, Kenya**

In Kenya,

- **The undernutrition rate (chronic energy deficiency) for mothers of children under five is 6 percent in the capital, other large cities, and small cities or towns compared with 13 percent in rural areas.**
- **The overnutrition rate (overweight) for mothers of children under five is lowest in rural areas (15 percent) and highest in the capital and other large cities (41 percent).**

## Figure 27

### Malnutrition among Mothers of Children under Five Years, by Residence, Kenya



Note: Maternal undernutrition is the percentage of mothers whose BMI ( $\text{kg}/\text{m}^2$ ) is less than 18.5. Maternal overnutrition is the percentage of mothers whose BMI is greater than 25.

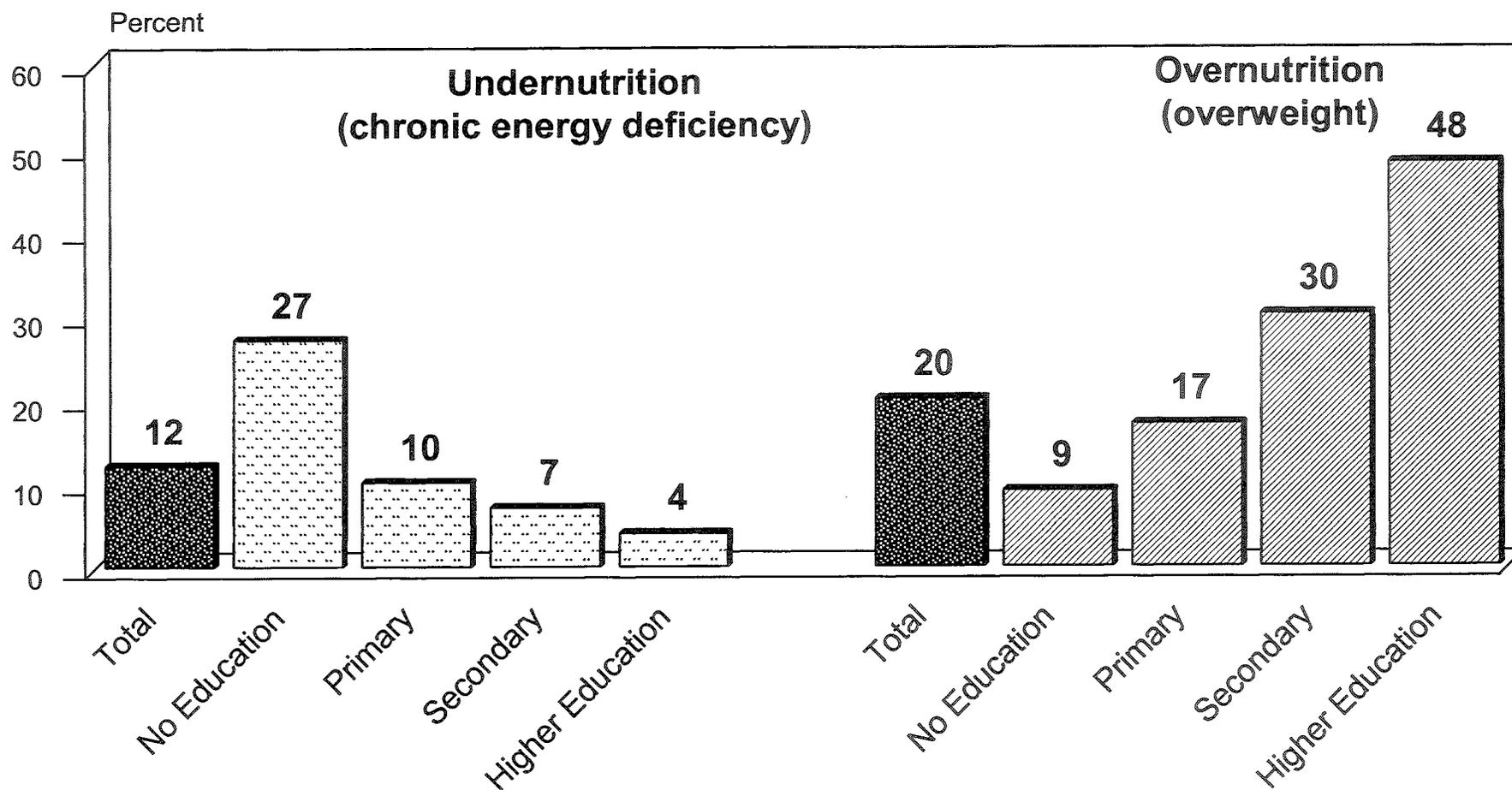
## **Figure 28: Malnutrition among Mothers of Children under Five Years by Education, Kenya**

In Kenya,

- **The rate of maternal undernutrition is highest among women with no education (27 percent) and lowest among those with at least a higher education (4 percent).**
- **The rate of maternal overnutrition is highest among women with a higher education (48 percent) and lowest among those with no education (9 percent).**

## Figure 28

### Malnutrition among Mothers of Children under Five Years, by Education, Kenya



Note: Maternal undernutrition is the percentage of mothers whose BMI ( $\text{kg}/\text{m}^2$ ) is less than 18.5. Maternal overnutrition is the percentage of mothers whose BMI is greater than 25.

