

Ethiopia 2000

Nutrition of Young Children and Mothers

Central Statistical Authority
U.S. Agency for International Development
ORC Macro



AFRICA NUTRITION CHARTBOOKS

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

Findings from the 2000 Ethiopia Demographic and Health Survey

ORC Macro
11785 Beltsville Drive
Calverton, Maryland, U.S.A.

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Introduction

Malnutrition¹ is one of the most important health and welfare problems among infants and young children in Ethiopia. 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, or 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 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 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 2000 Ethiopia Demographic and Health Survey (Ethiopia DHS 2000), a nationally representative survey of 7,737 households conducted by the Ethiopia Central Statistical Authority under the aegis of the Ministry of Health. ORC Macro provided technical assistance through its MEASURE *DHS+* program. The survey was funded principally by the Essential Services for Health in Ethiopia (ESHE) project through a bilateral agreement between the U.S. Agency for International Development (USAID) and the Federal Democratic Republic of Ethiopia. Funding was also provided by the United Nations Population Fund (UNFPA). Of the 10,753 living children age 0-59 months who were part of the study, 9,814 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 the prevalence of diarrhea and acute respiratory infection (ARI) in the two weeks prior to the survey and on relevant sociodemographic characteristics. For comparison, 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 U.S. National Center for Health Statistics (NCHS), the Centers for Disease Control and Prevention (CDC), and the World Health Organization (WHO) is presented in Appendix 2.

Figure 1: Infant and Child Mortality, Ethiopia Compared with Other Sub-Saharan Countries

Malnutrition compromises child health, making children susceptible to illness and death. Infectious diseases such as acute respiratory infections, 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.

- **Ethiopia's under-one mortality rate (97 deaths per 1,000 births) indicates that approximately 10 percent of children born in Ethiopia will die before their first birthday.** This rate is in the midrange among all sub-Saharan countries surveyed.
- **Ethiopia's under-five mortality rate (166 deaths per 1,000 births) indicates that approximately 17 percent of children born in Ethiopia will die before their fifth birthday.** Again, this rate places Ethiopia in the midrange among all sub-Saharan countries surveyed.

Figure 1

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

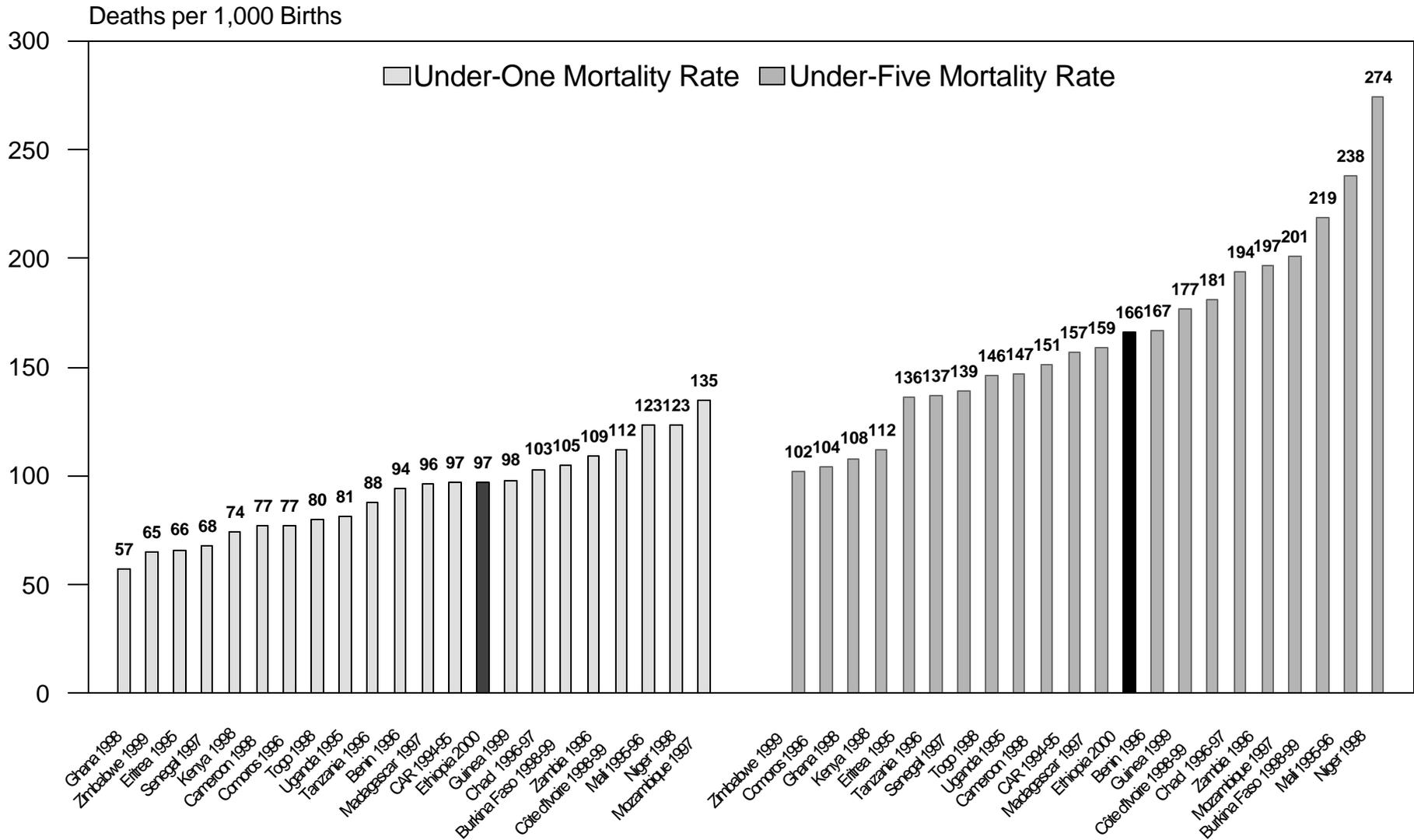


Figure 2: Contribution of Malnutrition to Under-Five Mortality, Ethiopia

Malnutrition 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, 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 moderate and severe malnutrition to under-five mortality.

In Ethiopia,

- **Fifty-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, moderate malnutrition (43 percent) contributes to more deaths than severe malnutrition (14 percent) does.** Moderate malnutrition is implicated in 75 percent of all deaths associated with malnutrition.
- **Forty-three percent of all 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 2

Contribution of Malnutrition to Under-Five Mortality, Ethiopia

How malnutrition contributes to death

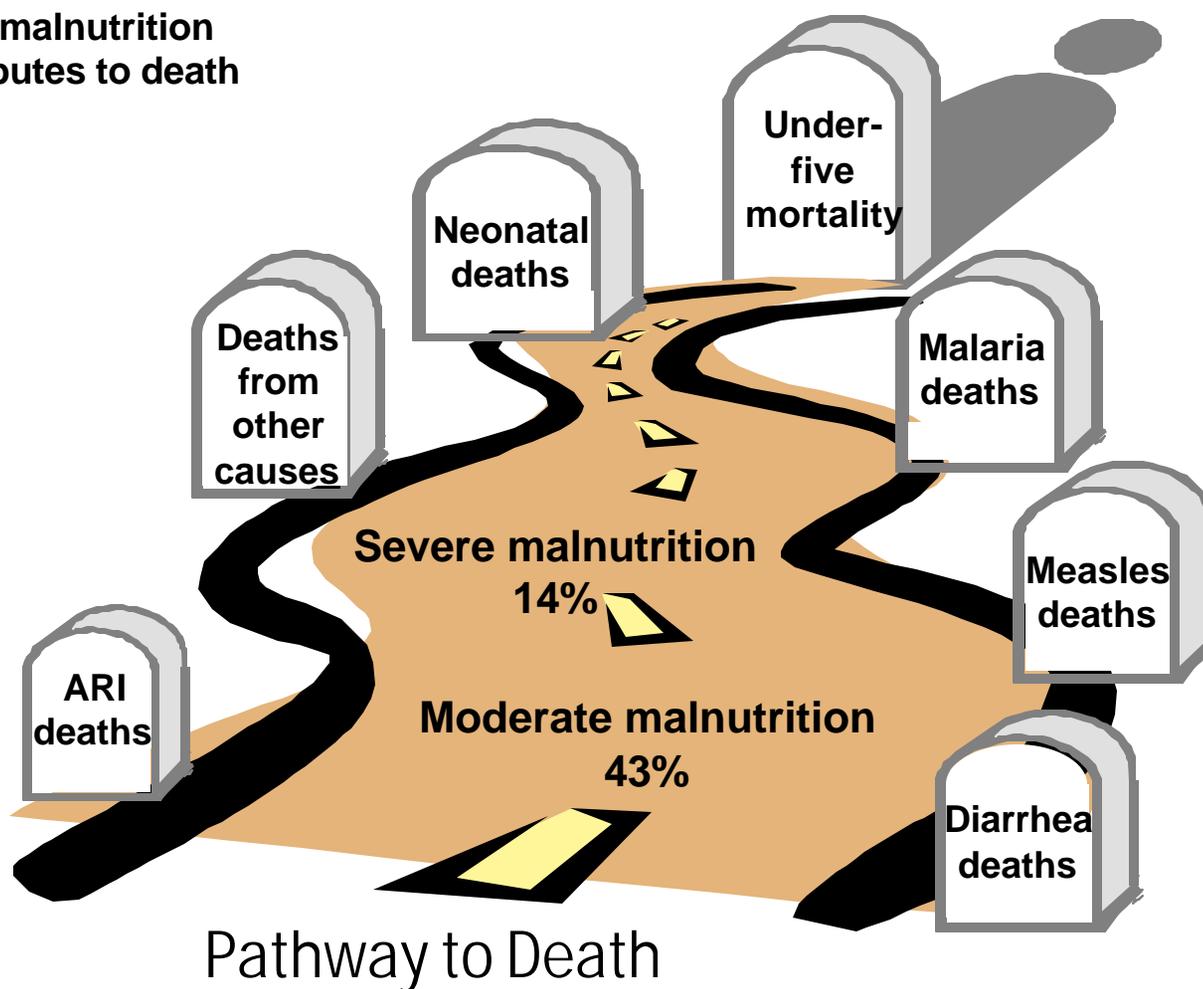


Figure 3: Survival and Nutritional Status of Children, Ethiopia

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.

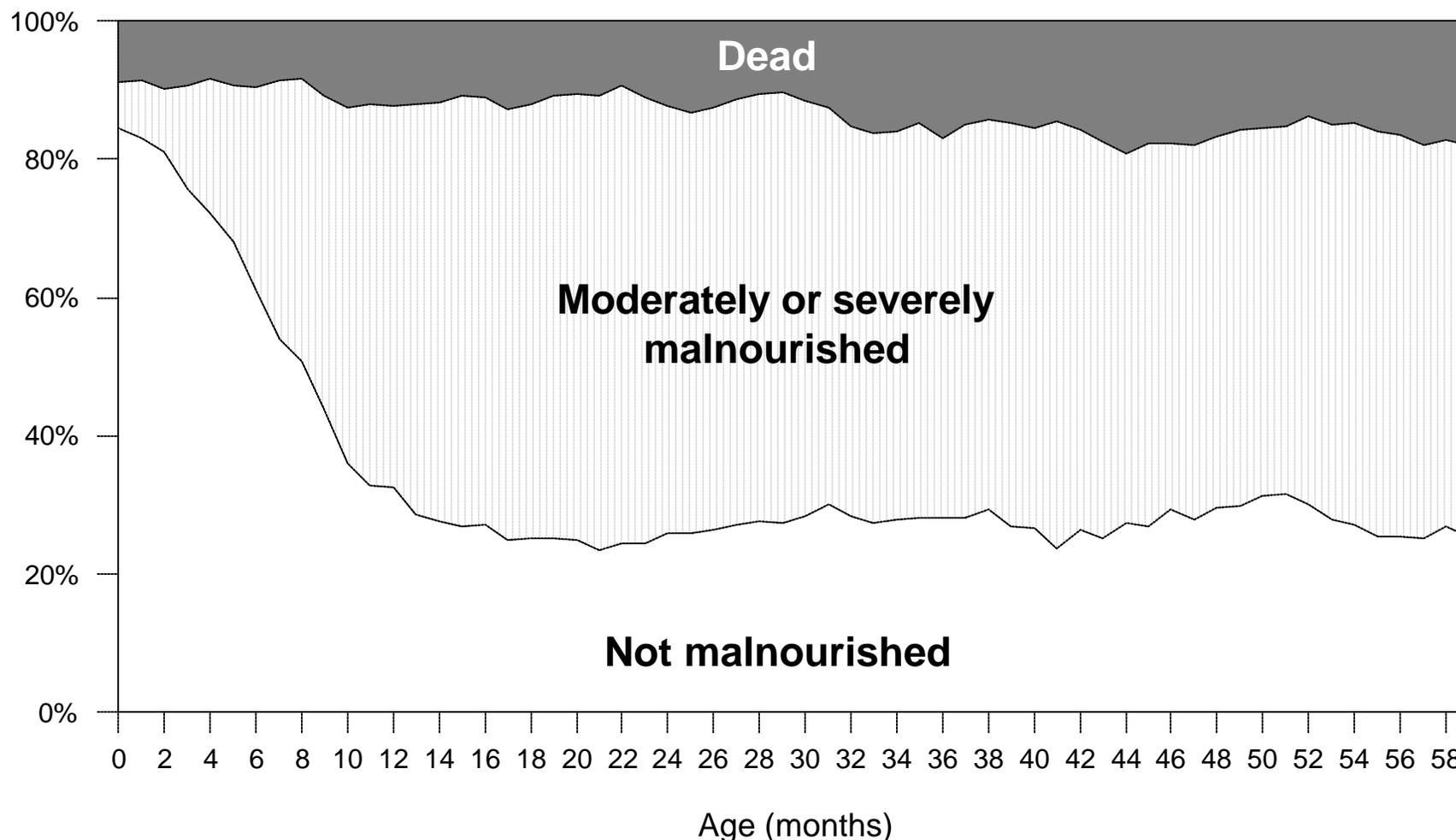
In Ethiopia,

- **Between birth and 18 months of age, the percentage of children who are alive and not malnourished drops rapidly from 83 percent to 25 percent.** The rate then levels off, never rising above 32 percent through 59 months.
- **Between birth and 18 months of age, the percentage of children who are moderately or severely malnourished¹ increases dramatically from 8 percent to 62 percent.** This percentage also levels off but decreases slightly to 55 percent at 59 months of age.
- **From birth until month 59, the percentage of children who have died increases steadily from 9 to 17 percent.**

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 SD and -2 SD is considered moderately malnourished.

Figure 3

Survival and Nutritional Status of Children, Ethiopia



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 Ethiopia

Figure 4: Malnutrition among Children under Five Years, Ethiopia

In Ethiopia,

- **Fifty-one percent of children age 0-59 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 more than 25 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 11 percent of children,** which is more than five times the level expected in a healthy population.
- **Forty-seven percent of children under five years are *underweight***³ for their age. This is more than 23 times the level expected in a healthy, well-nourished population.

