AFRICA NUTRITION CHARTBOOKS

NUTRITION OF YOUNG CHILDREN AND MOTHERS IN ZIMBABWE

Findings from the 1999 Zimbabwe DHS Survey

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TABLE OF CONTENTS

Introduction

Malnutrition[1] is one of the most important health and welfare problems among infants and young children in Zimbabwe. 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 Zimbabwe data presented here are from the 1999 Zimbabwe Demographic and Health Survey (ZDHS), a nationally representative survey of 6,369 households conducted by the Zimbabwe Central Statistical Office. The study was undertaken with technical assistance from Macro International Inc., the Ministry of Health and Child Welfare, the Centre for Population Studies of the University of Zimbabwe and the Zimbabwe Family Planning Council. Funding was provided by the United Nations Children's Fund and the U.S. Agency for International Development. Fieldwork was conducted from August to November 1999. Of the 3,269 living children age 0-59 months that were part of the study, 2,520 are included in this analysis. 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 presented from DHS surveys conducted in other sub-Saharan countries.

[1] The 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: Infant and Child Mortality in Zimbabwe Compared with Other Sub-Saharan Countries

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

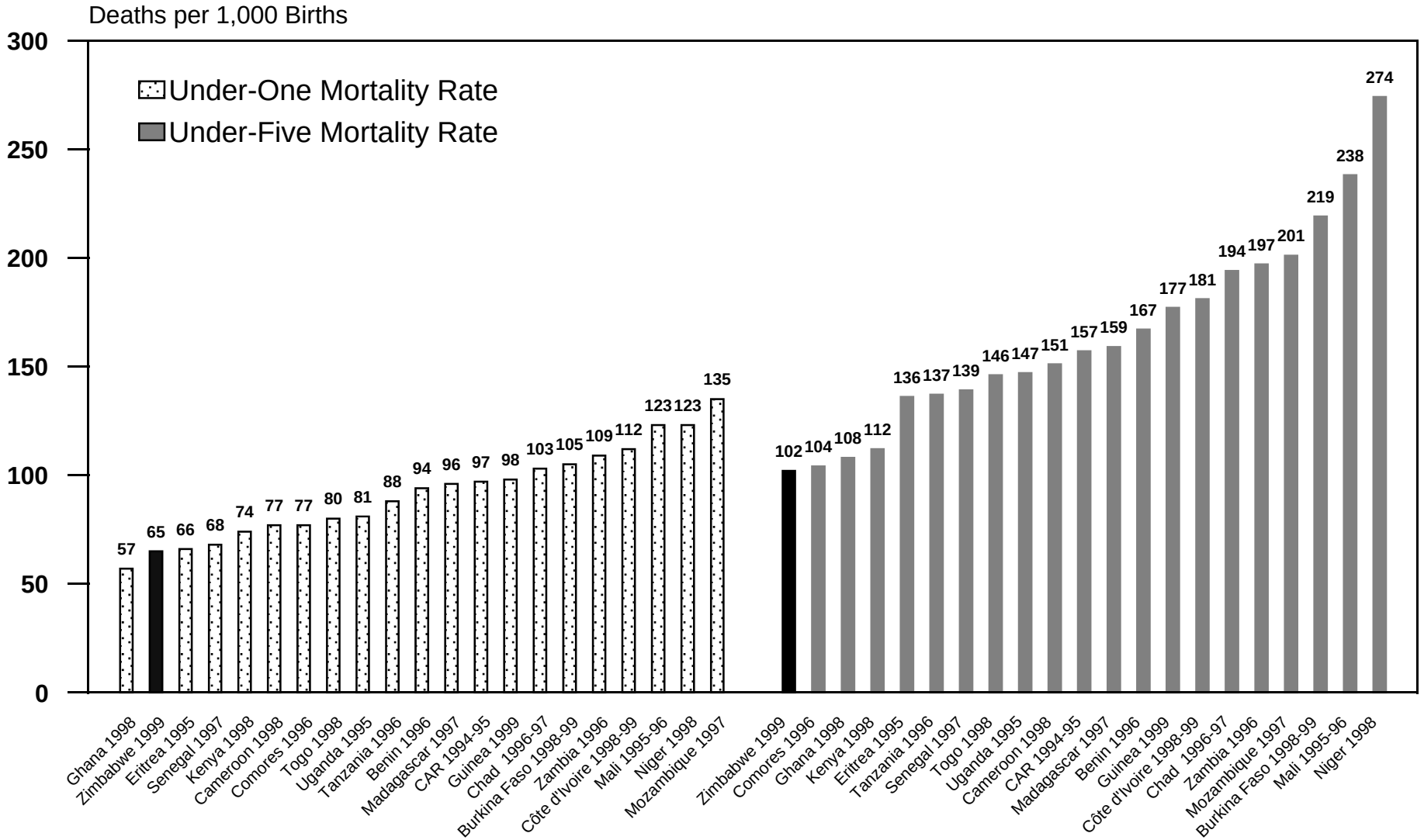
- **Zimbabwe's under-one mortality rate (65 deaths per 1,000 births) indicates that approximately 7 percent of children born in Zimbabwe will die before their first birthday.** This rate is in the low-range among all sub-Saharan countries surveyed. This rate is higher than the ZDHS survey in 1994 which reported a rate of 53 deaths per 1,000 births.

- **Zimbabwe's under-five mortality rate (102 deaths per 1,000 births) indicates that approximately 10 percent of children born in Zimbabwe will die before their fifth birthday.** Again, although this rate is lowest among all sub-Saharan countries surveyed, it is considerably higher than in 1994 (77 deaths per 1,000 births).

The increases in mortality have been explained by the worsening economic conditions and the direct and indirect impact of the AIDS pandemic.[1]

[1] Central Statistical Office [Zimbabwe] and Macro International Inc. 2000. *Zimbabwe Demographic and Health Survey 1999.* Calverton, Maryland: Central Statistical Office and Macro International Inc.

Figure 1
Infant and Child Mortality in Zimbabwe Compared with Other Sub-Saharan Countries



Source: DHS Surveys 1994-1999

Figure 2: Contribution of Malnutrition to Under-Five Mortality, Zimbabwe

Malnutrition is an important factor in the death of many young children. Even if a child is 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, diarrhea, malaria, measles and other infectious diseases take their toll on children.

Formulas developed by Pelletier et al.[1] are used to quantify the contributions of mild, moderate and severe malnutrition to under-five mortality.

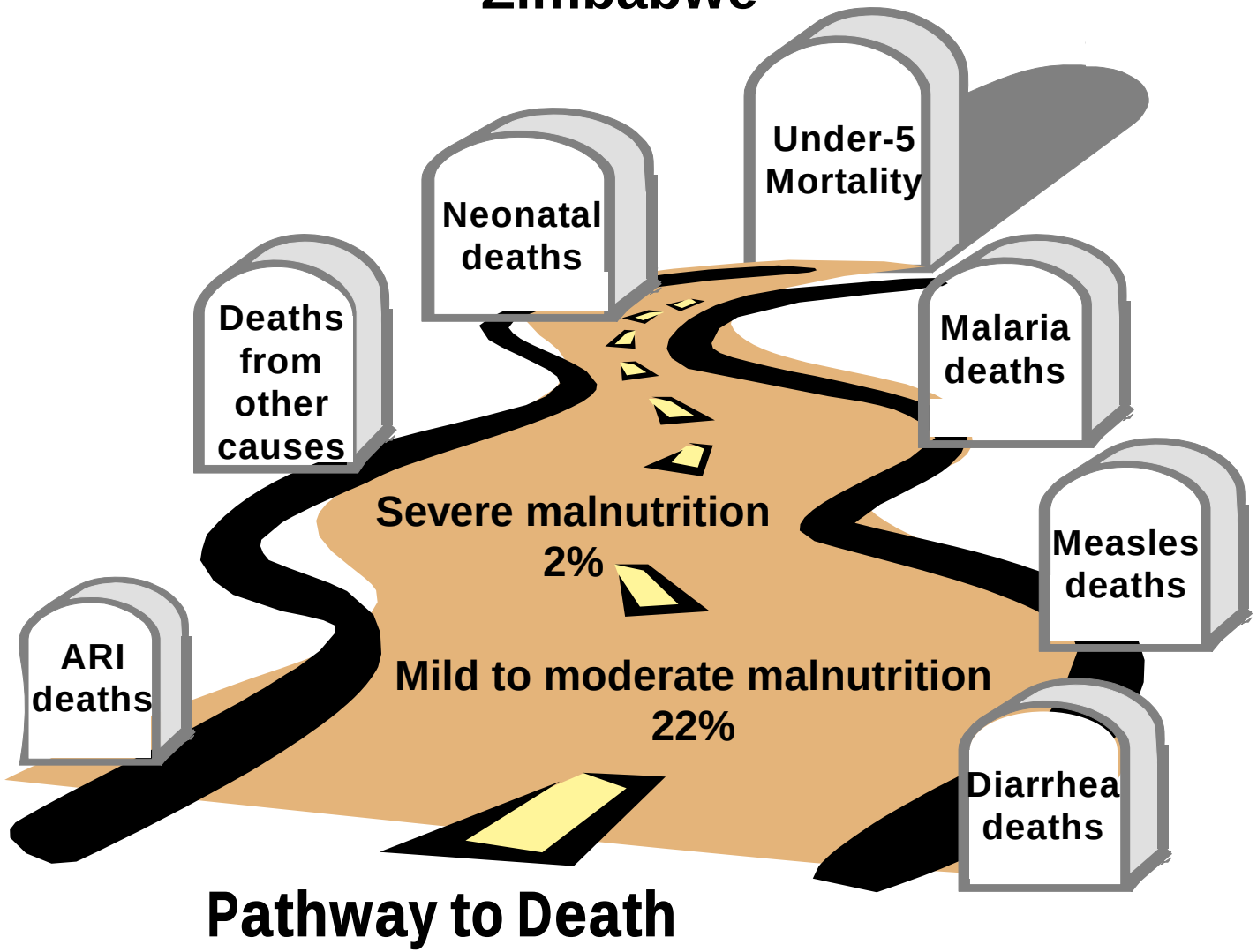
In Zimbabwe,

- **Twenty-four 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 (22 percent) contributes to more deaths than does severe malnutrition (2 percent).** Mild-to-moderate malnutrition is implicated in 92 percent of all deaths 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 2
Contribution of Malnutrition to Under-Five Mortality, Zimbabwe



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

Source: ZDHS Survey 1999

Figure 3: Survival and Nutritional Status of Children, Zimbabwe

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 Zimbabwe:

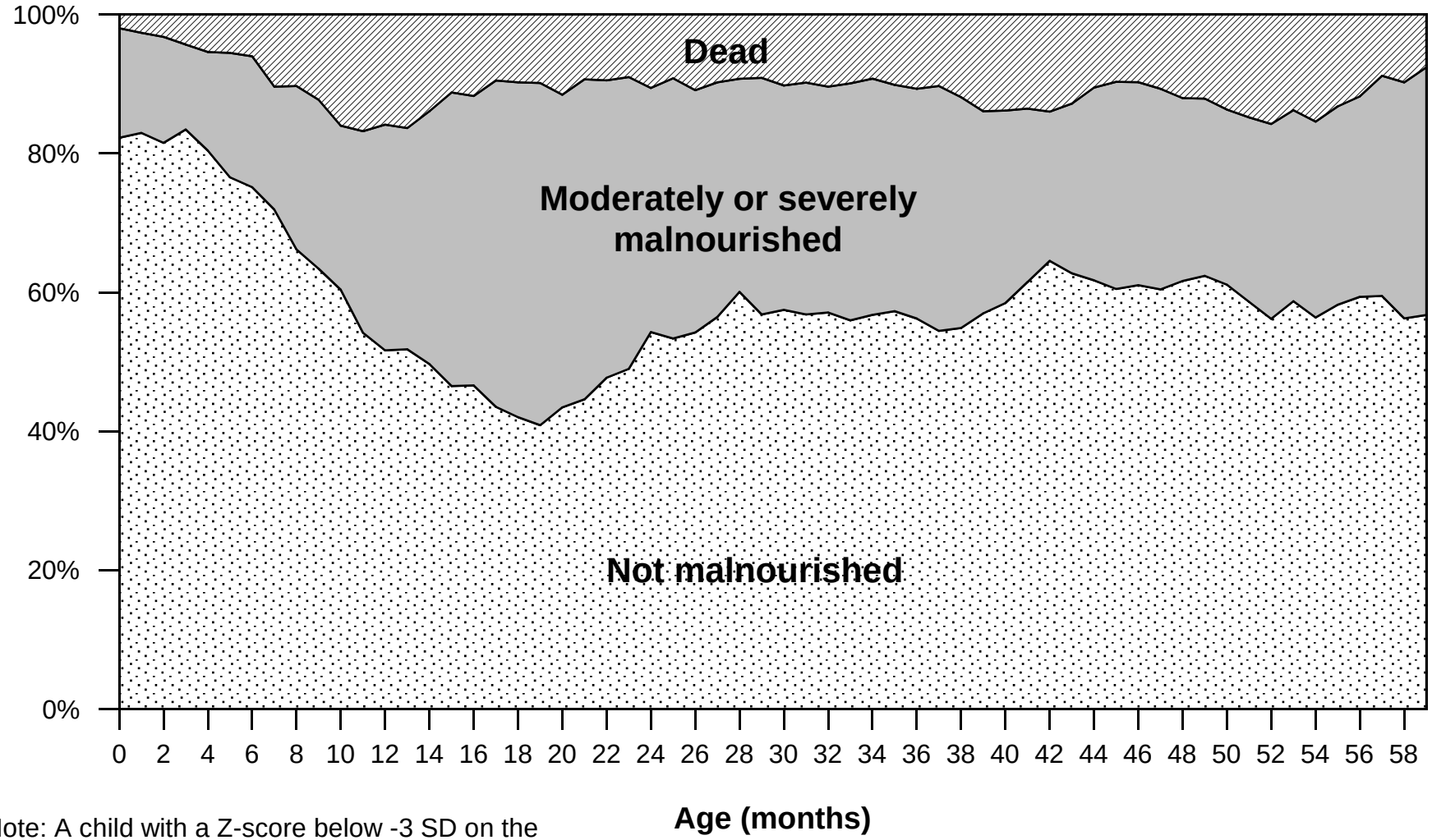
- **Between birth and 19 months of age, the percentage of children who are alive and not malnourished drops rapidly from 83 percent to 41 percent.** The rate increases to 60 percent by 28 months, peaking at 65 percent at 42 months. The percentage of children not malnourished at 59 months is about 57 percent.

- **Between birth and 19 months of age, the percentage of children who are moderately or severely malnourished[1] increases dramatically from 14 percent to 49 percent.** This percentage decreases at 24 months to 37 percent of all children but remains between 21 and 36 until the 59 months of age**.**

- **At the age of 12 months, the percent of children who have died reaches its peak at 17 percent.** Thereafter, the rate remains about the same, varying between 9 and 16 percent up to 59 months of age.

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

Figure 3
Survival and Nutritional Status of Children, Zimbabwe



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. Values have been smoothed using a five month rolling average.

Source: ZDHS Survey 1999

Malnutrition in Zimbabwe

Figure 4: Malnutrition among Children under 5 Years, Zimbabwe

In Zimbabwe:

- **Twenty-seven 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 over 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 6 percent of children**, which is over three times the level expected in a healthy population.

