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Nutrition and Health Characteristics of Low-Income Populations

Volume II, WIC Program Participants and Nonparticipants

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Nutrition and Health Characteristics of Low-Income Populations

Volume II, WIC Participants and Nonparticipants

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Abstract

Data from the Third National Health and Nutrition Examination Survey (NHANES-III), conducted in 1988-94, were used to compare the nutrition and health characteristics of participants and nonparticipants in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). This research was designed to establish a baseline from which to monitor the nutritional and health characteristics of WIC participants and nonparticipants over time. Because of age-based variations in the survey protocols and small samples of pregnant and postpartum women, data were not consistently available among women, infants, and children. Data availability was the richest for children and most limited for pregnant women.

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Executive Summary

This report describes the nutrition and health characteristics of participants and nonparticipants in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), using data from the Third National Health and Nutrition Examination Survey (NHANES-III).[1] The NHANES survey is the primary source of information used in monitoring the Nation's nutrition and health status. NHANES-III was completed between 1988 and 1994 and provides data for a large nationally representative sample of individuals.[2]

Data were examined for three groups that comprise the three major categories of WIC participants: pregnant and postpartum women, infants, and children (1-4 years of age).[3] WIC participants are compared to two groups of nonparticipants: low-income individuals who were income-eligible for WIC (household income at or below 185 percent of poverty) and higher-income individuals who were not income-eligible for WIC (household income above 185 percent of poverty). These comparisons provide useful insights into policy-relevant questions about program targeting, for example: are low-income individuals with the greatest nutritional and health needs receiving WIC services? And what are the nutrition- and health-related disparities between WIC participants and individuals who are not constrained by low incomes? These comparisons also provide information on whether WIC participants do as well as other groups with respect to outcomes that WIC might be expected to improve.

It should be noted that *this research was not designed to assess program impacts or in any way attribute differences between WIC participants and nonparticipants to an effect of the program.* Rather, this research provides a baseline from which to monitor the nutrition and health characteristics of WIC participants and nonparticipants over time and to generate questions and hypotheses for future research.

A broad array of measures is used to describe the nutrition and health characteristics of WIC participants and nonparticipants.[4] These measures include dietary intake, health-related behaviors, measures of health status, health conditions, and risks, and access to health care services. In reviewing findings, it is important to realize that many of the characteristics examined are used (or were used at the time the NHANES-III data were collected) as nutritional risks that qualify individuals for WIC participation. Therefore, differences observed between WIC participants and nonparticipants may be a reflection of criteria for selection into the program.

All reported population estimates have been population-adjusted, or standardized according to the year 2000 distribution of pregnant and postpartum women, infants, and children 1-4 years of age. Population adjustment eliminates between-group differences that are due solely to differences in the sample distribution across the three categories of WIC participants (women, infants, and children). Similarly, estimates reported for all

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[1]Similar reports have been prepared for participants and nonparticipants in the Food Stamp Program (FSP) (Fox and Cole, 2004a), for school-age children (Fox and Cole, 2004b), and for older adults (Cole and Fox, 2004).

[2]Beginning in 1999, NHANES became a continuing survey. Data for the first two continuous years of the ongoing NHANES (1999-2000) have been released since the time the tabulations presented in this report were prepared. Data for subsequent years are expected in mid-2005.

[3]The sample of women was limited to pregnant women, nonbreastfeeding women who gave birth within the past 6 months, and breastfeeding women who gave birth within the past 12 months.

[4]Because of age-based variations in NHANES-III data collection protocols and small samples of pregnant and postpartum women, data were not consistently available for the three major categories of WIC participants (pregnant and postpartum women, infants, and children). Data availability was greatest for children and most limited for women.

children have been age adjusted (based on year 2000 Census data) to eliminate between-group differences that are due solely to differences in the age distributions of the groups.

Dietary Intakes of Children

Dietary intake was assessed using data from a single 24-hour recall. In addition to energy intake, the analysis examined intakes of nine key nutrients and dietary components: vitamin C, iron, zinc, calcium, total fat, saturated fat, cholesterol, sodium, and fiber. Estimates of usual intake were generated using the personal computer version of the Software for Intake Distribution Estimation.[5] Healthy Eating Index (HEI) scores (Kennedy et al., 1995) were also examined. Both of these analyses were limited to children. The HEI analysis was limited to 2-4-year-old children because the standards used in the HEI to assess intakes of total fat, saturated fat, cholesterol, and sodium are not applicable to 1-year-olds.

- **Meal Consumption.** Most children consume three meals per day. WIC children were more likely than higher-income children to consume fewer than three meals per day (16% vs. 10) and less likely to eat breakfast on a daily basis (88% vs. 94%). These differences were largely attributable to differences among 2-year-olds.

- **Energy.** Usual food energy consumption was significantly higher for WIC children compared with nonparticipants. WIC children consumed an average of 107% of the 1989 Recommended Energy Allowance vs. 101% and 99% for income-eligible and higher-income nonparticipant children, respectively.

- **Vitamin C, Iron, and Zinc.** The usual diets of virtually all 1-4-year-old children provided adequate amounts of vitamin C, iron, and zinc, relative to defined Estimated Average Requirements (EARs). There were statistically significant differences between WIC participants and nonparticipants for the percentage of children with adequate intakes of vitamin C and iron; however, the differences were substantively negligible.

- **Calcium.** It was not possible to assess the prevalence of adequate calcium intakes among children because the required dietary standard—the EAR—has not been established for calcium. The mean usual calcium intake of 1-4-year-old children exceeded the defined Adequate Intake (AI), suggesting that, overall, children's calcium intakes were adequate.[6] On average, the usual calcium intake of WIC children was significantly greater than the usual calcium intakes of both groups of nonparticipant children. In all cases, however, mean intakes exceeded the AI by a substantial margin.

- **Percent of Energy from Fat.** On average, the usual diets consumed by 2-4-year-old children provided 33 percent of energy from fat. This level of fat intake exceeded the *Dietary Guidelines for Americans* recommendation of no more than 30 percent of total energy (U.S. Departments of Agriculture and Health (USDA) and Human Services (DHHS), 2000) but fell within the more recently defined Acceptable Macronutrient Distribution Ranges (AMDRs) for fat intake (30-40% of total energy for 2-3-year-olds and 25-35% for 4-year-olds) (Institute of Medicine (IOM), 2002b). Among

[5]Because NHANES-III included a very small sample of second dietary recalls, which are needed to estimate intraindividual variation in intake, variance components were derived from the Continuing Survey of Food Intake of Individuals (CSFII), 1994-96 (see appendix C).

[6]Mean usual intakes that exceed the AI suggest that the likelihood of inadequate intake is low.

2- and 3-year-olds, usual intakes that fell outside the AMDR tended to be lower than the recommended range rather than higher. In contrast, roughly 15 to 25 percent of 4-year-olds had usual fat intakes that exceeded the upper end of the AMDR.

Distributions of usual fat intake showed no significant differences between WIC children and income-eligible nonparticipant children. In contrast, fat intakes of WIC children were significantly greater than those of higher-income nonparticipant children, particularly for 2-year-olds and 4-year-olds. For 2-year-olds, these differences affected the proportion of children who had usual fat intakes within the AMDR. For 4-year-olds, significant between-group differences were concentrated at the lower end of the distribution and intakes of both groups fell within the AMDR.

- **Percent of Energy from Saturated Fat.** Saturated fat intake was evaluated relative to the *Dietary Guidelines* recommendation that saturated fat provide less than 10 percent of total energy (USDA and U.S. DHHS, 2000). On average, the usual diets of 2-4-year-old children in all three groups exceeded this standard. WIC children consumed significantly more saturated fat, on average, than nonparticipating children in the higher-income group (12.9% of usual energy intake vs. 12.1%) and were significantly less likely to have usual saturated fat intakes that were consistent with the *Dietary Guidelines* recommendation (6% of children vs. 17%).

- **Cholesterol.** Mean usual cholesterol intakes of 2-4-year-old children in all three groups were consistent with the *Dietary Guidelines* recommended maximum of 300 mg. (USDA and U.S. DHHS, 2000). WIC children, however, consumed significantly more cholesterol than both groups of nonparticipant children and were less likely than higher-income children to meet the *Dietary Guidelines* recommendation for cholesterol (82% of children vs. 96%).

- **Sodium.** The *Dietary Guidelines* recommend a maximum daily sodium intake of 2,400 mg (USDA and U.S. DHHS, 2000). On average, usual sodium intakes of all three groups of 2-4-year-old children came close to this goal, but only higher-income children actually met it. The mean usual sodium intake of WIC children was 2,513 mg. compared with 2,460 mg. for income-eligible nonparticipant children and 2,277 mg. for higher-income nonparticipant children. The difference between WIC children and higher-income children was statistically significant.