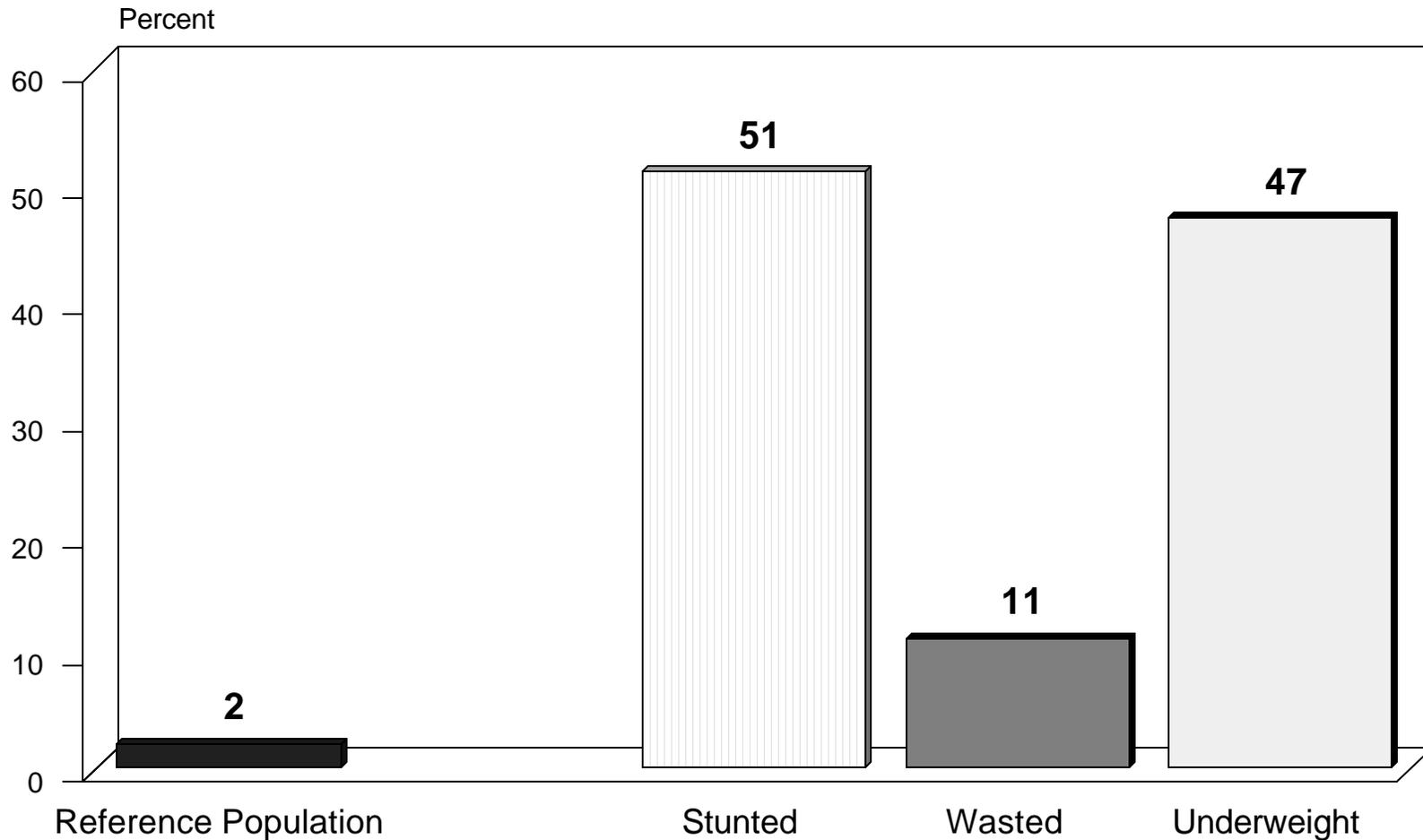
¹ A stunted child has a height-for-age Z-score that is below -2 standard deviations (SD) based on the NCHS/CDC/WHO reference population. Chronic malnutrition is the result of an inadequate intake of food over a long period and may be exacerbated by chronic illness.

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 Five Years, Ethiopia



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

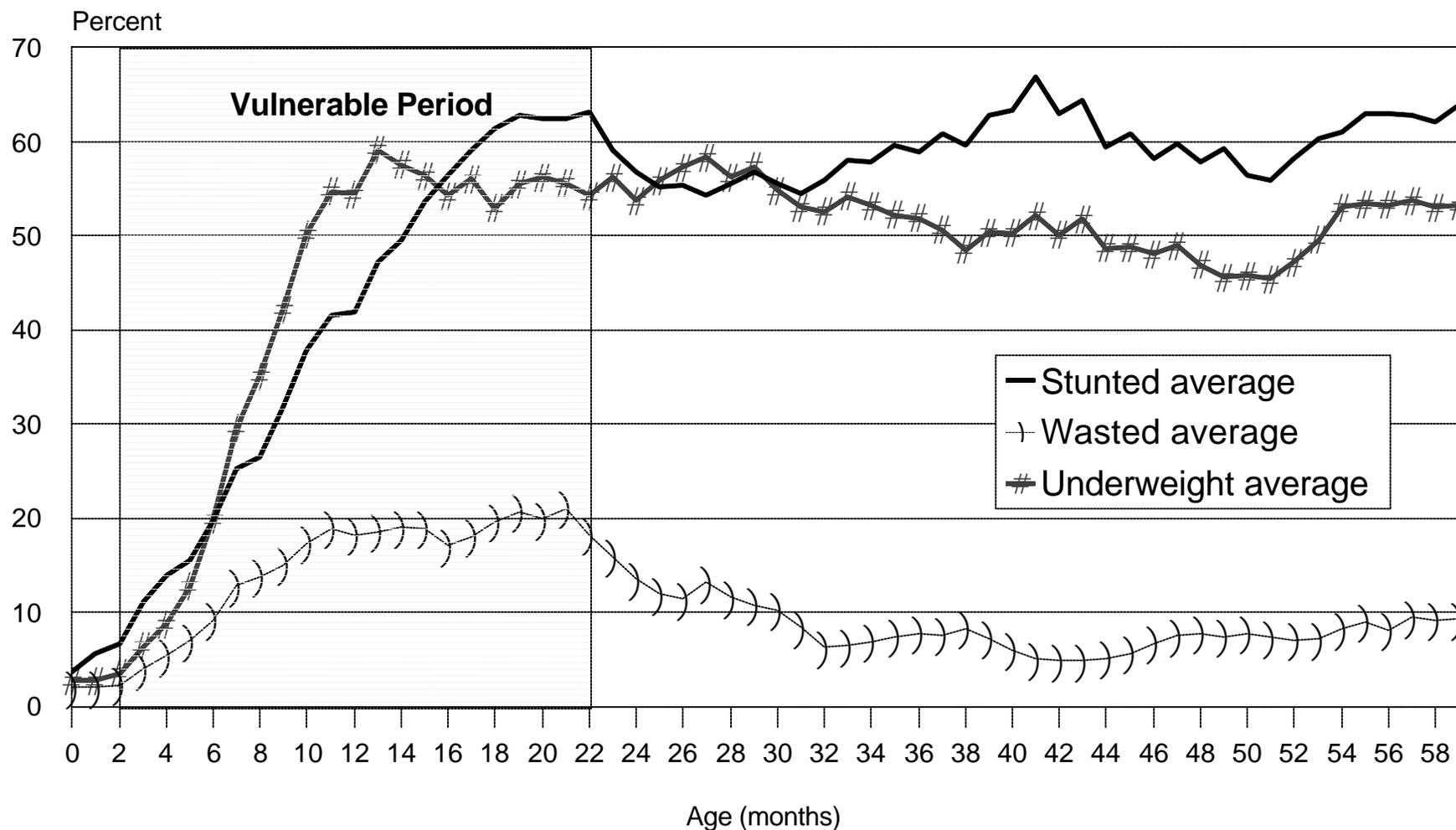
Figure 5: Stunting, Wasting, and Underweight by Age, Ethiopia

In Ethiopia, the time between 2 months and 22 months of age is a vulnerable period.

- **The proportion of children stunted rises sharply from 0 to 22 months of age, peaking at 66 percent.** The proportion of children stunted drops slightly to 54 percent at 31 months of age and then rises to its peak of 67 percent at 41 months of age. By 59 months of age, the percentage of children stunted is 64 percent.
- **The proportion of children wasted rises to almost 20 percent at 10 months and continues to be high through 21 months at 21 percent.** It then slowly declines to about 5 percent at 32 months of age and increases slightly again, so that at 59 months, 9 percent of children are wasted.
- **The proportion of children underweight sharply rises from 2 to 13 months of age, when it reaches 59 percent.** This rate plateaus, then slowly declines to remain at about 49 percent at 38 months of age, fluctuating a bit more to 45 percent at 52 months of age. The rate then rises again to more than 50 percent from the 54th through the 59th month.

Figure 5

Stunting, Wasting, and Underweight by Age, Ethiopia



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.

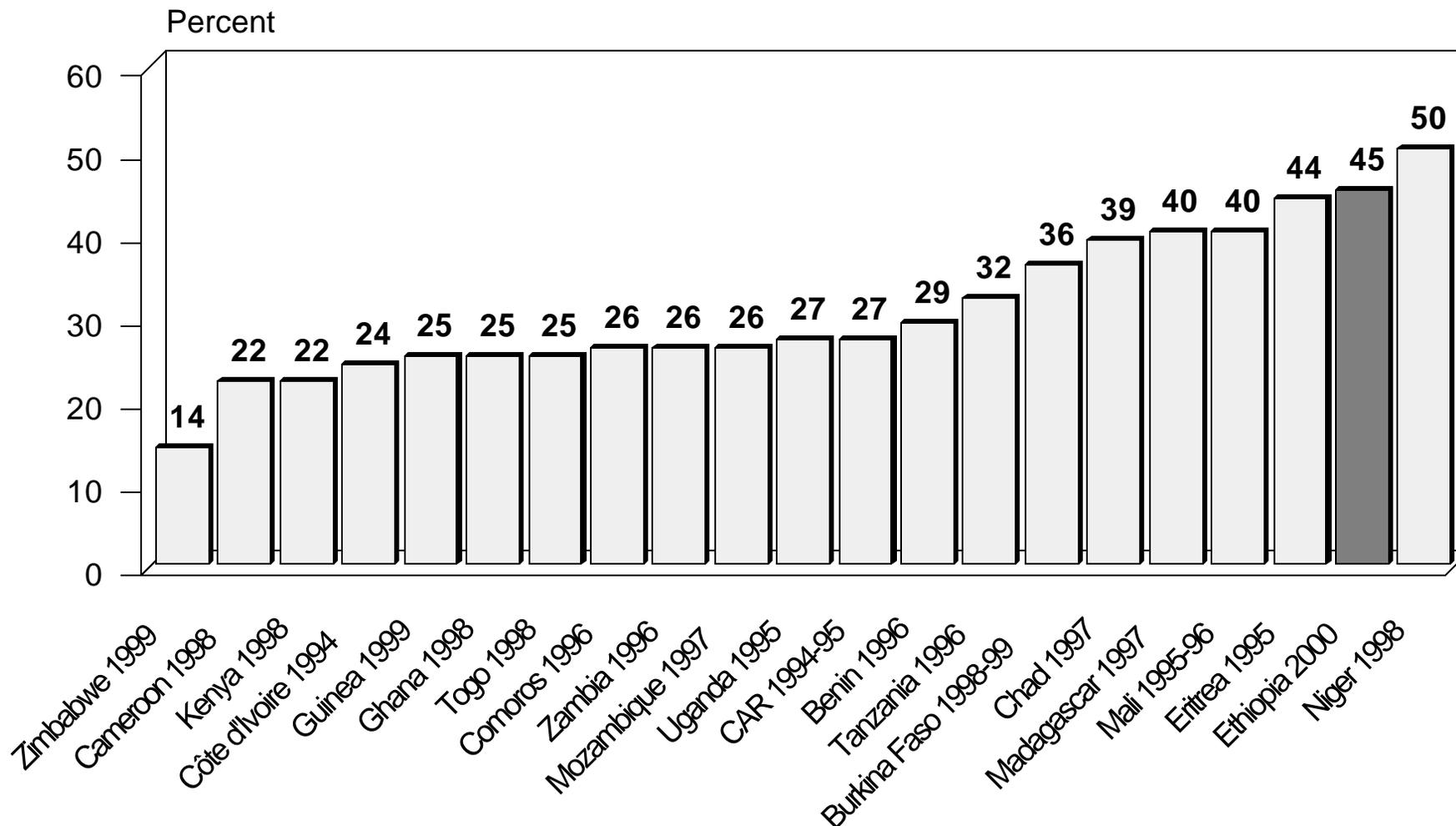
Figure 6: Underweight among Children under Three Years, Ethiopia Compared with Other Sub-Saharan Countries

Among the sub-Saharan countries surveyed,

- The percentage of children **under three years** who are *underweight* ranges from 14 to 50 percent. **With 45 percent of children underweight, Ethiopia has the second highest 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 6

Underweight among Children under Three Years, Ethiopia Compared with Other Sub-Saharan Countries



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

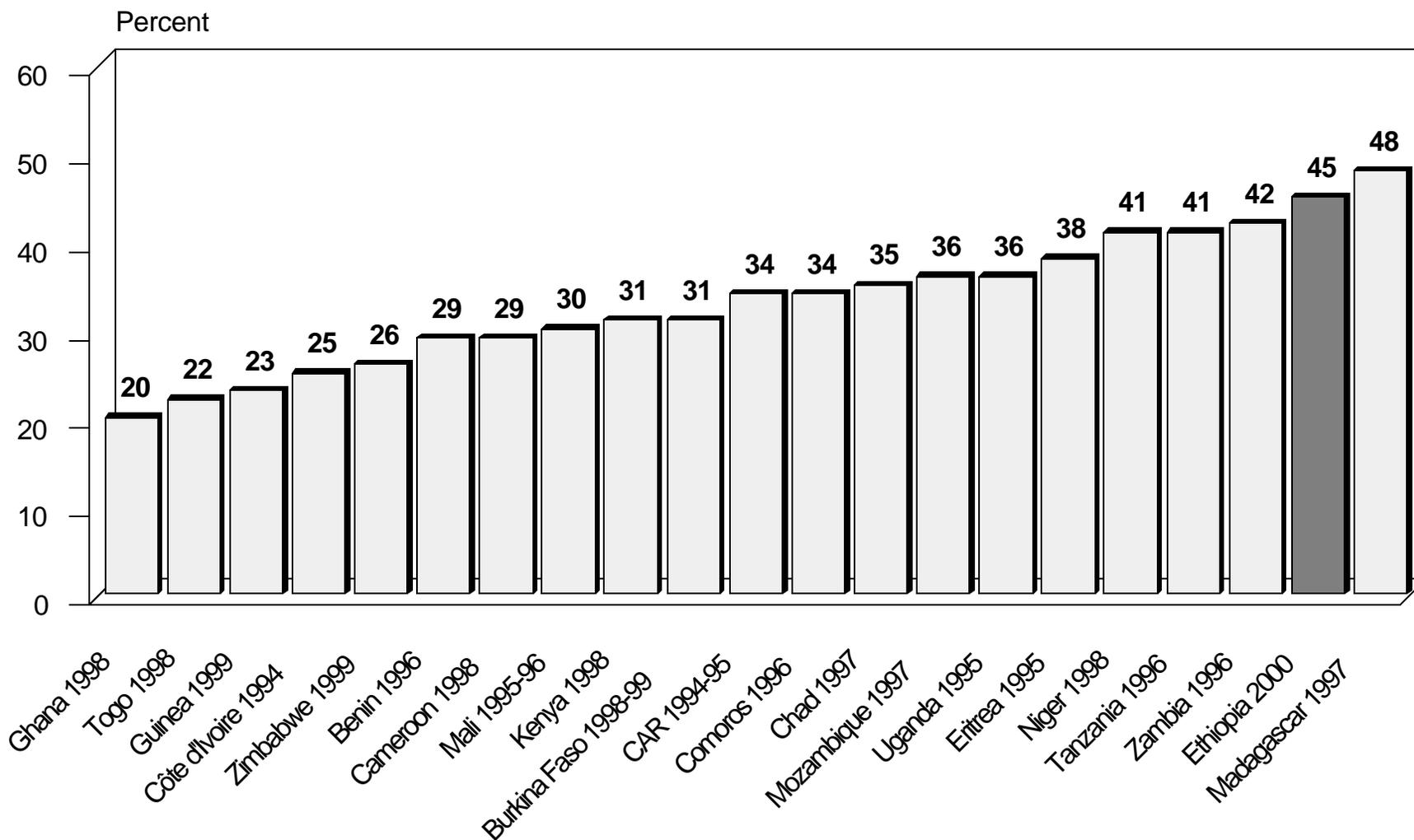
Figure 7: Stunting among Children under Three Years, Ethiopia Compared with Other Sub-Saharan Countries

Among the sub-Saharan countries surveyed,

- The percentage of children **under three years** who are *stunted* ranges from 20 to 48 percent. **At 45 percent, the proportion of stunted children in Ethiopia is the second highest 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 7

Stunting among Children under Three Years, Ethiopia Compared with Other Sub-Saharan Countries



Note: *Stunting* reflects chronic malnutrition.