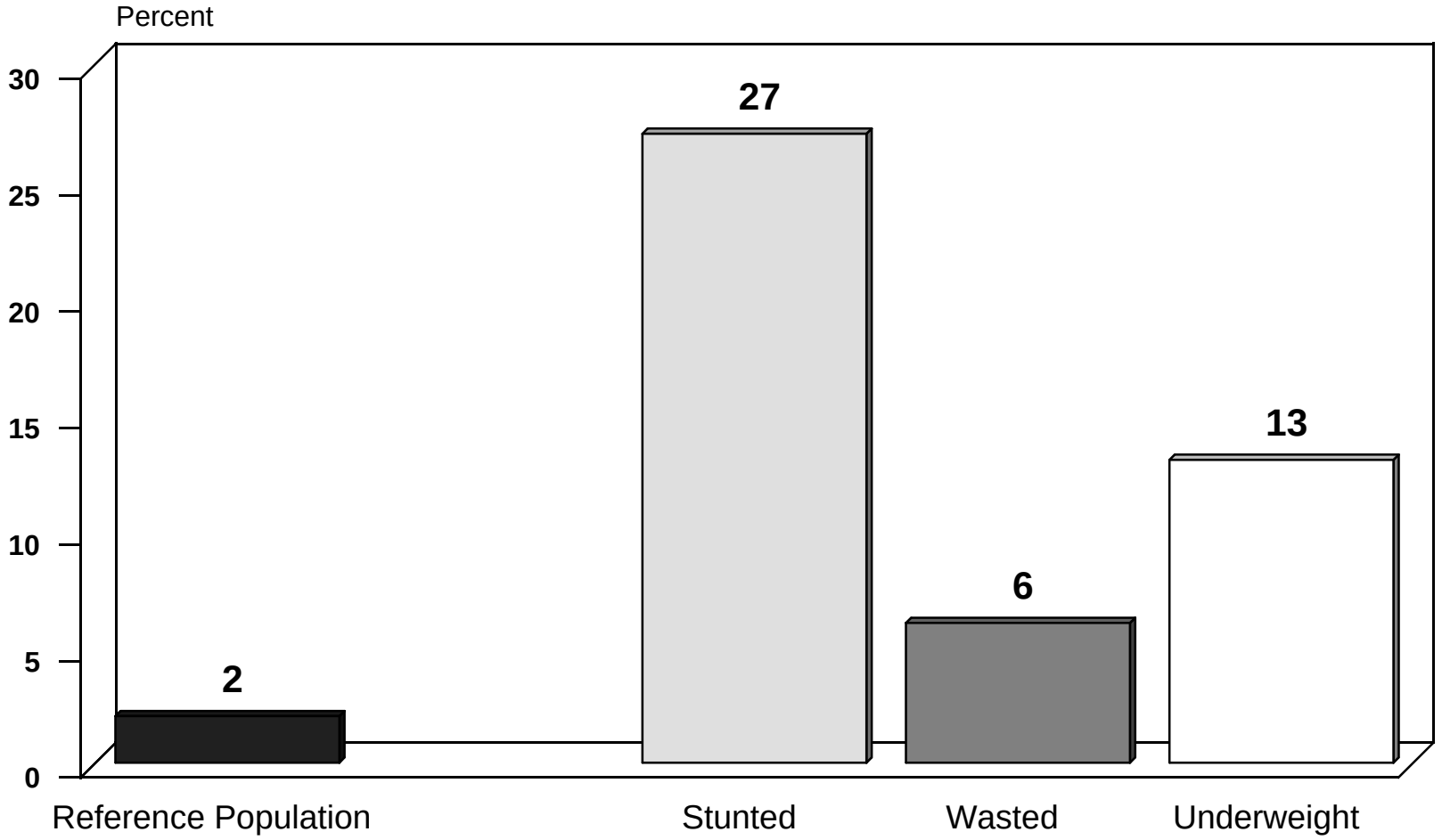
- **Thirteen percent of children under 5 years are *underweight***[3] for their age. This is over six times the level expected in a healthy, well-nourished population.

[1] A 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.

[2] 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 diarrhea.

[3] 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.

Figure 4
Malnutrition among Children under 5 Years, Zimbabwe



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

Source: ZDHS 1999

Figure 5: Changes in Malnutrition among Children under 3 Years, Zimbabwe 1994 and 1999

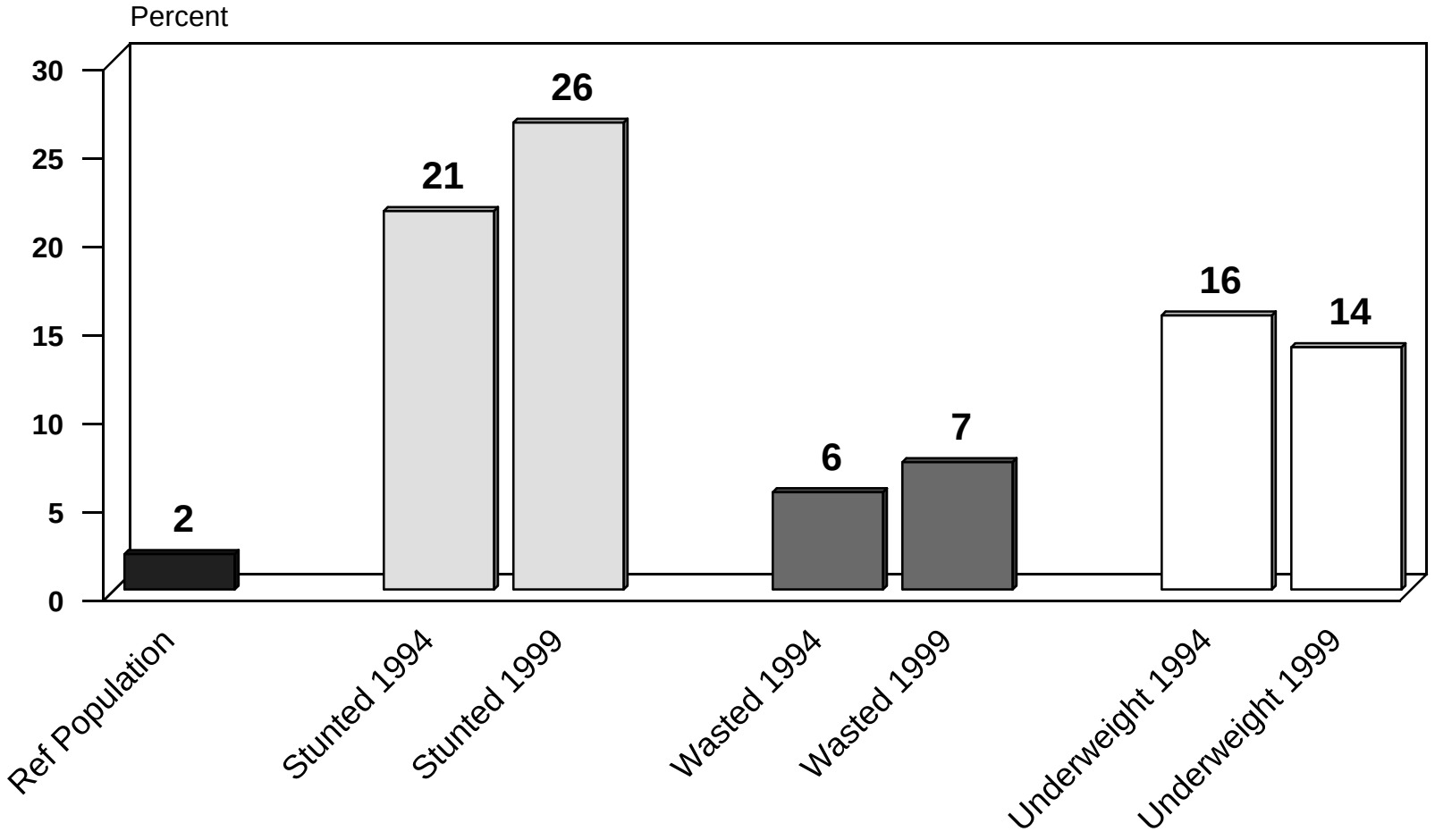
The findings of the 1999 ZDHS suggest that the nutritional status of children in Zimbabwe has changed since the 1994 ZDHS. The percentage of children who are stunted and wasted increased while the percentage of children who are underweight decreased slightly.

- **The percentage of children under 3 years who are stunted increased slightly from 21 percent in 1994 to 26 percent in 1999. This small rise in chronic malnutrition in Zimbabwe is statistically significant.**

- **Wasting (acute malnutrition) manifests itself directly as a result of weight loss in children. For this reason, it reflects seasonal patterns of illness and food scarcity. Therefore, no comparison of the prevalence of wasting can be made.**

- **The percentage of children under 3 years who are underweight decreased from 16 percent in 1994 to 14 percent in 1999. It is not clear why this indicator decreased while stunting increased.**

Figure 5
Malnutrition among Children under 3 Years, Zimbabwe



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

Source: ZDHS 1994, ZDHS 1999

Figure 6: Stunting, Wasting and Underweight by Age, Zimbabwe

In Zimbabwe, the time between 3 months and 21 months of age is a vulnerable period.

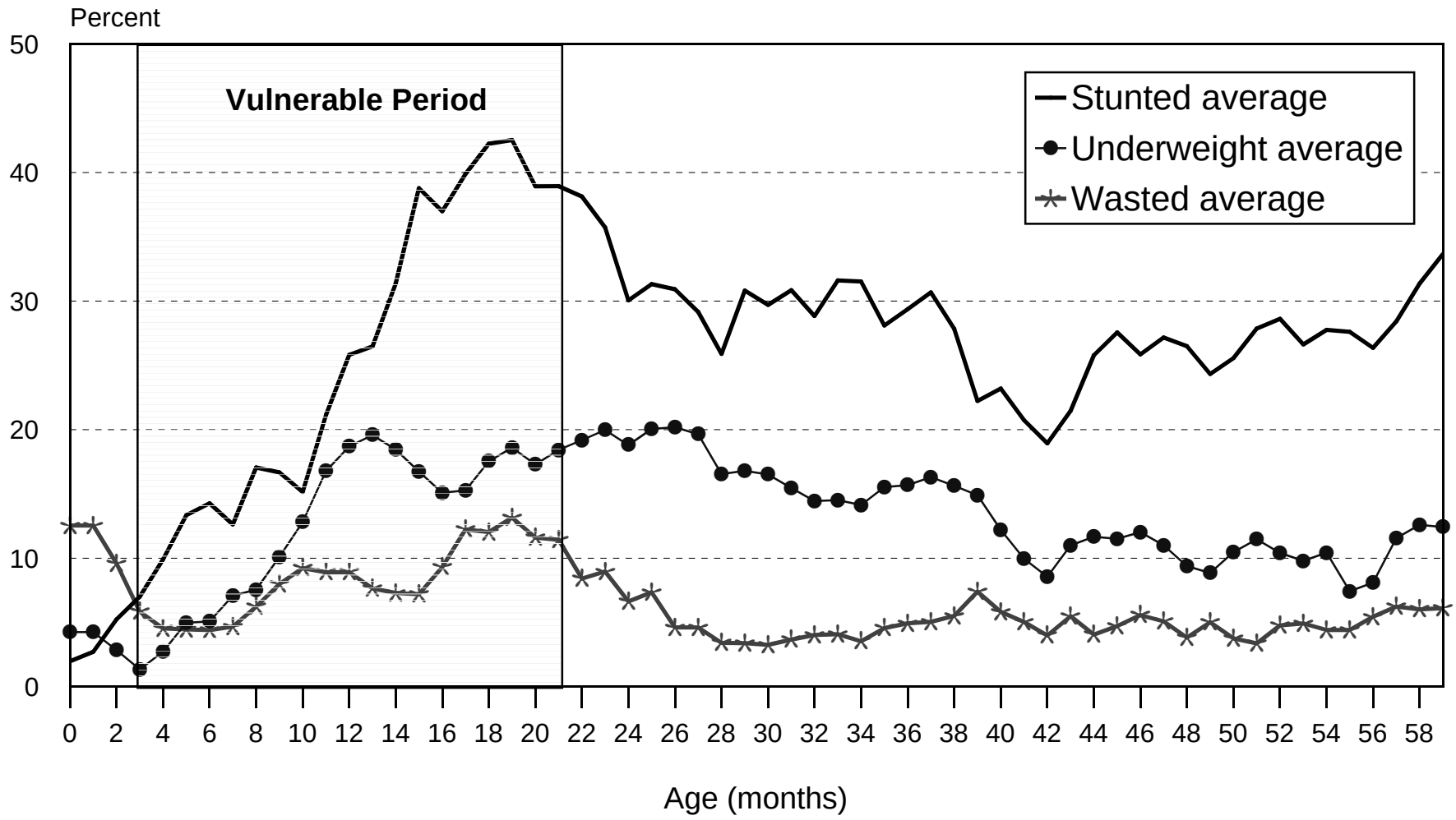
- **The proportion of children stunted rises sharply from 0 to 20 months of age, peaking at 43 percent.** The proportion of children stunted drops to 26 percent at 28 months of age, rising by about 5 percent until it drops again at 42 months of age to 19 percent. After 42 months of age, the stunting rate begins to climb steadily again, reaching 34 percent by 59 months of age.

- **The proportion of children wasted declines in the first 6 months of life from 13 to 4 percent.** It then slowly rises to 13 percent by 19 months of age. It reaches a low at 28 months (3 percent), and rises slightly but does not surpass 7 percent again. About 6 percent of children 59 months of age are wasted.

- **The proportion of children underweight rises steadily from 3 to 13 months of age, when it reaches 20 percent.** This rate remains about the same until it begins to decline at 28 months of age, remaining at about 17 percent until it drops to 9 percent at 42 months of age. The rate then rises slightly but remains between 7 and 13 percent through the 59 months of age.

The estimate in the early months should be interpreted with caution since the sample sizes are much smaller than succeeding months.

Figure 6
Stunting, Wasting and Underweight by Age, Zimbabwe



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.

