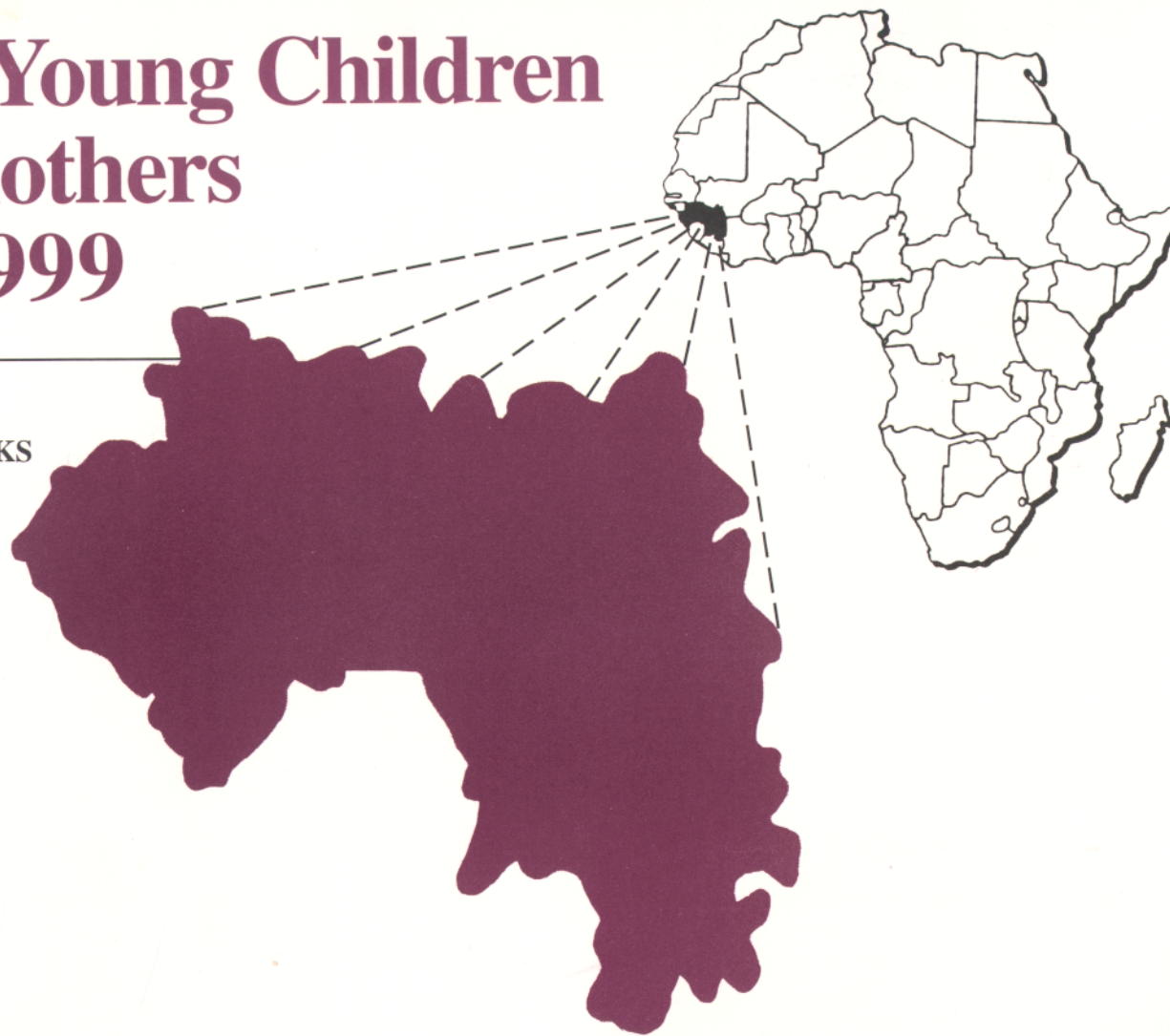

Nutrition of Young Children and Their Mothers in Guinea, 1999

AFRICA NUTRITION CHARTBOOKS



U.S. Agency for
International Development



Macro International Inc.

AFRICA NUTRITION CHARTBOOKS

**NUTRITION OF YOUNG CHILDREN AND THEIR MOTHERS
IN GUINEA**

Findings from the 1999 Guinea DHS Survey

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May 2000

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LIST OF FIGURES

Figure 1	Malnutrition among Children under 5 Years, Guinea.....	2
Figure 2	Stunting among Children under 3 Years in Sub-Saharan Countries, DHS Surveys 1994-1999	4
Figure 3	Underweight among Children under 3 Years in Sub-Saharan Countries, DHS Surveys 1994-1999	6
Figure 4	Stunting, Wasting, and Underweight by Age, Guinea.....	8
Figure 5	Feeding Practices for Infants under 4 Months, Guinea.....	10
Figure 6	Infants under 4 Months Who are Exclusively Breastfed and Those Who Receive a Bottle in Guinea Compared with Other Sub-Saharan Countries, DHS Surveys 1994-1999	12
Figure 7	Feeding Practices for Infants Age 6 to 9 Months, Guinea	14
Figure 8	Infants Age 6 to 9 Months Receiving Solid Foods in Addition to Breast Milk in Guinea Compared with Other Sub-Saharan Countries, DHS Surveys 1994-1999.....	16
Figure 9	Stunting and Wasting among Children under 5 Years by Region, Guinea.....	18
Figure 10	Stunting and Wasting among Children under 5 Years by Urban-Rural Residence, Guinea	20
Figure 11	Stunting and Wasting among Children under 5 Years by Mother's Education, Guinea.....	22
Figure 12	Stunting and Wasting among Children under 5 Years by Source of Drinking Water, Guinea	24
Figure 13	Stunting and Wasting among Children under 5 Years by Type of Toilet, Guinea.....	26
Figure 14	Diarrhea and Cough with Rapid Breathing among Children under 5 Years, Guinea.....	28

Figure 15	Fertility and Child Mortality in Guinea Compared with Other Sub-Saharan Countries, DHS Surveys 1994-1999.....	30
Figure 16	Survival and Nutritional Status of Children, Guinea	32
Figure 17	Malnutrition and Under-five Mortality, Guinea.....	34
Figure 18	Malnutrition among Mothers of Children under 5 Years by Region, Guinea	36
Figure 19	Malnutrition among Mothers of Children under 5 Years by Residence and Education, Guinea	38
Figure 20	Malnutrition among Mothers of Children under 5 Years in Guinea Compared with Other Sub-Saharan Countries, DHS Surveys 1994-1999.....	40
Appendix 1	Stunting, Wasting, and Underweight Rates by Background Characteristics, Guinea 1999	43
Appendix 2	WHO/CDC/NCHS International Reference Population, Normal Distribution	45

Introduction

Malnutrition¹ is one of the most important health and welfare problems among infants and young children in Guinea. 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 and/or improper feeding practices. 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 diarrheal 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 effect of long-term malnutrition can be a reduction in worker 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 Guinea data presented here are from the 1999 Guinea Demographic and Health Survey (GDHS), a nationally representative survey of 3,153 households conducted by the Guinea National Office of Statistics. The study was undertaken with technical assistance from Macro International Inc. and funding from the U.S. Agency for International Development and UNFPA. UNICEF, the World Bank, and the World Health Organization also contributed financial aid and equipment. Fieldwork was conducted from May to July 1999. Of the 5,046 living children age 0-59 months that were part of the study, 2,939 are included in this analysis. The main reason that some of the children were not included was due to approximate or missing information on their ages. Others were excluded because they were absent, sick, refused to be measured or because some of the recorded values for height and weight were highly improbable. Nutritional data collected on these children include height, weight, age, breastfeeding history, and feeding patterns. Information was also collected on diarrhea and ARI in the two weeks prior to the survey and on relevant sociodemographic characteristics. For comparison purposes, data are also presented from DHS surveys conducted in other sub-Saharan countries.

¹The technical method of determining a *malnourished* population as defined by the National Center for Health Statistics (NCHS), the Centers for Disease Control (CDC), and the World Health Organization (WHO) is presented in Appendix 2.

Figure 1: Malnutrition among Children under 5 Years, Guinea

In Guinea:

- **Twenty-six percent of children aged 0 to 59 months are chronically malnourished.** In other words, they are too short for their age or *stunted*.¹ The proportion of children who are stunted is 13 times the level expected in a healthy, well-nourished population.
- **Acute malnutrition**, manifested by *wasting*², results in a child being too thin for his or her height. **It affects 9 percent of children**, which is over four times the level expected in a healthy population.
- **Twenty-three percent of children under 5 years are *underweight***³ for their age. This is over 11 times the level expected in a healthy, well-nourished population.

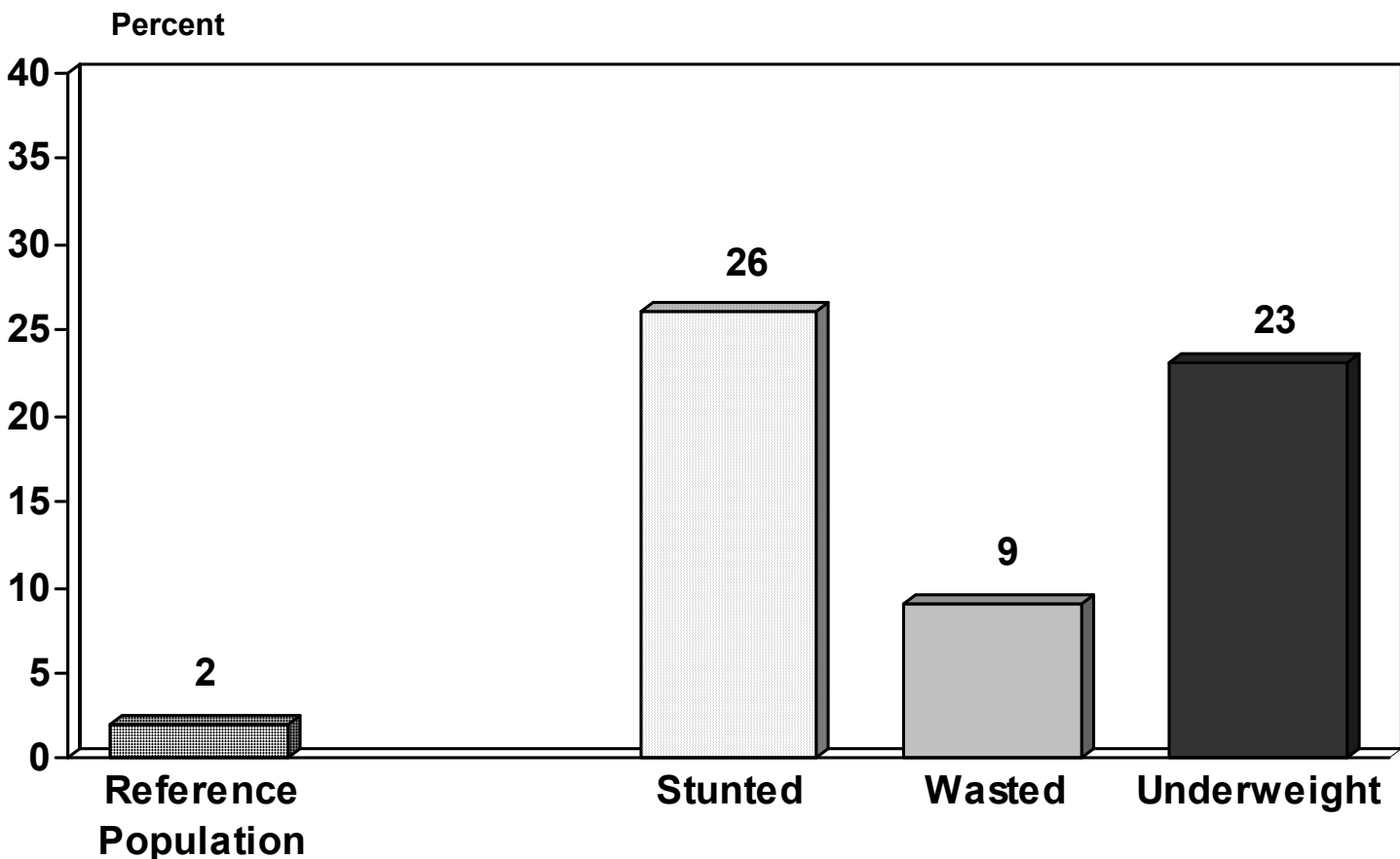
¹A *stunted* child has a height-for-age Z-score that is below -2 standard deviations (SD) based on the NCHS/CDC/WHO reference population. Chronic malnutrition is the result of an inadequate intake of food over a long period of time and may be exacerbated by chronic illness.

²A *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 diarrhea.

³An *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.