Conceptual Framework for Nutritional Status

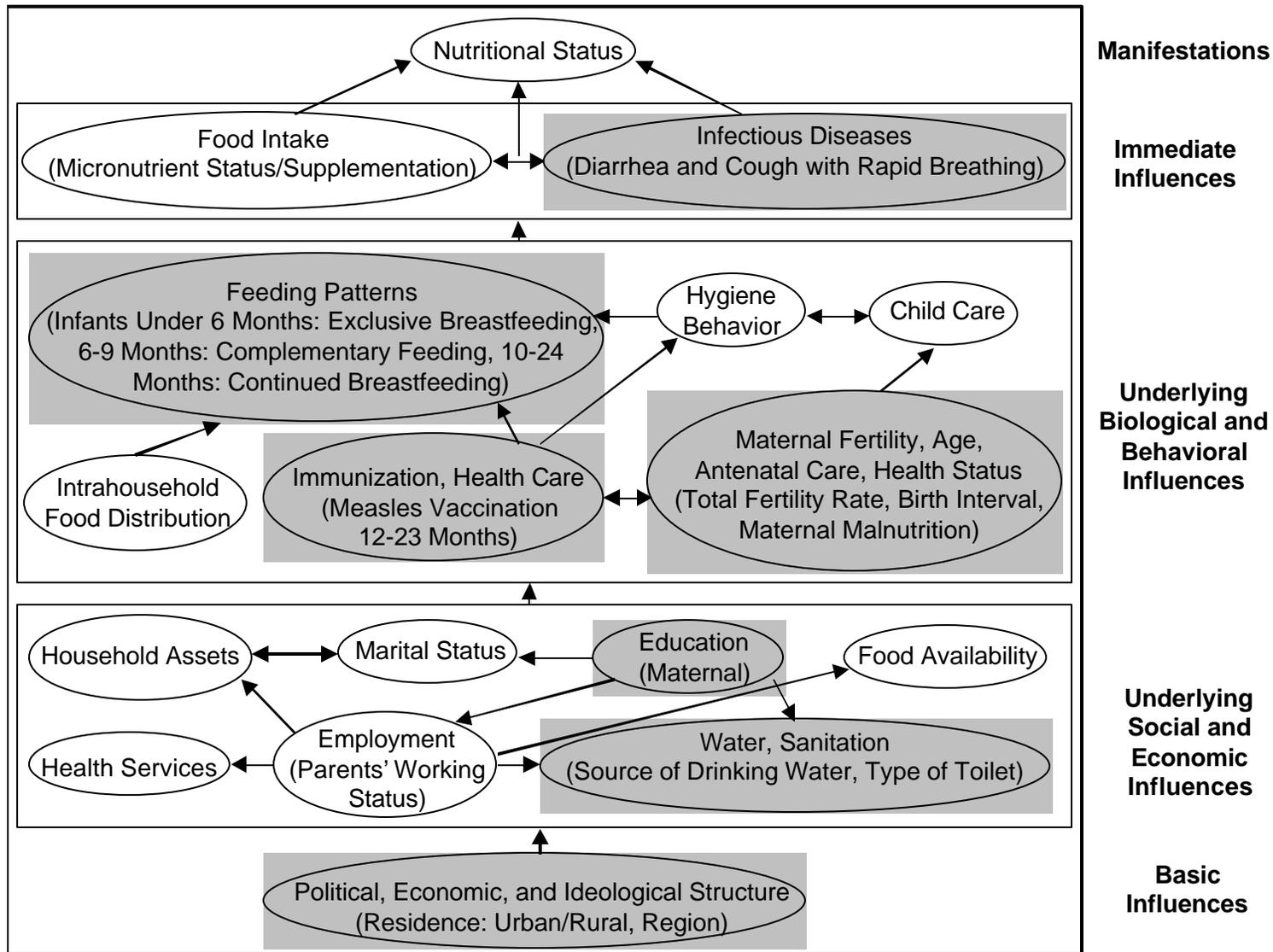
Nutrition is directly related to food intake and infectious diseases such as diarrhea, acute respiratory infection, malaria, and measles. Both infectious disease and food intake reflect underlying social and economic conditions at the household, community, and national levels that are supported by political,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

The following diagram is a conceptual framework for nutrition adapted from UNICEF 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), infectious diseases (diarrhea 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.

Conceptual Framework for Nutritional Status



Immediate Causes of Malnutrition

Figure 8: Use of Iodized Salt among Households with Children under Five Years by Region, Ethiopia

Iodine deficiency is known to cause goiter, cretinism (a severe form of neurological defects), spontaneous abortion, premature birth, infertility, stillbirth, and increased child mortality. One of the most serious consequences to child development is mental retardation caused by iodine deficiency disorder (IDD), putting at stake social investments in health and education. IDD is the single most common cause of preventable mental retardation and brain damage in the world. It causes goiters and decreases the production of hormones vital to growth and development. Children with IDD can grow up stunted; apathetic; mentally retarded; and incapable of normal movement, speech, or hearing. IDD in pregnant women may cause miscarriage, stillbirth, and mental retardation in infants.

The remedy for IDD is relatively simple. A teaspoon of iodine is all a person requires in a lifetime. Since iodine cannot be stored for long periods by the body, tiny amounts are needed regularly. In areas of endemic iodine deficiency, where soil and therefore crops and grazing animals do not provide sufficient dietary iodine to the population, food fortification and supplementation have proven to be highly successful and sustainable interventions. The fortification of salt or oil with iodine is the most common tool to prevent IDD. Iodized salt that is commercially packaged in plastic sacks and not stored properly can lose its concentration of iodine. Proper packaging and storage of iodized salt is essential to ensure that the population benefits from iodine fortification.

- **In Ethiopia, only 28 percent of households with children use a type of salt that has an adequate level of iodine to prevent IDD. The Gambela and Benishangul-Gumuz regions have the highest rates of households using iodized salt (46 percent), and the Tigray, Somali, and SNNP regions have the lowest percentages of households using iodized salt (10, 17, and 18 percent, respectively).**

Figure 8

Use of Iodized Salt among Households with Children under Five Years by Region, Ethiopia

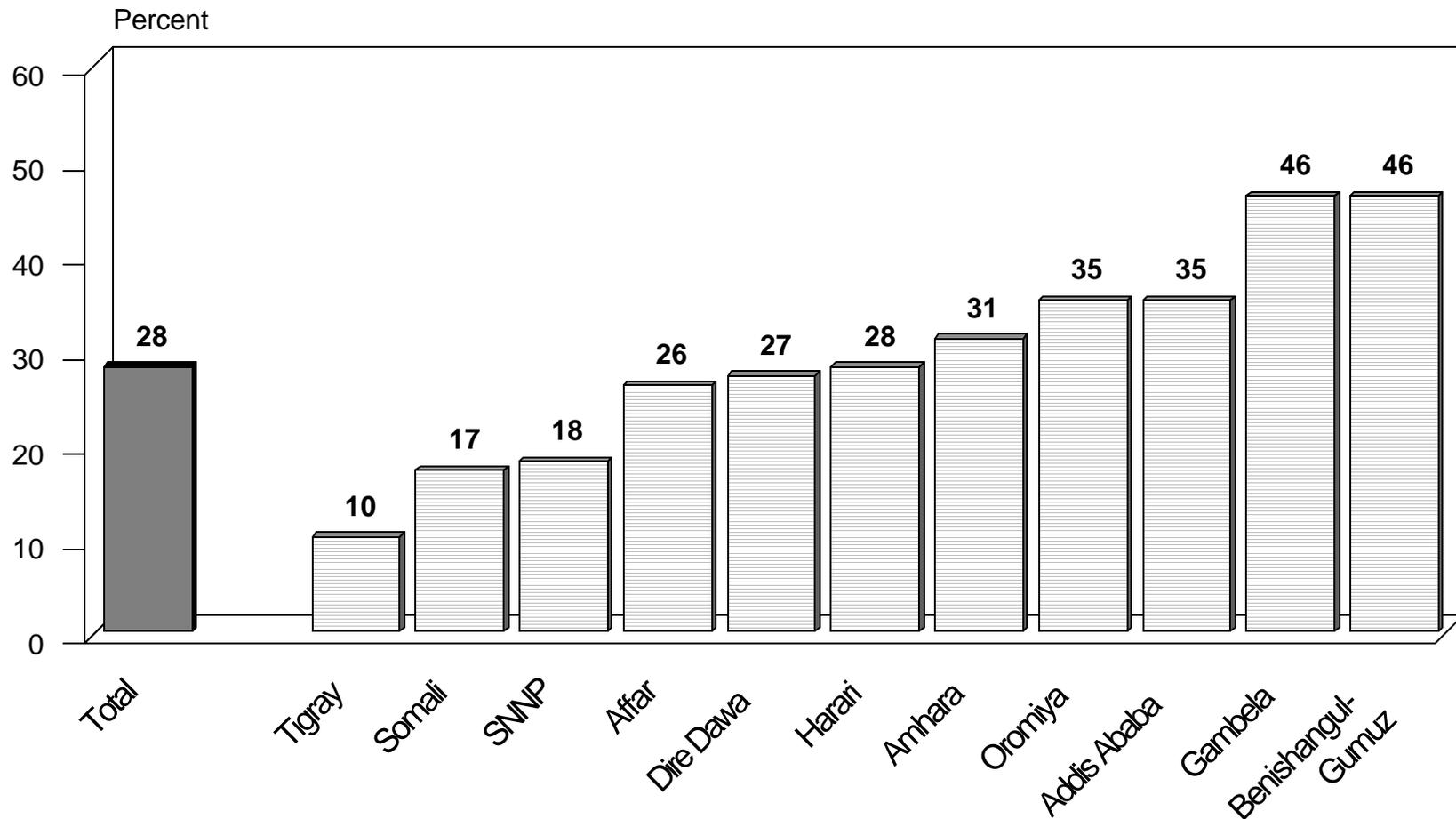


Figure 9: Night Blindness among Mothers of Children under Five Years, Ethiopia

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.

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 Ethiopia, 18 percent of all women reported having some form of night blindness during their last pregnancy.
- Only 5 percent of women actually reported having trouble with their vision during the night but not during the day during their last pregnancy. This is probably more reflective of Ethiopia's rate of night blindness, although it is probably somewhat of an underestimate.

Figure 9

Night Blindness among Mothers of Children under Five Years, Ethiopia

18% of all women had some form of night blindness during their last pregnancy.

5% of women had trouble with their vision during the night but not during the day during their last pregnancy.



Figure 10: Vitamin A Supplementation among Mothers of Children under Five Years by Region, Ethiopia

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 VAD, 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 very important for postpartum women within the first eight weeks after childbirth.

In Ethiopia,

- **Twenty-two percent of mothers with postnatal care received vitamin A supplements postpartum, compared with only 10 percent of women without postnatal care.**
- **Vitamin A supplementation of mothers varies by region. The overall rate of vitamin A supplementation is 12 percent of all pregnant women. The area with the lowest rate of supplementation is the Affar Region (5 percent), and the area with the highest rate of supplementation is the Gambela Region (22 percent).**

Figure 10

Vitamin A Supplementation among Mothers of Children under Five Years by Region, Ethiopia

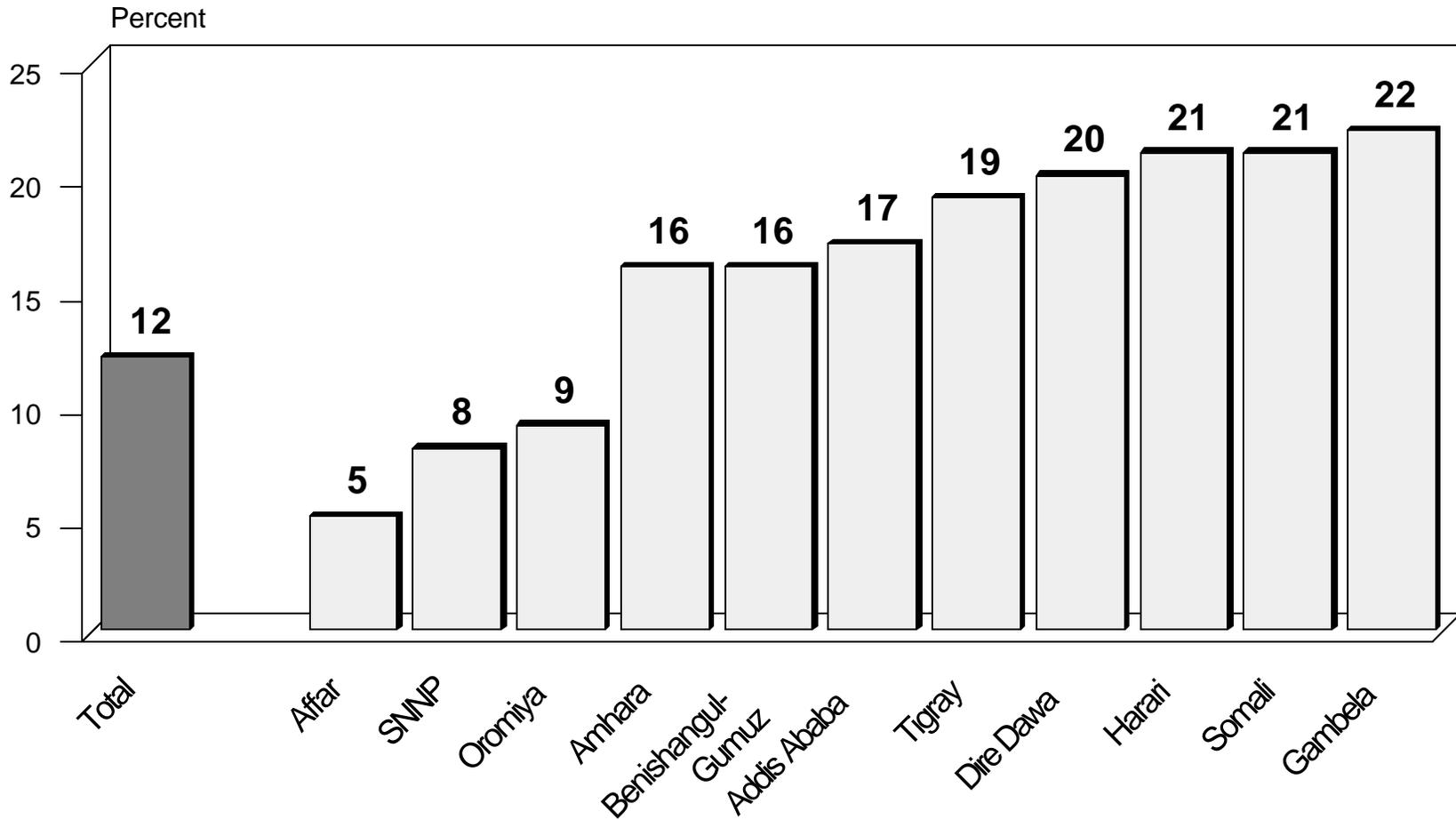


Figure 11: Vitamin A Supplementation among Children under Five Years by Region, Ethiopia

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 Immunization Days for polio or measles vaccinations are ideal for reaching a large number of children with vitamin A supplements.