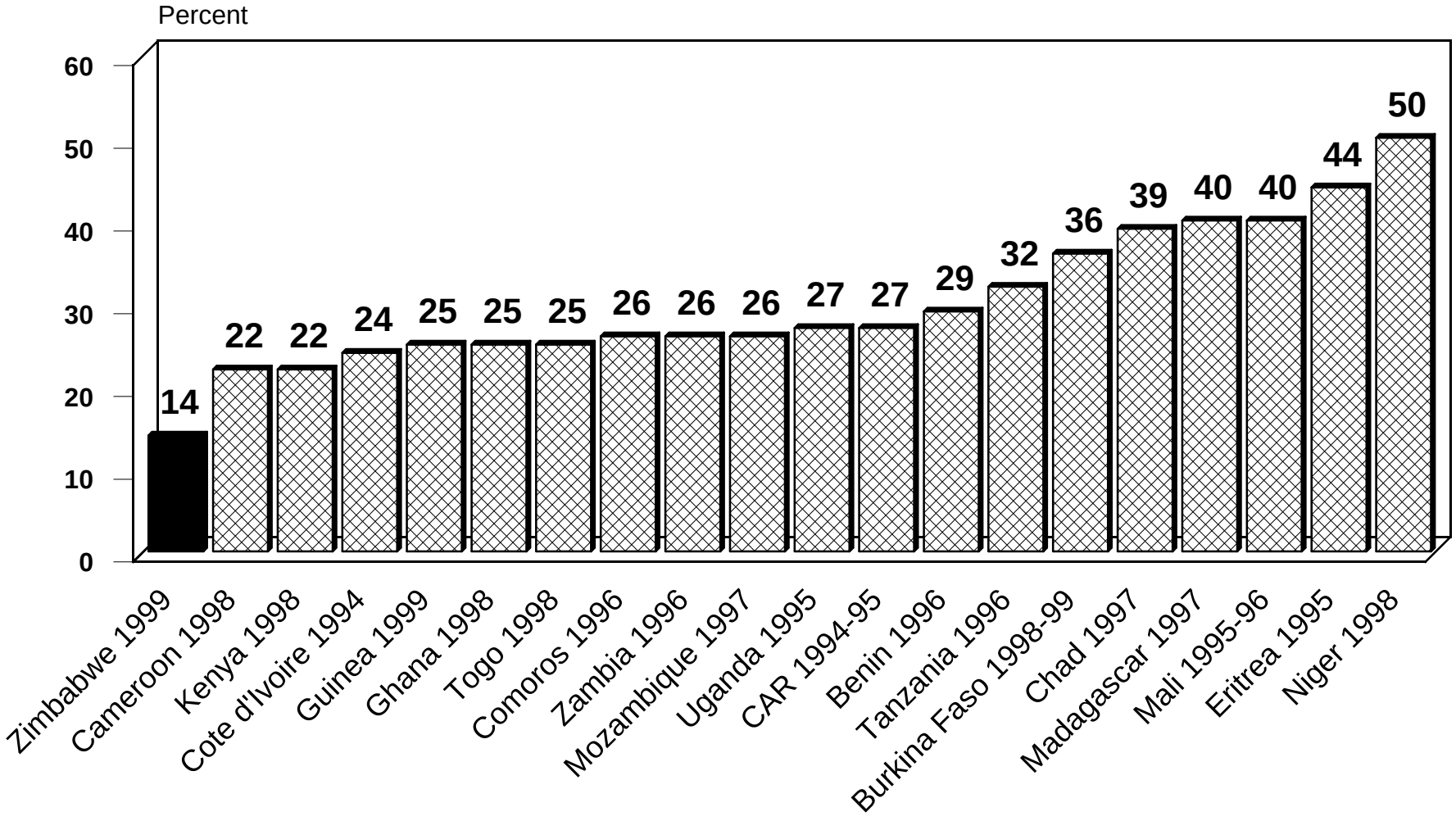
Source: ZDHS Survey 1999

Figure 7: 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** who are *underweight* ranges from 14 to 50 percent. **With only 14 percent of children underweight, Zimbabwe has the lowest rate 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 7
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.

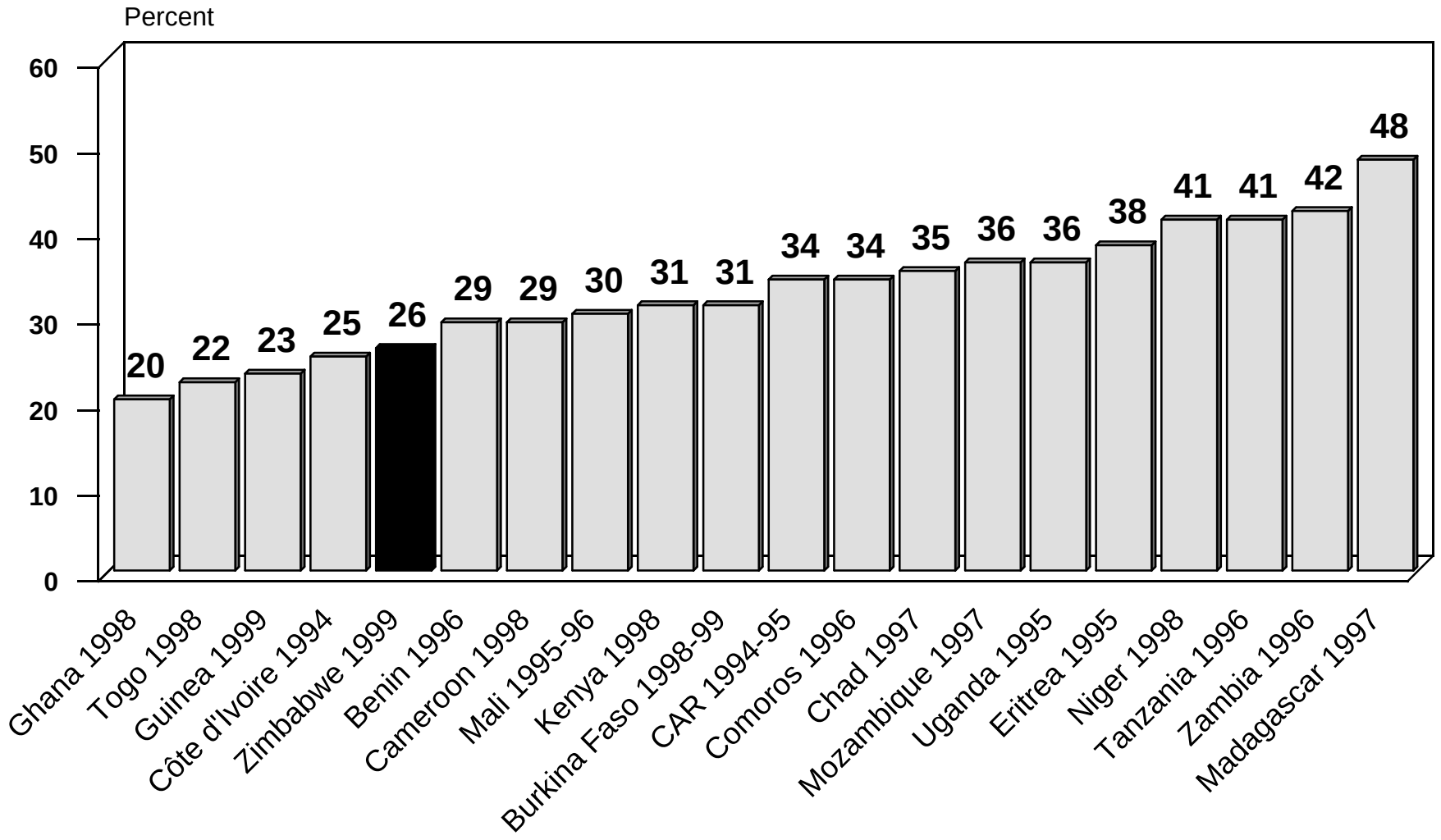
Source: DHS Surveys 1994-1999

Figure 8: 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 26 percent, the proportion of stunted children in Zimbabwe is one of the lowest rates in sub-Saharan Africa.** 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 3 Years in Sub-Saharan Countries, DHS Surveys 1994-1999



Note: *Stunting* reflects chronic malnutrition.

Source: DHS Surveys 1994-1999

Conceptual Framework for Nutritional Status

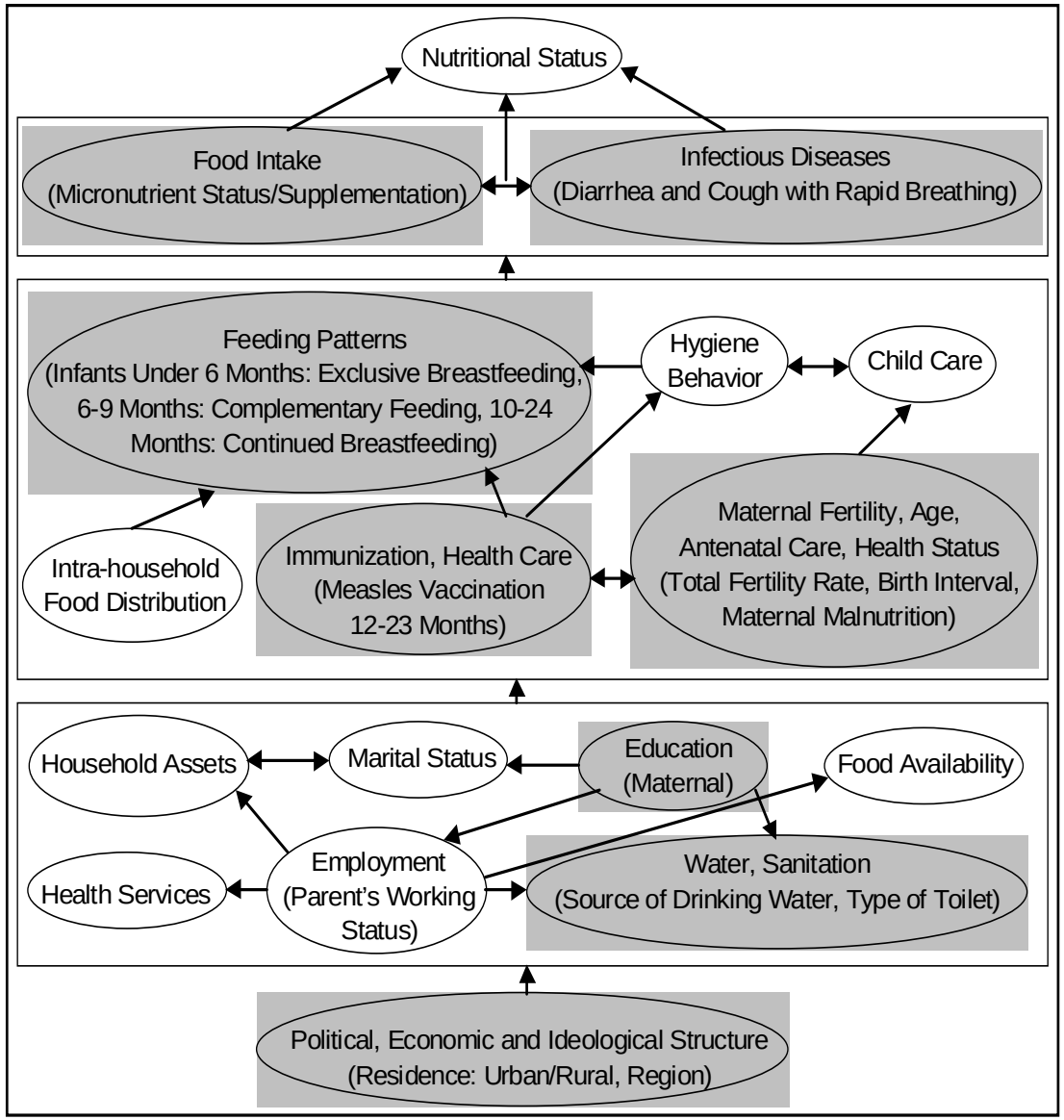
Nutrition is directly related to food intake and infectious diseases such as diarrhea, acute respiratory illness, malaria and measles. Both infectious disease and food intake reflect underlying social and economic conditions at the household, community and national levels which are supported by political,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

The following diagram is a conceptual framework for nutrition adapted from UNICEF 1990. It reflects relationships among factors and their influences on children's nutritional status. Although political, socioeconomic, 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 (diarrhea and respiratory infections);
- underlying biological and behavioral influences such as maternal fertility, measles vaccinations, and feeding patterns under 2 years;
- underlying social and economic influences, such as level of maternal education, source of drinking water, and type of sanitation facilities;
- basic influences, such as area of residence.

Conceptual Framework for Nutritional Status



Adapted from UNICEF 1990

Immediate Influences on Nutritional Status

Figure 9: Iron Supplementation among Mothers of Children under 5 Years, Zimbabwe

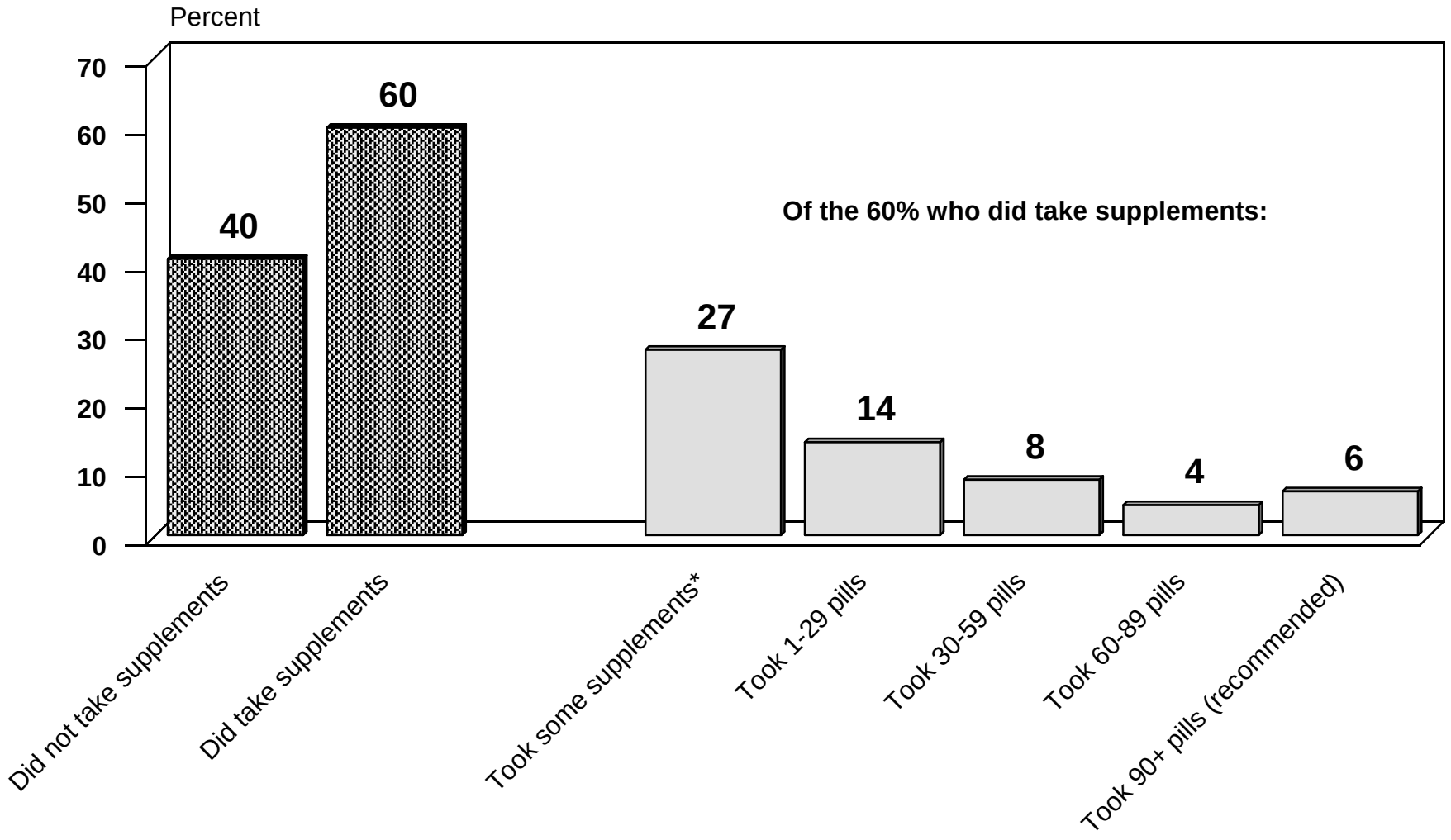
Anemia is the lack of adequate amounts of hemoglobin in the blood. It can be caused by several different health conditions, iron and folate deficiencies being some of the most prevalent conditions related to anemia. Vitamin B_{12} deficiency, protein deficiency, sickle cell disease, malaria, and parasite infection also cause anemia.

Iron deficiency is the most common form of nutritional deficiency worldwide. This type of nutritional deficiency develops slowly and does not manifest symptoms until anemia 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. Anemia is common in children 6 to 24 months of age who consume purely a milk diet and in women during pregnancy and lactation. Iron deficiency anemia is related to decreased cognitive development in children, decreased work capacity in adults, and limited chances of child survival. Severe cases are associated with the low birth weight of babies, perinatal mortality, and maternal mortality.