## **Figure 29: Malnutrition among Mothers of Children under Three Years, Kenya Compared with Other Sub-Saharan Countries**

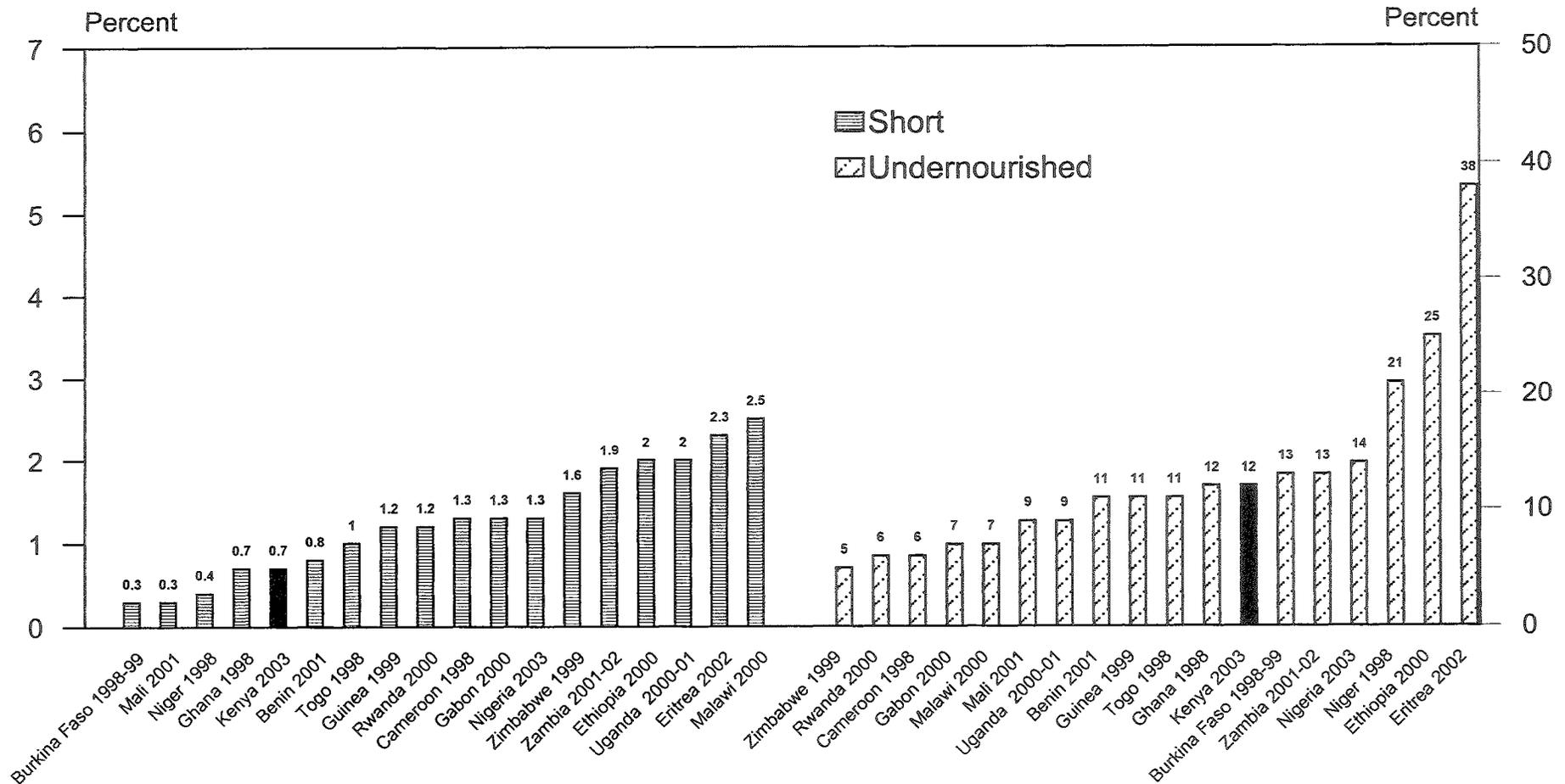
Malnutrition among mothers is likely to have a major impact on their ability to care for themselves and their children. Women less than 145 centimetres in height are considered too short. Mothers who are too short (a condition largely due to stunting during childhood and adolescence) may have difficulty during childbirth because of the small size of their pelvis. Evidence also suggests there is an association between maternal height and low birth weight. Underweight status in women assessed using the body mass index is also presented. Pregnant women are not included in the malnourished analysis due to weight considerations.