- **The rate of vitamin A supplementation of children varies widely in Ethiopia. The overall rate of vitamin A supplementation is 56 percent. The areas with the highest rate of vitamin A supplementation in children are Addis Ababa and Dire Dawa (82 and 83 percent, respectively). The area with the lowest rate is the Affar Region (26 percent).**

Figure 11

Vitamin A Supplementation among Children under Five Years by Region, Ethiopia

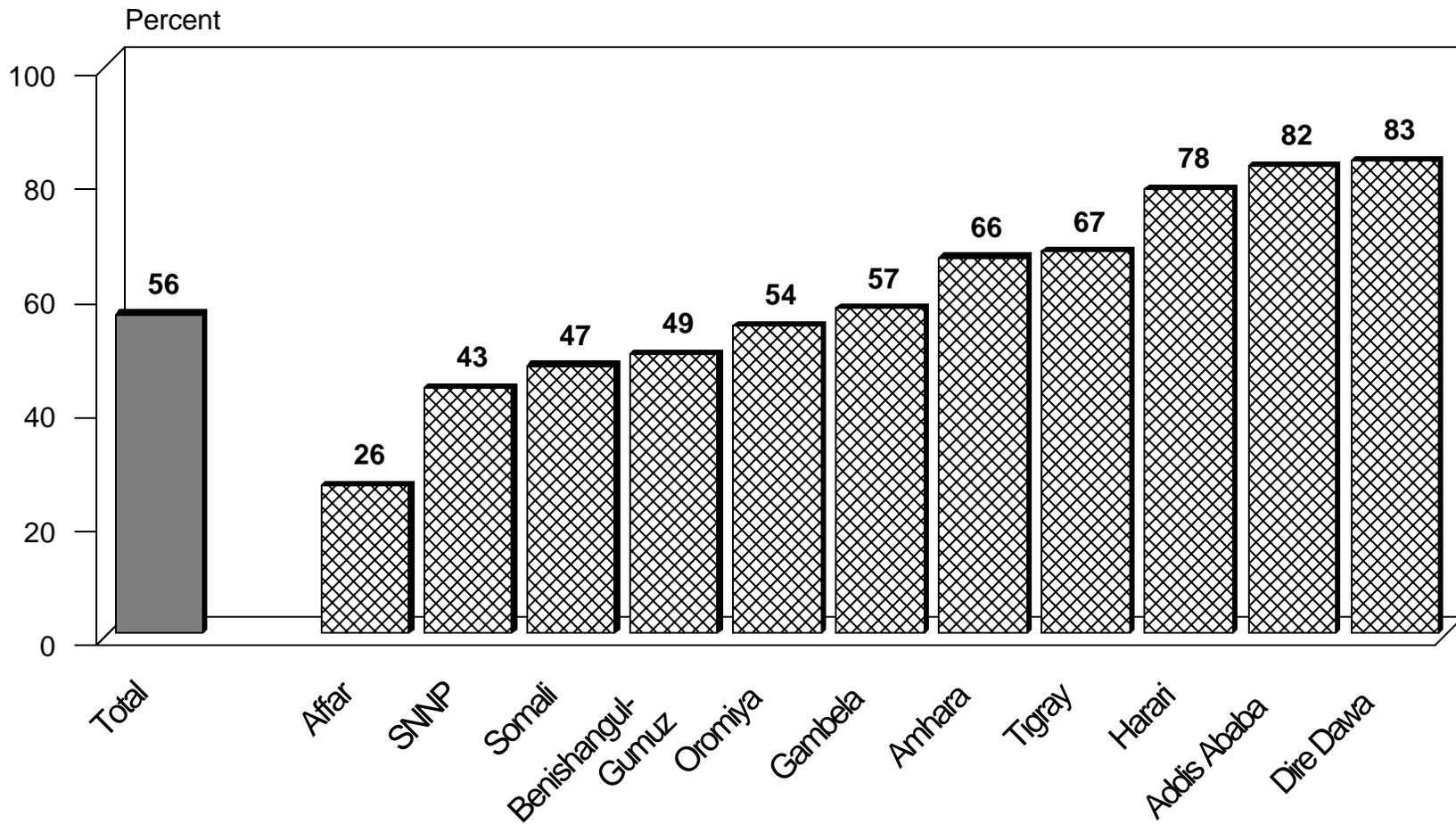


Figure 12: Diarrhea and Cough with Rapid Breathing among Children under Five Years Compared with Malnutrition Rates, Ethiopia

Acute respiratory infection and dehydration due to diarrhea 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 diarrhea, mothers were asked whether 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.

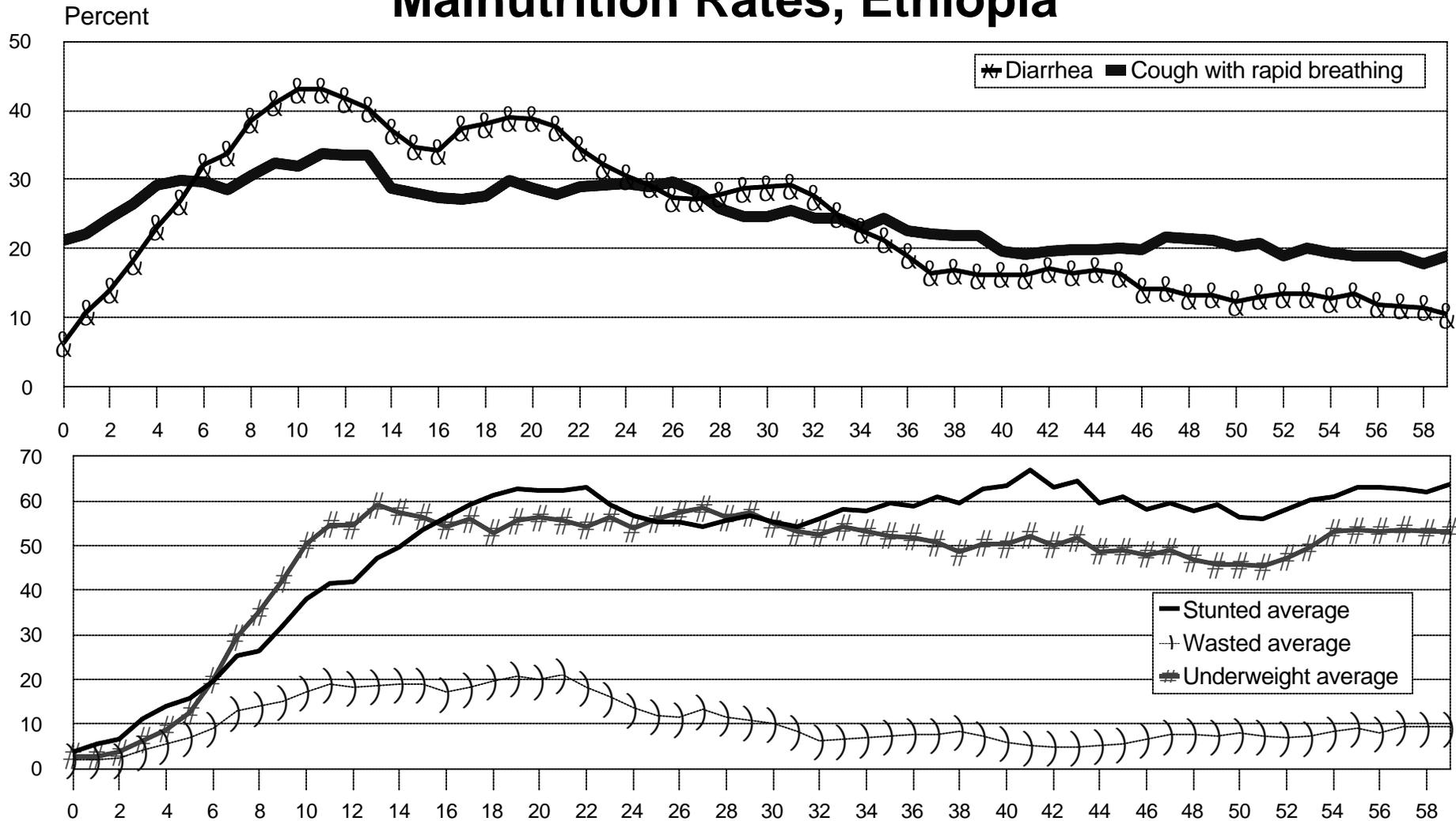
In Ethiopia,

- **Approximately 25 percent of children under five years of age experienced cough with rapid breathing in the two weeks preceding the survey.** Ethiopia's prevalence of cough with rapid breathing increases from 22 to 34 percent in the first 12 months and then gradually declines to 18 percent at 59 months of age.
- **Approximately 25 percent of children under five years of age had diarrhea in the two weeks preceding the survey.** The prevalence of diarrhea increases rapidly from the 1st to the 11th month when it peaks at 43 percent, cycling down to 35 percent at 14 months and then back up to 40 percent at 18 months. The rate cycles down again to about 30 percent at 30 months and then steadily declines to about 11 percent through at 59th month 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 in their mouth, again increasing the risk of pathogen contamination.

Figure 12

Diarrhea and Cough with Rapid Breathing among Children under Five Years Compared with Malnutrition Rates, Ethiopia



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

Underlying Biological and Behavioral Causes of Malnutrition

Figure 13: Fertility and Birth Intervals, Ethiopia 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 precursors to poor nutritional status in early childhood.

- **At the current fertility rate, a woman in Ethiopia will have an average of 5.9 children by the end of her childbearing years.** This rate is in the mid-range of all of the sub-Saharan countries surveyed between 1994-2000.
- **Ethiopian mothers have a median birth interval of 33 months.** This rate is also in the mid-range of all other countries surveyed.