Figure 1

Malnutrition among Children under 5 Years, Guinea



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

Source: EDSG-II 1999

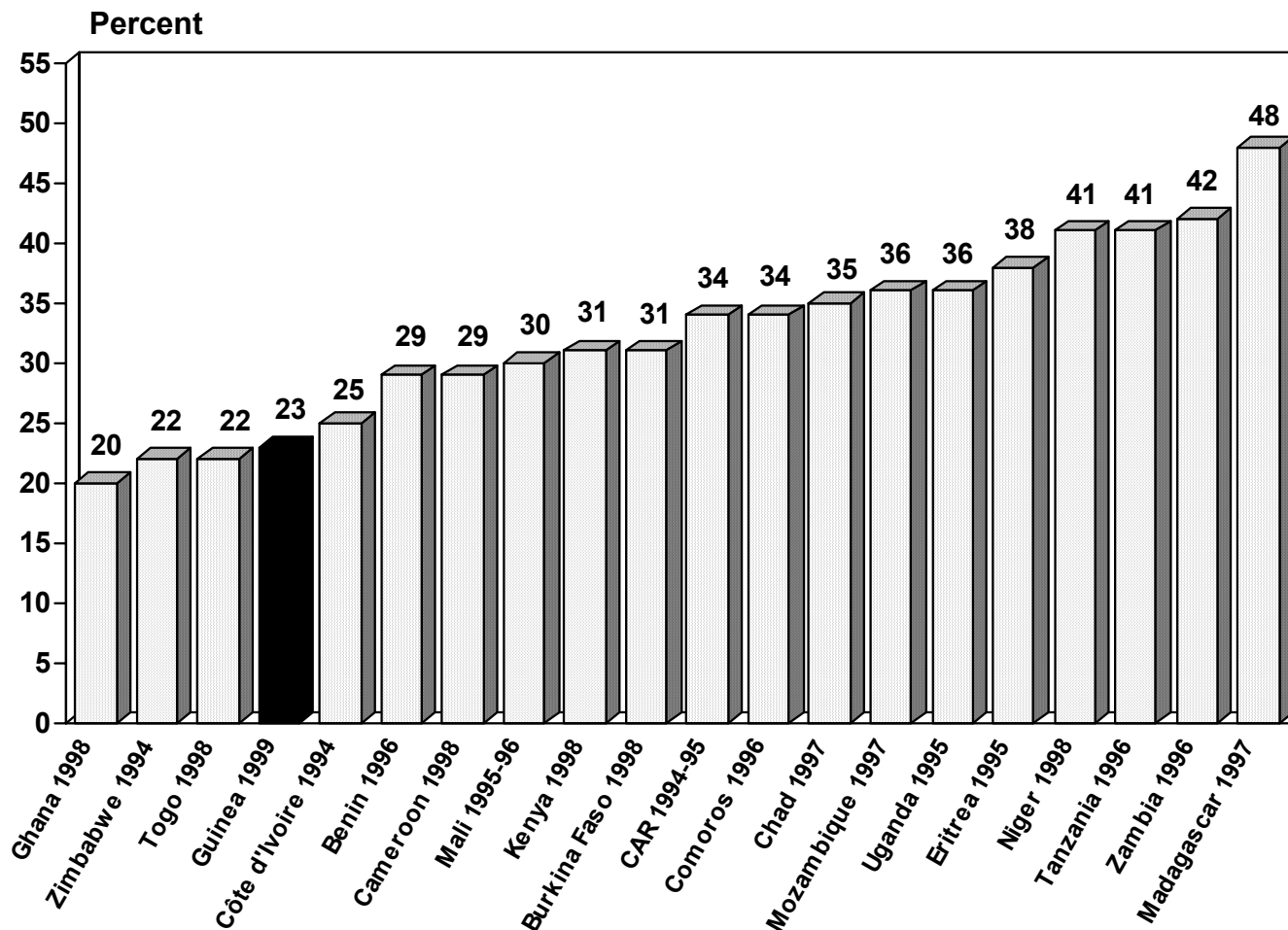
Figure 2: Stunting among Children under 3 Years in Sub-Saharan Countries, DHS Surveys 1994-1999

Among the sub-Saharan countries surveyed:

- The percentage of children less than 3 years who are *stunted* ranges from 20 to 48 percent. **At 23 percent, the proportion of stunted children in Guinea is among the lowest in sub-Saharan Africa, and is third lowest among the West African 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 2

Stunting among Children under 3 Years in Sub-Saharan Countries, DHS Surveys 1994-1999



Note: *Stunting* reflects chronic malnutrition.

Source: DHS Surveys 1994-1999

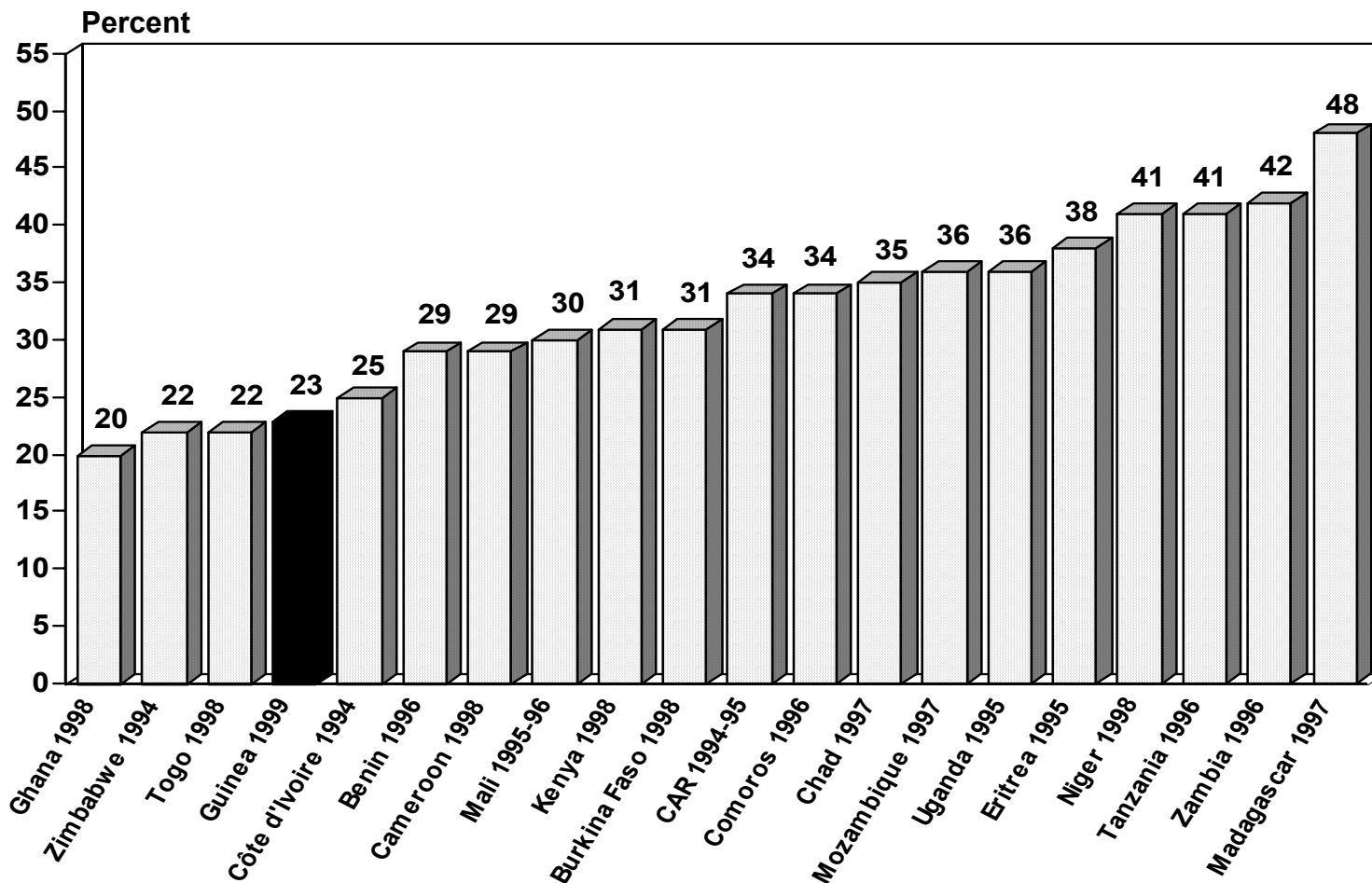
Figure 3: Underweight among Children under 3 Years in Sub-Saharan Countries, DHS Surveys 1994-1999

Among the sub-Saharan countries surveyed:

- The percentage of children less than 3 years of age who are *underweight* ranges from 16 to 50 percent. **With 25 percent of children underweight, Guinea has one of the lowest rates in West Africa. It is in the bottom third of all 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 3

Underweight among Children under 3 Years in Sub-Saharan Countries, DHS Surveys 1994-1999



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

Source: DHS Surveys 1994-1999

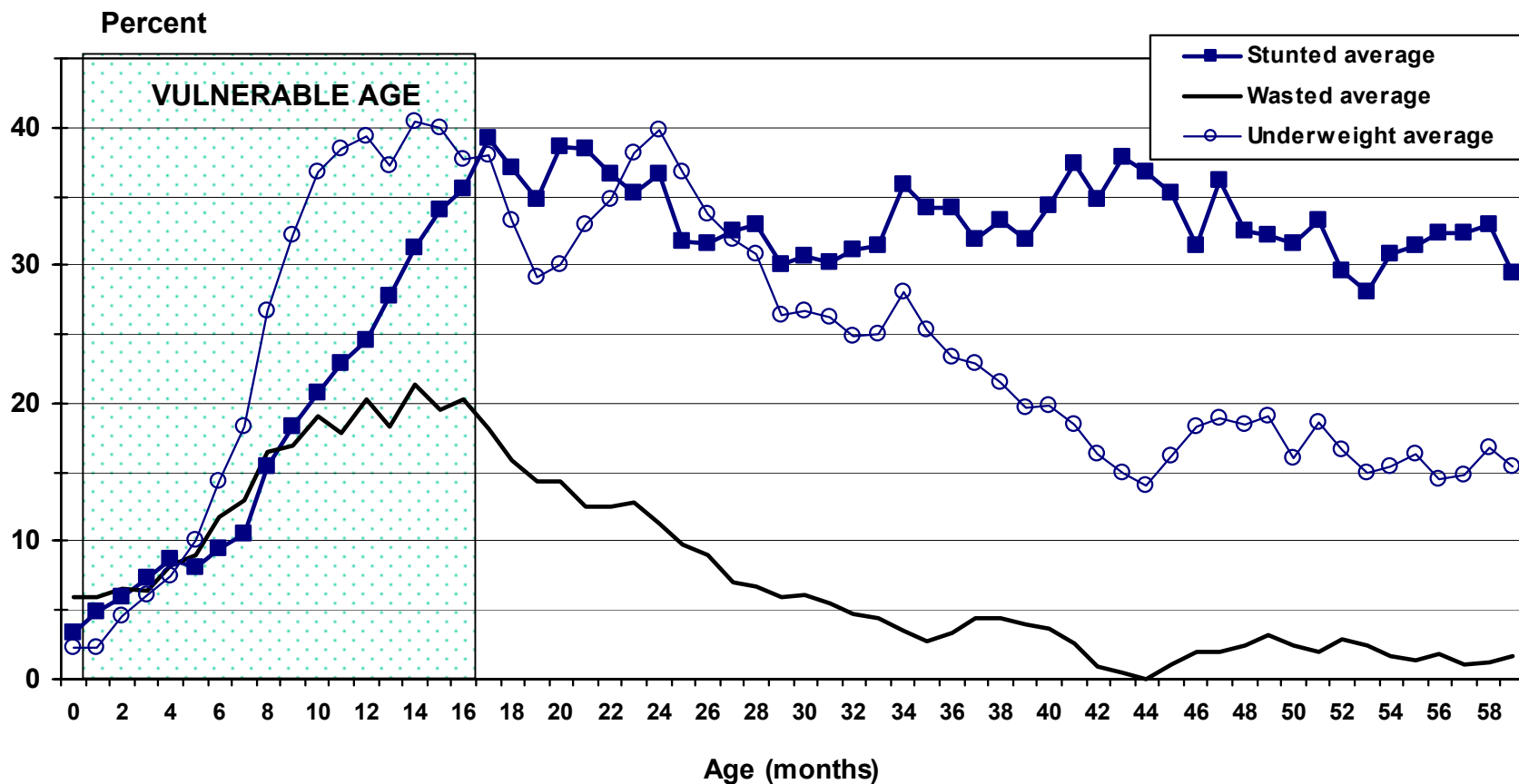
Figure 4: Stunting, Wasting and Underweight by Age, Guinea

In Guinea, the time between 2 months and 19 months of age is a vulnerable period:

- **The proportion of children stunted rises sharply from 5 to 17 months of age, at which time it peaks at 38 percent.** This is the period when the cumulative effects of stunting create damaging effects on the child. The proportion of children stunted drops to about 30 percent at 29 and 53 months of age, but generally remains steady at about 35 percent. At 59 months of age, 30 percent of children are stunted.
- **The proportion of children wasted rises steadily from 3 to 14 months of age, when it reaches 21 percent.** This rate then declines to 0 at 44 months and rises slightly again. The rate of 2 percent for children at 59 months of age is equal to the standard for the reference population.
- **The proportion of children underweight rises quickly to 40 percent from 3 to 14 months of age.** It drops to 30 percent at 18 months but then peaks again at 24 months with the prevalence rate reaching 40 percent. The rate then declines steadily, reaching a rate of 15 percent for children 59 months of age.

Figure 4

Stunting, Wasting, and Underweight by Age, Guinea



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.