- **In Zimbabwe, close to two-thirds of all pregnant women received some iron supplementation during their last pregnancy.**

- **Only 6 percent of all women took the recommended dosage of iron supplements during their pregnancy (90 or more pills).**

Figure 9
Iron Supplementation Status of Mothers of Children under 5 Years, Zimbabwe



*Don't know how many pills

Source: DHS Surveys 1994-1999

Figure 10: Night Blindness among Mothers of Children under 5 Years, Zimbabwe

Globally, vitamin A deficiency (VAD) is the leading cause of childhood blindness. The damage to vision (Xerophthalmia) is only one of the harmful outcomes of VAD. Vitamin A is crucial for rapid growth and recovery from illness or infection. Children who are vitamin A deficient have reduced immunity and are less likely to recuperate from common childhood illnesses, such as diarrhea, ARI, and measles and are twice as likely to die as children who are not vitamin A deficient.

If mothers have VAD, their children can be born with low stores of vitamin A. Low birth weight babies are especially at risk. Because vitamin A is found in breast milk, a mother's vitamin A status during pregnancy can be an indicator of the vitamin A status of her child. One such sign of VAD in women during pregnancy is night blindness.

- In Zimbabwe, 5 percent of all women reported having some form of night blindness during their last pregnancy.

- Only 1 percent of women reported having trouble with their vision during the night but not during the day in their last pregnancy. This is probably more reflective of Zimbabwe's rate of night blindness.

Figure 10
Night Blindness among Mothers of Children under 5 Years, Zimbabwe

5% of all women had some form of night blindness during their last pregnancy.

1% of women had trouble with their vision during the night but not during the day in their last pregnancy.

Source: DHS Surveys 1994-1999

Figure 11: Diarrhea and Cough with Rapid Breathing among Children under 5 Years Compared with Malnutrition Rates, Zimbabwe

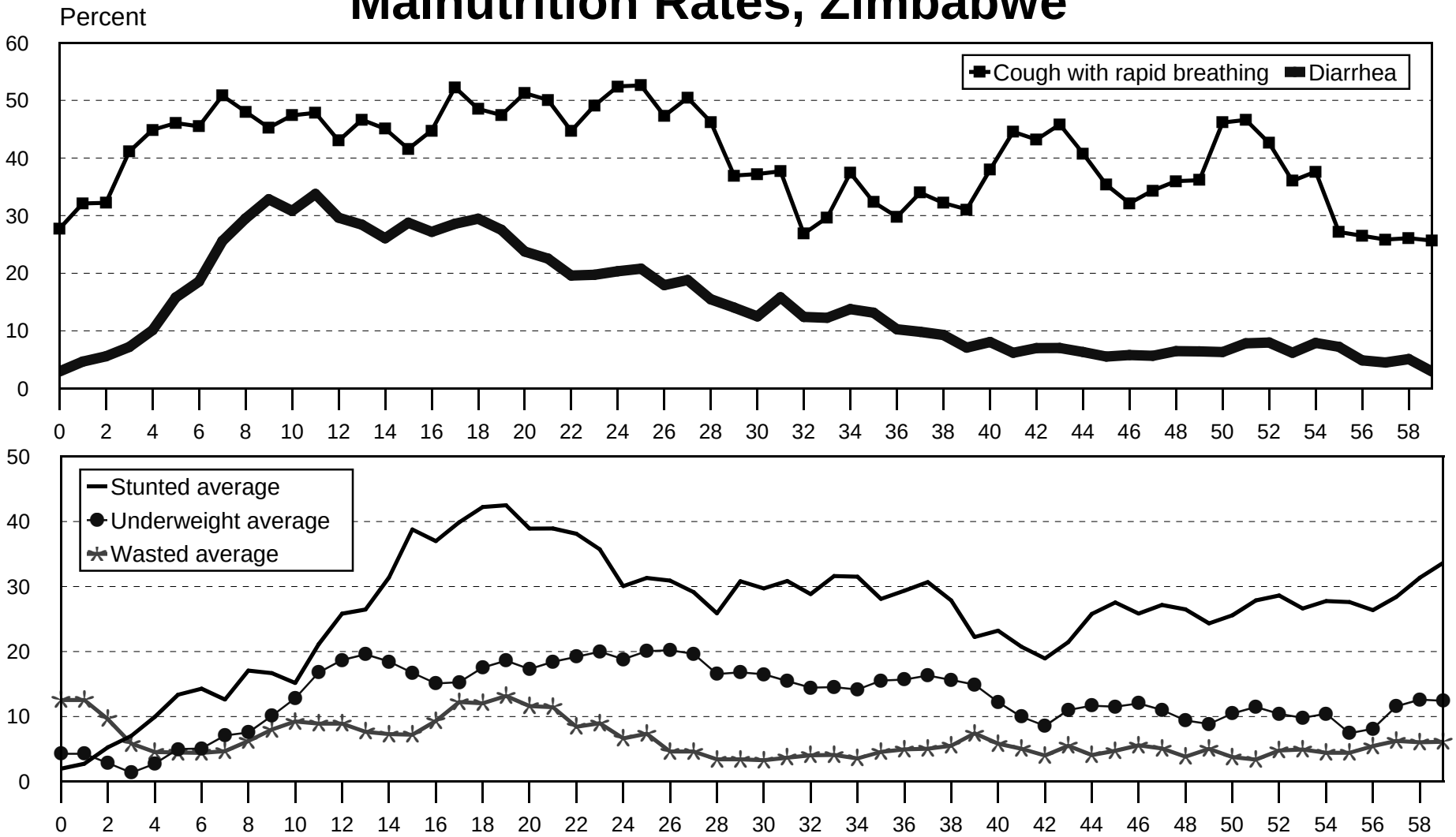
Acute respiratory infection (ARI) and dehydration due to diarrhea are major causes of morbidity and mortality in most sub-Saharan countries. In order to estimate the prevalence of ARI, mothers were asked if their children under five years had been ill with coughing accompanied by short rapid breathing in the past two weeks. For diarrhea, mothers were asked if their children under five years 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 Zimbabwe:

- **Approximately 42 percent of children under 5 years of age experienced cough with rapid breathing in the two weeks preceding the survey.** Zimbabwe's prevalence of cough with rapid breathing increases from 28 to 51 percent in the first seven months and stays at about that rate until it begins to decline at 28 months, reaching 27 percent at 32 months. The rate peaks at about 46 percent again at 44 and 52 months, dropping back down to 26 percent at 59 months of age.
- **Approximately 15 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 34 percent. It then continues a steady decline, decreasing to 12 percent at 32 months and 3 percent at 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 11
Diarrhea and Cough with Rapid Breathing among Children under 5 Years with Comparison to Malnutrition Rates, Zimbabwe



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

Source: ZDHS Survey 1999

Underlying Biological and Behavioral Influences on Nutritional Status

Figure 12: Fertility and Birth Intervals in Zimbabwe Compared with Other Sub-Saharan Countries

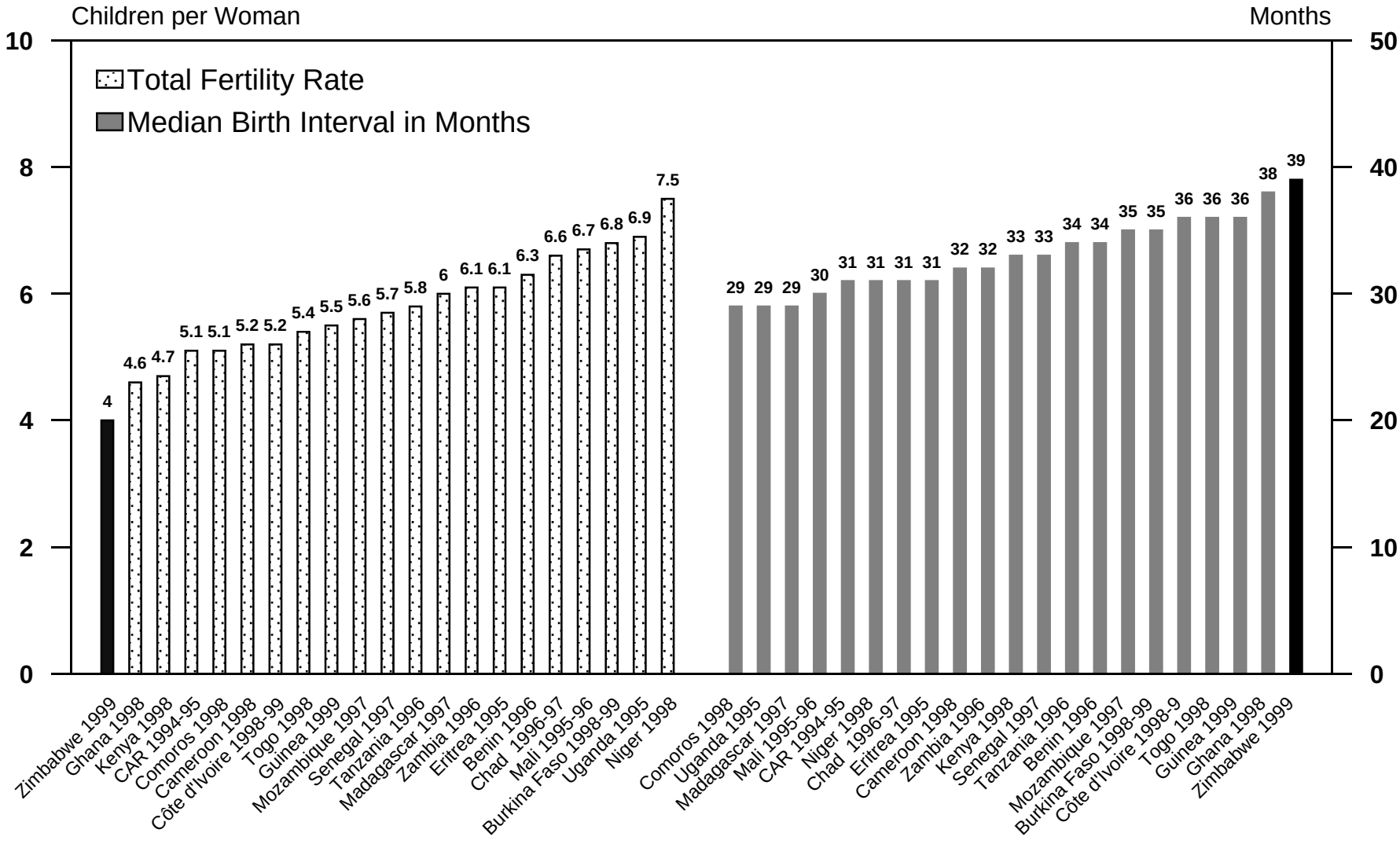
High fertility rates, especially when accompanied by short birth intervals are detrimental to children's nutritional status. In most countries in sub-Saharan Africa, families have scarce resources to provide adequate nutrition and health care for their children. As the number of children per woman increases, 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 the birth of 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 precursors to poor nutritional status in early childhood.

- **At the current fertility rate, a woman in Zimbabwe will have an average of 4 children by the end of her childbearing years.** This rate is the lowest among all of the sub-Saharan countries surveyed between 1994-1999.

- **Zimbabwe mothers have a median birth interval of 39 months.** This is the longest birth interval observed among the countries surveyed.

Figure 12
Fertility and Birth Intervals in Zimbabwe Compared with Other Sub-Saharan Countries



Source: DHS Surveys 1994-1999

Figure 13: Malnutrition among Children 12-23 Months Old by Measles Vaccination Status, Zimbabwe

Measles vaccination appears to have a statistically significant effect on chronic malnutrition (stunting) but not on acute malnutrition (wasting).

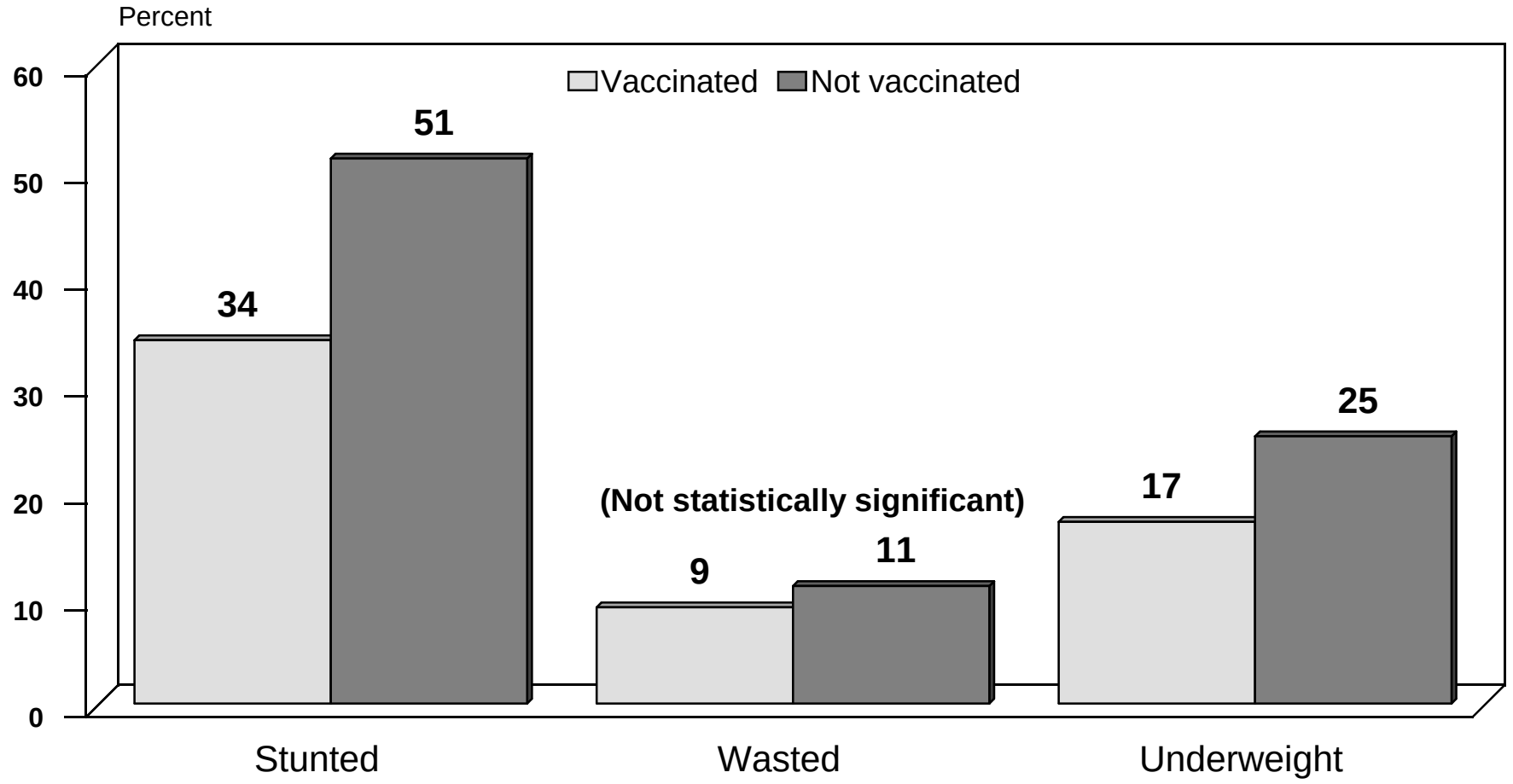
In Zimbabwe:

- **Thirty-four percent of vaccinated children were stunted compared with 51 percent of children who were not vaccinated**.

- There was no statistical difference in wasting for those who were vaccinated or not vaccinated.

- **Seventeen percent of vaccinated children were underweight compared with 25 percent of children who were not vaccinated**.