  Children's usual sodium intakes exceeded the more recently defined Tolerable Upper Intake Levels (UL) by a substantial margin. The ULs are notably more stringent than the *Dietary Guidelines* recommendation—1,500 mg. for 2-3-year-olds and 1,900 mg. for 4-year-olds (IOM, 2004). Few children consumed diets that did not exceed the UL. There were few significant differences in the distributions of usual sodium intake of WIC children and income-eligible nonparticipant children. However, significant differences in the usual sodium intakes of WIC children and higher-income children were noted at every percentile of the distribution. In all cases, usual intake was greater for WIC children. Differences were concentrated among 3-year-olds. In this age group, the difference in usual intakes at the 10^{th} percentile (1,637 mg. vs. 1,584 mg.) suggests that a greater proportion of higher-income children than WIC children consumed diets that were consistent with the sodium UL.

Healthy Eating Index Scores

- On average, 2-4-year-old children scored 70.4 out of a possible 100 on the HEI. Slightly more than a quarter (26%) had "good" diets, 8 percent had "poor" diets, and the majority (66%) had diets needing improvement. These general patterns were observed for all three groups of 2-4-year-old children and none of the differences in total HEI scores between WIC participants and nonparticipants was statistically significant. The HEI is a composite score constructed from 10 individual scores: five food groups (grains, vegetables, fruits, dairy, and meat), four nutrient-based components, and a variety score.[7]

- The HEI food consumption goal that presented the greatest difficulty for 2-4-year-old children was the goal for vegetable consumption. Mean scores for the vegetable component of the HEI ranged from 4.8 to 5.1, compared with a perfect score of 10, and less than one-quarter of the children in each group consumed the recommended number of daily vegetable servings.

- The only difference in food-based HEI component scores of WIC children and income-eligible nonparticipant children was observed for the fruit component (WIC children scored significantly higher with a score of 6.4 vs. 5.3). WIC food packages include 100% fruit juices, which are counted in the fruit component of the HEI.

- Differences in food-based HEI component scores of WIC children and higher-income nonparticipant children were observed for the dairy and meat scores. WIC children had significantly lower mean scores for the dairy component, although the size of the difference was relatively small (7.8 vs. 8.2). WIC children had significantly *higher* scores for the meat component and the difference in scores was substantial (7.0 vs. 5.7). WIC food packages include eggs, peanut butter, and dried beans and peas—all foods that are considered in the meat component of the HEI.

Health-Related Behaviors

Breastfeeding

Official WIC policy has always encouraged breastfeeding, while at the same time providing access to infant formula for nonbreastfeeding infants. The focus on breastfeeding promotion increased during the late 1980s and early 1990s. Therefore, NHANES-III data were collected during a time when WIC breastfeeding promotion strategies were evolving and do not reflect current program policies and procedures in this area. For this reason, NHANES-III breastfeeding data for WIC participants must be interpreted with caution.

- At the time NHANES-III data were collected, 54 percent of all infants and children under the age of 5 had been breastfed for some period of time. Among those ever breastfed, 41 percent had been breastfed for at least 6 months and 16 percent had been breastfed for at least a year.

- WIC infants were significantly less likely to have ever been breastfed than either income-eligible or higher-income nonparticipant infants (39% vs. 51% and 71%). Among infants ever breastfed, WIC

[7]The nutrient-based components compare intakes to recommendations included in the *Dietary Guidelines for Americans* and in the National Research Council's *Diet and Health* report (NRC, 1989b).

infants were significantly less likely than higher-income infants to have been breastfed for 6 months (31% vs. 42%).

- WIC children 1-4 years of age were significantly less likely than higher-income children to have ever been breastfed (41% vs. 67%). Among children who were breastfed as infants, however, there were no differences between WIC participants and nonparticipants in the percentage breastfed for 6 months or more, the percentage breastfed for a year or more, or in the mean duration of breastfeeding.

- Overall, breastfed WIC infants were significantly more likely to receive supplemental formula than breastfed infants in either of the nonparticipant groups (91% vs.81% and 78%). In addition, breastfed WIC infants were fed formula on a daily basis at a significantly younger age than higher-income breastfed infants (6.6 weeks vs. 9.1 weeks).

- Among 1-4-year-old children who had been breastfed, there were no significant differences, overall, between WIC participants and either group of nonparticipants in the percentage who never received supplemental formula or in the age at which formula was first fed on a daily basis.

Infant Feeding Practices

- WIC infant feeding guidelines, as well as guidelines issued by the American Academy of Pediatrics (AAP), recommend that cow's milk not be introduced until 12 months of age (USDA, FNS, 2003c and AAP, 2003). Early introduction of cow's milk was significantly less common for WIC infants and children than for infants and children in either of the nonparticipant groups (11% vs. 27% and 18% for infants and 31% vs. 46% and 41% for children).

- It is recommended that infants be fed beverages from cups rather than bottles as soon as they are able to sit erectly on their own. At about a year of age, there was a noteworthy decline in use of baby bottles in all three groups of children. However, the rate of decline was significantly slower for WIC children than for higher-income children. At each year of age, the proportion of children using a baby bottle was significantly greater for WIC participants than for higher-income nonparticipants.

- Recommended infant feeding practices suggest that infants not receive solid foods before they are 4 months old (USDA, FNS, 2003c and AAP, 2003). WIC infants and children were no more or less likely than nonparticipant infants and children to be fed solid foods before they were 4 months of age. On average, however, WIC children were significantly older than higher-income children (6.3 months vs. 5.5 months) when they began to eat solid foods on a daily basis.

Physical Activity Practices of Pregnant and Postpartum Women

- Pregnant and postpartum women enrolled in WIC were about as physically active as income-eligible nonparticipants, but less physically active than higher-income nonparticipants.[8] Twenty-seven percent of WIC women engaged in some physical activity at least three times per week, and 15

[8]Sample sizes were too small to support separate analyses for pregnant and postpartum women.

percent engaged in physical activity at least five times per week. This compares with 45 percent and 34 percent of higher-income nonparticipants, respectively.

Women's Use of Alcohol and Tobacco

- Patterns of alcohol consumption among pregnant and postpartum women were comparable for WIC participants and income-eligible nonparticipants. WIC participants, however, were less likely than higher-income nonparticipants to have consumed 12 or more alcoholic drinks in their lifetime (72% vs. 85%) or during the past year (21% vs. 46%). Among women who consumed alcohol during the past year, the mean number of drinks consumed on an average drinking day was significantly *greater* for WIC participants than for higher-income nonparticipants.

- There were no significant differences between WIC participants and either group of nonparticipants in the prevalence of smoking (ever or in the past 5 days) or in the mean number of cigarettes smoked by current smokers. However, WIC women reportedly started smoking at a younger age than higher-income women.

Health Status, Conditions, and Risks

General Health Status

- WIC participants and income-eligible nonparticipants had approximately equivalent health status, as measured by both self-reports and physician assessments. Roughly 63 percent of WIC participants and income-eligible nonparticipants rated their health as very good or excellent, 30 percent rated their health as good, and about 7 percent rated their health as fair or poor. According to physician assessments, which tended to be more positive, more than 85 percent of both WIC participants and income-eligible nonparticipants were in very good or excellent health and 12 percent of both groups were in good health.

- WIC participants were significantly *less* likely than higher-income nonparticipants to rate their health status as very good or excellent (62% vs. 84%) and were significantly *more* likely to rate their health status as fair or poor (8% vs. 2%). These between-group differences were consistently observed for women, infants, and children. Physician assessments revealed the same pattern of differences between WIC participants and higher-income nonparticipants; however, the magnitude of the between-group differences was smaller and only the difference in the percentage considered to be in excellent or very good health was statistically significant (87% vs. 91%). The between-group difference was concentrated among women.

Pregnancy and Childbirth History

- There were no significant differences between WIC women and income-eligible women in the mean number of pregnancies, mean number of live births, mean age at time of first live birth, or the percent of women who were teenagers or more than 35 years of age at the time of their first live birth. In comparison with higher-income nonparticipants, however, WIC participants had a significantly greater number of live births (1.6 vs. 1.1), were significantly younger at the time of their first live birth, and were more likely to have been teenagers.

Birth Characteristics of Infants and Children

- WIC infants were born to younger mothers, on average, than either income-eligible infants or higher-income infants (mean age of 24.1 years vs. 25.7 years and 28.9 years). In addition, WIC children were born to younger mothers than higher-income children (24.8 years vs. 28.2 years).

- WIC infants were also significantly more likely than infants in either nonparticipant group to be born to teenage mothers (23% vs. 14% and 3%). A similar pattern was observed among children; however, the difference between WIC children and income-eligible children was not statistically significant.