Source: EDSG-II 1999

Figure 5: Feeding Practices for Infants under 6 Months, Guinea

Improper feeding practices, in addition to diarrheal disease, are important determinants of malnutrition. The World Health Organization (WHO) recommends that *all infants be exclusively breastfed from birth until about 6 months of age*.¹ In other words, infants should be fed only breast milk during the first six months of life.

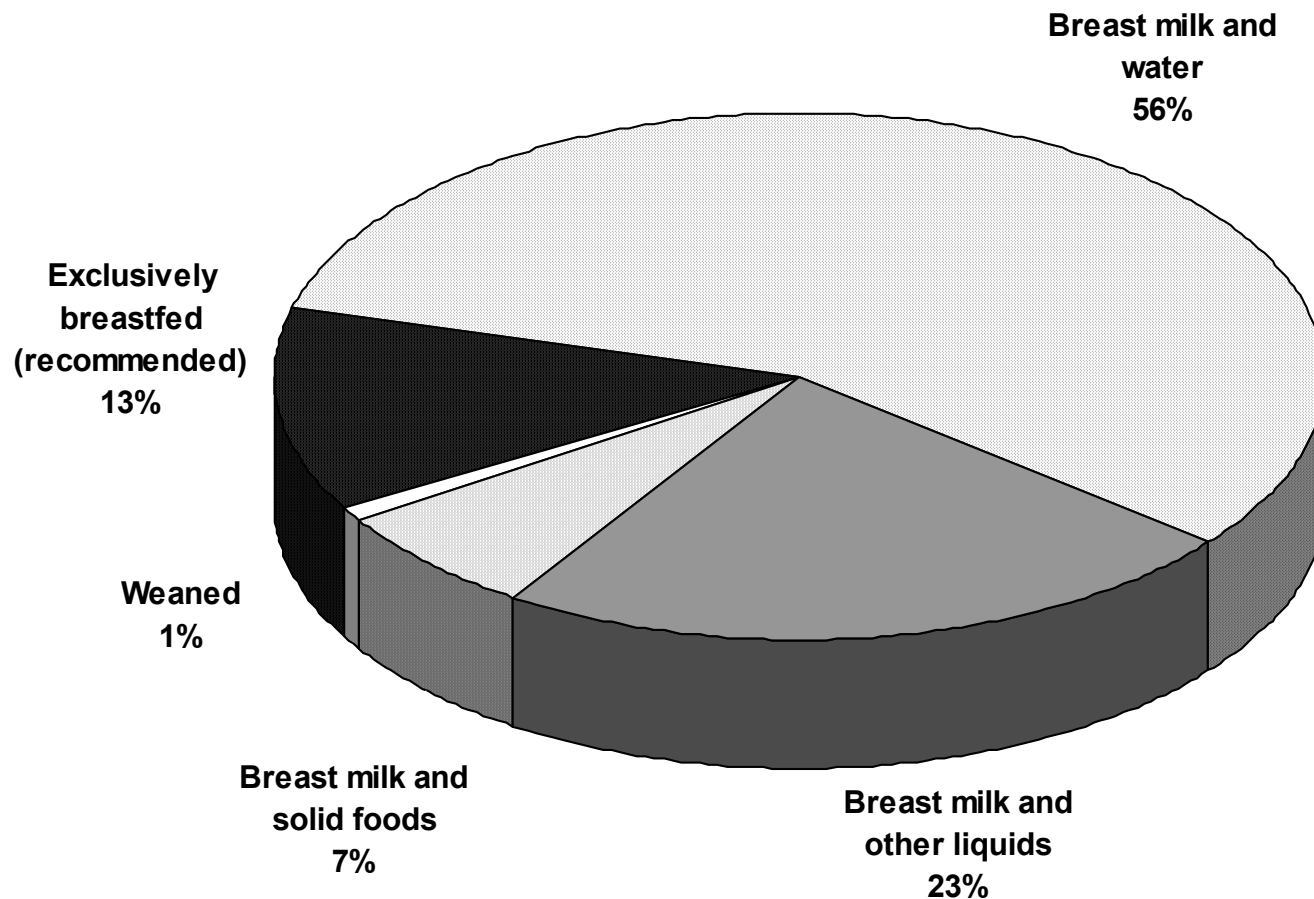
In Guinea, the introduction of liquids, such as water, sugar water, juice, formula, and solid foods, takes place earlier than the recommended age of about 6 months. This practice has a deleterious effect on nutritional status for a number of reasons. First, the liquids and solid foods offered are nutritionally 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 diarrheal disease.

- **In Guinea, only 12 percent of children under the age of 6 months are exclusively breastfed, as is recommended by WHO.**
- **Thirty-one percent of infants under 6 months old are given some form of complementary liquids or solids other than water, which is not recommended.**

¹World Health Organization, Forty-seventh World Health Assembly (WHA 47.5), May 9, 1994.

Figure 5

Feeding Practices for Infants under 6 Months, Guinea



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

Source: EDSG-II 1999

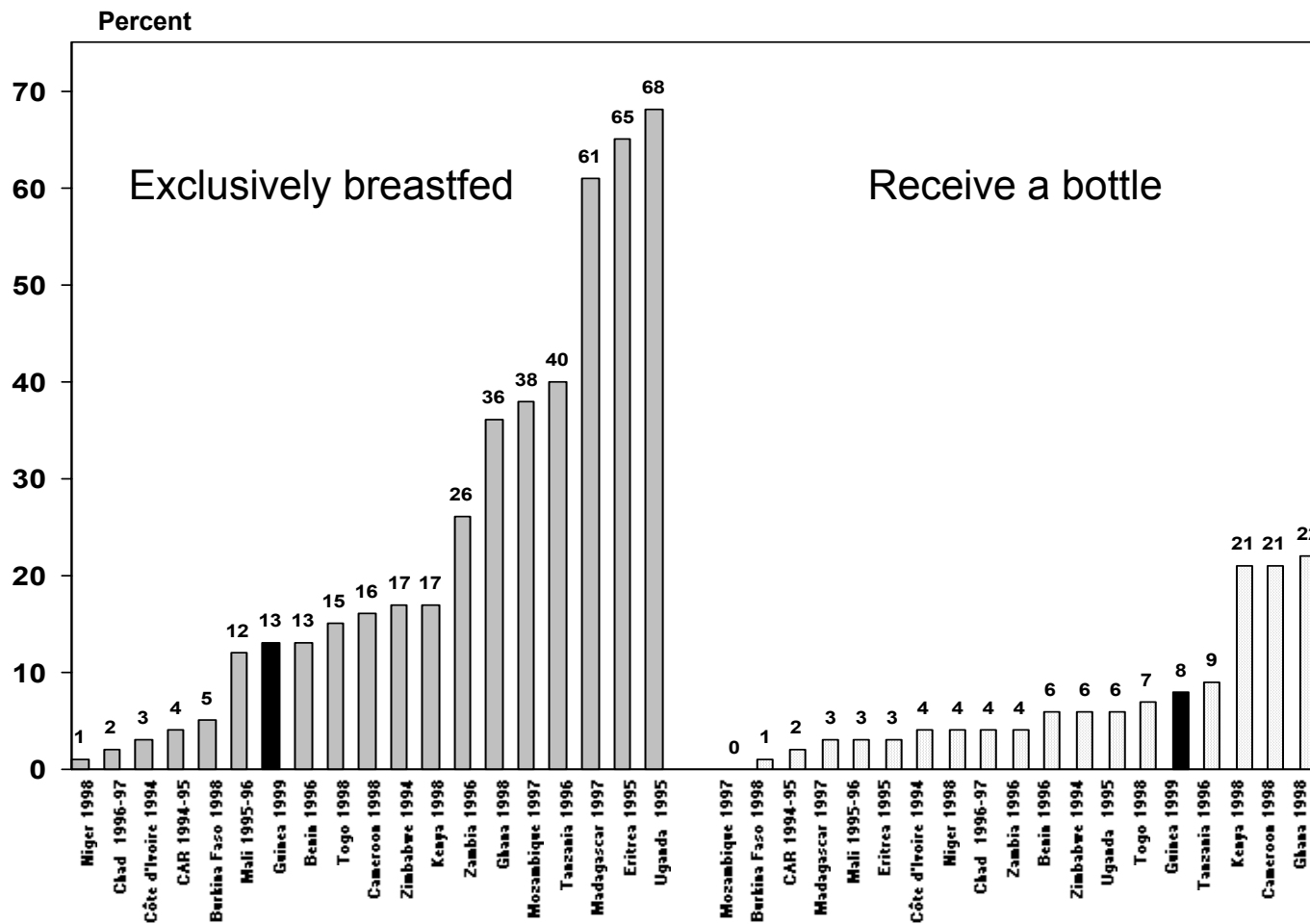
Figure 6: Infants under 4 Months Who are Exclusively Breastfed and Those Who Receive a Bottle in Guinea Compared with Other Sub-Saharan Countries, DHS Surveys 1994-1999

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

- In most of the sub-Saharan countries surveyed, relatively few mothers of infants under 4 months follow the recommended practice of breastfeeding exclusively. **In Guinea, 13 percent of mothers breastfeed their young infants exclusively.** This places Guinea in the lower half of sub-Saharan countries that follow the international recommendation. Guinea is similar to most of its West African neighbors in this respect.
- **Bottle-feeding is practiced by 8 percent of mothers of infants under 4 months in Guinea.** Guinea's bottle-feeding rate is in the upper half of sub-Saharan countries, with Ghana being the only neighboring West African country with a higher rate. **Bottle-feeding is not recommended by WHO** because improper sanitation in the process of bottle-feeding can introduce pathogens to the infant. Additionally, infant formula (which is often watered down) and other types of milk do not provide comparable nutrition to breast milk for infants less than 6 months of age. For these reasons, bottle-feeding puts infants at a higher risk of illness and malnutrition.

Figure 6

Infants under 4 Months Who Are Exclusively Breastfed and Those Who Receive a Bottle in Guinea Compared Other Other Sub-Saharan Countries, DHS Surveys 1994-1999



Note: Information on feeding practices is based on the 24 hours preceding the survey. WHO recommends that all infants should receive nothing but breast milk up to 6 months of age.

Source: DHS Surveys 1994-1999

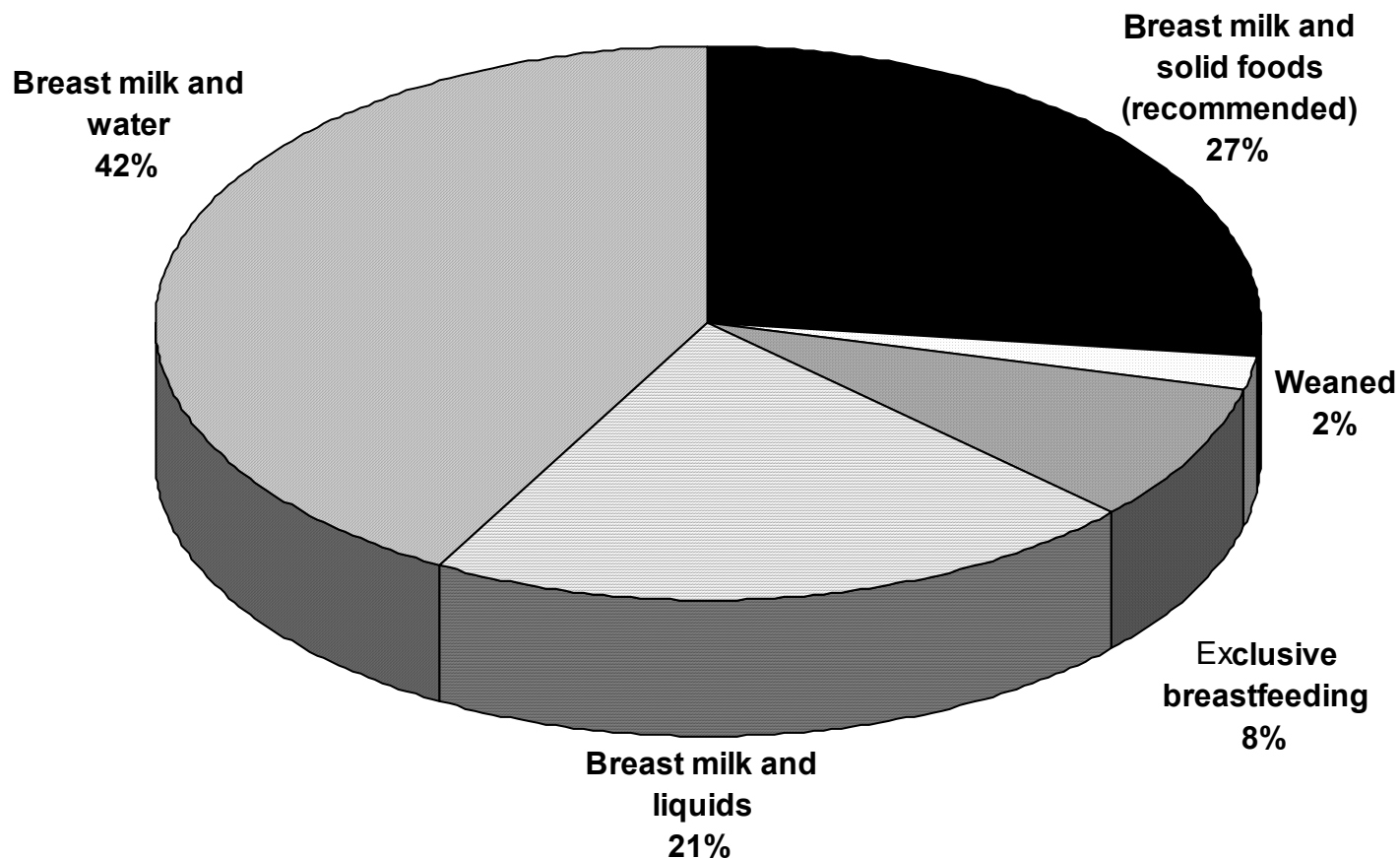
Figure 7: Feeding Practices for Infants Age 6 to 9 Months, Guinea

The World Health Organization recommends that solid foods be introduced to infants around the age of 6 months because breast milk alone is no longer sufficient to maintain a child's optimal growth at this point. Thus, *all infants over 6 months of age should be receiving solid foods* along with breast milk.