Figure 13

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

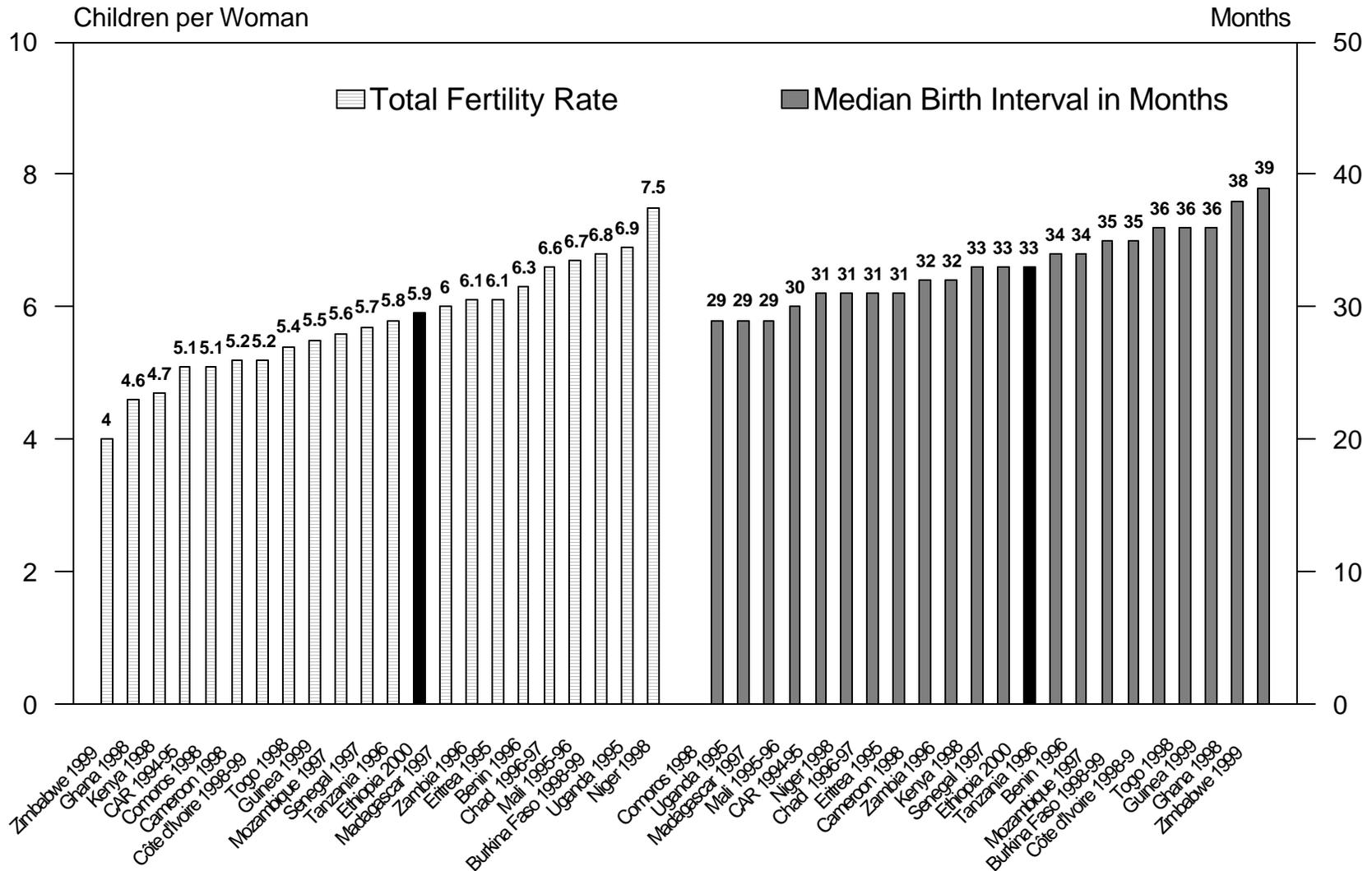


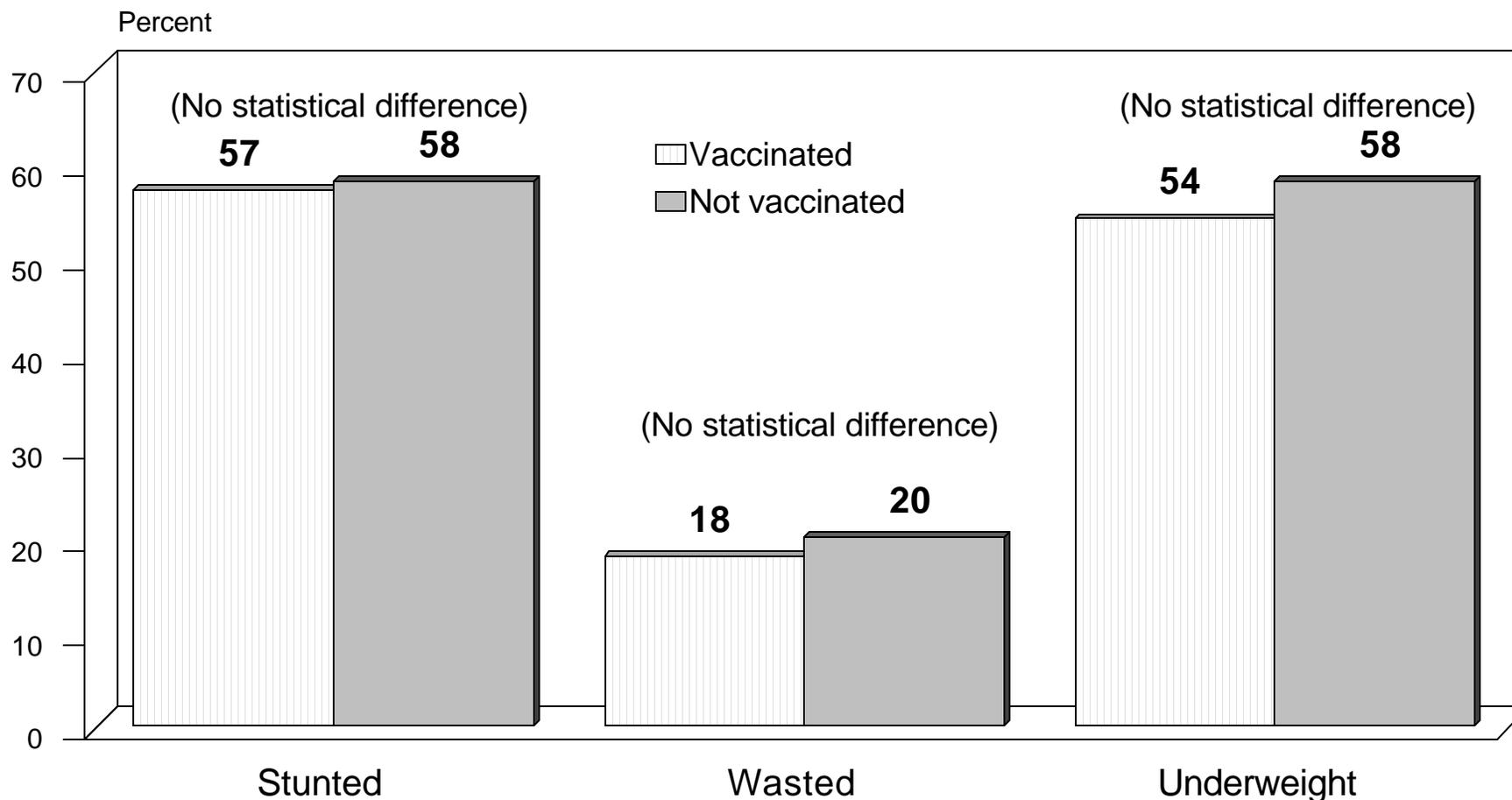
Figure 14: Malnutrition among Children Age 12-23 Months by Measles Vaccination Status, Ethiopia

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 without high immunization coverage. Measles not only increases the risk of death but is also an important direct cause of malnutrition. The occurrence of measles in poor environments is associated with faltering growth, vitamin A deficiency, and immune suppression. Even though infants are not protected after birth by their mother's breast milk, they are protected by their mother's measles antibodies while in the womb. These antibodies can last up to 15 months in an infant, but due to malnutrition, they only last up to 8 or 9 months in children in developing countries. Therefore, measles vaccination is an important child health strategy.

- **In Ethiopia, measles vaccination status is not statistically related to malnutrition.**

Figure 14

Malnutrition among Children Age 12-23 Months by Measles Vaccination Status, Ethiopia



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, Ethiopia Compared with Other Sub-Saharan Countries

In Ethiopia,

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

Figure 15

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

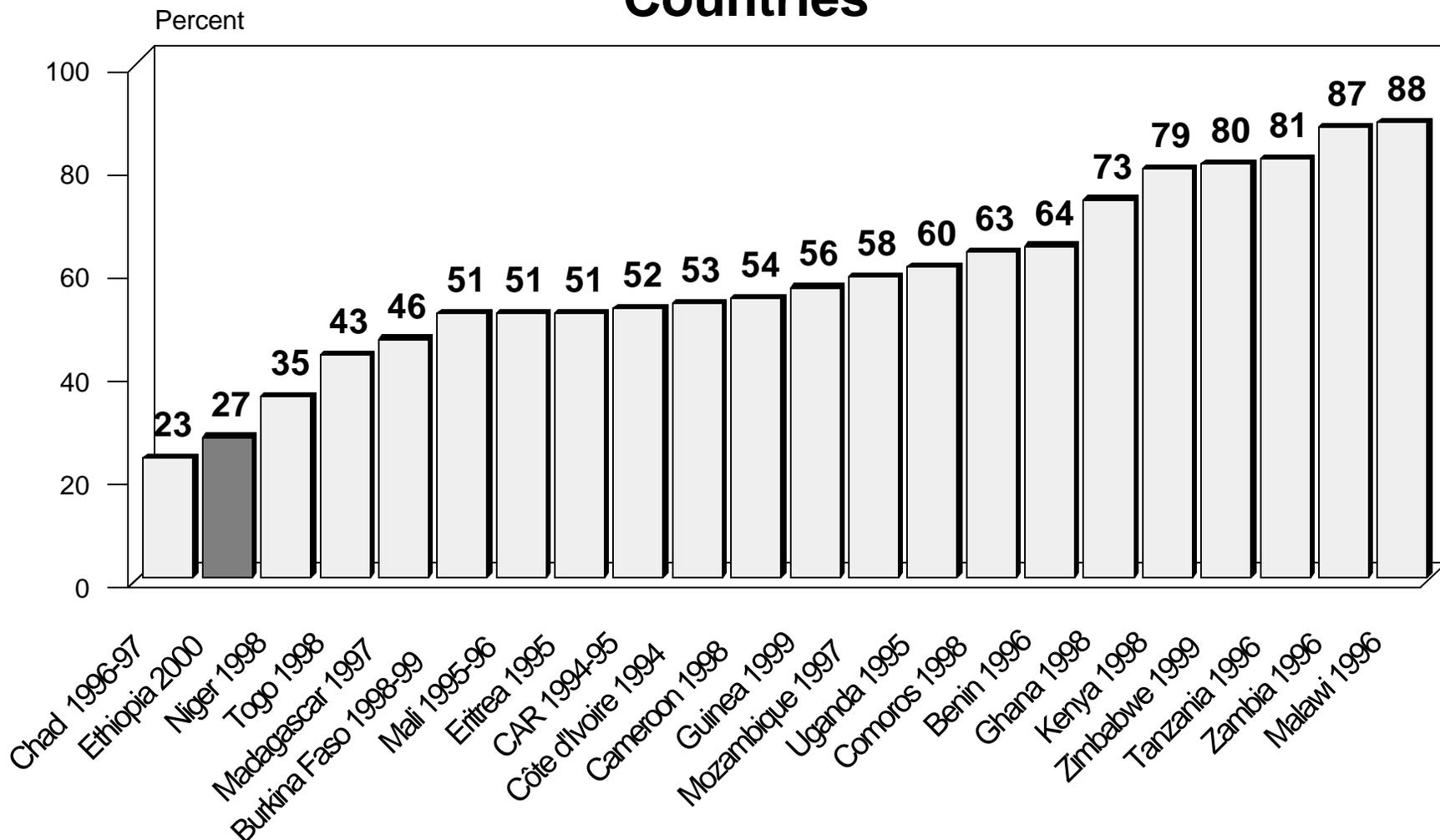


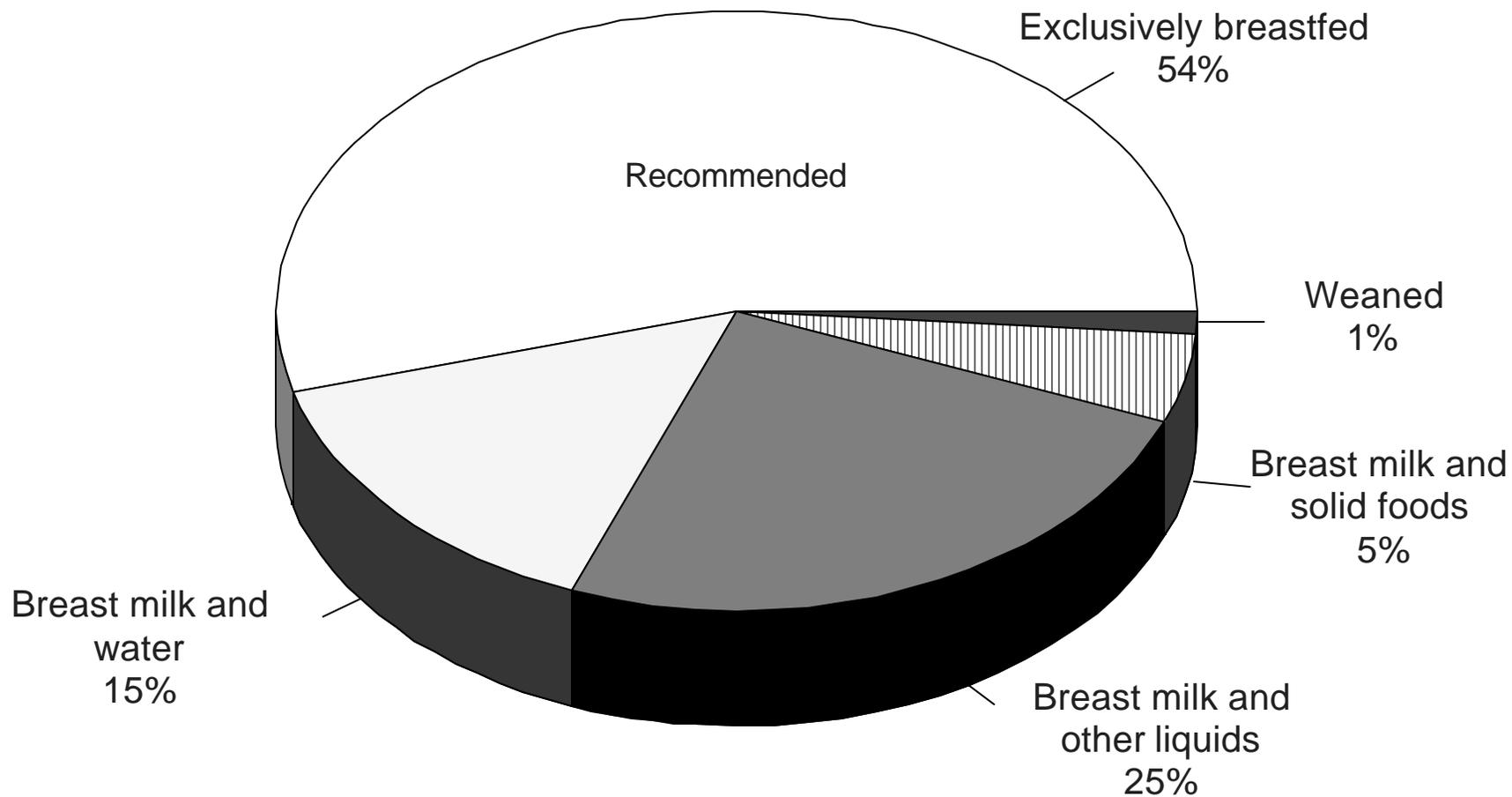
Figure 16: Feeding Practices for Infants under Six Months, Ethiopia

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 six months of age*. In other words, infants should be fed only breast milk during the first six months of their lives.

In Ethiopia, 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 diarrheal disease.

- **In Ethiopia, only 54 percent of children under the age of six months are exclusively breastfed, as is recommended by UNICEF.**
- **Thirty percent of infants under six months old are given some form of liquid or solid food other than breast milk and/or water, and 1 percent are fully weaned.**
- **Additionally, 15 percent of infants under six months of age are given a combination of breast milk and water.**

Figure 16
Feeding Practices for Infants under Six Months,
Ethiopia



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

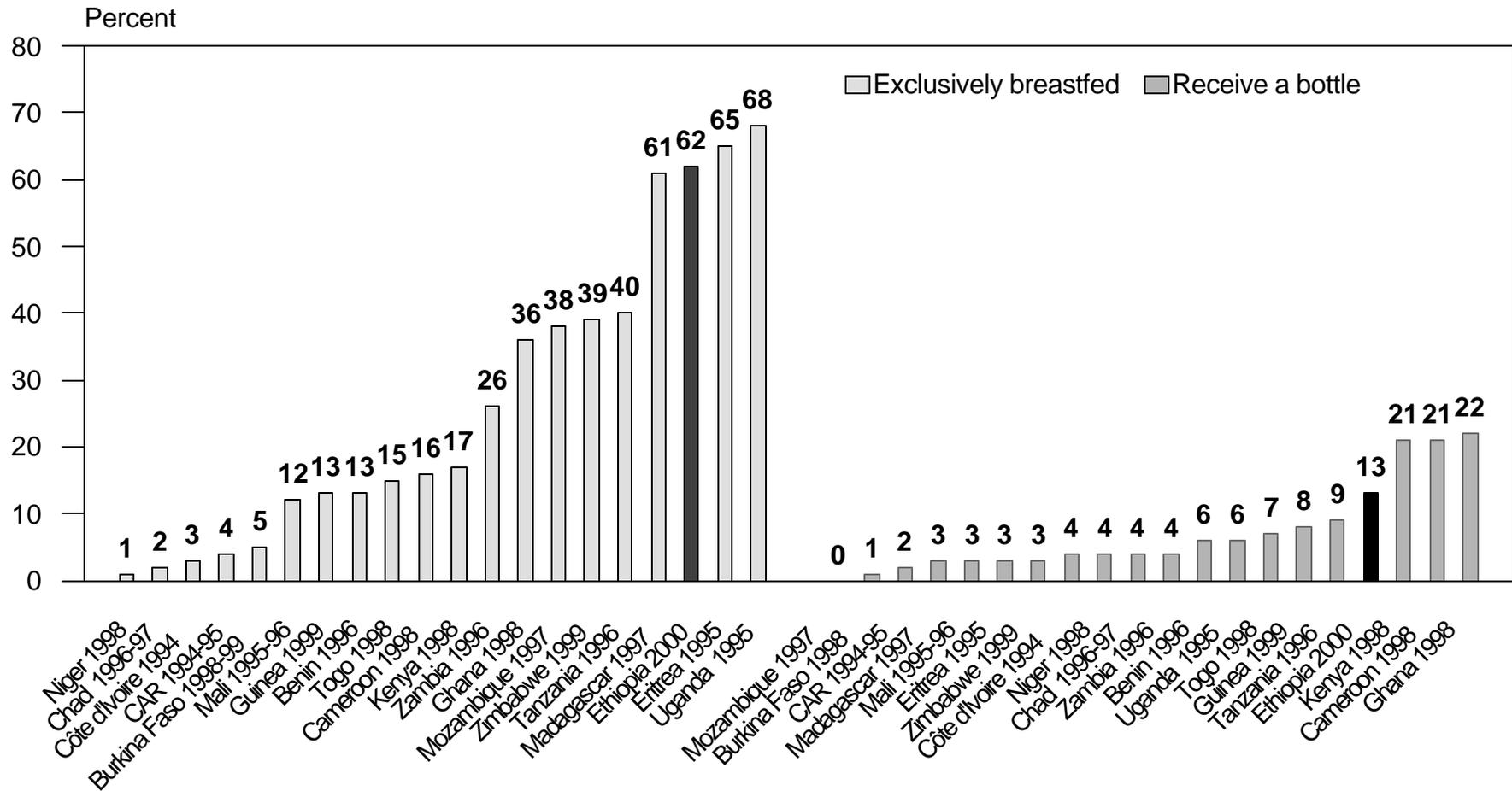
Figure 17: Infants under Four Months Who are Exclusively Breastfed and Those Who Receive a Bottle, Ethiopia Compared with Other Sub-Saharan Countries