- Both WIC infants and WIC children were less likely than their higher-income nonparticipant counterparts to be born to mothers over age 35 (4% vs. 11% for infants and 4% vs. 9% for children).

- There was no significant difference between WIC infants and children and income-eligible infants and children in the percentage born to women who smoked during the pregnancy. In comparison with higher-income infants and children, however, WIC infants and children were significantly more likely to have been born to mothers who smoked (27% vs. 17% for infants and 29% vs. 19% for children).

- WIC infants and children had significantly lower mean birthweights (as reported by parents and caregivers) and were more likely to be low birthweight (less than 2,500 gm. or 5.5 pounds), than nonparticipant infants and children. The prevalence of low birthweight among WIC infants was twice that of income-eligible infants and three times that of higher-income infants (12% vs. 6% and 4%). Children showed a comparable pattern, but the between-group disparities were smaller (12% vs. 8% and 5%). These results are not surprising, given that low birthweight is a nutritional risk criteria used to establish program eligibility. Moreover, low birthweight infants may stay on WIC longer than normal weight infants because they tend to have more problems.

Children's Weight Status

- Among 1-4-year-old children, there was no significant difference between WIC participants and income-eligible nonparticipants in the prevalence of overweight (defined as being at or above the 95th percentile on CDC weight-for-height growth charts). However, WIC children were significantly more likely to be overweight than higher-income children (7% vs. 4%). There were no statistically significant differences between WIC participants and either group of nonparticipants in the percentage of children at risk of overweight (at or above the 85th percentile on the weight-for-height growth charts).

- WIC children were significantly more likely than income-eligible children to be underweight (weight-for-height below the 5th percentile) (7% vs. 3%). There was no significant difference between WIC children and higher-income children in the prevalence of underweight.

- WIC children had a greater prevalence of growth retardation (height-for-age below the 5th percentile) than either group of nonparticipant children (9% vs. 5% and 2%); however, only the difference between WIC children and higher-income children was statistically significant.

Iron Deficiency, Iron Deficiency Anemia, and Anemia

- **Iron Deficiency.** The overall prevalence of iron deficiency among 1-4-year-old children was about 6 percent. Prevalence was greatest among 1-year-olds (13%) and was substantially lower for older children. Overall, WIC children were significantly less likely than income-eligible children to be iron deficient (5% vs. 10%). Overall, there was no significant difference between WIC children and higher-income children in the prevalence of iron deficiency.

- **Iron Deficiency Anemia.** Iron-deficiency anemia (defined as being iron-deficient *and* having a low hemoglobin) was observed in about 2 percent of all 1-4-year-old children. WIC children were significantly more likely than higher-income children to have iron-deficiency anemia, although this was a relatively uncommon finding for all children, particularly those older than 2.

- **Anemia.** The prevalence of anemia, defined on the basis of low hemoglobin or hematocrit, was substantially greater than the prevalence of iron-deficiency anemia, as assessed in this analysis. Low hemoglobin levels may be caused by factors unrelated to iron status, including infection, inflammation, deficiencies of other nutrients (unlikely with this age group), and hereditary anemias. WIC children were no more or less likely than income-eligible nonparticipant children to have anemia (low hemoglobin). In comparison with higher-income children, however, WIC children were more likely to be anemic (9% vs. 6%).

Lead Poisoning

The problem of lead poisoning has been declining sharply in recent years. Between NHANES-II (1976-80) and the first phase of NHANES-III (1988-91), the overall prevalence of lead poisoning in the population as a whole decreased from 77.8 percent to 4.4 percent (CDC, 1997). Between Phase I (1988-91) and Phase II (1991-94) of NHANES-III, the overall prevalence of high blood lead levels continued to decline, with percentage point decreases generally being greater among groups with the highest prevalence of elevated lead levels during Phase I (CDC, 1997).

- According to data from Phase II of the NHANES-III data collection, WIC children were significantly more likely than either group of nonparticipating children to have elevated levels of blood lead.

Exposure to Second-hand Smoke

- WIC participants were no more or less likely than income-eligible nonparticipants to be exposed to second-hand smoke produced by smokers living in the same household. In comparison with their higher-income nonparticipant counterparts, however, WIC participants were more likely to be exposed to second-hand smoke. This was true for all three categories of WIC participants (women, infants, and children).

- NHANES-III measured serum cotinine in all respondents 4 years of age and older. Serum cotinine is a breakdown product of nicotine that is used as a biological marker for tobacco use and exposure to environmental tobacco smoke. There were no significant differences between WIC participants and income-eligible nonparticipants in the prevalence of high serum cotinine levels, but WIC participants had higher prevalence when compared with higher-income nonparticipants (78% vs. 52%).

Dental Health

- WIC women and income-eligible women had comparable numbers of missing, decayed, and filled teeth. In comparison with higher-income women, however, WIC women had fewer teeth that were missing, decayed, or filled.[9]

- Children 2 to 4 years of age had, on average, about one missing, decayed, or filled tooth. Although differences between groups were small, WIC children and significantly fewer missing, decayed, or filled teeth than higher-income children. This difference was observed for each age-specific cohort except 3-year-olds.

- Close to 100 percent of pregnant and postpartum women reported visiting a dentist or dental hygienist at least once in their lifetime, and 63 percent reported visiting a dental health professional in the past year. There were no statistically significant differences between WIC women and either group of nonparticipating women in these health practices.

- Among children 2-4 years old, 38 percent visited a dental health professional at least once and 36 percent visited a dental health professional in the past year. WIC children were no more or less likely to have had dental care visits than higher-income children. However, WIC children were significantly more likely than income-eligible children to have visited a dental health practitioner, ever (41% vs. 30%) or in the past year (39% vs. 29%).

Access to Health Care Services

Health Insurance Coverage

- Among women, there was no difference between WIC participants and income-eligible nonparticipants in the rate of health insurance coverage (79% vs. 80%). However, in comparison with higher-income women, women participating in WIC were significantly less likely to have health insurance.

- Among infants and children, WIC participants were *more* likely than income-eligible nonparticipants and *less* likely than higher-income nonparticipants to have health insurance.

- WIC participants were significantly *less* likely than individuals in either of the nonparticipant groups to have private health insurance coverage and were *more* likely to be receiving Medicaid benefits. These patterns were observed separately for women, infants, and children; however, among women, the difference between WIC participants and income-eligible nonparticipants in the receipt of private health insurance was not statistically significant.

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[9] Reasons for differences between WIC participants and higher-income nonparticipants in the number of missing, decayed, and filled teeth could not be explored in this report. It is possible that the difference is due to better dental care for higher-income nonparticipants. For example, higher-income nonparticipants may have more *filled* teeth than WIC participants, resulting from attention to caries detected by x-ray rather than those causing pain or clearly visible on the exterior of a tooth.

Regular Source of Health Care

- More than 8 out of 10 pregnant and postpartum women reported having a regular source of health care—that is, a clinic, health center, or doctor's office that was usually used for health care needs or to obtain health-related advice and information. There were no significant differences between WIC participants and nonparticipants in this regard.

- Overall, 97 percent of all infants and 95 percent of children had a regular source of health care. Nonetheless, WIC infants were significantly *more* likely than income-eligible nonparticipant infants and just as likely as higher-income nonparticipant infants to have a regular source of health care. Among children, WIC participants were *more* likely than income-eligible nonparticipants and *less* likely than higher-income nonparticipants to have a regular source of health care.

- WIC participants were no more or less likely to have a regular health care provider than their counterparts in the income-eligible nonparticipant group. However, in comparison with higher-income nonparticipants, all three categories of WIC participants were less likely to have a regular health care provider. Between-group differences were most substantial for women and children. Just over half (53%) of WIC women reported having a regular provider, compared with 82 percent of higher-income women. Similarly, 69 percent of WIC children had a regular health care provider, compared with 87 percent of higher-income children.

Chapter One
Introduction

This report describes the nutrition and health characteristics of participants and nonparticipants in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), using data from the Third National Health and Nutrition Examination Survey (NHANES-III).[1] The NHANES survey is the primary source of information used in monitoring the Nation's nutrition and health status. NHANES-III was completed between 1988 and 1994 and provides data for a large nationally representative sample of individuals.[2]

A broad array of measures is used to describe the nutrition and health characteristics of WIC participants and two groups of nonparticipants: low-income individuals who were income-eligible for WIC (household income at or below 185 percent of poverty) and higher-income individuals who were not income-eligible for WIC (household income above 185 percent of poverty). Because of age-based variations in NHANES-III data collection protocols and small samples of pregnant and postpartum women, data were not consistently available for the three major categories of WIC participants (pregnant and postpartum women, infants, and children). Data availability was greatest for children and most limited for women.