- **In Guinea, 27 percent of infants age 6 to 9 months are fed solid foods in addition to breast milk.** This means that the majority of infants aged 6 to 9 months are not fed according to the recommended practice.
- **Seventy-one percent of infants age 6 to 9 months are not fed solid foods in addition to breast milk, putting these children at risk of malnutrition.** Additionally, only 2 percent of children are weaned by this period, meaning that only a small number of children do not receive the benefits of breast milk at this age.

Figure 7

Feeding Practices for Infants Age 6 to 9 Months, Guinea



Note: WHO recommends that by the age of 6 months all infants should receive solid foods and liquids in addition to breast milk.

Source: EDSG-II 1999

Figure 8: Infants Age 6 to 9 Months Receiving Solid Foods in Addition to Breast Milk in Guinea Compared with Other Sub-Saharan Countries, DHS Surveys 1994-1999

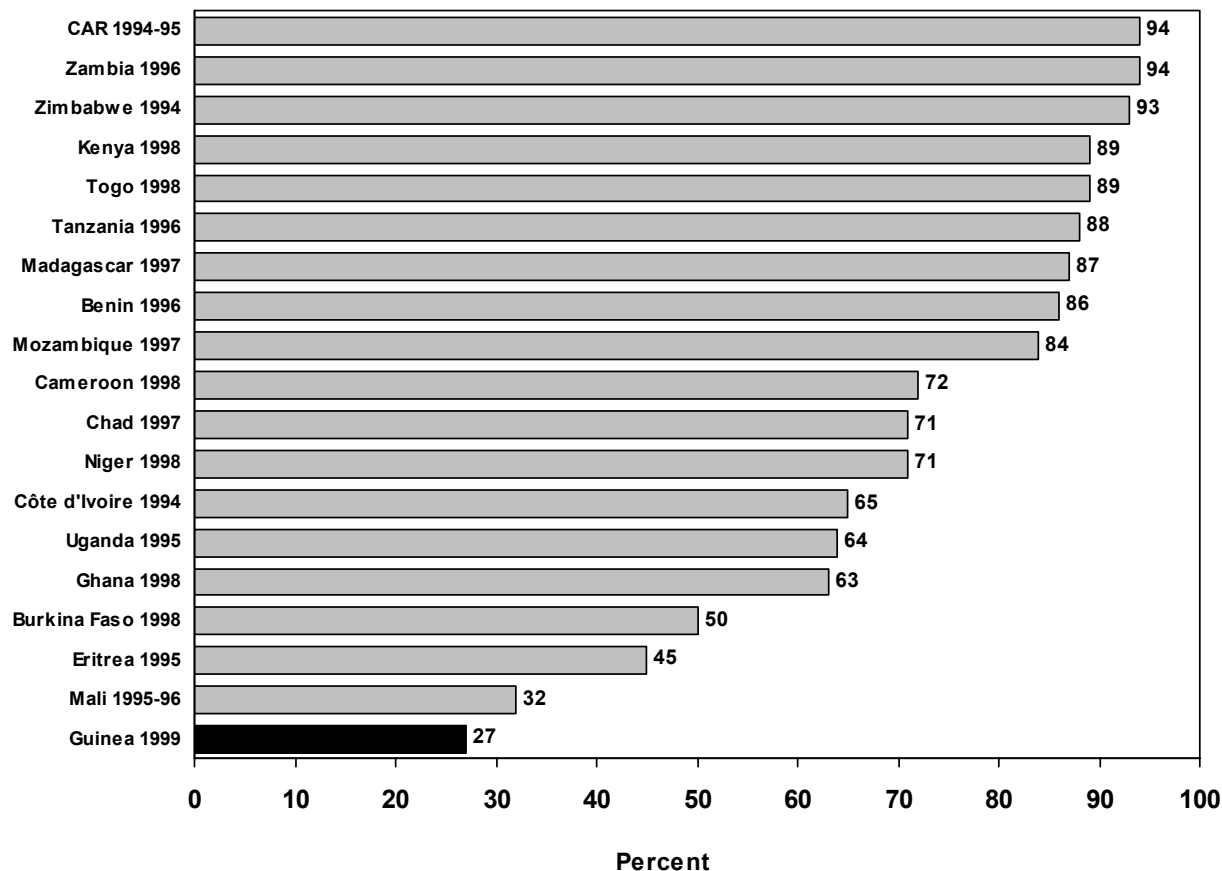
Optimal infant feeding practices include the introduction of complementary foods at about 6 months of age. The introduction of complementary feeding is necessary because breast milk is no longer sufficient to satisfy the developing infant's energy, protein, and micronutrient needs. All infants between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

In Guinea:

- **Twenty-seven percent of infants age 6 to 9 months receive solid food in addition to breast milk.** This is the lowest level of complementary feeding among all the countries surveyed.

Figure 8

Infants Age 6 to 9 Months in Guinea Receiving Solid Foods and Breast Milk Compared with Other Sub-Saharan Countries, DHS Surveys 1994-1999



Note: WHO recommends that by the age of 6 months all infants should receive solid foods and liquids in addition to breast milk.

Source: DHS Surveys 1994-1999

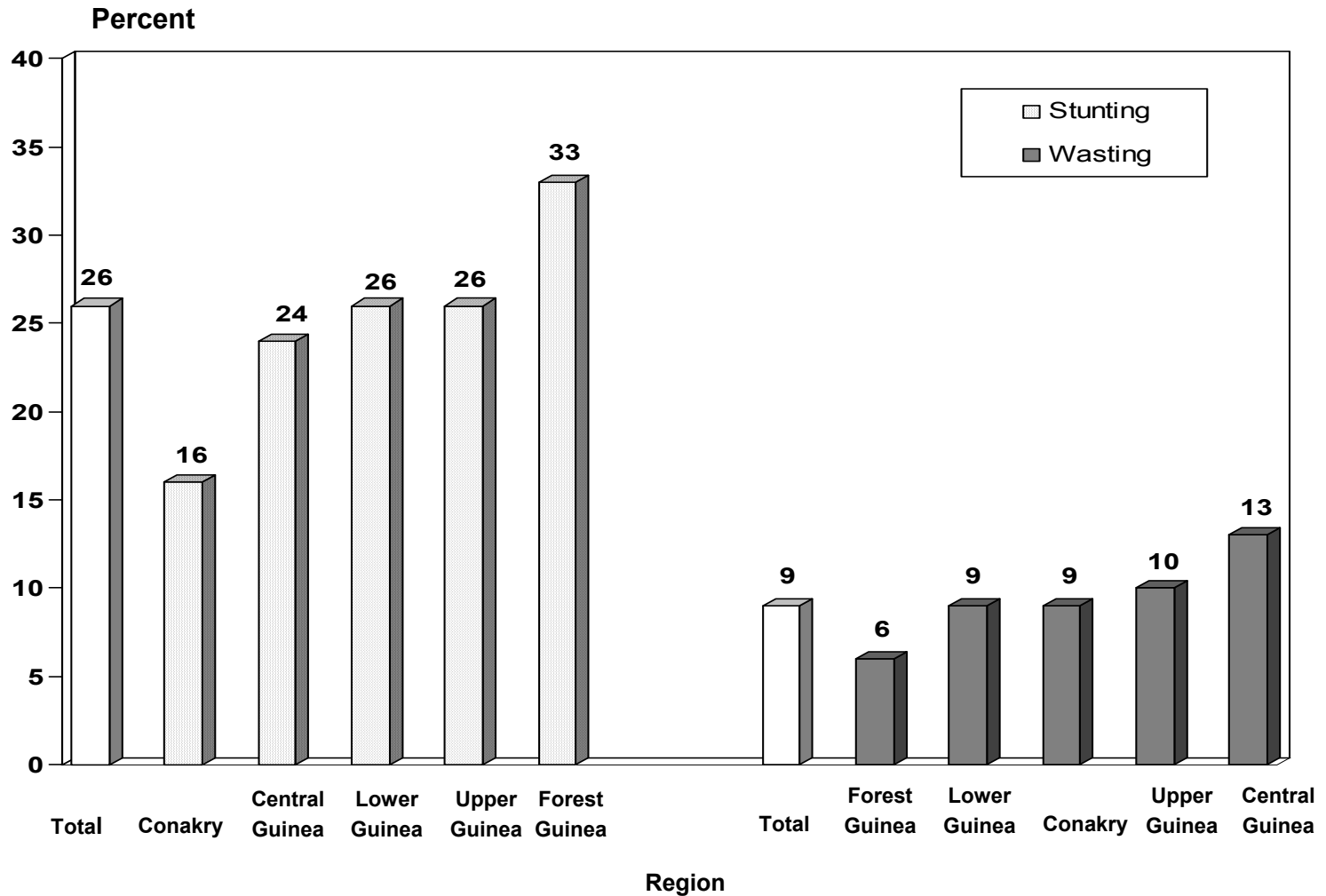
Figure 9: Stunting and Wasting among Children under 5 Years by Region, Guinea

In Guinea:

- **Stunting ranges from 16 to 33 percent among children in the 5 regions.** The highest level of stunting was reported in Forest Guinea (33 percent). The lowest level of stunting was reported in the capital city of Conakry (16 percent).
- **Wasting ranges from 6 to 13 percent among children in the 5 regions.** The highest level was found in Central Guinea (13 percent), while the lowest level was found in Forest Guinea (6 percent).

Figure 9

Stunting and Wasting among Children under 5 Years by Region, Guinea



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

Source: EDSG-II 1999

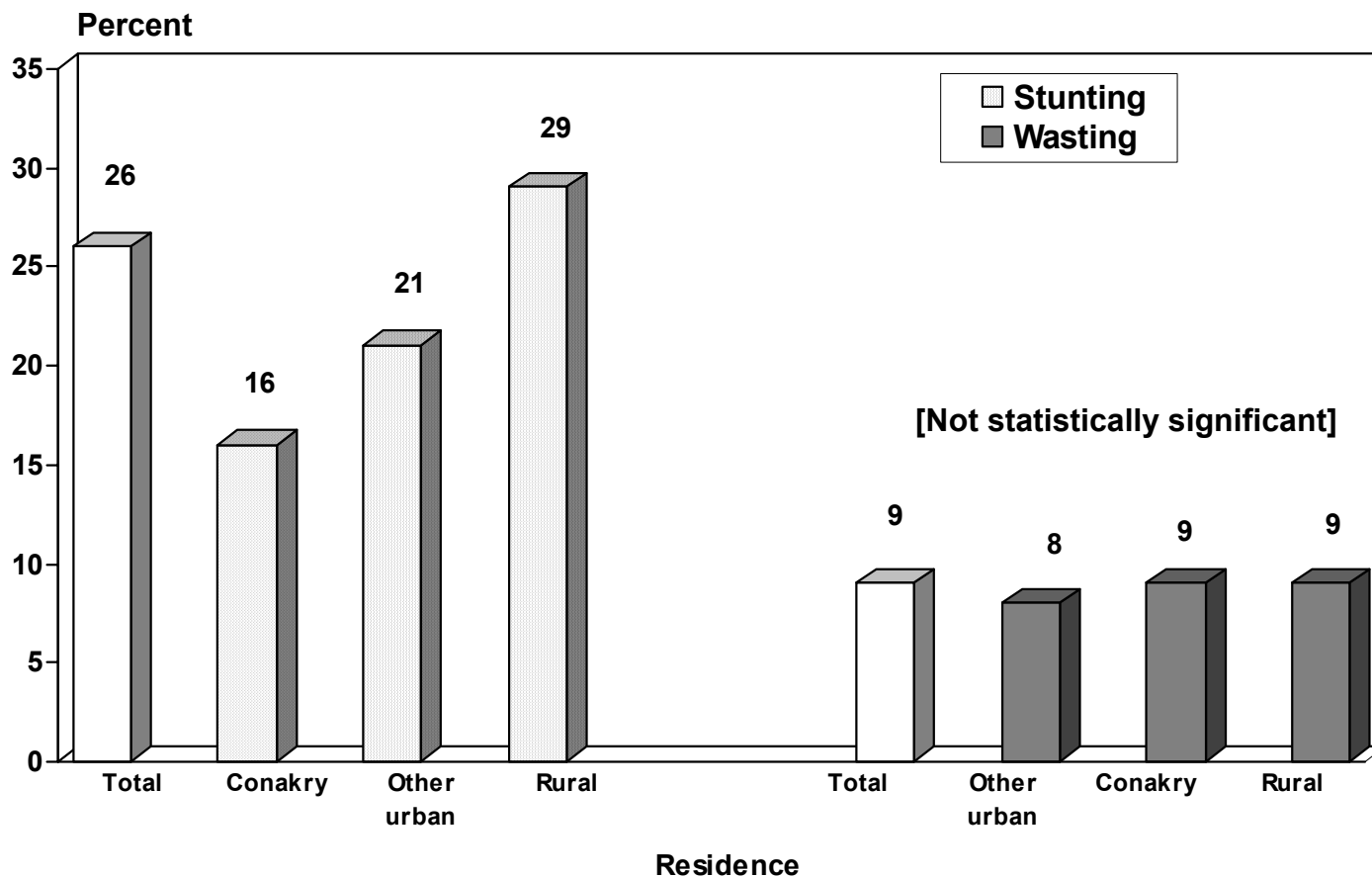
Figure 10: Stunting and Wasting among Children under 5 Years by Urban-Rural Residence, Guinea

In Guinea:

- **Twenty-nine percent of rural children are stunted.** In the capital city of Conakry, 16 percent of children are affected by chronic malnutrition. In other urban areas, the rate of stunting is 21 percent.
- Nine percent of children living in rural areas and the capital city of Conakry and 8 percent of children from other urban areas are wasted. Nevertheless, these rates are not statistically significant. Wasting rates are about the same for urban and rural Guinea—between 8 and 9 percent.