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 four months follow the recommended practice of breastfeeding exclusively. **In Ethiopia, 62 percent of these mothers breastfeed their young infants exclusively.** This places Ethiopia in the upper quarter of sub-Saharan countries that follow the international recommendation.
- **Bottle-feeding is practiced by 13 percent of mothers of infants under four months in Ethiopia.** Ethiopia's rate is again in the higher quarter of all sub-Saharan countries for bottle-feeding. **Bottle-feeding is not recommended** because improper sanitation with bottle-feeding can introduce pathogens to the infant. Additionally, infant formulas (which are often watered down) and other types of milk do not provide comparable nutrition to breast milk for infants less than six months of age. For these reasons, bottle-feeding puts infants at a higher risk of illness and malnutrition.

Figure 17

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



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

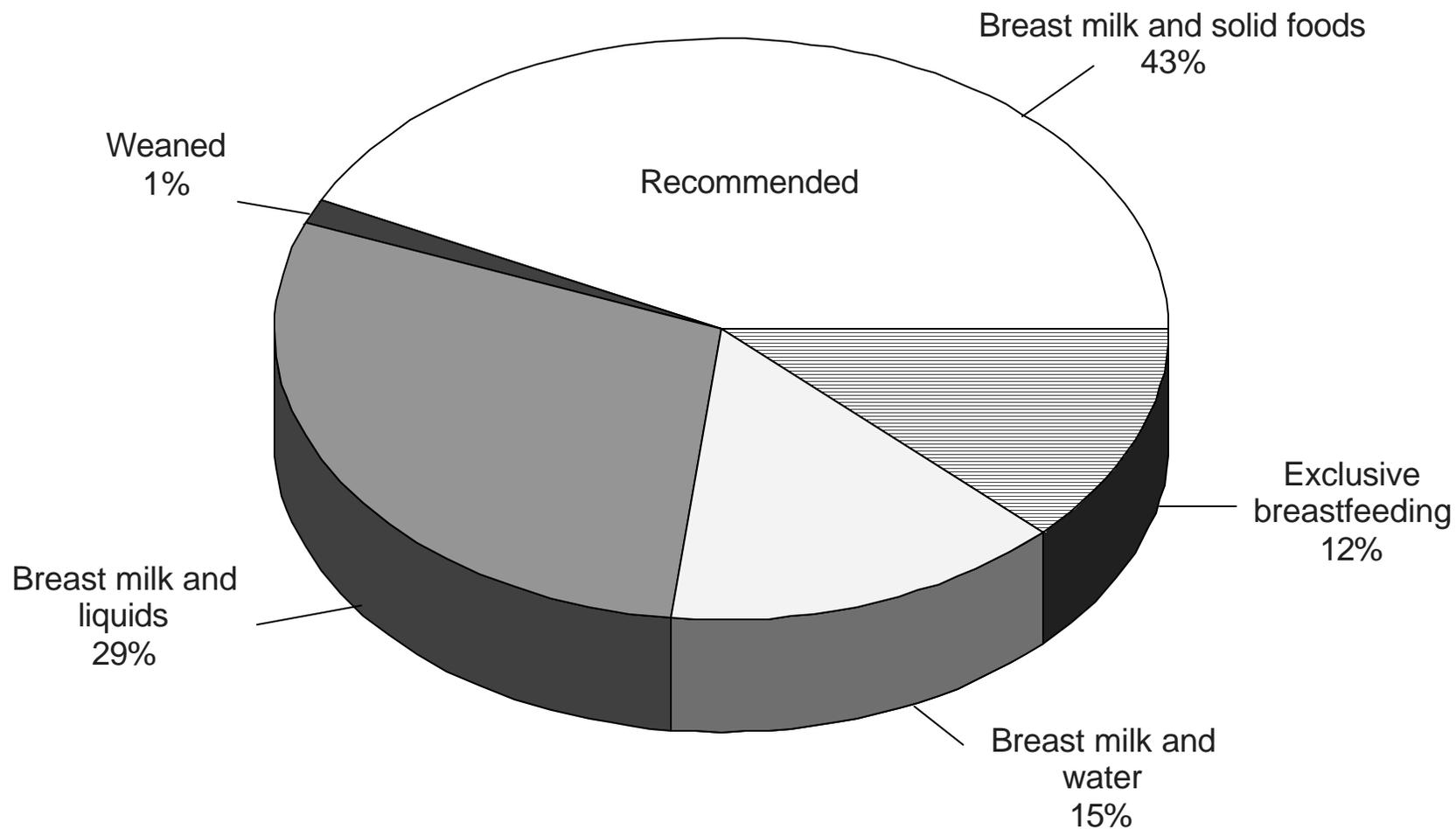
Figure 18: Feeding Practices for Infants Age 6-9 Months, Ethiopia

UNICEF recommends 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 at that point. Thus, *all infants over six months of age should receive solid foods* along with breast milk.

- **In Ethiopia, 43 percent of infants age 6-9 months are fed solid foods in addition to breast milk.** This means that about four out of ten infants age 6-9 months are fed according to the recommended practice.
- **Fifty-six percent of infants age 6-9 months are not fed solid foods in addition to breast milk, putting these children at risk of malnutrition.**
- **Additionally, 1 percent of infants are fully weaned** and therefore not receiving the additional nutritional and emotional support of breastfeeding.

Figure 18

Feeding Practices for Infants Age 6-9 Months, Ethiopia



Note: UNICEF recommends 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, Ethiopia Compared with Other Sub-Saharan Countries

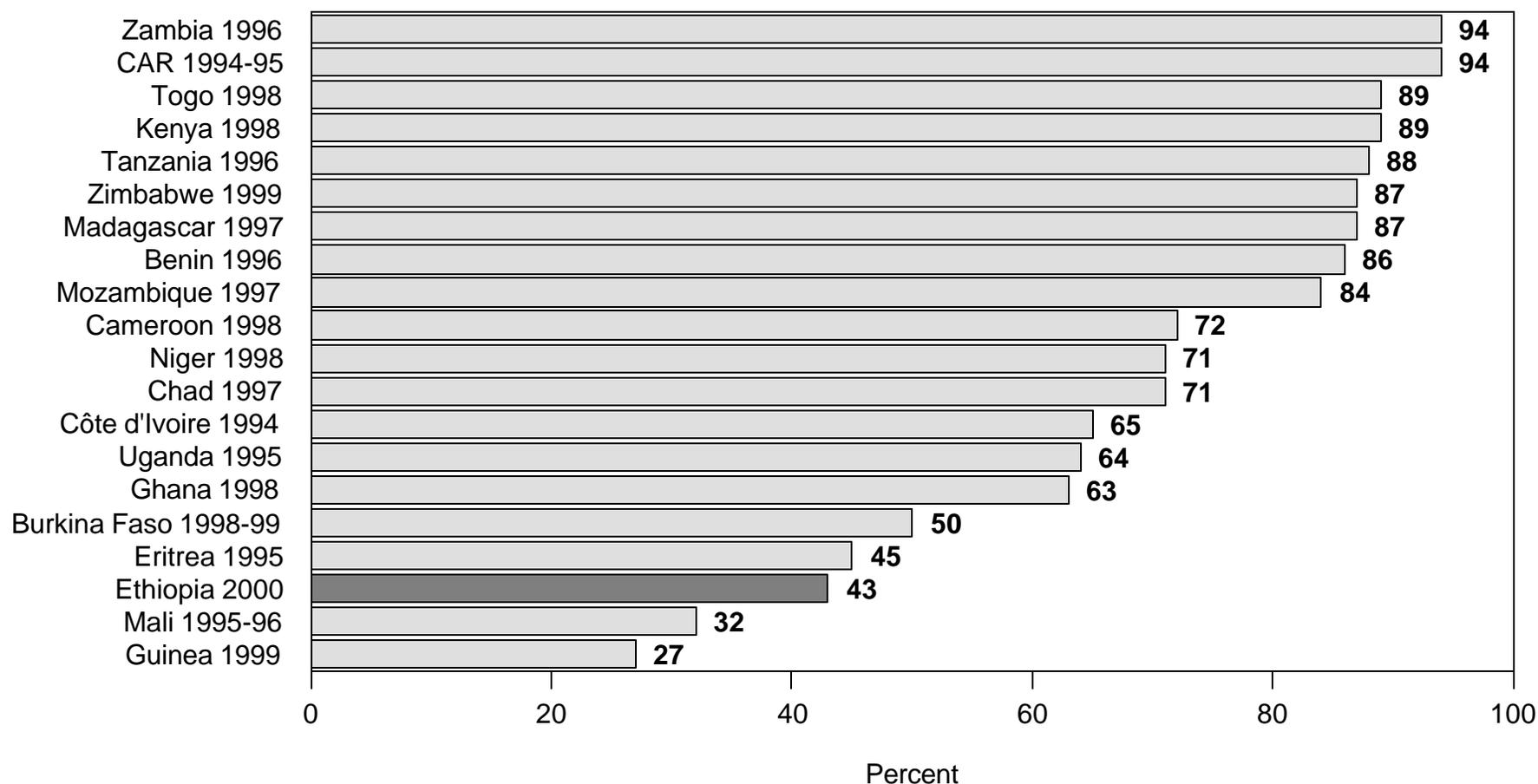
Optimal infant feeding practices include the introduction of complementary foods at about six months of age. The introduction of complementary feeding is necessary because breast milk is no longer sufficient to satisfy the developing infant's energy, protein, and micronutrient needs. All infants age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

In Ethiopia,

- **Forty-three percent of infants age 6-9 months receive solid food in addition to breast milk.** This is one of the lowest rates of proper feeding of infants 6-9 months of all the countries surveyed. The 57 percent of infants who are not given complementary food are more susceptible to stunting and wasting.

Figure 19

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



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

Underlying Social and Economic Causes of Malnutrition

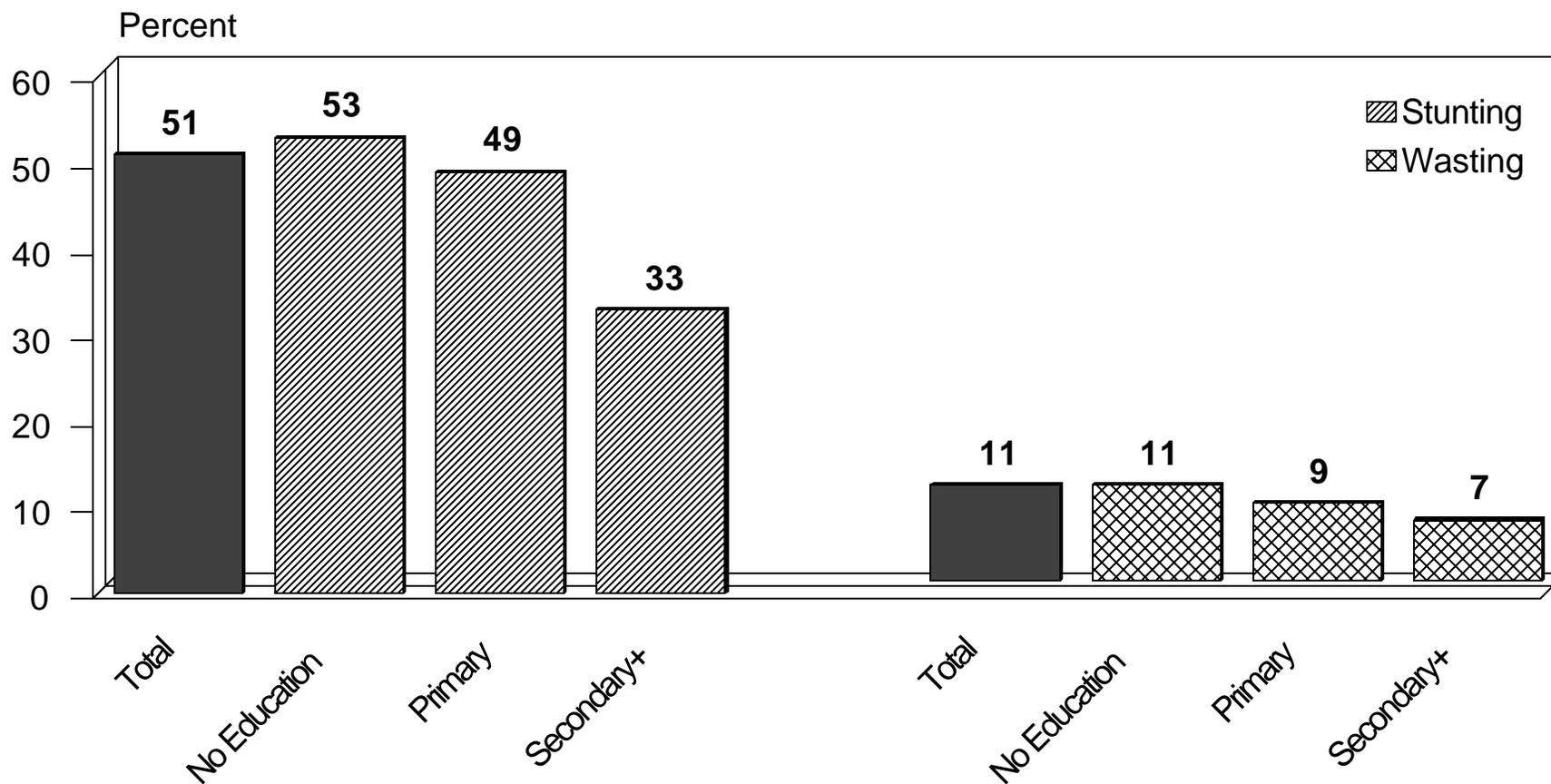
Figure 20: Stunting and Wasting among Children under Five Years by Mother's Education, Ethiopia

Maternal education is related to knowledge of good child care practices and to household wealth. In Ethiopia, 82 percent of the mothers of children under five years of age have never attended school, while 13 percent have had some primary education and 5 percent have a secondary or higher education. There are variations in school attendance, especially between urban and rural areas. In the rural areas, 87 percent of the mothers have never attended school, 11 percent have attended primary school, and 2 percent have gone to secondary school or higher. In contrast, only 43 percent of the mothers in urban areas have never attended school, 23 percent have attended primary school, and 34 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 Addis Abbaba (47 percent). The region with the second highest rate of secondary school or higher education is Dire Dawa (26 percent), with the Somali, Amhara, Tigray, Affar, Benishangul-Gumuz, SNNP, and Oromiya regions having the lowest rates of secondary or higher education (less than 5 percent).