Figure 13
Malnutrition among Children 12-23 Months Old by Measles Vaccination Status, Zimbabwe



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

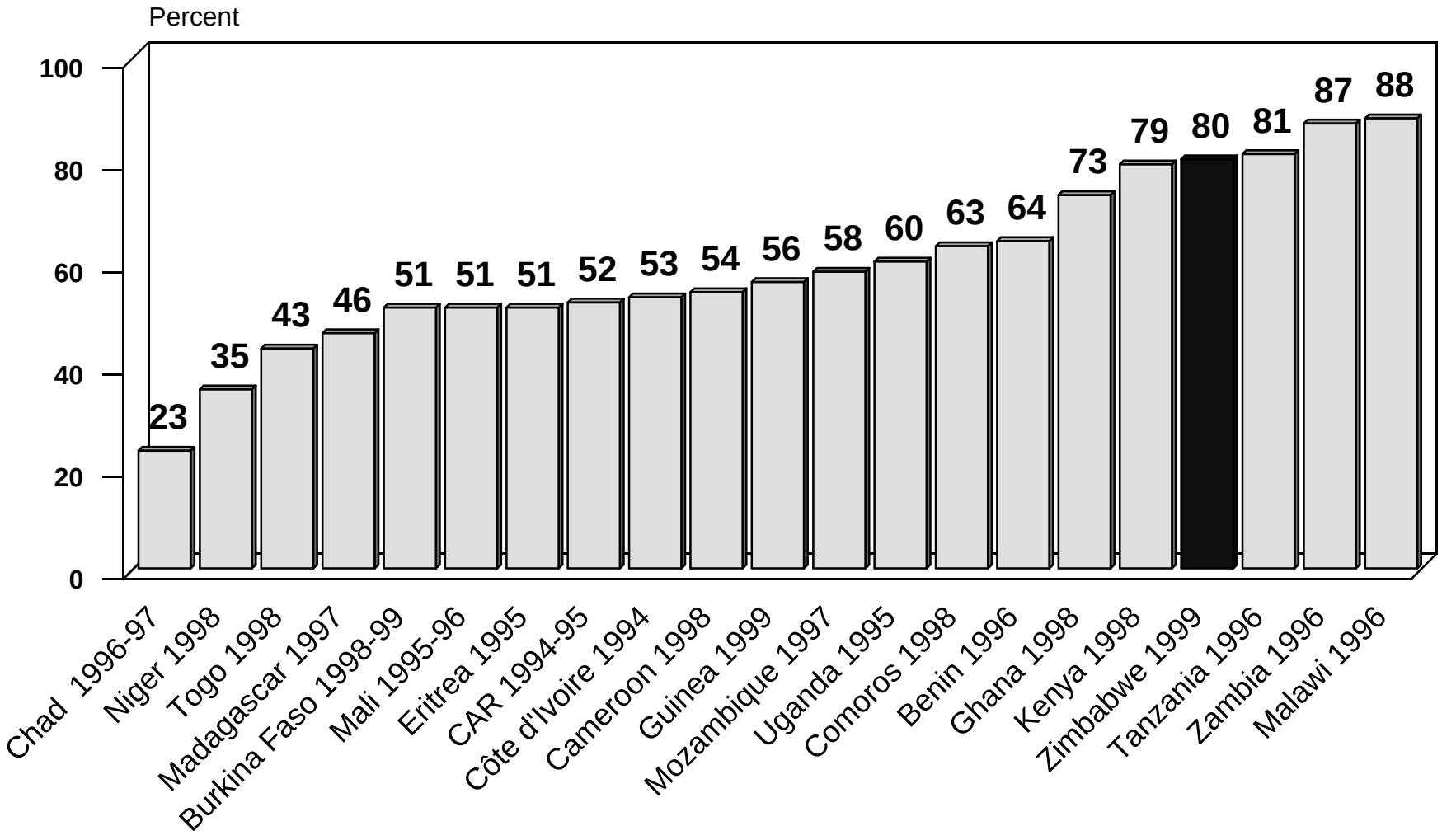
Source: ZDHS Survey 1999

Figure 14: Measles Vaccination Coverage among Children 12-23 Months Old, Zimbabwe Compared with Other Sub-Saharan Countries

Measles is estimated to kill 2 million children a year, all in developing countries. It is one of the most common diseases during childhood in areas without high immunization coverage. Measles not only increases the risk of death, but also is an important direct cause of malnutrition. The occurrence of measles in physical environments characterized by crowding and inadequate sanitation facilities is associated with faltering growth, vitamin A deficiency, and immune suppression. While infants in the womb are protected by their mother's measles antibodies, and after birth these antibodies last up to 15 months, malnutrition can severely limit the duration of this protection. For malnourished children in developing countries, the beneficial effects of measles antibodies is reduced to only eight or nine months. Therefore, measles vaccination is an important child health strategy in these countries.

- **Eighty percent of children 12-23 months of age have been vaccinated against measles in Zimbabwe. This is one of the highest rates of coverage in sub-Saharan Africa.**

Figure 14
Measles Vaccination Coverage among Children 12-23 Months Old, Zimbabwe Compared with Other Sub-Saharan Countries



Source: DHS Surveys 1994-1999

Figure 15: Feeding Practices for Infants under 6 Months, Zimbabwe

Improper feeding practices, in addition to diarrheal disease, are important determinants of malnutrition. UNICEF recommends that *all infants be exclusively breastfed from birth until about 6 months of age.* In other words, infants should be fed only breast milk during the first six months of their lives.

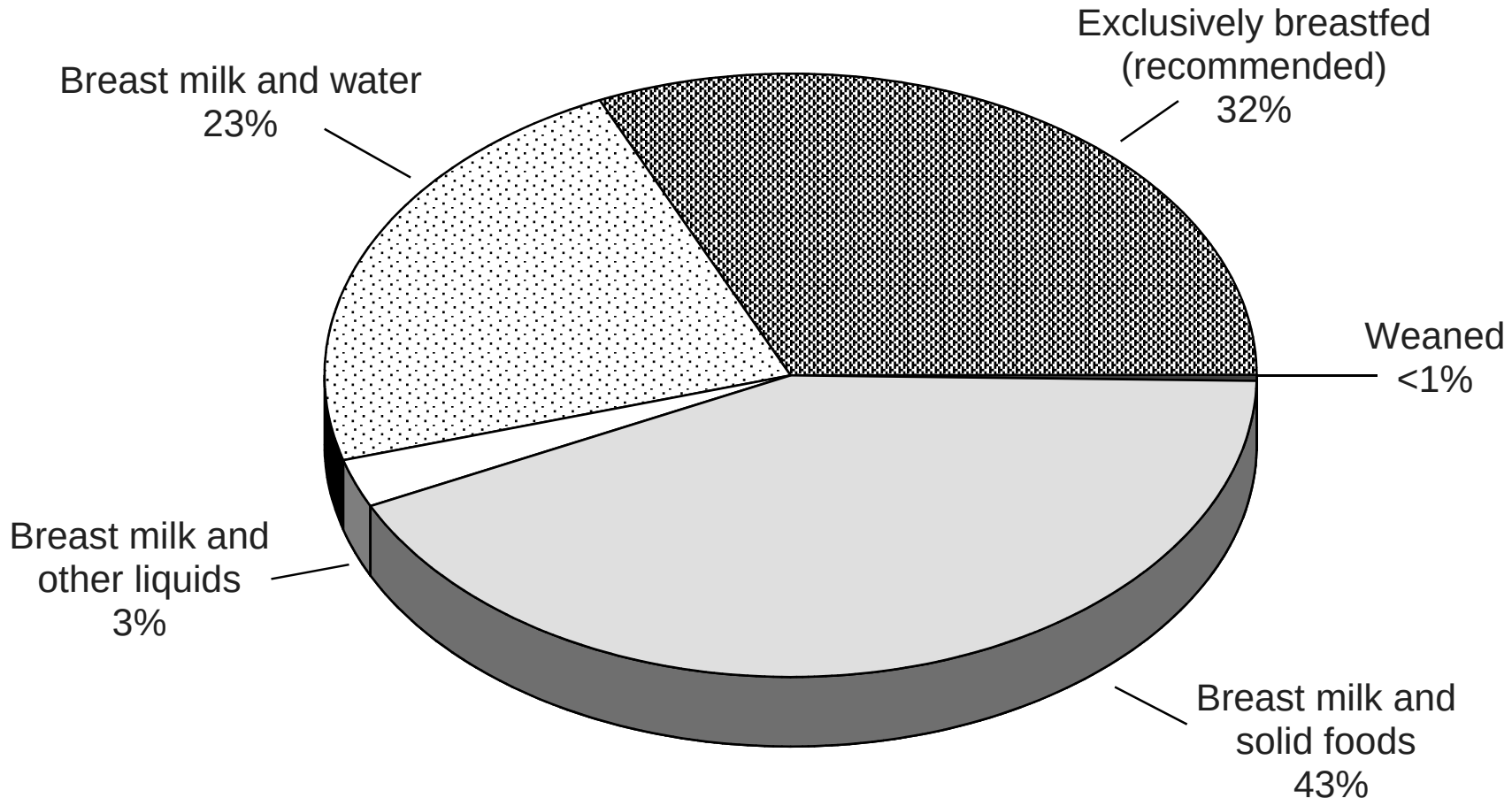
In Zimbabwe, the introduction of liquids, such as water, sugar water, juice, formula and solid foods, takes place earlier than the recommended age of about 6 months. This practice has a deleterious effect on nutritional status for a number of reasons. First, the liquids and solid foods offered are nutritionally 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 Zimbabwe, only 32 percent of children under the age of 6 months are exclusively breastfed, as is recommended by UNICEF.**

- **Forty-six percent of infants under 6 months old are given some form of liquid or solid other than breast milk and/or water, and a little under 1 percent are fully weaned.**

- **Additionally, 23 percent of infants under 6 months of age are given a combination of breast milk and water.**

Figure 15
Feeding Practices for Infants under 6 Months, Zimbabwe



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

Source: ZDHS Survey 1999

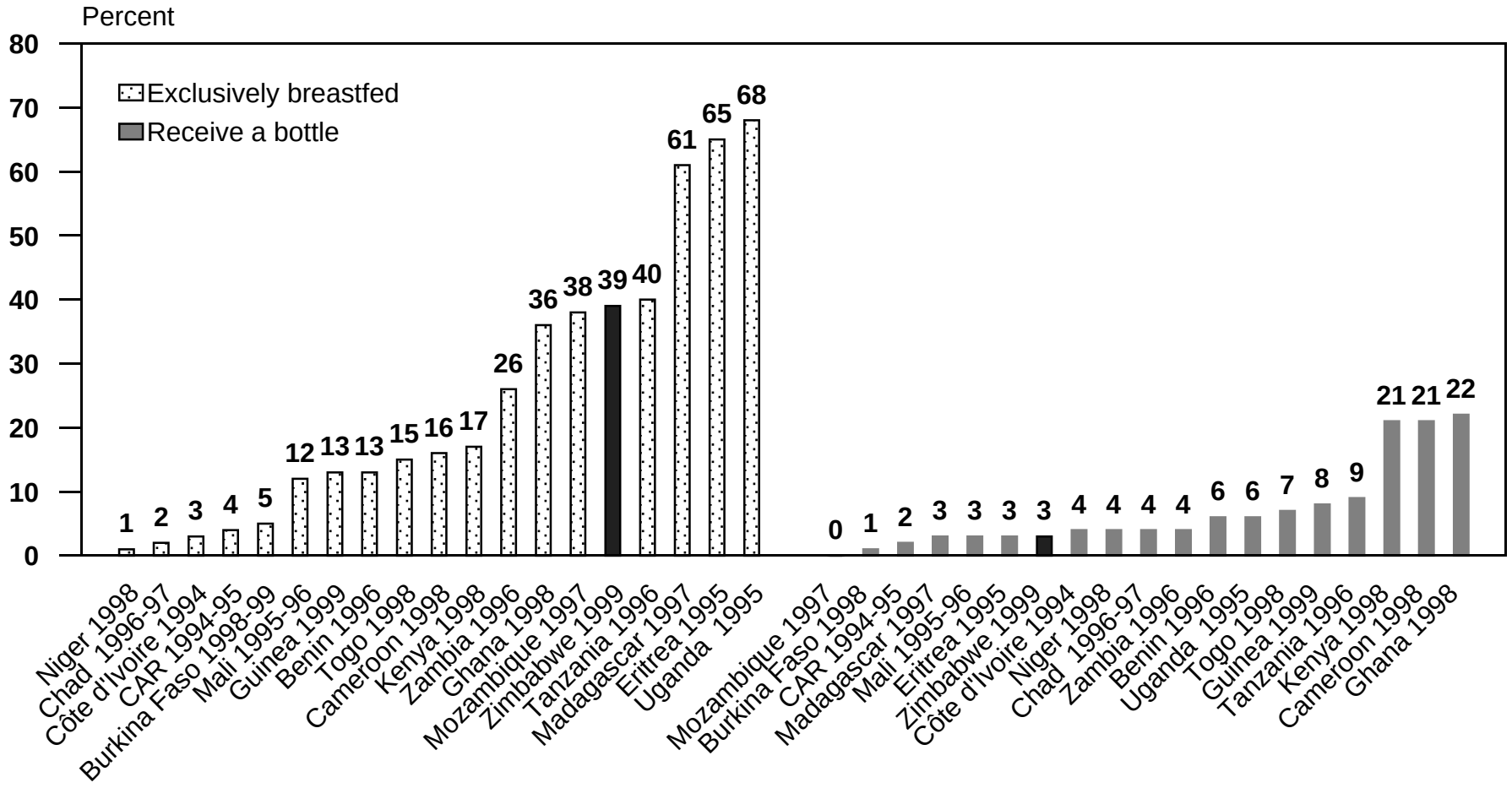
Figure 16: Infants under 4 Months Who are Exclusively Breastfed and Those Who Receive a Bottle in Zimbabwe Compared with Other Sub-Saharan Countries

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

- In most of the sub-Saharan countries surveyed, relatively few mothers of infants even under 4 months follow the recommended practice of breastfeeding exclusively. **In Zimbabwe, 39 percent of these mothers breastfeed their young infants exclusively**. This places Zimbabwe in the upper quarter of sub-Saharan countries that follow the international recommendation.