Figure 10

Stunting and Wasting among Children under 5 Years by Urban-Rural Residence, Guinea



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

Source: EDSG-II 1999

Figure 11: Stunting and Wasting among Children under 5 Years by Mother's Education, Guinea

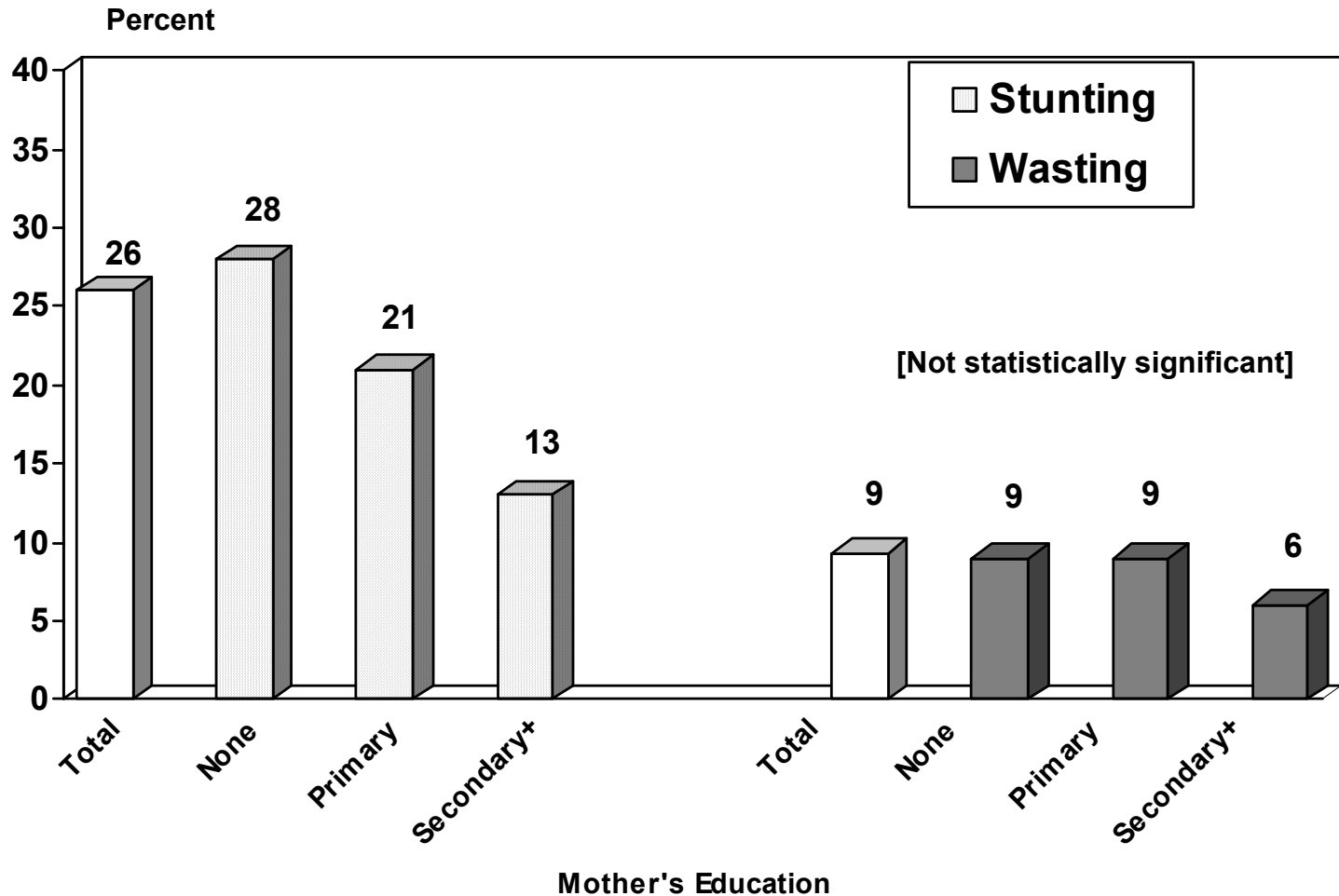
Maternal education is related to knowledge of good childcare practices and to household wealth. In Guinea, 86 percent of the mothers of children under 5 years of age have never attended school, while 8 percent have a primary education, and 6 percent have a secondary or higher education. There are variations in school attendance, especially between urban and rural areas. In the rural areas, 93 percent of the mothers have never attended school, 4 percent have attended primary school, and only 2 percent have gone to secondary school. In contrast, 64 percent of the mothers in urban areas have never attended school, 18 percent have attended primary school, and 18 percent have gone to secondary school.

Among the regions, the highest percentage of mothers reporting a primary or secondary school education live in the capital city of Conakry (47 percent). The region with the second highest rate of primary or secondary school attendance is Forest Guinea (12 percent) with Lower, Central and Upper Guinea trailing at 10, 8, and 6 percent, respectively.

- Maternal education has an inverse relationship with stunting in Guinea. **As the level of maternal education increases, the level of stunting decreases.** There is a 7 percentage point difference in stunting rates between children of mothers with no education and children whose mothers have a primary education, and a 15 percentage point difference between children of mothers with no education and those whose mothers have a secondary education.
- The relationship between wasting and maternal education is not statistically significant in Guinea.

Figure 11

Stunting and Wasting among Children under 5 Years by Mother's Education, Guinea



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

Source: EDSG-II 1999

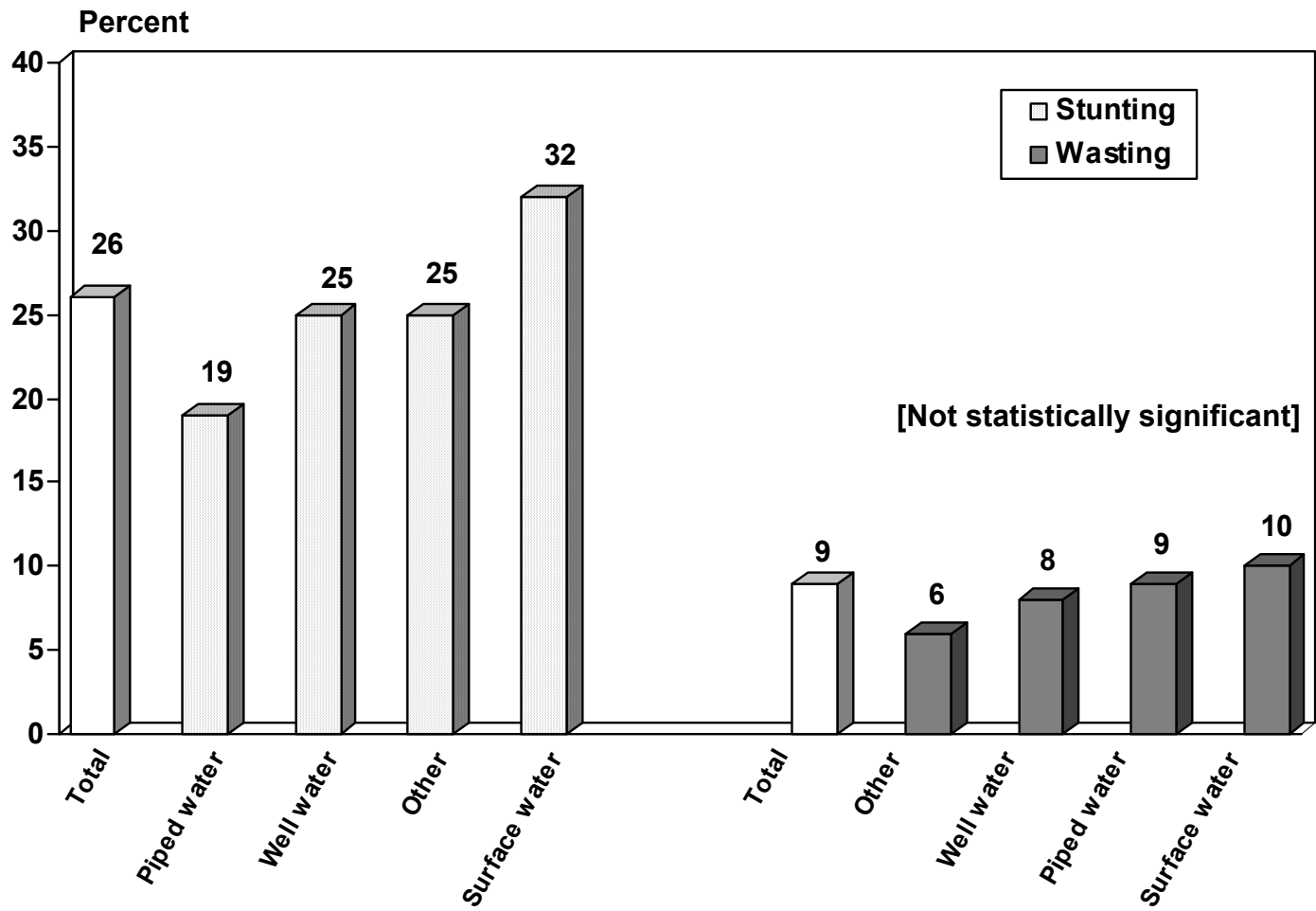
Figure 12: Stunting and Wasting among Children under 5 Years by Source of Drinking Water, Guinea

A household's source of drinking water is linked with its socioeconomic 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, diarrheal 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 5 years, 19 percent use piped water, 46 percent obtain their drinking water from a well, and 34 percent use surface water.

- **The highest rate of stunting among children under 5 years of age (32 percent) is found in households that use surface water.** This level of stunting is 16 times the level expected in a well-nourished population (2 percent).
- **Among households with piped water, 19 percent of children are stunted.** Although easy access to indoor tap water may be associated with a reduced risk of malnutrition, it does not ensure that a child will be well nourished.
- **The relationship between wasting and source of drinking water is not statistically significant in Guinea.**

Figure 12

Stunting and Wasting among Children under 5 Years by Source of Drinking Water, Guinea