For children, data are provided on dietary intake, breastfeeding and infant feeding history, birth characteristics, weight status, nutritional biochemistries, general measures of childhood health, and dental health. For infants, information is provided on breastfeeding and infant feeding practices, birth characteristics, and hospitalizations, accidents, and injuries since birth. Data reported for women include physical activity, use of alcohol and tobacco, pregnancy history, and dental health. Finally, data on general health status, exposure to second hand smoke, health insurance coverage, and access to a regular source of health care are provided for all three groups (women, infants, and children).

This research was not designed to assess program impacts or in any way attribute differences observed between WIC participants and either group of nonparticipants to an effect of the program. Rather, it was designed to establish a baseline from which to monitor the nutrition and health characteristics of WIC participants and nonparticipants over time and to generate questions and hypotheses for future research. The data presented in this report provide useful background information for researchers interested in studying the nutrition and health characteristics of low-income populations and/or the impact of participation in food assistance programs, or other variables, on nutrition and health characteristics. The data also provide important insights for individuals who plan and implement nutrition or health programs for preschool children, infants, and pregnant and postpartum women.

This introductory chapter provides an overview of the WIC Program as well as a brief descrip-

[1] Similar reports have been prepared for participants and nonparticipants in the Food Stamp Program (FSP) (Fox and Cole, 2004a), for school-age children (Fox and Cole, 2004b), and for older adults (Cole and Fox, 2004).

[2] Beginning in 1999, NHANES became a continuing survey, without breaks between data collection cycles. Similar sampling and data collection procedures are used, although at least two years of data are necessary to have adequate sample sizes for subgroup analyses (Flegal et al., 2002). Data for the first two continuous years of the ongoing NHANES (1999-2000) have been released since the tabulations presented in this report were prepared. Data for subsequent years are expected in mid-2005.

tion of the NHANES-III data and the general approach to the analysis. The five chapters that follow present data on the nutrition and health characteristics listed previously. Details on data and methodology may be found in appendices referenced throughout the report.

The WIC Program

The WIC program, administered by the U.S. Department of Agriculture's (USDA) Food and Nutrition Service (FNS), provides supplemental foods, nutrition education, and health and social service referrals to eligible pregnant women, breastfeeding and nonbreastfeeding postpartum women, infants, and children up to 5 years of age. In FY 2002, WIC served 7.5 million participants per month and accounted for approximately 11.4 percent of the $38 billion Federal expenditure for food assistance and nutrition programs (FANPs) (USDA, FNS, 2003a).

Program Eligibility

WIC eligibility is based on four factors: State residence, categorical eligibility, income eligibility, and nutritional risk. WIC participants must be residents of the State or other jurisdiction (U.S. territory or Indian Tribal Organization) supplying the WIC benefits, unless they are part of a migrant farm worker family.

Participants must also belong to one of five categorically eligible groups—women during pregnancy and up to 6 weeks after delivery, breastfeeding women (who may participate for up to a year after giving birth), postpartum women who are not breastfeeding (who may participate for up to 6 months after giving birth or other termination of pregnancy), infants (0-12 months), and children up to the age of 5 years. Children and infants comprise the majority of WIC participants. In April 2002, 50 percent of all WIC participants were children and 26 percent were infants. The remaining 24 percent were women—11 percent pregnant women, 7.5 percent postpartum nonbreastfeeding women, and 5.7 percent breastfeeding women (Bartlett et al., 2003 and Kresge, 2003).

Income-eligibility criteria are defined by each State WIC agency according to Federal guidelines. The income limit may not exceed 185 percent or be less than 100 percent of Federal poverty guidelines, which are based on household size. As of April 2000, all State agencies defined income eligibility for WIC as less than or equal to 185 percent of poverty (Bartlett et al., 2002).

Income eligibility may also be established by participation in other means-tested programs. FNS regulations require WIC agencies to accept applicants as adjunctively income-eligible for WIC if they document participation in Medicaid, Temporary Assistance for Needy Families (TANF), or the Food Stamp Program (FSP).[3] As of October 1998, applicants not certified under adjunctive income-eligibility provisions must present documentation of income at certification (P.L. 105-336). Before P.L. 105-336 went into effect, some States allowed applicants to self-report income without documentation.

Finally, each WIC participant must be determined to be at nutritional risk, based on assessment by a competent professional authority such as a physician, nutritionist, nurse, or other health professional. For participants over 9 months of age, assessment of nutritional risk must include, at a minimum, measurement of height (or

[3]Since the mid-1980s, several legislative actions have expanded Medicaid income eligibility for pregnant women, infants, and children. As a result, some States have adopted Medicaid income-eligibility limits that exceed the WIC maximum of 185 percent of poverty. Although the number of States using such income-eligibility requirements has been increasing in recent years, this situation was relatively uncommon when the NHANES-III data were being collected. In 1990, the earliest year for which data are available, Medicaid eligibility guidelines in all States were consistent with WIC eligibility guidelines (National Governor's Association (NGA), 1990). In 1994, the last year of NHANES-III data collection, two States had Medicaid income- eligibility limits for pregnant women and infants that exceeded the WIC cutoff (NGA, 1994).

length) and weight and a hematological test for anemia.

Prior to 1999, State agencies established their own nutritional risk criteria following broad guidelines in Federal regulations. This autonomy meant that the criteria used to define nutritional risk and, consequently, program eligibility, varied across State agencies. This variability raised concerns about equity. To address these concerns, FNS asked the Institute of Medicine (IOM) to review the scientific basis for the risk criteria used in the program. The IOM reviewed nutritional risk criteria being used by States and made recommendations about appropriate criteria for future use (IOM, 1996). The IOM report formed the basis for a standardized list of nutritional risk criteria to be used in all WIC programs nationwide. States are still free to define the specific criteria used to determine program eligibility but, since April 1, 1999, criteria must be selected from the approved list.

Some of the measures examined in this report are indicators of nutritional risk that may qualify individuals for WIC participation. Consequently, the prevalence of these characteristics may be greater among WIC participants than nonparticipants. To the extent feasible, text discussions point out nutritional risk criteria that may have been used by States during the NHANES-III data collection period (based on mention in the IOM (1996) report).

Program Participation

The number of individuals participating in WIC increased steadily from the program's inception in 1975 through the late 1990s. Since then, WIC participation has leveled off. Average monthly WIC participation increased from 4.5 million in 1990 to 7.5 million in 2002. However, during this period the annual percentage increase in participation declined from an average of 9 percent during 1990 to 1995 to only 1 percent during 1996 to 2002 (USDA, FNS, 2003a).

In addition, there has been a slight shift in the composition of the WIC participant population since the early 1990s. This shift occurred largely as a result of increased funding that allowed local programs to serve lower-priority participant groups, such as children.[4] Specifically, the number of children has increased, relative to the number of women and infants. In 1990, children comprised 46.3 percent of WIC participants. In 2002, children comprised 50.1 percent of all WIC participants. Over the same time period, the percentage of WIC participants who were pregnant or postpartum women remained relatively constant (23.9% in 1990 vs. 24.1% in 2002), and the percentage of WIC participants who were infants decreased (29.8% in 1990 vs. 25.7% in 2002) (Randall and Boast, 1994 and Bartlett et al., 2003).

Program Benefits

WIC seeks to improve the health of program participants by serving as an adjunct to good health care and by providing supplemental foods, nutrition education, and referral to needed health and social services.

Supplemental Foods

The supplemental foods provided by WIC are good sources of nutrients that research has identified as typically lacking in the diets of low-income pregnant women and children—protein, iron, calcium, and vitamins A and C. Foods available in WIC food packages include milk, eggs, cheese, dried beans and peas, peanut butter, full-strength (100%) fruit or vegetable juices, breakfast cereals that are high in iron and low in sugar, and, for certain breastfeeding women, carrots and canned tuna. Infant packages include iron-fortified infant formula and

[4]WIC employs a priority system for filling vacancies that occur after a local agency has reached its maximum caseload (based on available funding). Children have a lower priority in this system than pregnant women, breastfeeding women, and infants with specific types of nutritional risks.

infant cereals as well as infant juices that are high in vitamin C.

The type and quantity of foods provided vary according to participants' eligibility category, nutritional needs, and, to the extent possible, personal preferences. Most WIC participants receive vouchers or checks to use in purchasing supplemental foods at local grocery stores. In a limited number of geographic areas, foods are delivered to participants' homes or participants pick up foods at warehouses. In recent years, several States have conducted pilot tests on the use of electronic benefits transfer (EBT) systems in disbursing WIC benefits. At least one State has implemented EBT Statewide and several other States are considering Statewide EBT systems.