In Kenya,

- **Slightly less than 1 percent of mothers of children under three are too short (<145 cm).** This proportion is on the low end among the sub-Saharan countries surveyed.
- **Twelve percent of mothers of children under three are undernourished (BMI<18.5).** This is in the mid-range among the sub-Saharan countries surveyed.

# Figure 29

## Malnutrition among Mothers of Children under Three Years, Kenya Compared with Other Sub-Saharan Countries



Note: Short is the percentage of mothers under 145 cm; undernourished is the percentage of mothers whose BMI (kg/m<sup>2</sup>) is less than 18.5. Pregnant women and those who are less than two months postpartum are excluded from BMI calculation.



# Appendices



**Appendix 1**  
**Stunting, Wasting, Underweight, and Overweight Rates by Background Characteristics**  
**Kenya 2003**

Background characteristic	Stunted	Wasted	Underweight	Overweight	Background characteristic	Stunted	Wasted	Underweight	Overweight
<b>Child's age in months</b>					<b>Regions</b>				
0-5	7.3	3.9	2.4	36.5	Nairobi	18.5	4.4	6.1	24.0
6-11	15.7	6.1	15.2	16.7	Central	26.9	4.4	14.2	16.6
12-17	40.0	9.4	27.4	12.9	Coast	35.1	5.4	25.2	9.7
18-23	48.4	9.8	26.4	14.1	Eastern	33.7	3.8	21.9	8.8
24-29	36.8	6.5	26.9	7.6	Nyanza	31.0	2.5	15.3	15.3
30-35	35.3	4.1	23.1	9.1	Rift Valley	32.0	7.9	24.2	11.0
36-47	34.3	4.5	20.6	8.0	Western	30.2	4.9	19.1	14.5
48-59	28.1	3.2	18.0	7.3	North Eastern	25.2	26.7	33.9	6.8
	p<0.000 n=4,884	p<0.000 n=4,884	p<0.000 n=4,884	p<0.000 n=4,884		p<0.000 n=4,884	p<0.000 n=4,884	p<0.000 n=4,884	p<0.000 n=4,884
<b>Gender of child</b>					<b>Urban-rural residence</b>				
Female	27.8	4.8	17.4	14.1	Capital or large city	19.7	4.8	8.1	21.8
Male	33.3	6.4	22.3	11.9	Small city or town	27.9	3.9	17.2	18.6
	p<0.000 n=4,884	p=0.018 n=4,884	p<0.000 n=4,884	p=0.022 n=4,884	Rural	31.9	5.9	21.4	11.5
						p<0.000 n=4,884	NS n=4,884	p<0.000 n=4,884	p<0.000 n=4,884
<b>Overall</b>	<b>30.6</b>	<b>5.6</b>	<b>19.8</b>	<b>13.0</b>	<b>Overall</b>	<b>30.6</b>	<b>5.6</b>	<b>19.8</b>	<b>13.0</b>

Note: Level of significance is determined using the chi-square test. NS=Not significant at p>0.05

## **Appendix 2**

# **WHO/CDC/NCHS International Reference Population Compared with the Distribution of Malnutrition in Kenya**

The assessment of nutritional status is based on the concept that in a well-nourished population, the distributions of children's height and weight, at a given age, will approximate a normal distribution. This means that about 68 percent of children will have a weight within one standard deviation of the mean for children of that age or height and a height within one standard deviation of the mean for children of that age. About 14 percent of children will be between one and two standard deviations above the mean; these children are considered relatively tall or overweight for their age or relatively overweight for their height. Another 14 percent will be between one and two standard deviations below the mean; these children are considered relatively short or underweight for their age or relatively thin for their height. Of the remainder, 2 percent will be very tall or obese for their age or obese for their height; that is, they are more than two standard deviations above the mean. Another 2 percent will fall more than two standard deviations below the mean and be considered moderately or severely malnourished. These children are very short (stunted), very underweight for their age, or very thin for their height (wasted). For comparative purposes, nutritional status has been determined using the International Reference Population defined by the United States National Centre for Health Statistics (NCHS standard) as recommended by the World Health Organisation and the Centres for Disease Control and Prevention.

Appendix 2 includes four curves: weight-for-age, height-for-age, and weight-for-height graphed against the normal curve. The weight-for-height, height-for-age and weight-for-age curves are greatly to the left of the standard curve indicating that there is a large number of malnourished children. The implications are that interventions are necessary to address widespread malnutrition in order to improve child health, which will result in a shift in the curves closer to the reference standard.

# Appendix 2

## WHO/CDC/NCHS International Reference Population Compared with the Distribution of Malnutrition in Kenya