- Maternal education has an inverse relationship with stunting in Ethiopia. **As the level of maternal education increases, the level of stunting decreases.** There is a 4 percentage point difference in stunting rates between children of mothers with no education and those whose mothers have a primary education, and there is a 20 percentage point difference between children of mothers with no education and those whose mothers have a secondary education or higher.
- Maternal education also has an inverse relationship with wasting in Ethiopia. There is a 2 percentage point difference in wasting rates between children of mothers with no education and those whose mothers have a primary education, and there is a 4 percentage point difference between children of mothers with no education and those whose mothers have a secondary education or higher.

Figure 20

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



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

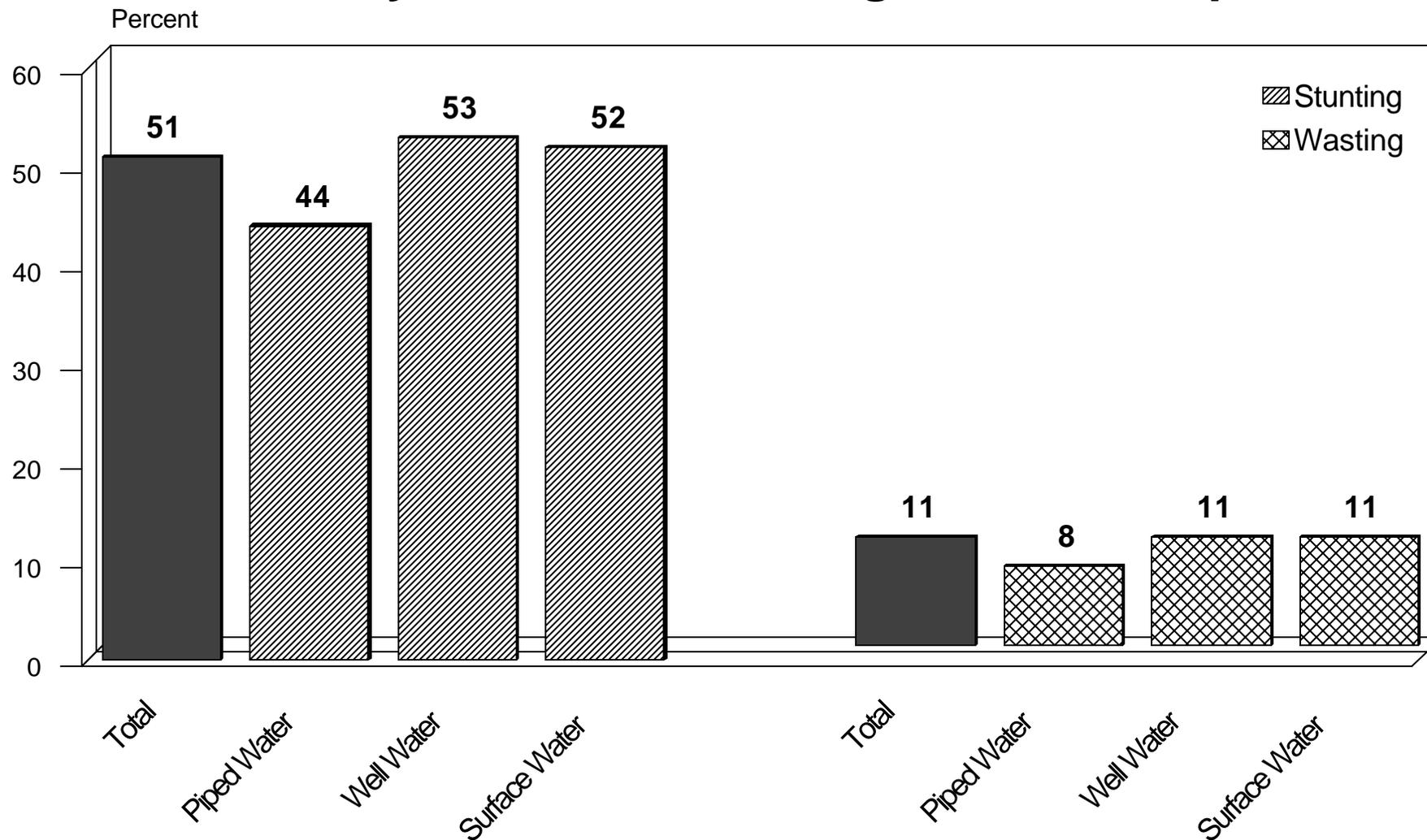
Figure 21: Stunting and Wasting among Children under Five Years by Source of Drinking Water, Ethiopia

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 five years, 13 percent use piped water, 52 percent obtain their drinking water from a well, and 32 percent use surface water.

- **In Ethiopia, children whose drinking water is well water or surface water are more likely to be stunted (53 percent and 52 percent, respectively) than children with access to piped water (44 percent).**
- **Children living in households whose drinking water is well water or surface water are also more likely to be wasted (11 percent) than children with access to piped water (8 percent).**

Figure 21

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



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

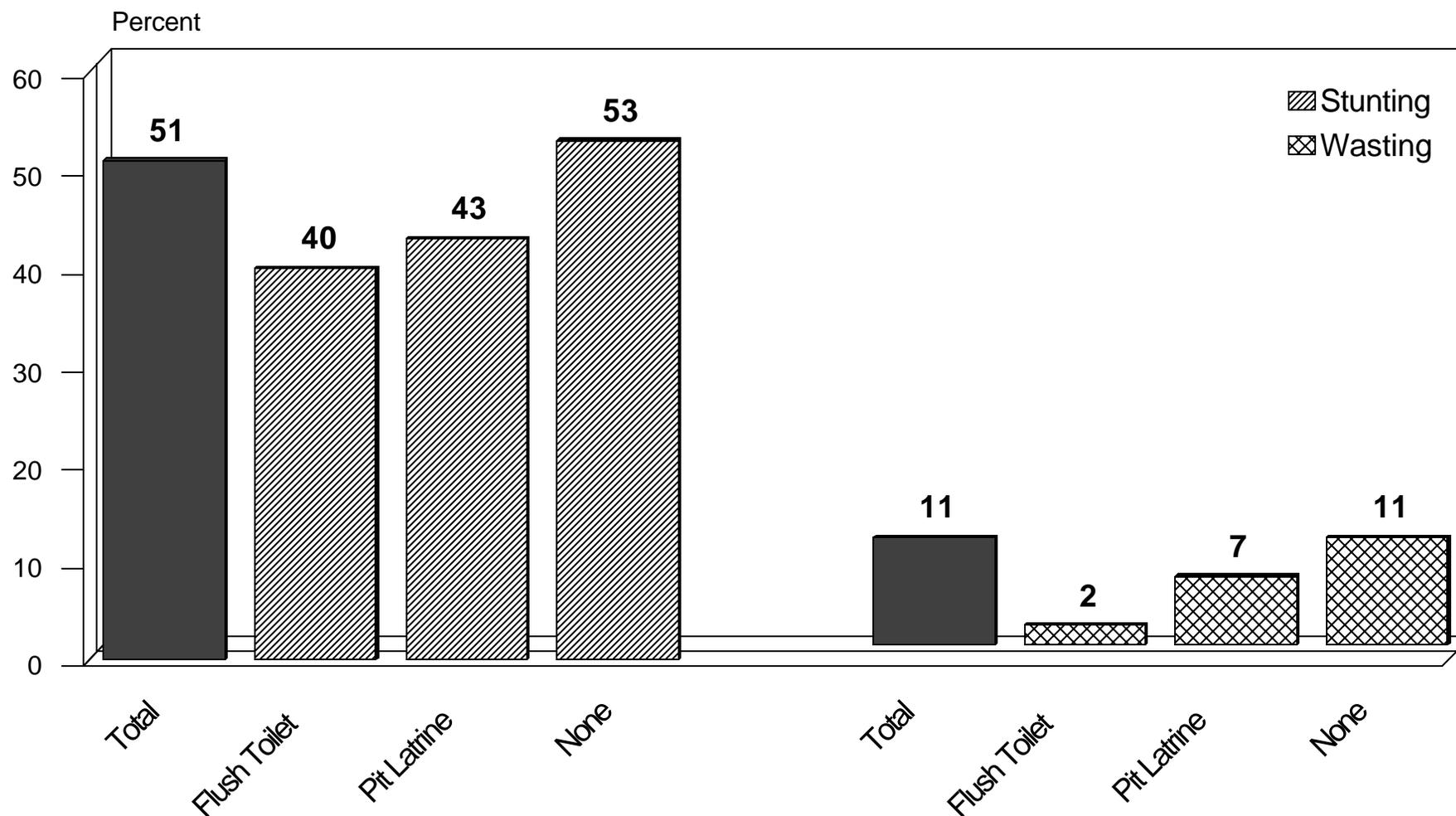
Figure 22: Stunting and Wasting among Children under Five Years by Type of Toilet, Ethiopia

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 Ethiopia, 15 percent have access to a pit latrine, less than 1 percent have access to a flush toilet, and 85 percent of survey households have no facilities.

- **Households that do not have any toilet facilities have the highest proportion of stunting in children under five years of age (53 percent).**
- **Households with access to flush toilets have the lowest proportion of children stunted (40 percent).**
- **Households that do not have any toilet facilities or that only have a pit latrine have the highest proportion of wasting in children under five years of age (11 percent and 7 percent, respectively).**
- **In households with access to flush toilets, the proportion of children wasted is only 2 percent.**

Figure 22

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



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

Basic Influences

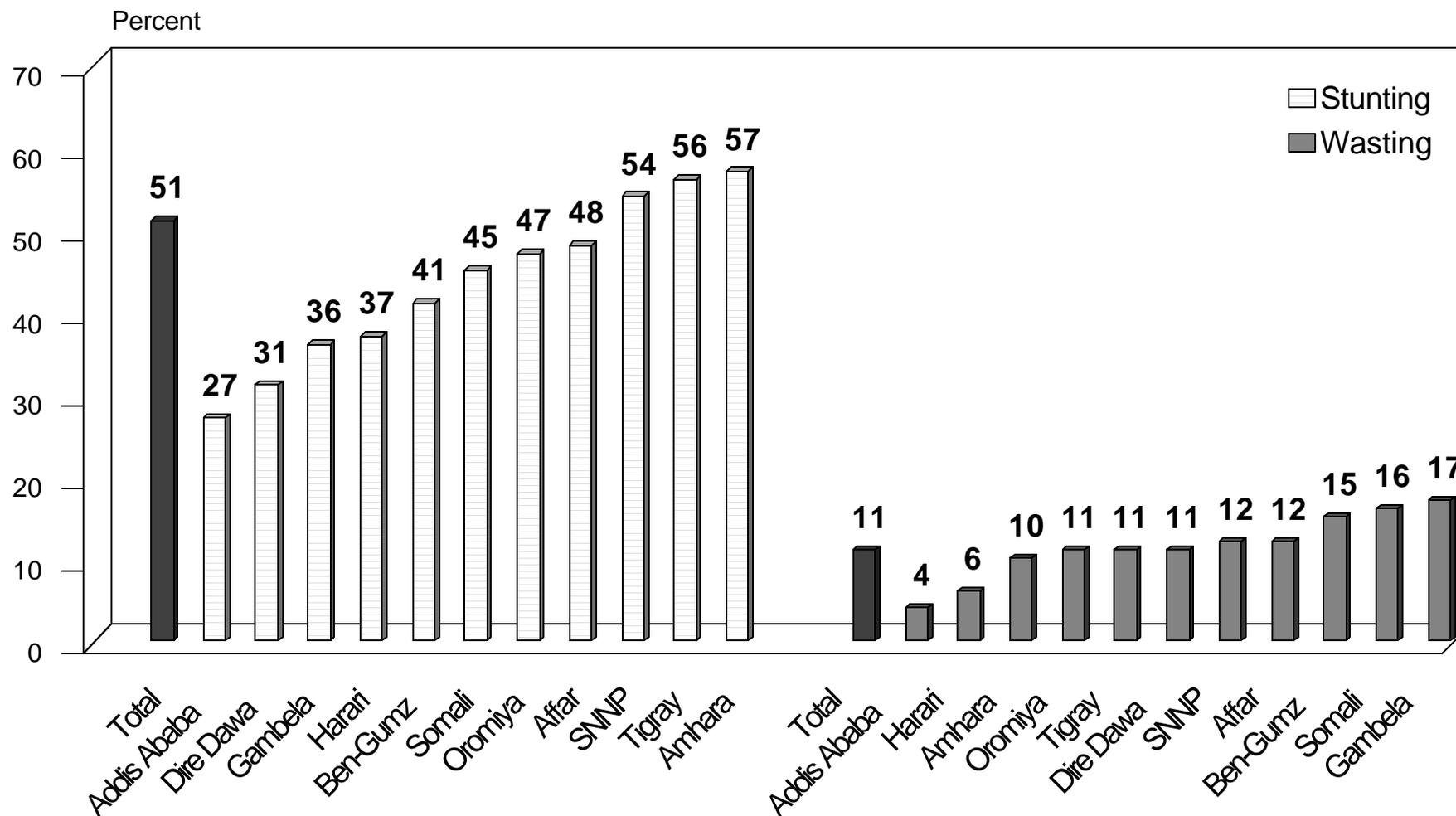
Figure 23: Stunting and Wasting among Children under Five Years by Region, Ethiopia

In Ethiopia,

- **Stunting ranges from 27 to 57 percent among children in the 11 regions.** The highest level of stunting (57 percent) was reported in the Amhara Region. The lowest level of stunting (27 percent) was reported in Addis Ababa.
- **Wasting ranges from 4 to 17 percent among children in the 11 regions.** The highest level was found in the Gambela Region (17 percent), while the lowest level was found in Addis Ababa (4 percent).