Nutrition Education

The WIC food package does not meet participants' total nutrient needs. Therefore, nutrition education is an essential part of the WIC Program. It provides a mechanism for ensuring that WIC participants learn about healthy eating practices and that they are encouraged to adopt positive food-related attitudes and behaviors. Program regulations define two broad goals for WIC nutrition education:

- to stress the relationship between proper nutrition and good health, with special emphasis on the nutritional needs of the program's target populations; and

- to assist individuals at nutritional risk in achieving a positive change in food habits, resulting in improved nutritional status and the prevention of nutrition-related problems.

In practice, WIC nutrition education encompasses many other topics such as breastfeeding promotion, the need to avoid cigarettes, alcohol, illicit drugs, and over-the-counter medications during pregnancy, and the importance of childhood immunizations.

Each year, State agencies are required to use for nutrition education activities an amount that is equal to at least one-sixth of their annual expenditures for nutrition services and administrative (NSA) costs. Local WIC agencies are required to offer all adult participants and caretakers of infant and child participants at least two nutrition education contacts during each certification period. Participants are generally certified for periods of 6 months; however, infants may be certified for 1 year and pregnant women are certified for the duration of their pregnancy and up to 6 weeks postpartum. For infants with certifications that extend beyond 6 months, nutrition education must be offered to parents or caregivers on a quarterly basis.

Although local WIC agencies are required to offer nutrition education, participants are free to decline these services without affecting receipt of other program benefits. There is evidence that some WIC participants do not take advantage of the nutrition education opportunities provided by WIC (Fox et al., 1999). To maximize participation, local agencies tend to schedule nutrition education activities to coincide with issuance of WIC vouchers.

State and local WIC agencies have broad autonomy to develop plans and procedures for providing nutrition education to WIC participants. Consequently, WIC nutrition education is quite diverse and may vary both in quantity and quality from one site to the next. A variety of different methods may be used to provide nutrition education. For example, participants may be counseled one-on-one, may attend classes, or may view videos, filmstrips, or slide presentations on a variety of nutrition- and health-related topics. Providers are encouraged to ensure that nutrition education messages take

into account participants' educational levels, nutritional needs, household situations, and cultural preferences.

Referrals to Health Care and Social Services

Local WIC agencies are expected to promote routine use of preventive health care services. Through co-location with health service providers or referrals to other agencies, WIC service delivery sites serve as a link between the participant and the health care system. Coordination between WIC and social service programs has increased since 1989, when Federal law created adjunctive income-eligibility for WIC benefits based on eligibility for other programs. Local WIC staff are encouraged to provide referrals, as needed, to appropriate social services, such as the FSP, Medicaid, TANF, and other programs relevant to participants' needs (such as smoking cessation programs, alcohol and drug treatment programs, parenting classes). The degree to which local WIC agencies facilitate access and referrals to other services varies, depending on the adequacy of health and social service infrastructures at the State and local level and the extent to which participants are already linked into health and social service networks before coming to WIC (Fox et al., 1999).

The Third National Health and Nutrition Examination Survey

NHANES-III was conducted by the National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC) between 1988 and 1994. The survey included interviews and physical examinations and was designed to provide national estimates of the health and nutrition status of the civilian, noninstitutionalized population in the 50 United States.

NHANES-III was based on a complex multistage probability sample design (NCHS, 1994). Persons were selected on the basis of sex, age, and race or ethnicity. Children under 6 years of age, adults over 60 years of age, and black and Mexican American persons were oversampled. NHANES-III collected data from 33,994 persons 2 months of age and older. Response rates were 85.6 percent for the household interviews and 78.8 percent for the physical examinations (NCHS, 1996). Total NHANES-III samples for the population subgroups served by WIC are 4,744 children under 5 years of age, 1,961 infants, and 667 pregnant and postpartum women.

Interviews were conducted in respondents' homes and physical examinations and measurements were completed in a Mobile Exam Center (MEC). The MEC examination included a physical exam, dietary interview, health interview, blood tests, body measurements, and a dental exam. The dietary interview included a single 24-hour recall that collected quantitative data on foods and beverages consumed during the preceding 24 hours.[5] NCHS staff used these data to calculate nutrient intakes, using food composition data from the Survey Nutrient Database maintained by USDA's Agricultural Research Service (ARS).

Analytic Approach

WIC participants and nonparticipants in the NHANES-III sample were identified by response to a question that asked about current WIC participation: "(Are you/is [infant/child]) now receiving benefits from the WIC program?" This question was asked during the MEC interview, which included a subsample of all NHANES-III respondents. Consequently, the analyses presented in this report are based on the MEC-examined subsample. (The other volumes in this series use the NHANES-III household

[5]For adults (17 years and older), NHANES-III also included a food frequency questionnaire, administered as part of the household interview. The food frequency had a 1-month reference period and was designed to collect qualitative information about dietary patterns. Data from the food frequency were not analyzed for this report.

interview sample or MEC sample, depending on the analysis variable being examined).

Respondents who reported current WIC participation were considered WIC participants. Those who did not report current participation were considered nonparticipants.[6] Nonparticipants were further subdivided into those who were income-eligible for WIC (household income at or below the WIC cutoff of 185 percent of poverty) and those whose income exceeded eligibility requirements (income above 185 percent of poverty).[7]

Participants and nonparticipants were divided into three subgroups corresponding to the three major categories of WIC participants: pregnant and postpartum women, infants (2-12 months of age), and children (1-4 years of age). To accurately reflect categorical-eligibility criteria, the sample of women was limited to pregnant women, nonbreastfeeding women who gave birth within the past 6 months, and breastfeeding women who gave birth within the past 12 months.

[6]Some nonparticipants may have participated in WIC previously. For example, nonparticipant women may have participated in WIC during a previous pregnancy or, for postpartum women, during their pregnancy. Nonparticipating infants and children may have participated at some point prior to the time data were collected. NHANES-III data on WIC participation are not adequate to examine patterns of WIC participation over time. Burstein et al. (2000) analyzed data from the 1993 panel of the Survey of Income and Program Participation (SIPP) and found that most infants and children who enter the WIC program (70 percent) do so during infancy. Most infants (81 percent) go on to participate as children, but participation declines sharply as children age.

[7]NHANES-III data include individuals who reported participation in WIC and reported household income above the 185 percent of poverty cutoff used to define income-eligibility for WIC. This was true for 9.6 percent of those reporting WIC participation. Several factors may contribute to these situations: NHANES-III measures income as a range rather than as an exact value and uses the midpoint of the range to compare household income to the poverty line; WIC eligibility is based on contemporaneous measures of household income, while NHANES-III measured income retrospectively (over the past 12 months); NHANES-III interviewers and WIC staff may have used different probes or techniques to ascertain household income; and, as noted above, during the last 2 years of NHANES-III data collection two states used an income-eligibility cutoff for Medicaid that exceeded 185 percent of poverty. Individuals who reported WIC participation are included in the WIC participant group, regardless of reported household income.

For each variable examined, detailed tables were produced showing estimates for each of the subgroups for which data were available. Data for children were also broken down by year of age. Readers interested in comparing data for women, infants, or children to the population as a whole, or to other subgroups of the population, are referred to volume I in this series (Fox and Cole, 2004a). The detailed tables that accompany that volume include data for the entire population as well as for 72 gender-and-age-specific subgroups.

Table 1 illustrates the format used in the detailed tabulations. Table columns show data for all persons as well as for WIC participants and the two groups of nonparticipants. Table rows show data for the specific subgroups included in the tabulation. Table 1 also shows the maximum sample size for each table cell. For comparison purposes, sample sizes for the full NHANES-III household interview are provided as well (column 1). (As noted previously, this report used the MEC-examined sample because the question on current WIC participation was collected as part of the MEC interview).

All detailed tables include footnotes that clearly identify data source(s). Brief descriptions of the various NHANES-III data files are provided in appendix A. Tables also include footnotes, as appropriate, that identify reference standards used in interpreting NHANES-III data. Reference standards are described in appendix B. To the extent possible, standards are based on those used in the *Healthy People 2010* objectives (U.S. Department of Health and Human Services (U.S. DHHS), 2000a).

Age and Population Adjustment

Detailed tables that show data for children by year of age also present data for the total population of children. These "Total, age-adjusted" estimates are standardized according to the age distribution of the U.S. population in the year

Table 1—Number of NHANES-III respondents: WIC participants and nonparticipants

	Household Interview	MEC Examined			
	Total persons	Total Persons	Currently Receiving WIC Benefits	Income-eligible Nonparticipants	Higher-income Nonparticipants
Women[1]	1,050	667	181	247	185
Infants	2,107	1,961	787	348	731
Children					
1 year old	1,339	1,258	419	391	357
2 years old	1,350	1,269	253	545	387
3 years old	1,186	1,119	201	513	325
4 years old	1,169	1,098	137	547	342
All children	5,044	4,744	1,010	1,996	1,411
Total	8,201	7,372	1,978	2,591	2,327

[1] Pregnant women responded yes to 'Are you now pregnant? Pregnant women identified only by urinalysis results are not included in table.