- **Bottle-feeding is practiced by 3 percent of mothers of infants under 4 months in Zimbabwe.** Zimbabwe's rate is in the lower half of all sub-Saharan countries for bottle-feeding. **Bottle-feeding is not recommended** because improper hygiene with 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 16
Infants under 4 Months Who Are Exclusively Breastfed and Those Who Receive a Bottle in Zimbabwe Compared with Other Sub-Saharan Countries, 1994-1999



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

Source: DHS Surveys 1994-1999

Figure 17: Feeding Practices for Infants Age 6 to 9 Months, Zimbabwe

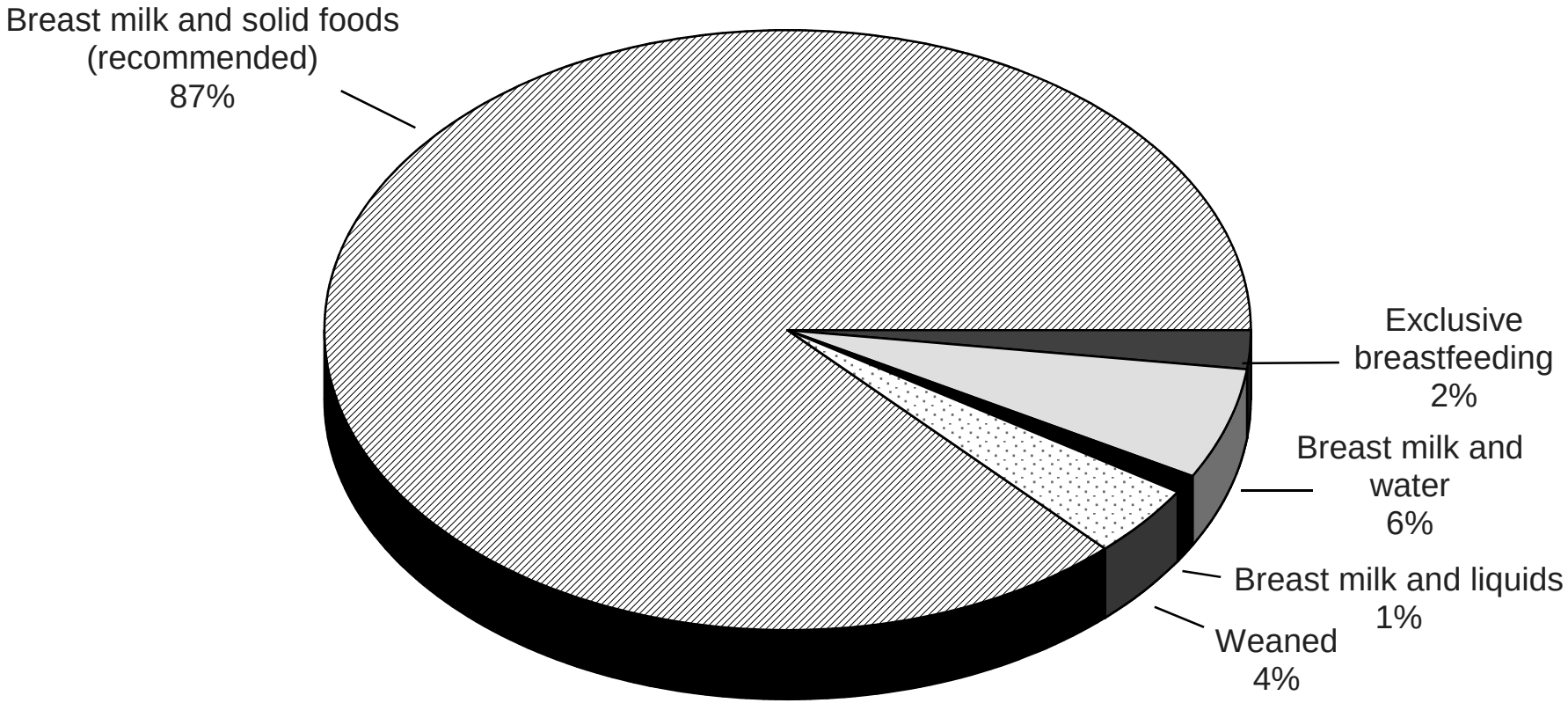
UNICEF recommends that solid foods be introduced to infants around the age of 6 months because breast milk alone is no longer sufficient to maintain a child's optimal growth at this point. Thus, *all infants over 6 months of age should be receiving solid foods* along with breast milk.

- **In Zimbabwe, 87 percent of infants age 6 to 9 months are fed solid foods in addition to breast milk.** This means that almost 9 out of 10 infants age 6 to 9 months are fed according to the recommended practice

- **Nine 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.**

- **Four percent of infants are fully weaned** and therefore not receiving the additional nutritional and emotional support of breastfeeding.

Figure 17
Feeding Practices for Infants Age 6 to 9 Months, Zimbabwe



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

Source: ZDHS Survey 1999

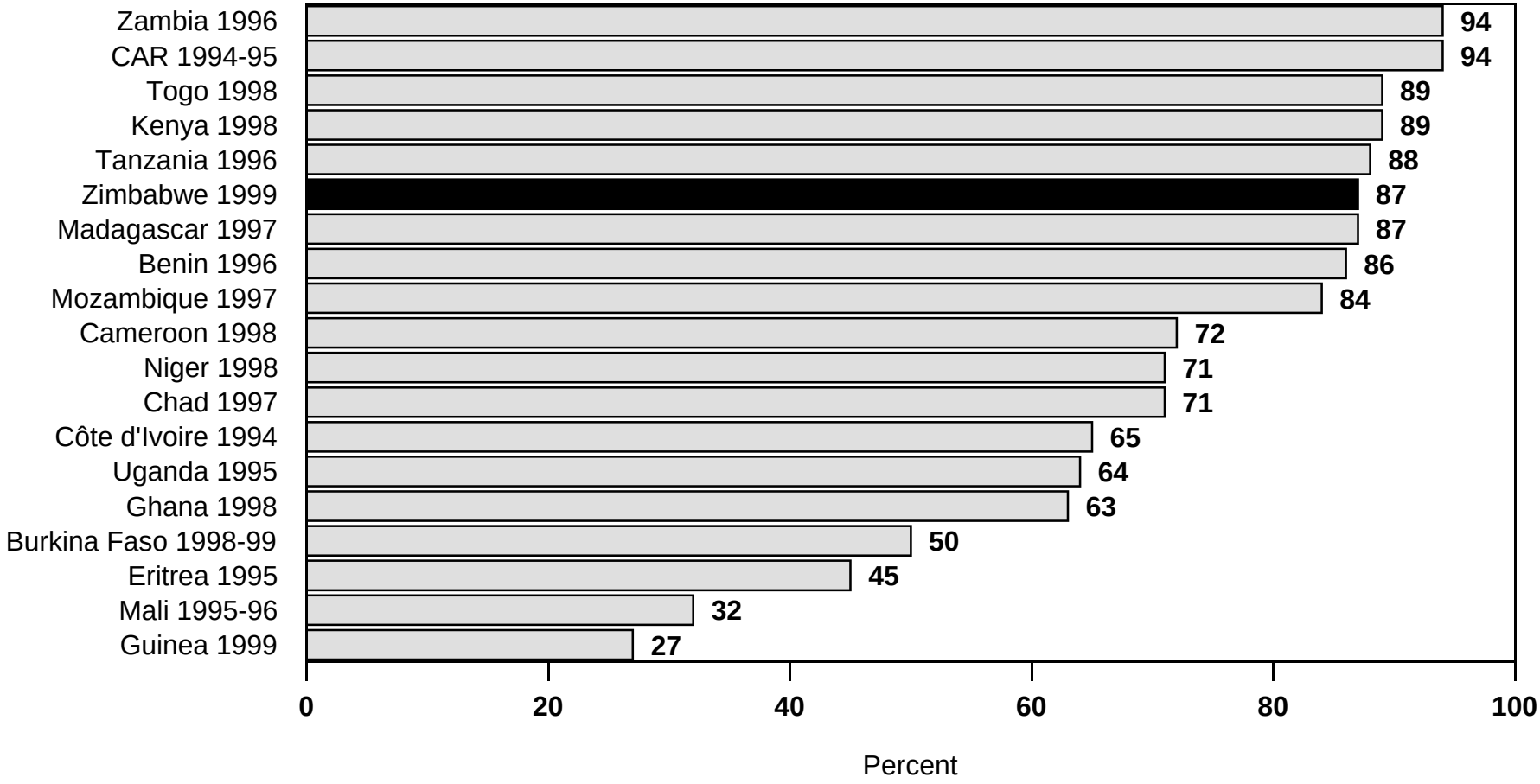
Figure 18: Infants Age 6 to 9 Months Receiving Solid Foods in Addition to Breast Milk in Zimbabwe Compared with Other Sub-Saharan Countries

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 Zimbabwe:

- **Eighty-seven percent of infants age 6 to 9 months receive solid food in addition to breast milk.** This level is in the upper third of the sub-Saharan countries surveyed. Thirteen percent of infants in this age group are not given complementary foods, and therefore are more susceptible to stunting and wasting.

Figure 18
Infants Age 6 to 9 Months Receiving Solid Foods in Addition to Breast Milk in Zimbabwe Compared with Other Sub-Saharan Countries, 1994-1999



Note: UNICEF 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

Underlying Social and Economic Influences on Nutritional Status

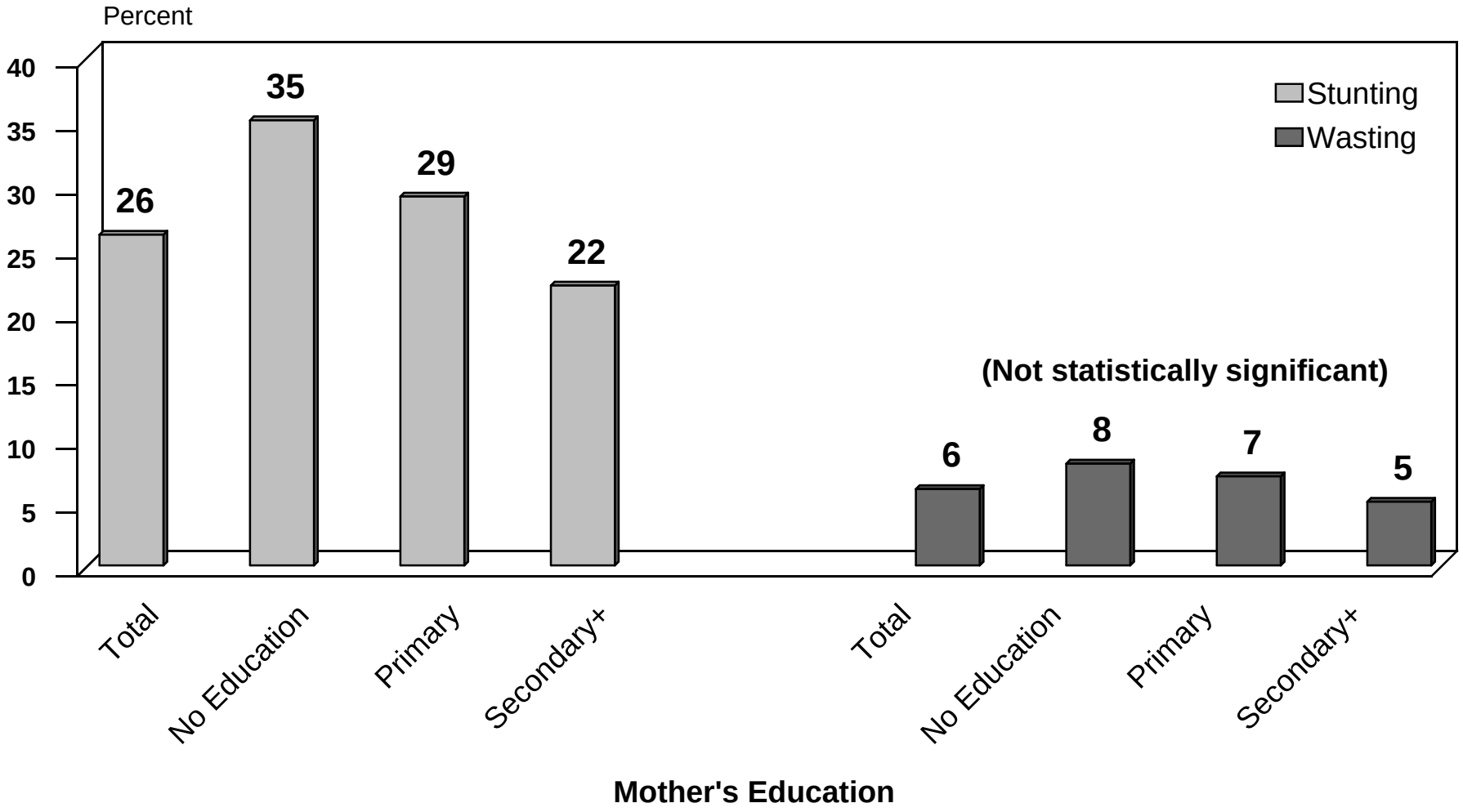
Figure 19: Stunting and Wasting among Children under 5 Years by Mother's Education, Zimbabwe

Maternal education is related to knowledge of good childcare practices and to household wealth. In Zimbabwe, only 14 percent of the mothers of children under 5 years of age have never attended school, while 54 percent have had some primary education and 32 percent have a secondary or higher education. There are variations in school attendance, especially between urban and rural areas. In the rural areas, 18 percent of the mothers have never attended school, 61 percent have attended primary school, and 21 percent have gone to secondary school or higher. In contrast, only 6 percent of the mothers in urban areas have never attended school, 37 percent have attended primary school and 57 percent have gone to secondary school or higher. Among the regions, the highest percentage of mothers reporting a secondary school education or higher live in the Harare (61 percent). The region with the second highest rate of secondary school or higher education is Bulawayo (55 percent), with Manicaland, Mashonaland Central, East and West having the lowest rates of secondary or higher education, from 22 to 24 percent.

- Maternal education has an inverse relationship with stunting in Zimbabwe. **As the level of maternal education increases, the level of stunting decreases.** There is a 6 percent difference in stunting rates between children of mothers with no education and those whose mothers have a primary education, and a 13 percent difference between children of mothers with no education and those whose mothers have a secondary education or higher.

- **Wasting in Zimbabwe is not significantly related to maternal education.**

Figure 19
Stunting and Wasting among Children under 5 Years by Mother's Education, Zimbabwe



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

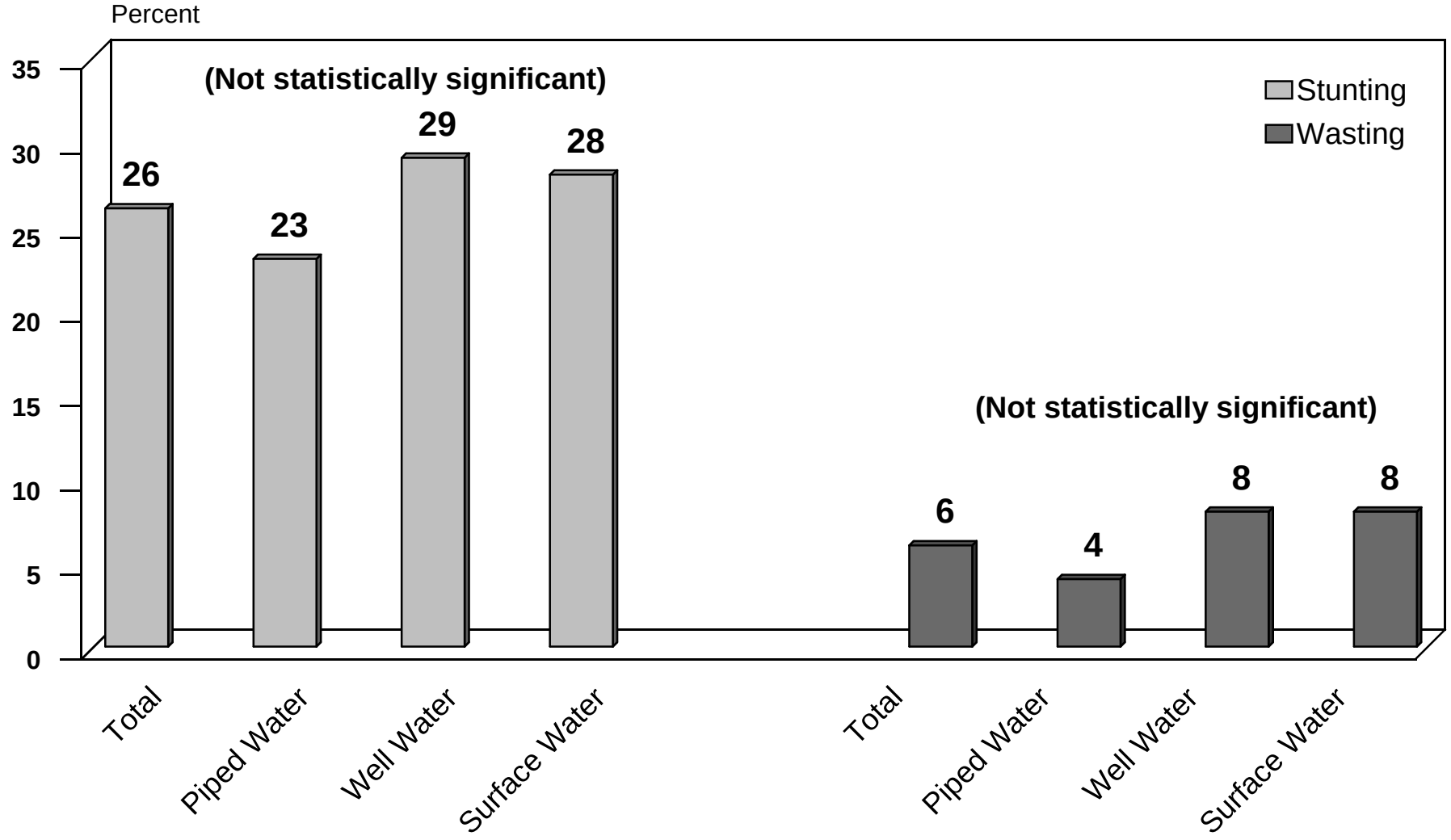
Source: ZDHS Survey 1999

Figure 20: Stunting and Wasting among Children under 5 Years by Source of Drinking Water, Zimbabwe

A household's source of drinking water is linked with its socioeconomic status. Low income 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, 45 percent use piped water, 48 percent obtain their drinking water from a well, and 7 percent use surface water.