Figure 23

Stunting and Wasting among Children under Five Years by Region, Ethiopia



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

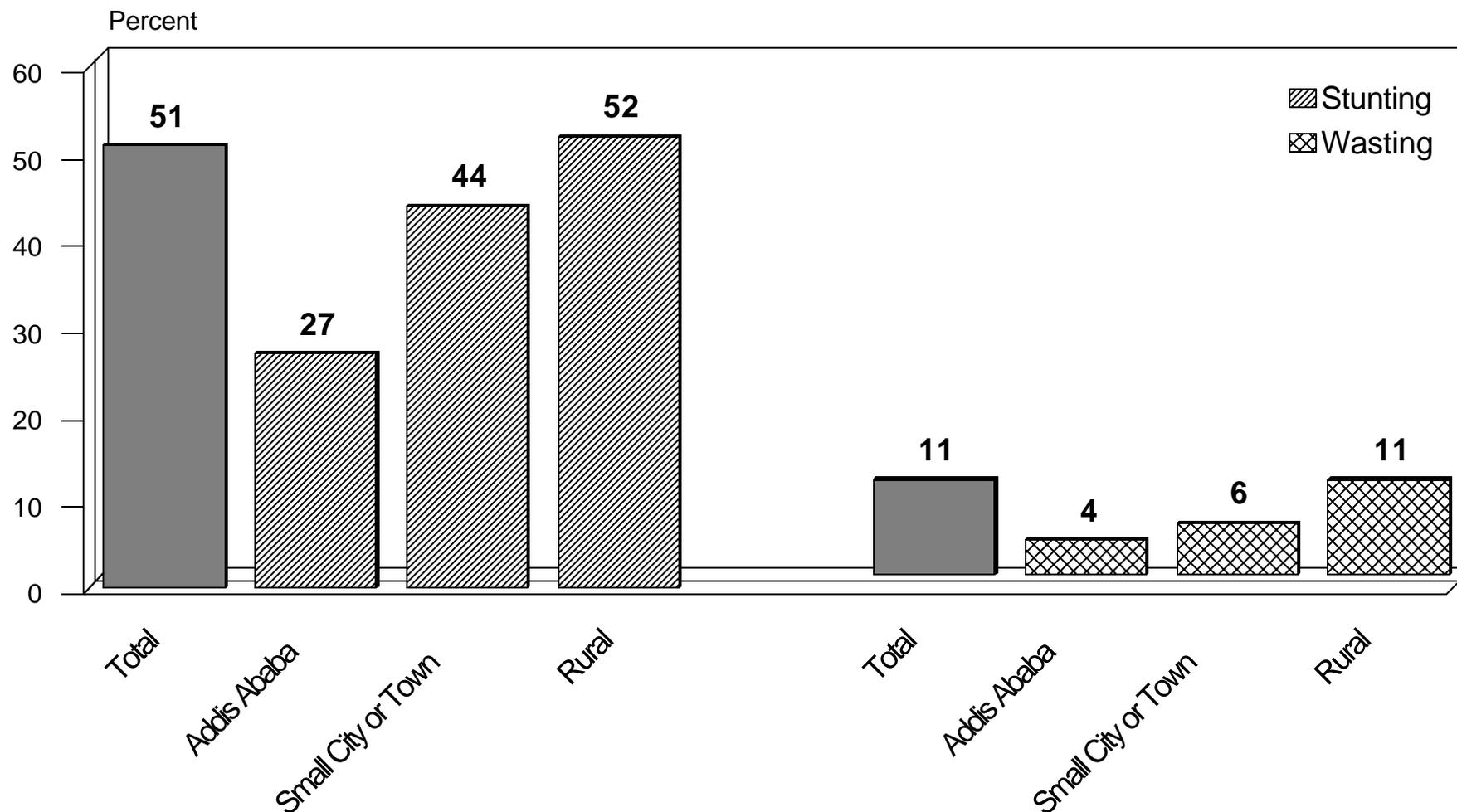
Figure 24: Stunting and Wasting among Children under Five Years by Urban-Rural Residence, Ethiopia

In Ethiopia,

- Fifty-two percent of rural children are stunted. In the capital city of Addis Ababa, 27 percent of children are affected by chronic malnutrition. In other urban areas (small cities or towns), the rate of stunting is 44 percent.
- Eleven percent of children living in rural areas, 4 percent of children in the capital city of Addis Ababa, and 6 percent of children in other urban areas are wasted.

Figure 24

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



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

Maternal Nutritional Status

Figure 25: Malnutrition among Mothers of Children under Five Years by Region, Ethiopia

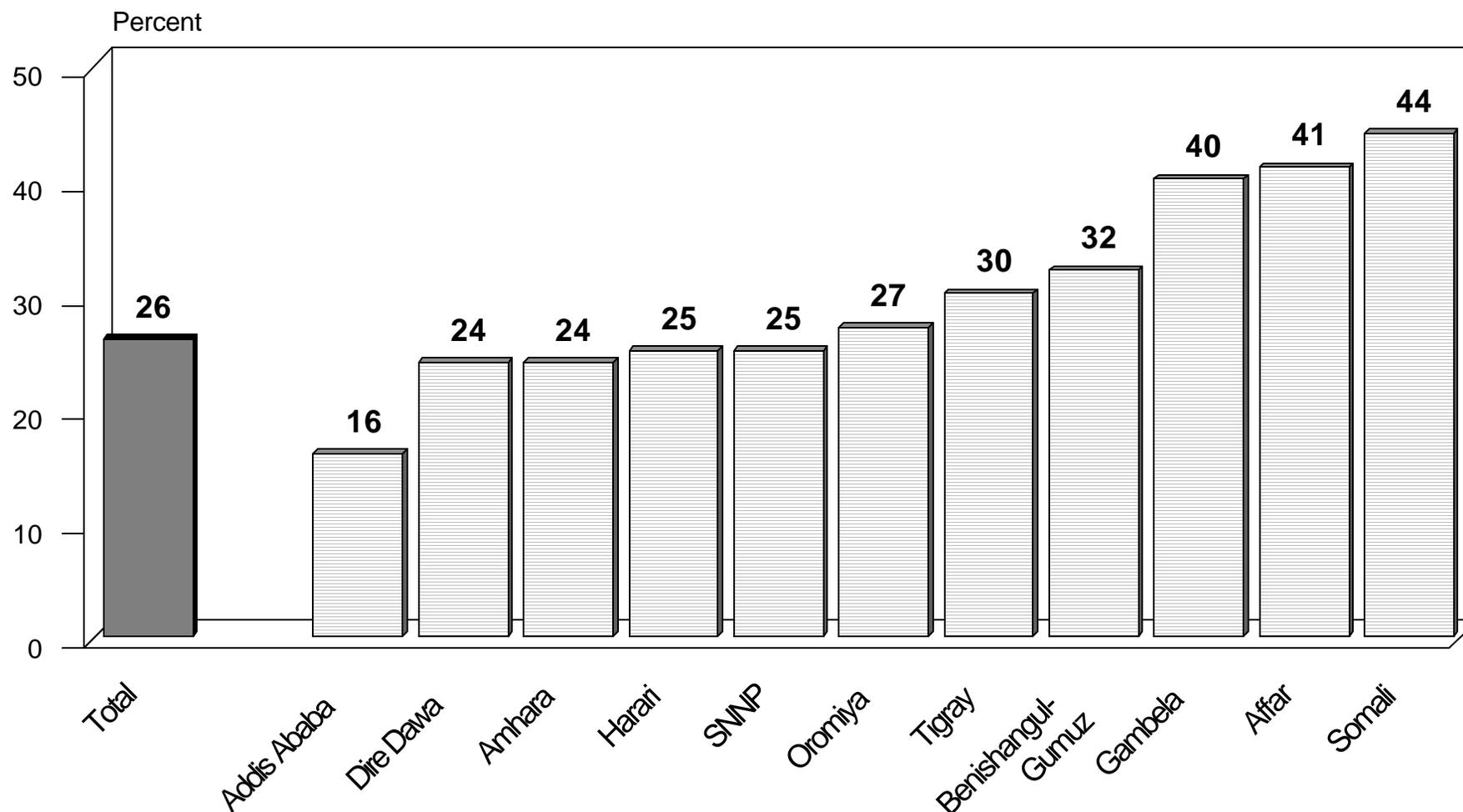
Besides being of concern in its own right, a mother's nutritional status affects her ability to successfully carry, deliver, and care for her children. There are generally accepted standards for indicators of malnutrition among adult women that can be applied.

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 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 for nonpregnant, nonlactating women.

- **Twenty-six percent of all mothers of children under age five in Ethiopia are malnourished.**
- **The highest level of maternal malnutrition is in the Somali Region (44 percent of mothers of children under five). The lowest level of maternal malnutrition is in Addis Ababa (16 percent).**

Figure 25

Malnutrition among Mothers of Children under Five Years by Region, Ethiopia



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

Figure 26: Malnutrition among Mothers of Children under Five Years by Residence and Education, Ethiopia

In Ethiopia,

- **The malnutrition rate for mothers of children under five is lowest in the capital city of Addis Ababa (16 percent) and highest in rural areas (26 percent).**
- **There is no direct relationship between mother's education and maternal malnutrition.**

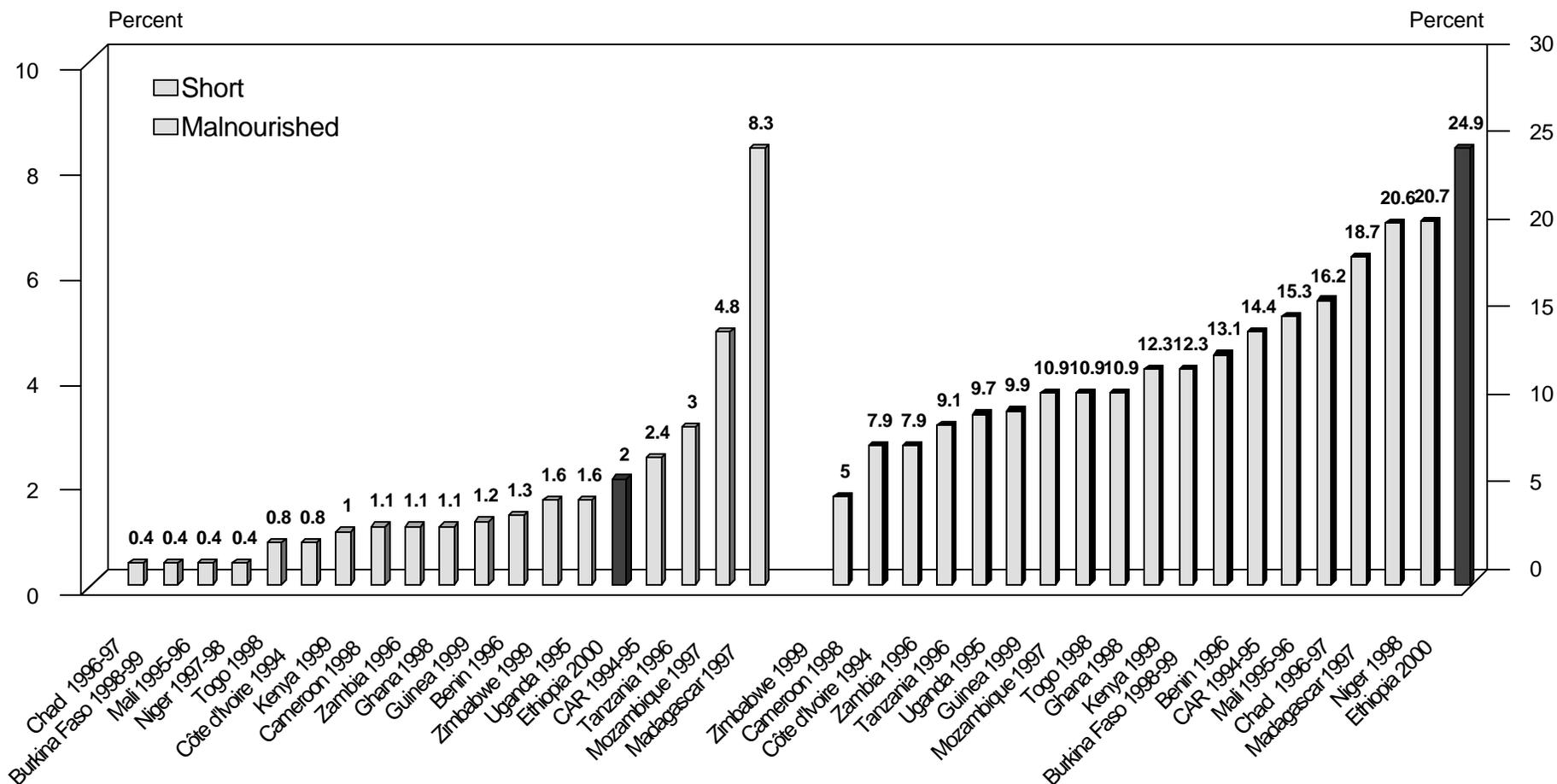
Figure 27: Malnutrition among Mothers of Children under Five Years, Ethiopia Compared with Other Sub-Saharan Countries

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 assessed using the body mass index is also presented.

- **Approximately 2 percent of mothers of children under five are too short. This level is in the upper third of all sub-Saharan countries surveyed.**
- **Approximately 25 percent of mothers of children under five are malnourished (BMI<18.5). This is the highest level among the sub-Saharan countries surveyed.**

Figure 27

Malnutrition among Mothers of Children under Five Years, Ethiopia 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/m²) is less than 18.5. Pregnant women and those who are less than three months postpartum are excluded from the BMI calculation.

Appendices

Appendix 1
Stunting, Wasting, and Underweight Rates by Background Characteristics
Ethiopia 2000

Background characteristic	Stunted	Wasted	Under-weight	Background characteristic	Stunted	Wasted	Under-weight
Child's age in months				Regions			
0-5	10.8	3.9	6.2	Tigray	55.8	10.9	48.3
6-11	28.7	14.0	37.5	Affar	48.2	12.3	50.7
12-17	52.3	19.5	57.7	Amhara	56.6	9.7	51.5
18-23	63.1	19.7	55.1	Oromiya	47.3	10.6	42.9
24-29	54.7	12.3	57.7	Somali	45.0	16.3	43.4
30-35	57.2	6.1	53.0	Benishangul-Gumuz	41.1	14.7	42.9
36-47	61.5	6.6	49.7	SNNP	53.9	12.1	52.5
48-59	60.2	8.3	50.1	Gambela	36.4	17.2	38.3
n=9813	p<0.001	p<0.001	p<0.001	Harari	36.9	6.2	27.0
				Addis Ababa	27.3	4.0	13.9
				Dire Dawa	31.1	11.1	30.9
				n=9811	p<0.001	p<0.03	p<0.001
Gender of child				Urban-rural residence			
Male	51.9	11.4	47.7	Urban	41.6	5.4	34.0
Female	50.5	10.0	46.5	Rural	52.3	11.3	48.6
n=9813	NS	p<0.02	NS	n=9813	p<0.001	p<0.001	p<0.001
Overall	51.2	10.7	47.1	Overall	51.2	10.7	47.1

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

NS = Not significant

Appendix 2

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

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 fat 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 very overweight for their age or very overweight 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 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 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 curve is closest to the normal curve. However, a large area of that curve falls within the malnourished range from mild to moderate. Height-for-age and weight-for-age are largely to the left of the standard curve indicating that there is a large number of malnourished children. In addition, a similarly large number of children are somewhat short and/or thin for their age. The implications are that interventions are needed to address malnutrition and undernutrition 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 Ethiopia