Source: EDSG-II 1999

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

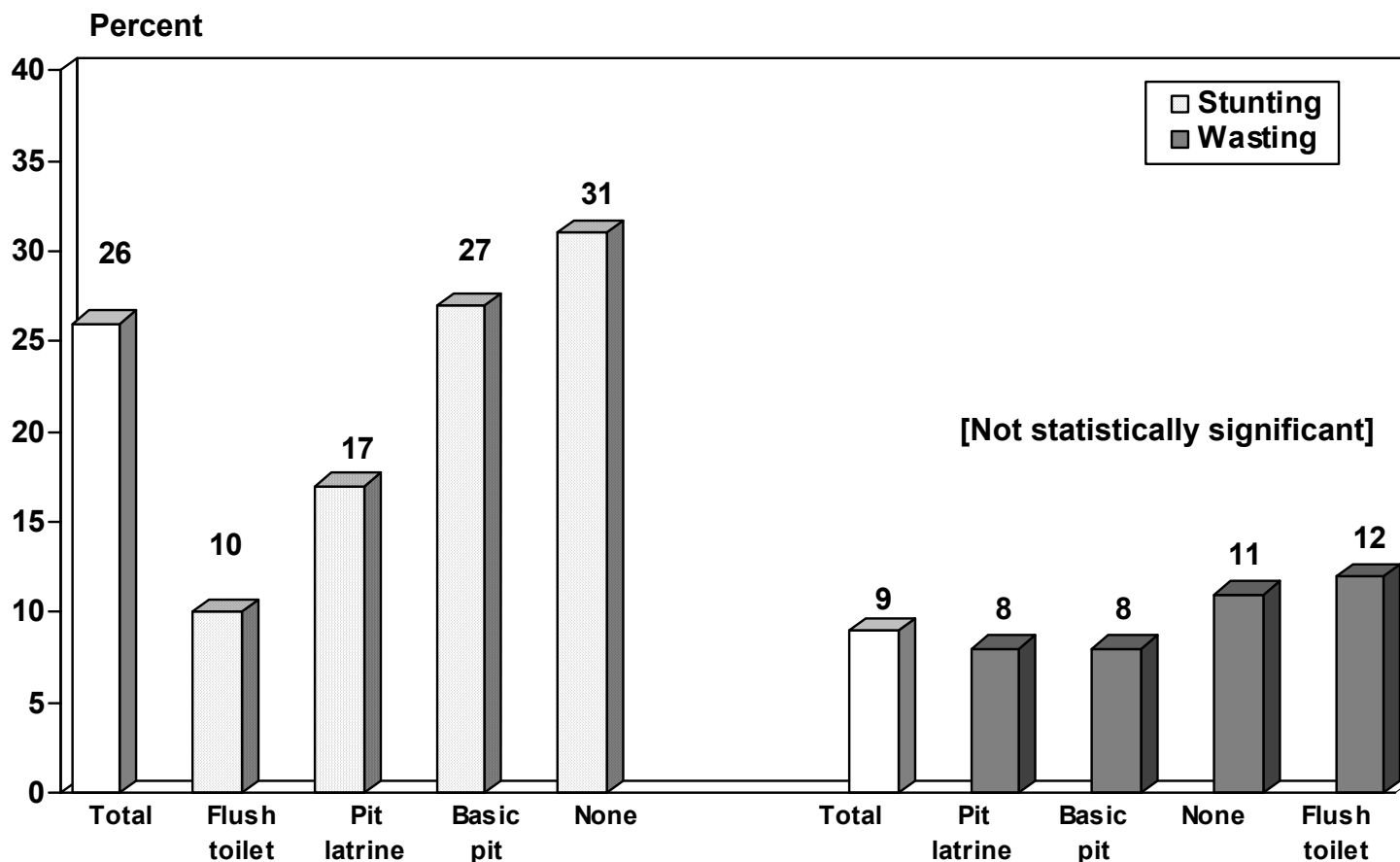
Figure 13: Stunting and Wasting among Children under 5 Years by Type of Toilet, Guinea

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 diarrheal 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 Guinea, 42 percent of households have a basic pit latrine, 17 have an improved pit latrine, 2 percent have a private or shared flush toilet, and 37 percent of survey households have no facilities or something other than the above types.

- **Thirty-one percent of children in households that do not have any toilet facilities are stunted. Conditions in households with basic or improved pit latrines are better (27 percent and 17 percent of children, respectively, are stunted).**
- **In households with access to flush toilets, the proportion of children stunted is only 10 percent.**
- **There is no direct relationship between wasting and type of toilet facility. (Note that the sample size for those using a flush toilet was small.)**

Figure 13

Stunting and Wasting among Children under 5 Years by Type of Toilet, Guinea



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

Source: EDSG-II 1999

Figure 14: Diarrhea and Cough with Rapid Breathing among Children under 5 Years, Guinea

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

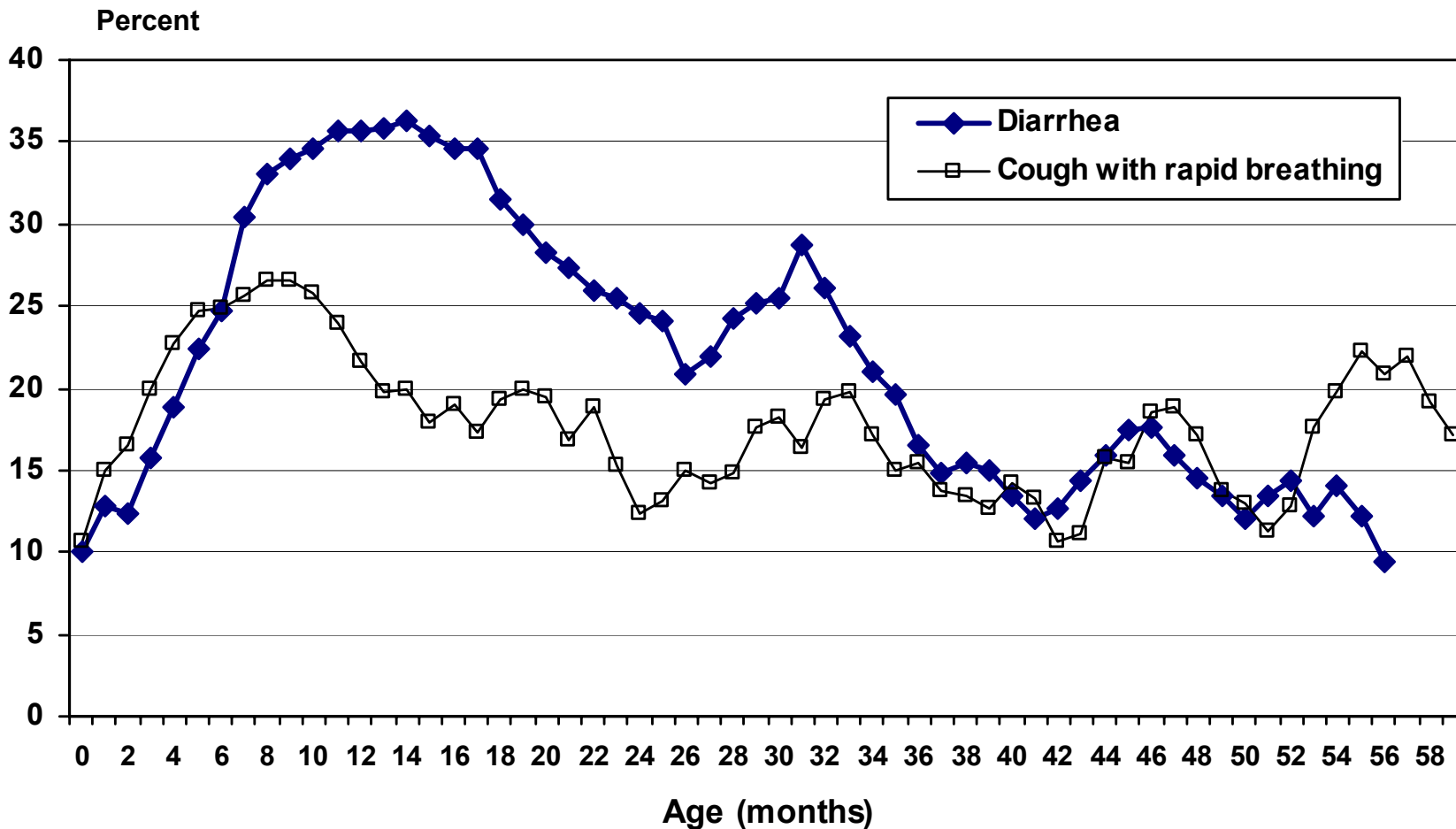
In Guinea:

- **Approximately 18 percent of children under 5 years of age experienced cough with rapid breathing in the two weeks preceding the survey. Guinea's prevalence of cough with rapid breathing increases rapidly until the tenth month when it peaks at 27 percent. Between 10 and 42 months, the rate decreases slowly to 11 percent, with fluctuations between 36-54 months, and declines to 17 percent at 59 months of age.**
- **Approximately 22 percent of children under 5 years of age had diarrhea in the two weeks preceding the survey.** The prevalence of diarrhea increases rapidly from the first to the twelfth month when it peaks at 36 percent and then varies between 15 and 35 percent in a downward trend until 59 months of age.

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

Figure 14

Diarrhea and Cough with Rapid Breathing among Children under 5 Years, Guinea



Note: Five-month moving average

Source: EDSG-II 1999

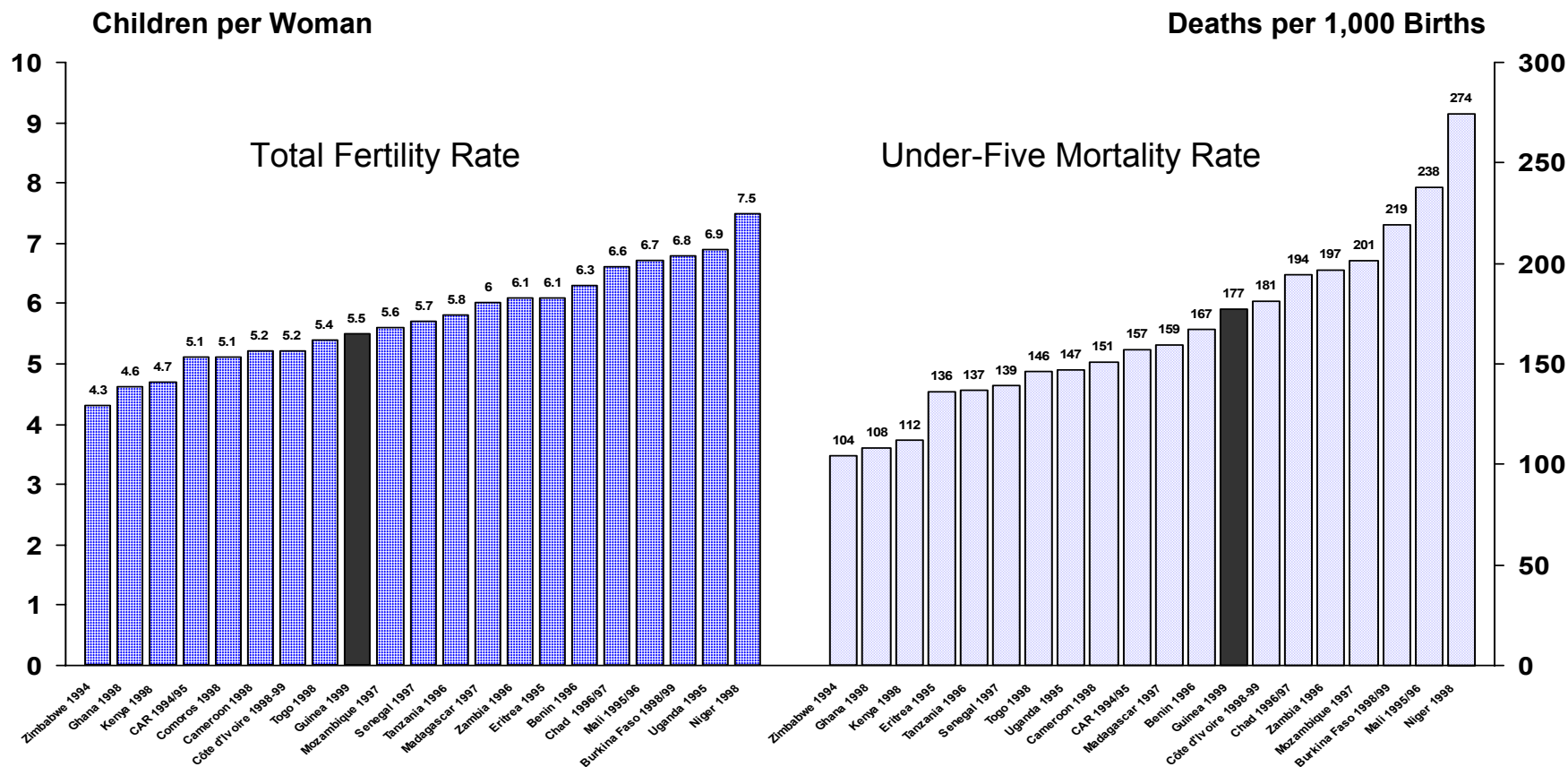
Figure 15: Fertility and Child Mortality in Guinea Compared with Other Sub-Saharan Countries, DHS Surveys 1994-1999

High fertility rates, especially when accompanied by short intervals between births, 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 women's health, thus increasing the chances that a mother may not be able to breastfeed or care for her children adequately. Young children, who are more vulnerable to malnutrition and disease, are more likely to die.

- **At current fertility levels, a woman in Guinea will have an average of 5.5 children by the end of her childbearing years.** (This is the total fertility rate for women age 15 to 49 years.) The total fertility rate for Guinea is in the lower half of the sub-Saharan countries surveyed and in the lower half of the West African countries surveyed.
- **Guinea's under-five mortality rate (177 deaths per 1,000 births) indicates that approximately 18 percent of children born in Guinea will die before their fifth birthday.** This rate is in the mid-range among the sub-Saharan countries surveyed as well as among the neighboring West African countries surveyed.