Source: NHANES-III, 1988-94. WIC participation is asked during the MEC exam.

2000. Age-adjustment is important for comparisons between subgroups and for trend analyses between NHANES surveys. When comparing subgroups such as WIC participants and nonparticipants at a point in time, age-adjustment eliminates between-group differences that are due solely to differences in the age distributions of the groups (U.S. DHHS, 2000b).

Detailed tables that show data for each of the three participant categories (women, infants, and children, or W-I-C) also present data for the total population. These "Total, population-adjusted" estimates are standardized according to the year 2000 distribution of pregnant and postpartum women, infants, and children 1-4 years of age. Population adjustment eliminates between-group differences that are due solely to differences in the sample distribution across categories (W-I-C).

It is important to understand that age- and population-adjusted estimates do not represent the *true* or raw estimates for a given population or subgroup. Rather, the adjusted estimates should be viewed as constructs or indices that provide information on the relative comparability of two or more populations (in this case, WIC participants and nonparticipants) on a particular measure (U.S. DHHS, 2000b).[8]

The choice of a standard population to use in making age and population adjustments is somewhat arbitrary. For this report, adjustments are based on year 2000 Census estimates and year 2000 Vital Statistics data for the number of births, with the number of births used to derive the estimated number of pregnant and postpartum woman.[9] Use of year 2000 population estimates facilitates comparison of NHANES-III estimates with estimates from NHANES 1999-2000.

Population estimates are shown in table 2. The year 2000 population distribution shown in column 1 of table 2 was used to weight participant categories (W-I-C) in the NHANES-III sample frame, for WIC participants and each group of nonparticipants, so that totals reflect the year 2000 population distribution.

Statistical Tests

In addition to descriptive tabulations, the statistical significance of differences between WIC participants and each group of nonparticipants was tested using t-tests. When multiple outcome categories were examined simultaneously, the Bonferroni adjustment was used to adjust for multiplicity (Lohr, 1999). Nonetheless, because of the large number of t-tests conducted, caution must be exercised in interpreting results. In general, findings discussed in the text are limited to those with strong statistical significance (1 percent level or better) or those that are part of an obvious trend or pattern in the data.

Text discussions generally focus on differences between WIC participants and one or both groups of nonparticipants. Reference may be made to other between-group differences when the differences are noteworthy, for example, differences among children by year of age. The statistical significance of these secondary comparisons has not been tested, and this fact is

[8]Separate estimates for children by year of age, infants, and women *do* represent true or raw estimates for these population subgroups.

[9]Table 2 shows Census 2000 population estimates for infants and children (by year of age and total) in April 2000. The estimated population of women (pregnant, breastfeeding, and nonbreastfeeding postpartum) in April 2000 is based on the number of births in the year 2000 adjusted by the following multipliers: number of pregnant women with gestation > 3 months = # births * 7/12; number of postpartum women (breastfeeding and nonbreastfeeding) who gave birth in past 6 months = # births * 0.5; number of breastfeeding women between 6 and 12 months postpartum = # births * 0.2.

Table 2—Age distribution of WIC participants and nonparticipants in NHANES-III sample frame and year 2000 population

	Year 2000 population distribution		NHANES-III sample frame							
	Total Persons		Total Persons[1]		Currently Receiving WIC Benefits		Income-eligible Nonparticipants		Higher-income Nonparticipants	
	Population (thousands)	Percent	Population (thousands)	Percent	Population (thousands)	Percent	Population (thousands)	Percent	Population (thousands)	Percent
Women	5,208	21.6	5,233	23.8	865	20.5	1,518	21.9	2,851	26.3
Infants	3,815	15.8	2,987	13.6	1,133	26.9	527	7.6	1,328	12.2
Children										
1 year old	3,789	15.7	3,406	15.5	915	21.7	904	13.0	1,587	14.6
2 years old	3,757	15.6	3,572	16.2	518	12.3	1,310	18.9	1,743	16.1
3 years old	3,753	15.5	3,525	16.0	488	11.6	1,352	19.5	1,685	15.5
4 years old	3,825	15.8	3,271	14.9	293	7.0	1,321	19.1	1,656	15.3
All children	15,124	62.6	13,773	62.6	2,214	52.6	4,887	70.5	6,672	61.5
Total	24,147	100.0	21,994	100.0	4,212	100.0	6,931	100.0	10,851	100.0

[1] Total includes persons with missing income.

Source: NHANES-III, 1988-94. Year 2000 population of infants and children is from U.S. Census Bureau, *Monthly Estimates of the United States Population*, April 2000.
The estimated population of pregnant, breastfeeding, and nonbreastfeeding postpartum women for April 2000 is based on the number of births in the year 2000 adjusted by the following multipliers: number of pregnant women = # births * 7/12; number of postpartum women (breastfeeding and nonbreastfeeding) who gave birth in past 6 months = # births * 0.5; number of breastfeeding women between 6 and 12 months postpartum = # births * 0.2. It is assumed that pregnant women self-report their pregnancy status only after the second month of pregnancy.

noted in the text. Statistical tests were not performed on these second-level differences because of the expansive number of statistical tests performed in the main analysis and because these comparisons are not the focus of the report.

Additional information about the analytic approach, including use of NHANES-III sampling weights, calculation of standard errors, age standardization, and guidelines used to flag point estimates deemed to be statistically unreliable, is provided in appendix C. Individual point estimates may be deemed statistically unreliable because of small sample size or a large coefficient of variation. In keeping with NHANES-III reporting guidelines, such estimates are reported in detailed tables and are clearly flagged.

The chapters that follow summarize key findings. Graphics are used to illustrate observed differences between WIC participants and nonparticipants. Differences that are statistically significant at the 5 percent level or better are highlighted. Detailed tables provided in appendix D differentiate three levels of statistical significance ($p < .001$, .01, and .05). It is important to note that differences between WIC participants and nonparticipants may be statistically significant even if point estimates are unreliable. When this occurs, the text describes the existence and direction of the significant difference and identifies the group(s) for which point estimates are unreliable.

Comparisons between WIC participants and income-eligible nonparticipants are of primary interest. These comparisons provide useful insights into policy-relevant questions about program targeting, for example: are low-income individuals with the greatest nutritional and health needs receiving WIC services? Comparisons between WIC participants and higher-income nonparticipants are also of interest. These comparisons provide information on nutrition- and health-related disparities between WIC participants and individuals who are not constrained by low incomes. Both sets of comparisons also provide information on whether WIC participants do as well as other groups with respect to outcomes that WIC might be expected to improve.

As noted previously, however, this research was not designed to measure program impacts. Thus, significant differences that are observed between participants and nonparticipants cannot be attributed to participation in the WIC program; and similarly, the absence of a significant difference cannot be interpreted as evidence that WIC participation has no effect. Accurate assessment of WIC impacts requires specially designed studies or, at a minimum, complex analytical models that require a variety of measures that are not available in the NHANES-III dataset. It is also important to remember that, for characteristics used to define nutritional risk, differences observed between participants and nonparticipants may simply be a reflection of criteria for selection into the program.

Chapter Two

Usual Intake of Food Energy and Nutrients Among Children Ages 1 to 4

This chapter describes usual intakes of food energy and four key nutrients and, to the extent possible, the prevalence of adequate intakes among WIC participants and nonparticipants. Nutrients included in the analysis are vitamin C, iron, zinc, and calcium. Usual intakes of fat, saturated fat, cholesterol, sodium, and fiber were also examined. These data are presented in Chapter Three.

The analysis is limited to children who were age-eligible for WIC (1 through 4 years of age). Women were excluded because of small sample sizes and infants were excluded because of differences in the nutrient standards defined for children and infants.[1]

To provide some context for these discussions, the chapter begins with information on several factors that may influence the relative adequacy of children's dietary intakes. These include participation in the Food Stamp Program (FSP), household food sufficiency status, and meal and snacking patterns.

Participation in the Food Stamp Program

NHANES-III provides information on household participation in the FSP. The survey question used to define FSP participation for this analysis measured current participation: "(Are you/Is any member of this family) receiving food stamps at the present time?"

In reviewing data on FSP participation, it is important to bear two facts in mind. First, household survey data tend to yield lower estimates of program participation than estimates derived from program administrative data. For example, data from the Survey of Income and Program Participation (SIPP), which is generally recognized as the optimal source of survey data on program participation, underestimates participation in most programs by 10 to 15 percentage points (Trippe, 2000). Second, data reflect participation rates at the time the NHANES-III data were collected (1988-94) and therefore are not expected to be representative of *current* program participation rates.