- **In Zimbabwe, there is no statistically significant difference in stunting or wasting by source of drinking water.**

Figure 20
Stunting and Wasting among Children under 5 Years by Source of Drinking Water, Zimbabwe



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

Source: ZDHS Survey 1999

Figure 21: Stunting and Wasting among Children under 5 Years by Type of Toilet, Zimbabwe

The type of toilet used by a household reflects its wealth, and low income 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 Zimbabwe, 15 percent of households have a traditional pit latrine, 24 percent have a ventilated, improved pit (VIP) latrine, 34 percent have a private or shared flush toilet, and 27 percent have no facilities or something other than the above options.

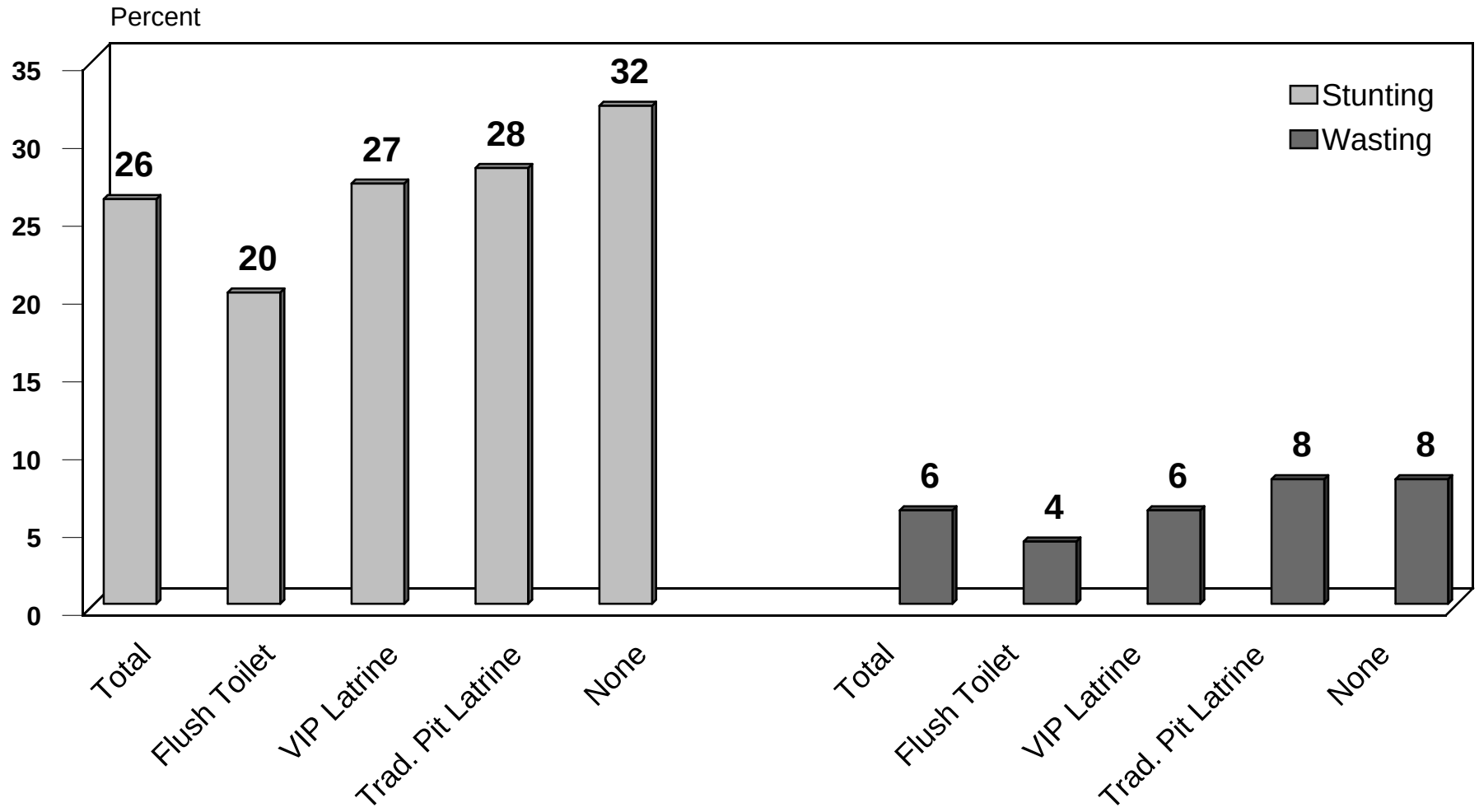
- **Households that do not have any toilet facilities have the highest proportion of stunting in children under 5 years of age (32 percent).**

- **Households with access to a flush toilet have the lowest proportion of children stunted (20 percent).**

- **Households that do not have any toilet facilities or that only have a traditional pit latrine have the highest proportion of wasting in children under 5 years of age (8 percent). Six percent of children in households with a VIP latrine are wasted.**

- **In households with access to a flush toilet, the proportion of children wasted is only 4 percent.**

Figure 21
Stunting and Wasting among Children under 5 Years by Type of Toilet, Zimbabwe



Note: *Stunting* reflects chronic malnutrition; *wasting* reflects acute malnutrition. VIP/Blair latrine is a ventilated, improved pit latrine.

Source: ZDHS Survey 1999

Basic Influences on Nutritional Status

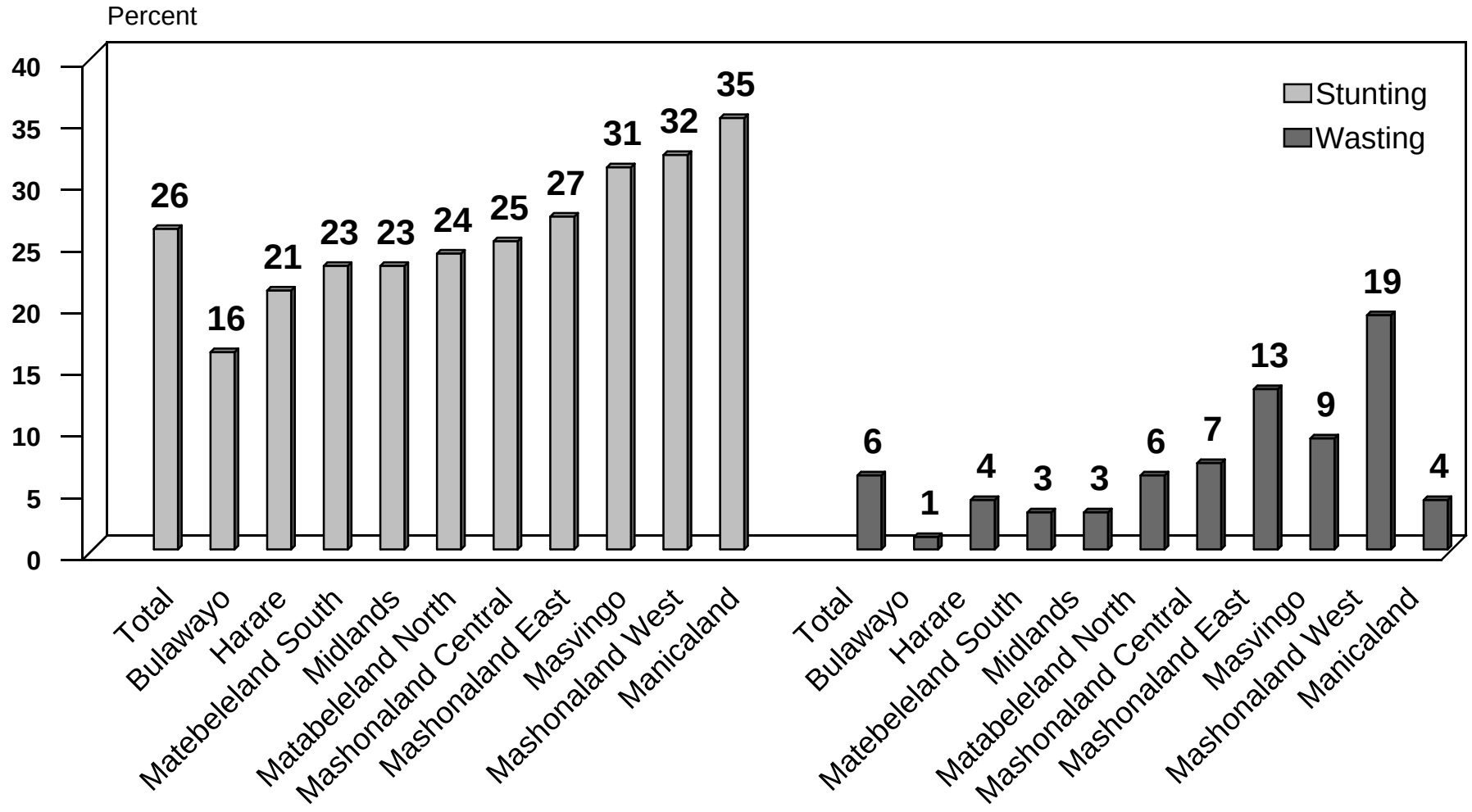
Figure 22: Stunting and Wasting among Children under 5 Years by Region, Zimbabwe

In Zimbabwe:

- **Stunting ranges from 16 to 35 percent among children in the 10 regions.** The highest level of stunting was reported in Manicaland (35 percent). The lowest level of stunting was reported in Bulawayo (16 percent).

- **Wasting ranges from 1 percent to 19 percent among children in the 10 regions**. The highest level was found in Mashonaland West (19 percent), while the lowest level was found in Bulawayo (1 percent).

Figure 22
Stunting and Wasting among Children under 5 Years by Region, Zimbabwe



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

Source: ZDHS Survey 1999

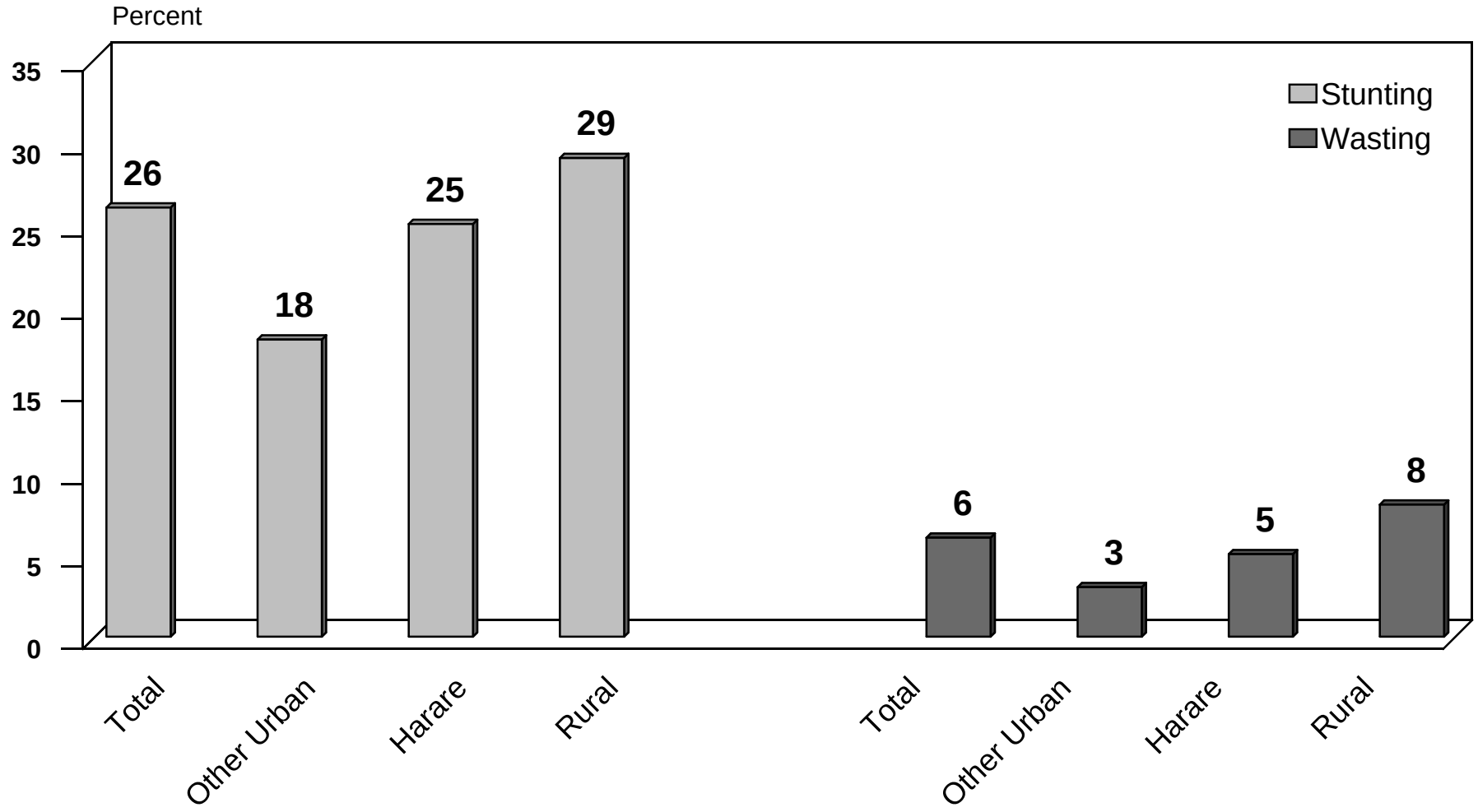
Figure 23: Stunting and Wasting among Children under 5 Years by Urban-Rural Residence, Zimbabwe

In Zimbabwe:

- Twenty-nine percent of rural children are stunted. In the capital city of Harare, 25 percent of children are affected by chronic malnutrition. In other urban areas, the rate of stunting is lower (18 percent).

- Eight percent of children living in rural areas, 5 percent living in the capital city of Harare, and 3 percent of children living in other urban areas are wasted.