Figure 15

Fertility and Child Mortality in Guinea Compared with Other Sub-Saharan Countries, DHS Surveys 1994-1999



Source: DHS Surveys 1992-1998

Figure 16: Survival and Nutritional Status of Children, Guinea

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

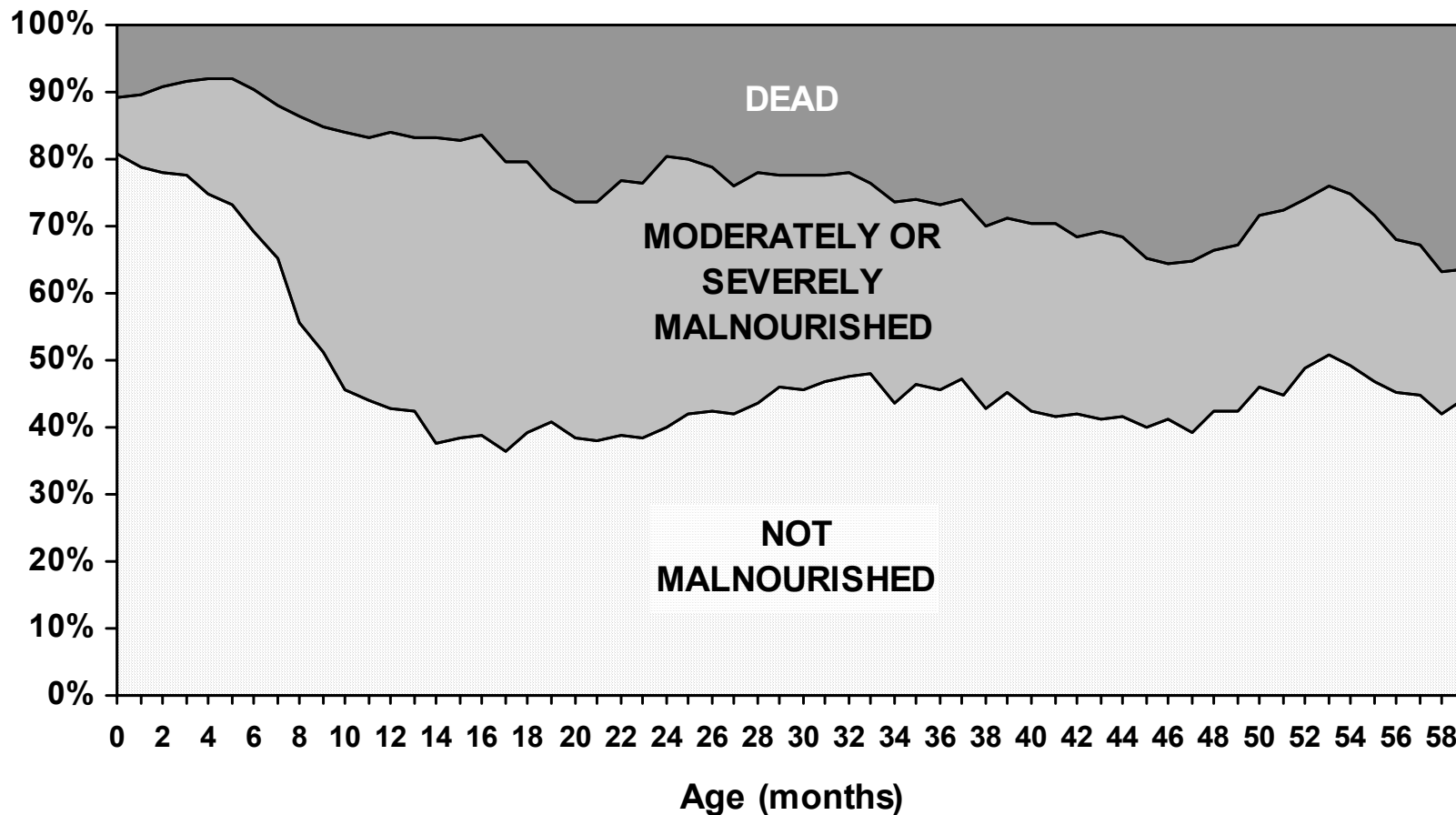
In Guinea:

- **Between birth and 19 months of age, the percentage of children who are alive and not malnourished drops rapidly from 80 percent to approximately 40 percent. The rate increases slightly to 44 percent by 59 months.**
- **Between birth and 14 months of age, the percentage of children who are moderately or severely malnourished¹ increases dramatically from 9 percent to 45 percent. This percentage decreases with increasing age, declining to 19 percent at 59 months of age.**
- **At 20 months of age, 27 percent of children have died. This percentage increases to 36 percent by 59 months of age.**

¹ A child with a Z-score below -3 SD on the reference standards is considered severely malnourished while one with a Z-score between -3 and -2 SD is considered moderately malnourished.

Figure 16

Survival and Nutritional Status of Children, Guinea



Note: A child with a Z-score below -3 SD on the reference standard is considered severely malnourished while a child with a Z-score between -3 and -2 SD is considered moderately malnourished.

Source: EDSG-II 1999

Figure 17: Contribution of Malnutrition to Under-Five Mortality, Guinea

Malnutrition is an important factor in the death of many young children in Guinea. Formulas developed by Pelletier et al.¹ are used to quantify the contributions of mild, moderate, and severe malnutrition to under-five mortality.

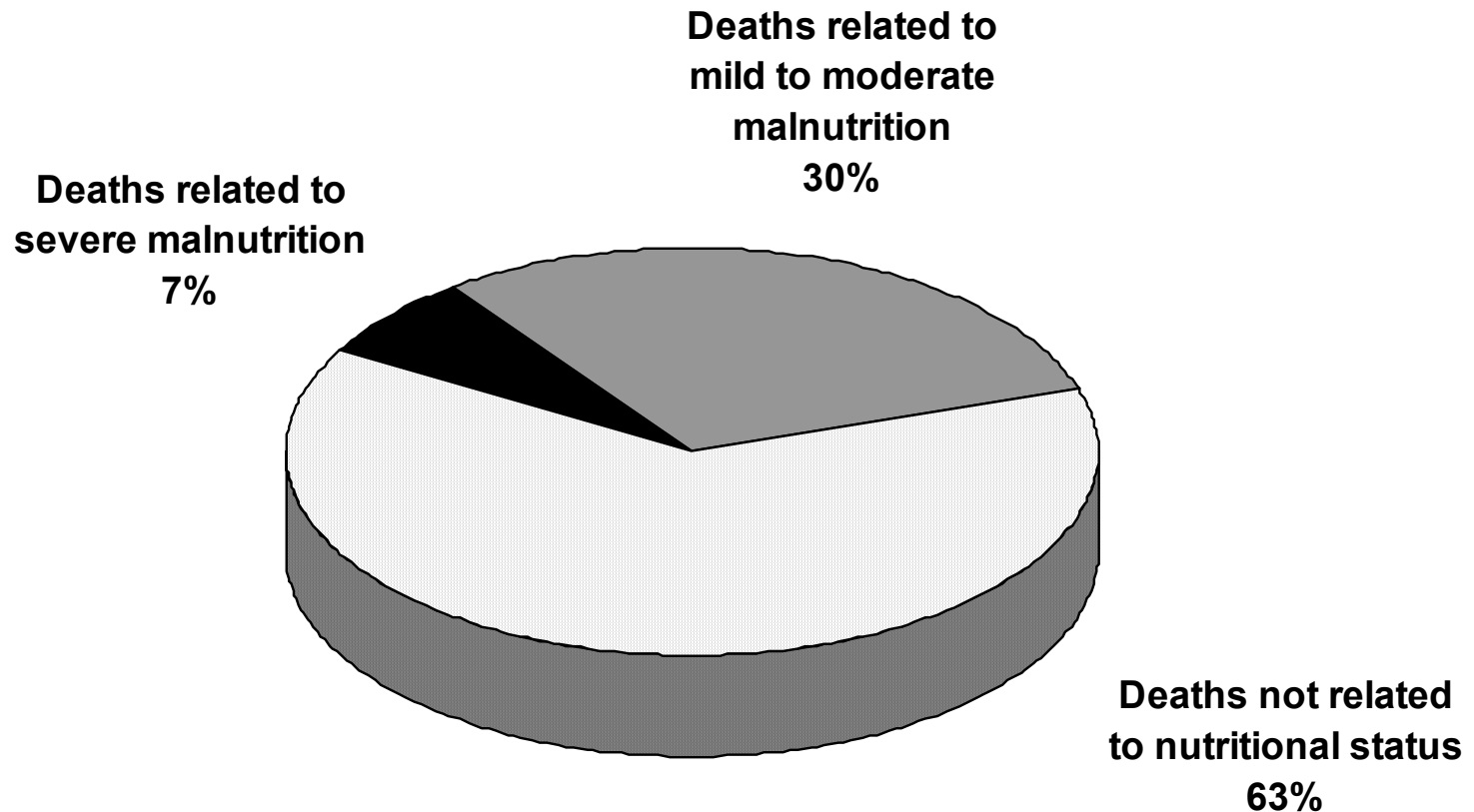
In Guinea,

- **Thirty-seven percent of all deaths that occur before age five are related to malnutrition (severe and mild-to-moderate malnutrition).**
- Because of its extensive prevalence, **mild-to-moderate malnutrition (30 percent) contributes to more deaths than does severe malnutrition (7 percent).** Mild-to-moderate malnutrition is implicated in 81 percent of all deaths associated with malnutrition.
- **Sixty-three percent of under-five deaths are not associated with malnutrition.**

¹ 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 17

Contribution of Malnutrition to Under-Five Mortality, Guinea



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

Source: EDSG-II 1999

Figure 18: Malnutrition among Mothers of Children under 5 Years by Region, Guinea

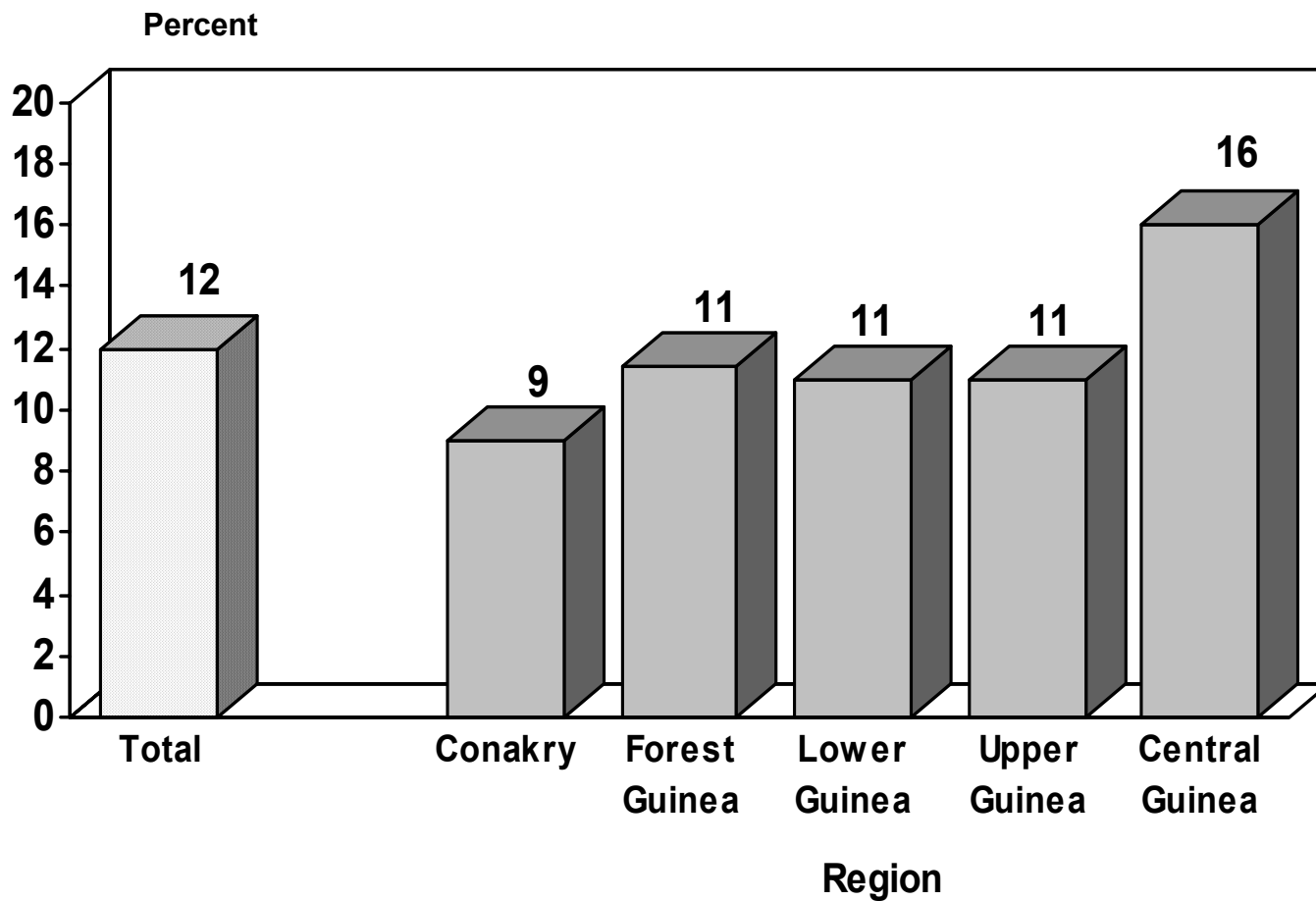
Besides being a concern in its own right, a mother's nutritional status affects her ability to successfully carry, deliver, and care for her children. There are generally accepted standards for indicators of malnutrition among adult women that can be applied.

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 meters. Thus, $BMI = \text{kg}/\text{m}^2$. When the BMI falls below the suggested cutoff point of 18.5, this indicates chronic energy deficiency or malnutrition among nonpregnant women.