The FSP uses a more stringent cutoff for income eligibility than the WIC program: 130 percent of the Federal poverty guideline rather than 185 percent. Therefore, to obtain the most useful information on FSP participation among WIC children and nonparticipant children, the analysis was limited to children who were income-eligible for the FSP.

Overall, 63 percent of 1-4-year-old children who were income-eligible for the FSP resided in households that participated in the FSP (table D-1). Given the expected underreporting in survey data, this estimate is consistent with historical data on child participation in the FSP during the

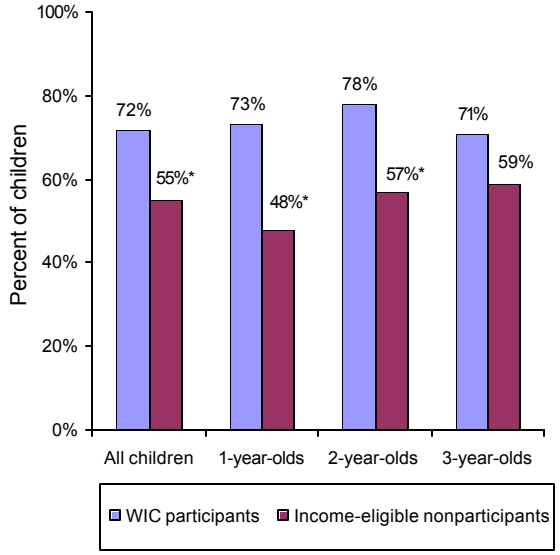
[1]The NHANES-III sample of women categorically eligible for WIC includes 294 pregnant women, 86 breastfeeding women, and 287 nonbreastfeeding postpartum women. These subgroups had to be examined separately because of differing nutritional requirements and had to be further divided into WIC participants and two groups of nonparticipants. Seven of nine cells in the stratified sample had fewer than 100 women. The reference standard used in estimating the prevalence of inadequate intakes of vitamin C, iron, and zinc—the Estimated Average Requirement (EAR)—has either not been defined for infants (vitamin C), or has been defined only for infants 7-11 months of age (iron and zinc).

relevant time period (1988-94) (Cody and Trippe, 1997).[2]

Among 1-4-year-old children who were income-eligible for the FSP, WIC participants were significantly more likely to participate in the FSP than nonparticipants. Overall, 72 percent of FSP-eligible WIC children resided in households that participated in the FSP, compared with 55 percent of FSP-eligible nonparticipant children (figure 1 and table D-1). This difference was concentrated among the youngest children (1-year-olds and 2-year-olds). A potential explanation for the increased rate of FSP participation among WIC children is the referral component of the WIC program, which is designed to ensure that participating families receive needed health and social services.

[2]Studies of FSP participation over time indicate that participation rates for income-eligible preschoolers were lower in the earliest years of NHANES-III (1988-91) than in later years (1992-94) (Cody and Trippe, 1997 and Stavrianos, 1997). The biennial WIC Participant and Program Characteristics Studies (for example, Bartlett et al., 2003) do not report FSP participation by WIC participant category, and the FSP participation rates that are reported apply to all WIC participants rather than to those who are income-eligible for the FSP.

Figure 1 - Percent of income-elgible 1-4-year-old children participating in the Food Stamp Program



*Statistically significant difference from WIC participants at the .05 level or better.

Note: "All children" includes 1-4-year- old children; 4-year-olds are not shown separately because the point estimate for 4-year-old WIC participants is statistically unreliable.

Source: NHANES-III, 1988-94.

Household Food Sufficiency

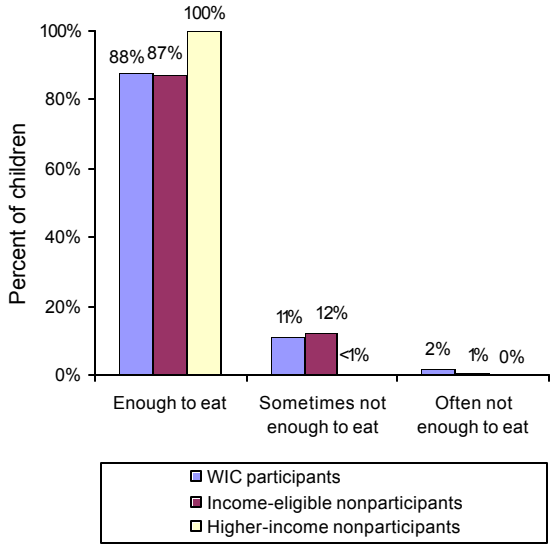
NHANES-III data were collected before dissemination of the 18-item Federal food security module, the currently accepted standard for measuring household and individual food security (Price et al., 1997 and Bickel et al., 2000). NHANES-III included a question that asked whether the household had enough to eat, sometimes did not have enough to eat, or often did not have enough to eat. Respondents who indicated that their household sometimes or often did not have enough to eat were asked how many days this occurred during the past month and why it occurred.[3] This measure has been used in NHANES-III as well as in other studies to identify households with food insufficiency (defined as households that report that there is "sometimes" or "often" not enough food to eat) (Alaimo et al., 1998).

The data indicate that the majority (87% or more) of 1-4-year-old children in all three groups resided in households that were food sufficient (households that always had enough to eat) (figure 2 and table D-2). Eleven percent of WIC children and 12 percent of income-eligible nonparticipant children lived in households that sometimes did not have enough food to eat. This problem was reported for less than 1 percent (0.5%) of higher-income nonparticipant children, but the difference between WIC participants and higher-income nonparticipants was not statistically significant.

Approximately two percent of WIC children lived in households that often did not have

[3]Versions of the questionnaires used in the last two rounds of data collection included additional followup questions about whether children or adults in the household had decreased the size of their meals because there was not enough food. These questions were not tabulated for this report because of the restricted nature of the sample.

Figure 2 - Distribution of 1-4-year-old children by household food sufficiency status



No statistically significant differences between WIC participants and either group of nonparticipants.
Source: NHANES-III, 1988-94.

enough food to eat. The same was true for one percent of income-eligible nonparticipant children and zero higher-income nonparticipant children. Neither of the differences between WIC participants and nonparticipants was statistically significant.

Because so few children in the various subgroups examined in this report resided in households that sometimes or often did not have enough to eat, the followup questions on how often and why households experienced these problems were not analyzed. Sample sizes were too small to produce reliable subgroup estimates.

Meals and Snacks Consumed

This analysis examined the number of meals and snacks consumed by 1-to-4-year-old children in the preceding 24 hours. Data from the 24-hour dietary recall were used to compute, for each child, the total number of meals and snacks consumed. (As dietary intakes were reported, respondents were asked to identify eating occasions as meals (breakfast, brunch, lunch, or dinner/supper) or snacks.) Responses to a separate survey question about daily breakfast consumption were also tabulated.

Number of Meals Consumed

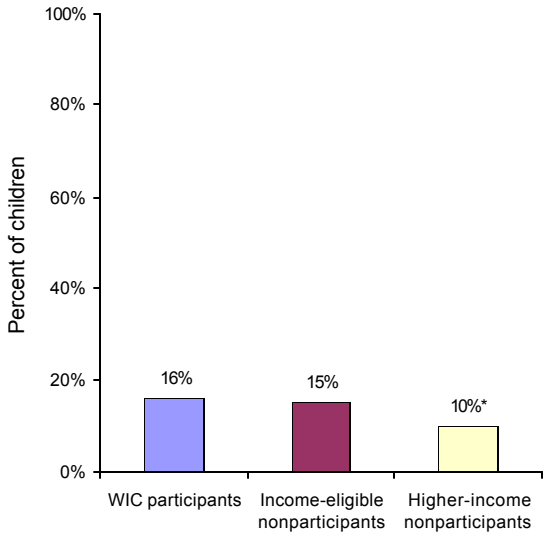
Overall, 13 percent of 1-4-year-old children consumed fewer than three meals per day (table D-3).[4] The percentage of WIC children who consumed fewer than three meals per day was comparable to that of income-eligible nonparticipants (15-16%) (figure 3). In comparison with higher-income nonparticipants, however, WIC children were more likely to consume fewer than three meals per day (16% vs. 10%). This difference was largely attributable to a difference among 2-year-olds (table D-3). In this age group, the proportion consuming fewer than three meals per day was twice as high for WIC participants than for higher-income nonparticipants (12% vs. 6%).

Consumption of Breakfast

NHANES-III included a separate question about usual breakfast consumption habits: "How often

[4]Data on the mean number of meals consumed is presented in table D-4.