Figure 23
Stunting and Wasting among Children under 5 Years by Urban-Rural Residence, Zimbabwe



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

Source: ZDHS Survey 1999

Maternal Nutritional Status

Figure 24: Malnutrition among Mothers of Children under 5 Years by Region, Zimbabwe

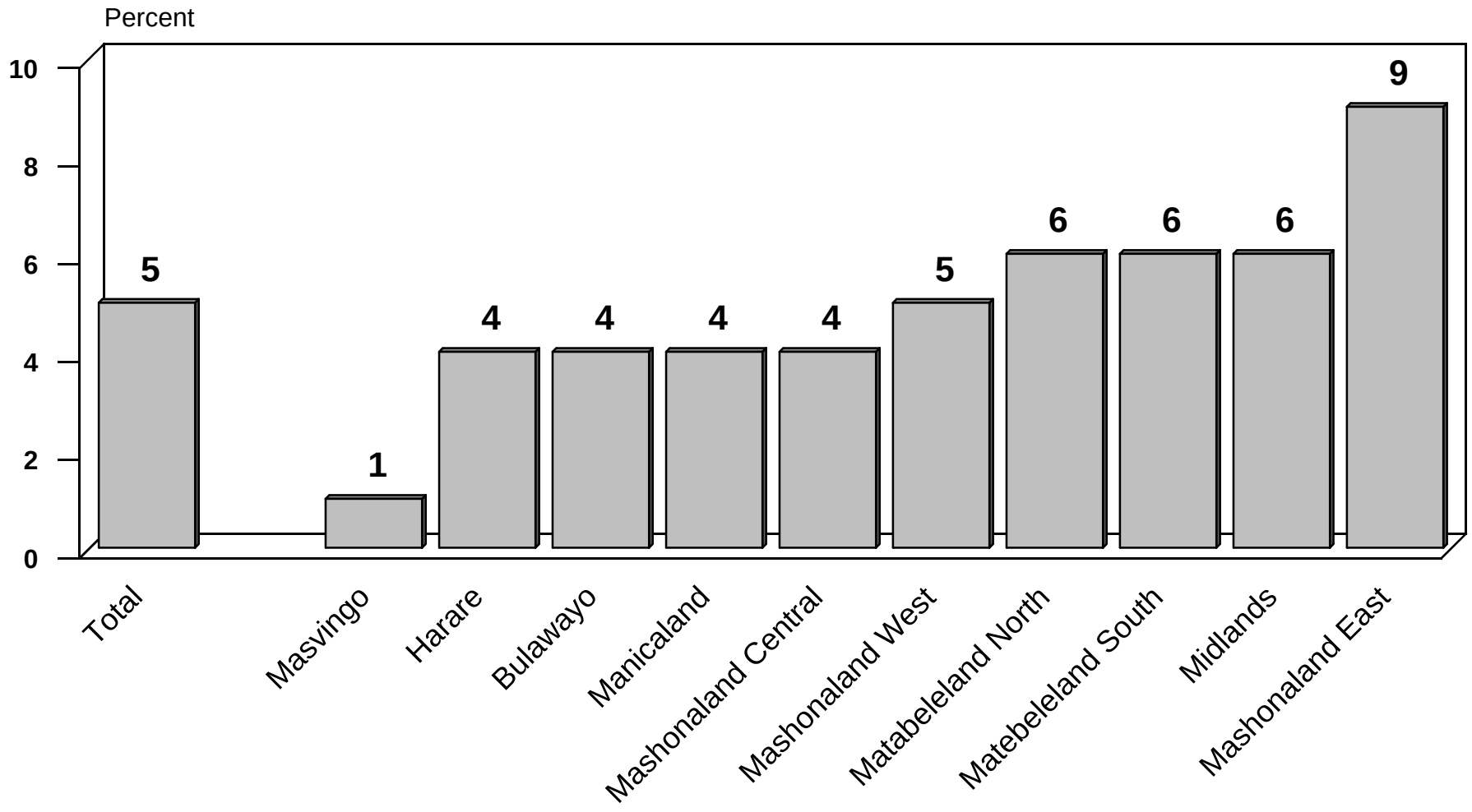
Besides being a concern in its own right, a mother's nutritional status affects her ability to successfully carry, deliver, and care for her children. There are generally accepted standards for indicators of malnutrition among adult women that can be applied.

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 (kg/m^2). When the BMI for nonpregnant women falls below the suggested cut-off point of 18.5, this indicates chronic energy deficiency or malnutrition.

- **Five percent of mothers of children under age five in Zimbabwe are malnourished.**

- **The highest prevalence of maternal malnutrition occurs in Mashonaland East (9 percent of mothers with children under 5). The lowest prevalence of maternal malnutrition occurs in Masvingo (1 percent).**

Figure 24
Malnutrition among Mothers of Children under 5 Years by Region, Zimbabwe



Note: Maternal malnutrition is the percentage of mothers whose BMI (kg/m^2) is less than 18.5.

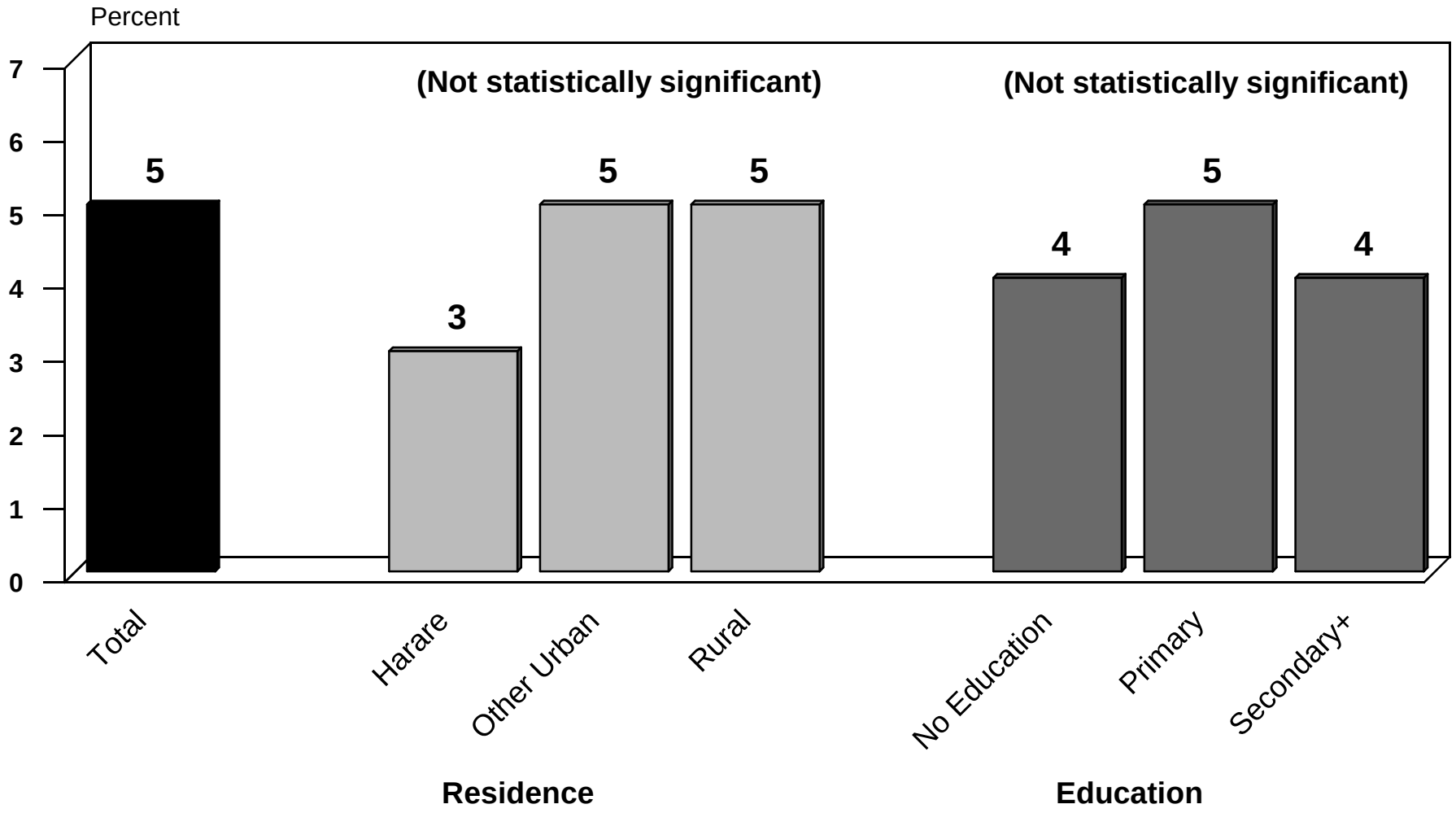
Source: ZDHS Survey 1999

Figure 25: Malnutrition among Mothers of Children under 5 Years by Residence and Education, Zimbabwe

In Zimbabwe:

- **There is no direct relationship between mother's residence and maternal malnutrition.**
- **There is no direct relationship between mother's education and maternal malnutrition.**

Figure 25
Malnutrition among Mothers of Children under 5 Years, by Residence and Education, Zimbabwe



Note: Maternal malnutrition is the percentage of mothers whose BMI (kg/m^2) is less than 18.5.

Source: ZDHS Survey 1999

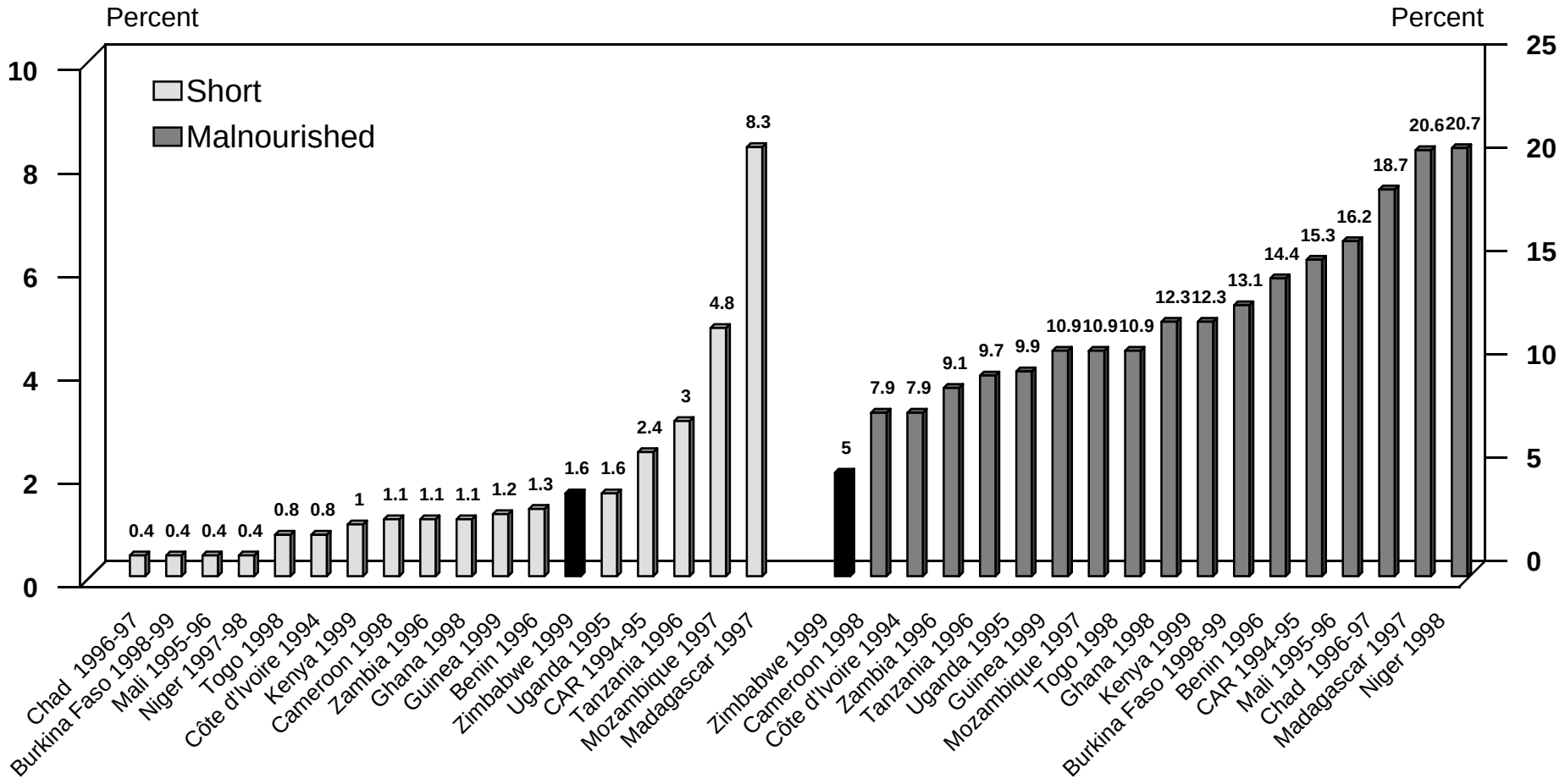
Figure 26: Malnutrition among Mothers of Children under 5 Years in Zimbabwe Compared with Other Sub-Saharan Countries

Malnutrition among mothers is likely to have a major impact on their ability to care for themselves and their children. Women less than 145 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 is assessed using the body mass index (BMI). Women whose BMI is less than 18.5 are considered underweight or malnourished.

- **Approximately 1.6 percent of mothers of children under 5 years of age are too short. This level is in the mid-range of all sub-Saharan countries surveyed.**

- **Approximately 5.0 percent of mothers of children under 5 years of age are malnourished (BMI<18.5). This is the lowest level among the sub-Saharan countries surveyed.**

Figure 26
Malnutrition among Mothers of Children under 5 Years in Zimbabwe Compared with Other Sub-Saharan Countries



Note: Short is the percentage of mothers under 145 cm; malnourished is the percentage of mothers whose BMI (kg/m^2) is less than 18.5. Pregnant women and those who are less than 3 months postpartum are excluded from the BMI calculation.

Source: DHS Surveys 1994-1999

Appendices

Appendix 1
Stunting, Wasting, and Underweight Rates by Background Characteristics
Zimbabwe 1999

Background Characteristic	Stunted	Wasted	Under-weight	Background Characteristic	Stunted	Wasted	Under-weight
Child's Age in Months				**Regions**			
0-5	6.0	7.2	1.9	Manicaland	35.3	3.8	16.3
6-11	17.4	7.0	9.5	Mashonaland Central	35.2	7.4	17.4
12-17	36.3	7.9	18.5	Mashonaland East	27.0	12.7	15.2
18-23	37.7	11.9	17.7	Mashonaland West	32.1	19.4	16.7
24-29	30.9	5.0	20.4	Matabeleland North	23.9	5.9	18.9
30-35	29.2	3.8	13.8	Matabeleland South	23.0	2.9	15.3
36-47	25.8	5.3	12.9	Midlands	22.9	2.9	9.9
48-59	27.2	5.1	10.5	Masvingo	31.3	8.8	11.3
n=2519	p<0.001	p<0.004	p<0.001	Harare	20.5	3.7	5.8
				Bulawayo	16.2	1.2	8.1
				n=2521	p<0.001	p<0.001	p<0.001
Gender of child				**Urban-Rural Residence**			
male	28.0	7.2	13.4	rural	29.2	7.7	15.6
female	24.8	5.7	12.6	urban	20.6	3.7	7.5
n=2520	NS	NS	NS	n=2520	p<0.001	p<0.001	p<0.001
Overall	26.5	6.4	13.0	**Overall**	26.5	6.4	13.0

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

NS = Not significant

Appendix 2
WHO/CDC/NCHS International Reference Population Compared to the Distribution of Malnutrition in Zimbabwe

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).

Appendix 2 includes four curves: weight-for-age, height-for-age and weight-for-height are graphed against the normal curve. The weight-for-height curve most closely mimics the normal curve. However, there is still a small area within the malnourished part of the curve at minus two standard deviations. Height-for-age and weight-for-height are largely to the left of the standard curve indicating that there is a large number of malnourished children. In addition, an even larger number of children are somewhat short and/or thin for their age. The implications are that interventions are needed to address malnutrition to improve child health, and that this will result in a shift in the curves closer to the reference standard. 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 and Prevention.

Appendix 2
WHO/CDC/NCHS International Reference Population Compared to the Distribution of Malnutrition in Zimbabwe