- **Twelve percent of mothers of children under age five in Guinea are malnourished.**
- **The highest prevalence of maternal malnutrition occurs in Central Guinea; 16 percent of mothers of children under 5 are malnourished. The lowest prevalence of maternal malnutrition occurs in the capital city of Conakry (9 percent).**

Figure 18

Malnutrition among Mothers of Children under 5 Years by Region, Guinea



Note: Maternal malnutrition is the percentage of mothers whose BMI (kg/m²) is less than 18.5.

Source: EDSG-II 1999

Figure 19: Malnutrition among Mothers of Children under 5 Years by Residence and Education, Guinea

In Guinea:

- **Mothers living in rural areas are more likely to be malnourished (13 percent).** Only 9 percent of mothers are malnourished in the capital city of Conakry, and 10 percent are malnourished in the other urban areas of Guinea.
- **There is no direct relationship between mother's education and maternal malnutrition.**

Figure 19

Malnutrition among Mothers of Children under 5 Years, by Residence and Education, Guinea



Note: Maternal malnutrition levels are based on the percentage of mothers whose BMI (kg/m²) is less than 18.5.

Source: EDSG-II 1999

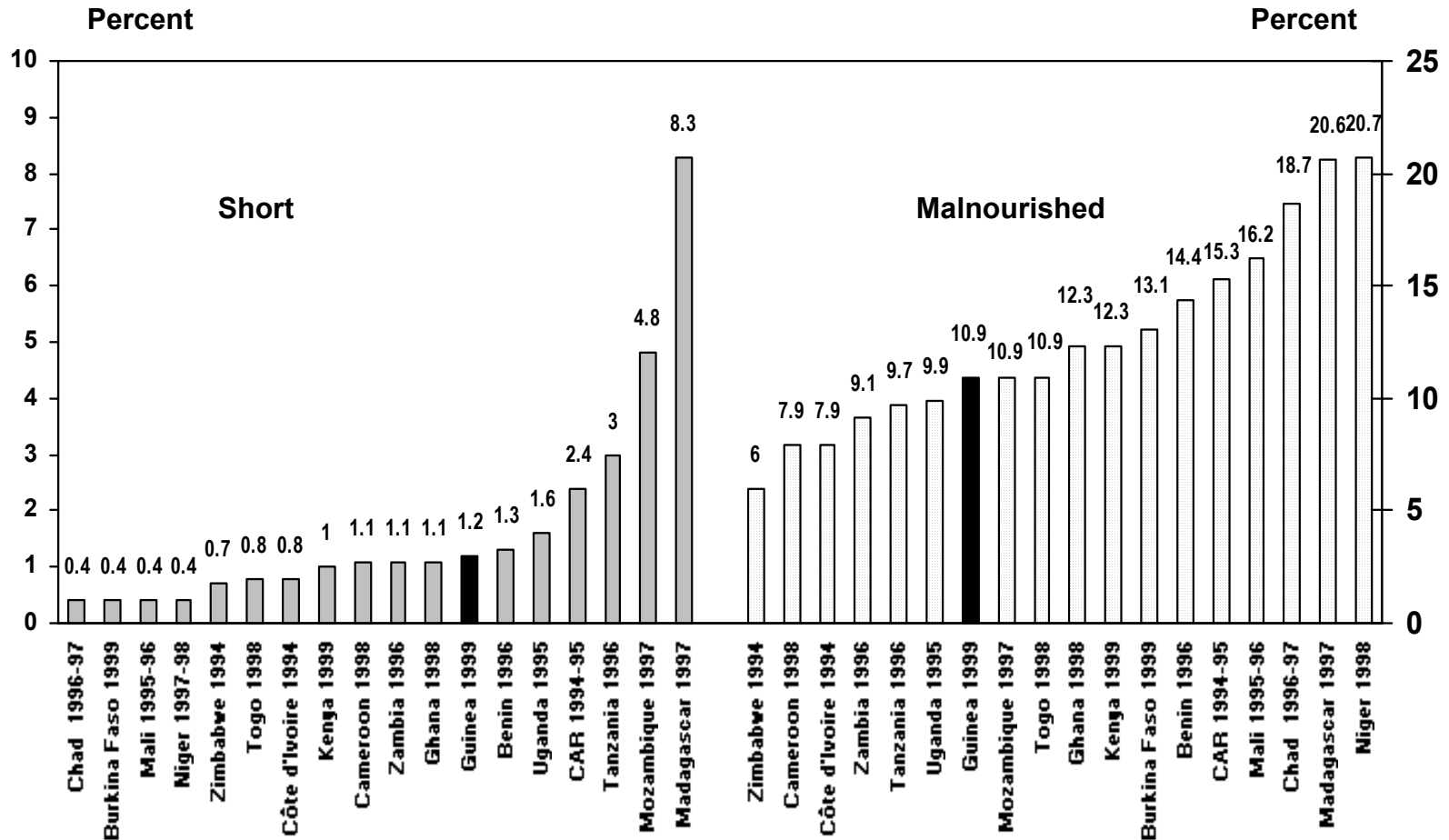
Figure 20: Malnutrition among Mothers of Children under 3 Years in Guinea Compared with Other Sub-Saharan Countries, DHS Surveys 1994-1999

Malnutrition among mothers is likely to have a major impact on their ability to care for themselves and their children. Women less than 145 centimeters 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 (BMI), is also presented.

- **An estimated 1.2 percent of mothers of children under three years of age are too short. This level is in the mid-range of the sub-Saharan countries surveyed.**
- **An estimated 10.9 percent of mothers of children under three years of age are malnourished (BMI <18.5). This level is in the lower half of the sub-Saharan countries surveyed and is the second lowest level among the West African countries surveyed.**

Figure 20

Malnutrition among Mothers of Children under 3 years in Guinea compared with Other Sub-Saharan Countries, DHS Surveys 1994-1999



Note: *Short* is the percentage of mothers under 145 cm; *malnourished* is the percentage of mothers whose BMI (kg/m²) is less than 18.5. Pregnant women and those who are less than 3 months postpartum are excluded from the BMI calculation.

Source: DHS 1994-1999

Appendix 1

Stunting, Wasting and Underweight Rates by Background Characteristics Guinea 1999

Background Characteristic	Stunted	Wasted	Underweight	Background Characteristic	Stunted	Wasted	Underweight
Child's Age in Months				Region			
0-5	7.0	6.8	5.9	Lower Guinea	26.0	8.9	23.3
6-11	14.1	14.4	23.8	Central Guinea	23.6	13.0	26.2
12-17	30.6	20.5	39.8	Upper Guinea	26.3	9.6	24.4
18-23	37.3	13.9	31.2	Forest Guinea	33.1	6.2	22.8
24-29	32.7	8.9	34.1	Conakry	15.9	9.4	19.1
30-35	31.4	4.4	25.9				
36-47	34.2	3.2	19.5				
48-59	31.3	2.1	16.3				
n=2939	p<0.000	p<0.000	p<0.000	n=2939	p<0.000	p<0.001	NS
Gender of child				Urban-Rural Residence			
Male	27.0	9.2	22.5	Rural	29.4	9.2	25.3
Female	25.0	8.9	24.0	Other urban	20.7	8.0	17.6
				Capital city	15.9	9.4	19.1
n=2939	NS	NS	NS	n=2939	p<0.000	NS	p<0.000
Overall	26.1	9.1	23.2		26.1	9.1	23.2

Note: Level of significance is determined using the chi-square test.

NS = Not significant

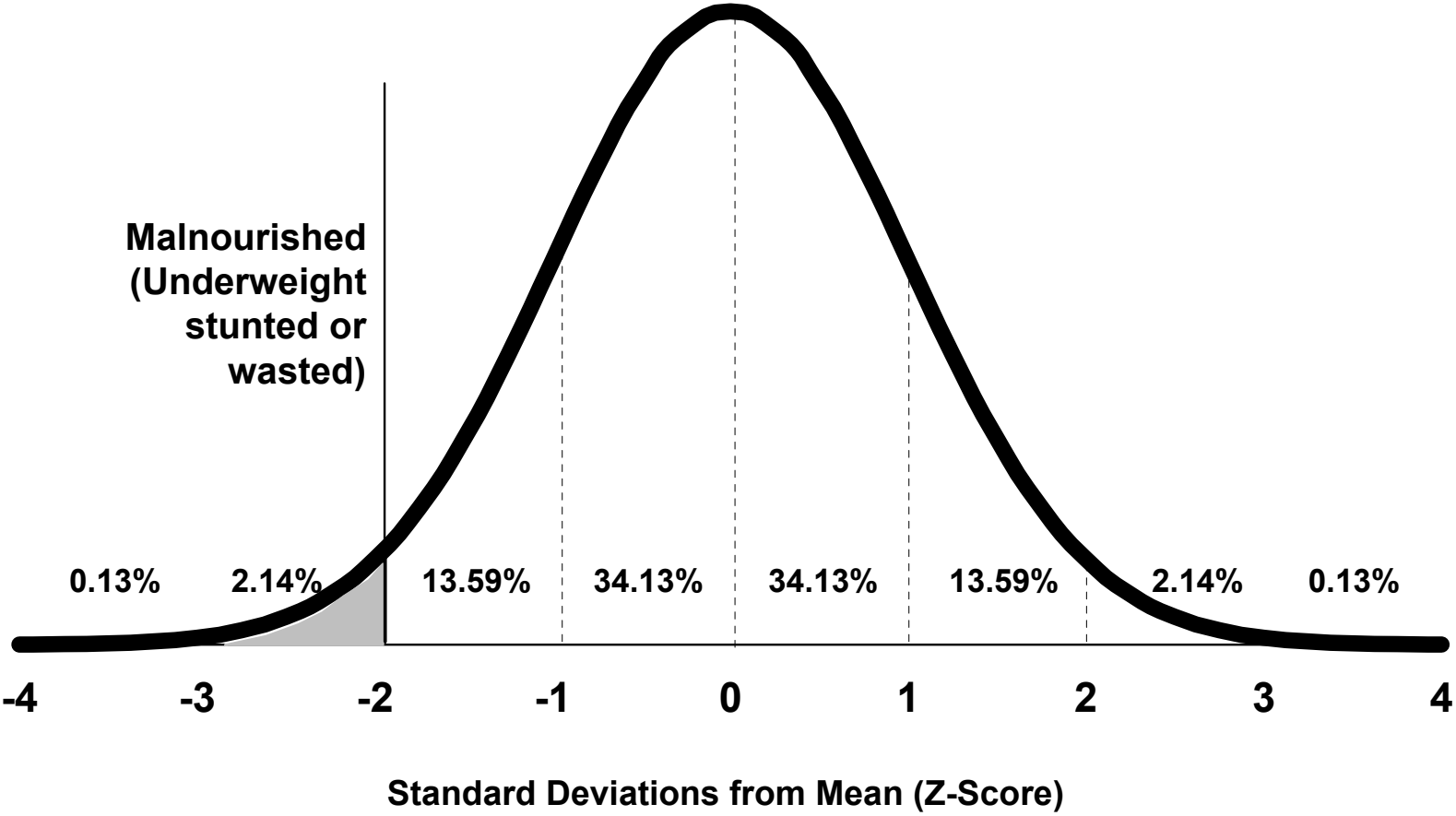
Appendix 2

WHO/CDC/NCHS International Reference Population

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 1 standard deviation of the mean for children of that age or height, and a height within 1 standard deviation of the mean for children of that age. About 14 percent of children will be between 1 and 2 standard deviations above the mean; these children are considered relatively tall or overweight for their age or relatively fat for their height. Another 14 percent will be between 1 and 2 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 very overweight for their age or very overweight for their height. That is, they are more than 2 standard deviations above the mean. Another 2 percent will fall more than 2 standard deviations below the mean and be considered 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 Center for Health Statistics (NCHS standard) as recommended by the World Health Organization and the Centers for Disease Control.

Appendix 2
WHO/CDC/NCHS Nutrition Reference Standard
Normal Distribution



Appendix 1

Stunting, Wasting and Underweight Rates by Background Characteristics Guinea 1999

Background Characteristic	Stunted	Wasted	Underweight	Background Characteristic	Stunted	Wasted	Underweight
Child's age in months				Region			
0-5	7.0	6.8	5.9	Lower Guinea	26.0	8.9	23.3
6-11	14.1	14.4	23.8	Central Guinea	23.6	13.0	26.2
12-17	30.6	20.5	39.8	Upper Guinea	26.3	9.6	24.4
18-23	37.3	13.9	31.2	Forest Guinea	33.1	6.2	22.8
24-29	32.7	8.9	34.1	Conakry	15.9	9.4	19.1
30-35	31.4	4.4	25.9	n=2939			
36-47	34.2	3.2	19.5		p<0.000	p<0.001	NS
48-59	31.3	2.1	16.3				
n=2939	p<0.000	p<0.000	p<0.000				
Gender of child				Urban-rural Residence			
Male	27.0	9.2	22.5	Rural	29.4	9.2	25.3
Female	25.0	8.9	24.0	Other urban	20.7	8.0	17.6
n=2939	NS	NS	NS	Capital city	15.9	9.4	19.1
				n=2939	p<0.000	NS	p<0.000
Overall	26.1	9.1	23.2		26.1	9.1	23.2

Note: Level of significance is determined using the chi-square test.

NS = Not significant

Appendix 2

WHO/CDC/NCHS Nutrition Reference Standard Normal Distribution