Figure 3 - Percent of 1-4-year-old children consuming fewer than three meals per day



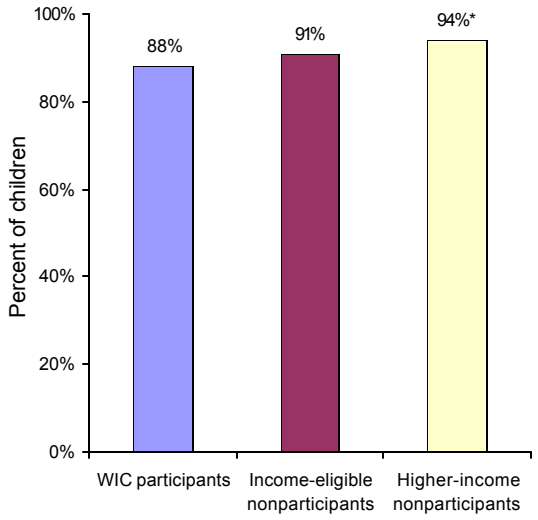
*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

does [child] eat breakfast?" Response options were every day, on some days, rarely, never, and on weekends only. Overall, the percentage of 1-4-year-old children who consumed breakfast every day was high—92 percent (table D-5). Among WIC children, 88 percent consumed breakfast every day. This compares with 91 percent of income-eligible nonparticipants and 94 percent of higher-income nonparticipants (figure 4). The difference between WIC participants and higher-income nonparticipants was statistically significant and may account for at least part of the difference in the percentage of WIC children and higher-income-nonparticipant children who consumed fewer than three meals per day.

Number of Snacks Consumed

Ninety-five percent of all 1-4-year-old children consumed at least one snack per day (table D-6). On average, children in all three groups consumed about three snacks per day (table D-7). WIC children consumed significantly more snacks per day, on average, than income-eligible nonparticipating children, but the difference was small (2.8 vs. 2.6).

Figure 4 - Percent of 1-4-year-old children consuming breakfast every day



*Statistically significant difference from WIC participants at the .05 level or better.

Source: NHANES-III, 1988-94.

Usual Intake of Food Energy and Key Nutrients

This section describes usual intakes of food energy, vitamin C, iron, zinc, and calcium among 1-4-year-old WIC participants and nonparticipants. Tabulations are based on the single 24-hour recall collected in NHANES-III. The data have been adjusted, however, to account for within-person variation using variance estimates from the Continuing Survey of Food Intake of Individuals (CSFII). (The procedures used in making these adjustments are described in appendix C.) As such, the data presented are indicative of children's *usual* dietary intakes, exclusive of vitamin and mineral supplements, and can be used to assess the prevalence of adequate intakes.[5]

Standards Used To Assess Adequacy of Usual Intake

Children's usual nutrient intakes were assessed relative to Estimated Average Requirements (EARs) and Adequate Intakes (AIs). EARs and AIs are part of a newly established set of dietary standards—the Dietary Reference Intakes (DRIs) (Institute of Medicine (IOM), 1999, 2000a, 2000b, 2002a, 2002b, 2004). The DRIs replace the *Recommended Dietary Allowances* (RDAs) used in most previous research (National Research Council (NRC), 1989a).[6] When adequate scientific evidence is available, an EAR is established. The EAR is

[5]Data on usual nutrient intakes do not include contributions from vitamin and mineral supplements. At the time this report was being prepared, other investigators were working on methods for incorporating supplement data into estimates of usual nutrient intake. In the NHANES-III data, the issue is not straightforward because of a lack of congruence in recall period—the preceding 24 hours for food and beverage intake vs. the preceding month for supplements.

[6]In addition to EARs and AIs, the DRIs define two other reference standards: Recommended Dietary Allowances (RDAs) and Tolerable Upper Intake Levels (ULs) (see appendix B).

the level of intake that is estimated to meet the requirement of half of the healthy individuals in a particular life stage and gender group. When the available data are insufficient to estimate requirements, an AI is established rather than an EAR. The AI is the level of intake that is assumed to be adequate, based on observed or experimentally determined estimates of intake.

EARs have been defined for three of the four nutrients examined in this chapter (vitamin C, iron, and zinc). For the fourth nutrient (calcium), AIs have been defined. For nutrients that have EARs and a symmetrical requirement distribution, the IOM recommends that usual nutrient intakes be assessed using the "EAR-cutpoint method" (IOM, 2001). This approach compares the distribution of usual intakes in a population with a population-specific EAR. The proportion of the population with usual intakes below the EAR is an estimate of the proportion of the population with inadequate intakes—intakes that do not meet nutrient requirements.

For nutrients with AIs, methods for assessing usual intakes are more limited. AIs cannot be used to determine the proportion of a population with inadequate intakes. Instead, assessment focuses on comparison of mean usual intakes to the AI. Populations with a mean usual intake equivalent to or greater than the population-specific AI can be assumed to have adequate intakes.

At the time the analyses presented in this report were completed, DRIs had not been established for food energy.[7] Therefore, assessment of usual energy intakes also focuses on comparison of mean intakes, expressed as a percentage of the 1989 Recommended Energy Allowance (REA) (NRC, 1989a).

Because the EARs and the calcium AI are relatively new reference standards, appendix B includes a table that shows the 1989 RDAs for vitamin C, iron, zinc, and calcium—the reference standards used in most previous research. The interested reader can compare data on mean usual intakes with the most appropriate RDA to obtain a reasonable approximation of how these data compare with previously published data. In addition, appendix D includes tables that show means and the full distribution of usual intakes (the 5th, 10th, 15th, 25th, 50th, 75th, 85th, 90th, and 95th percentiles) for food energy and each of the four nutrients.

Food Energy

On average, the diets consumed by 1-4-year-old children provided roughly 100 percent of the 1989 REA (table D-9).[8] WIC children consumed a significantly greater percentage of the 1989 REA than either income-eligible nonparticipant children or higher-income nonparticipant children (107% vs. 101% and 99%) (figure 5). Differences were concentrated among 2-year-olds (WIC children vs. income-eligible children) and 3-year-olds (WIC children vs. higher-income children).

Vitamin C, Iron, and Zinc

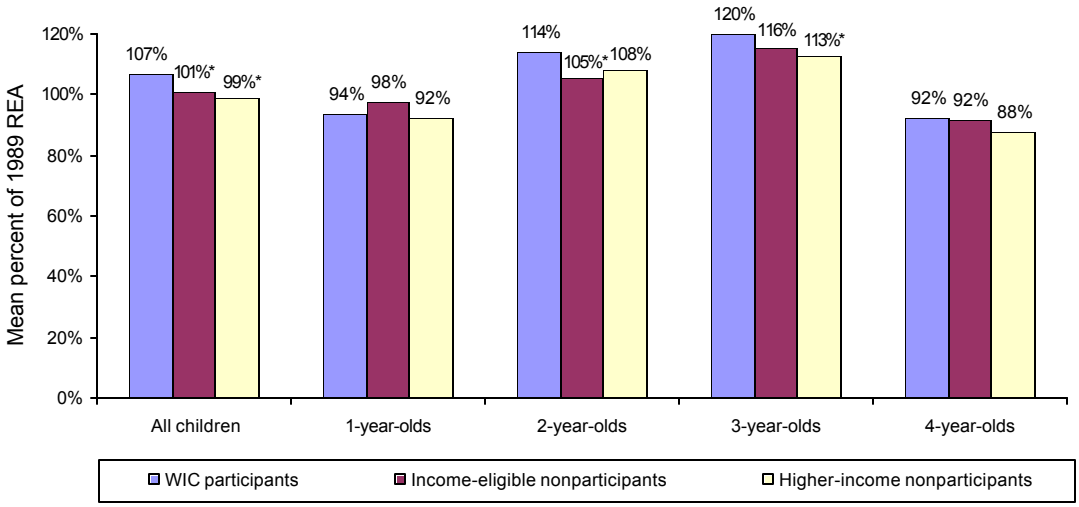
Virtually all 1-4-year-old children consumed adequate amounts of vitamin C, iron, and zinc (tables D-12, D-15, and D-18).[9] For vitamin C and iron, there were statistically significant differences between WIC participants and one or both groups of nonparticipants in the percentage of children with adequate usual intakes; however, the differences were substantively

[7]DRIs for food energy have subsequently been released (IOM, 2002b).

[8]Data on mean usual energy intakes (in kilocalories) are presented in table D-8 and the full distribution of usual energy intakes is presented in table D-10.

[9]Data on mean usual intakes (in mg.) and the full distribution of usual intakes are presented in tables D-11 and D-13 (vitamin C), D-14 and D-16 (iron), and D-17 and D-19 (zinc).

Figure 5 - Mean intake of food energy as a percent of the 1989 Recommended Energy Allowance: 1-4-year-old children



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

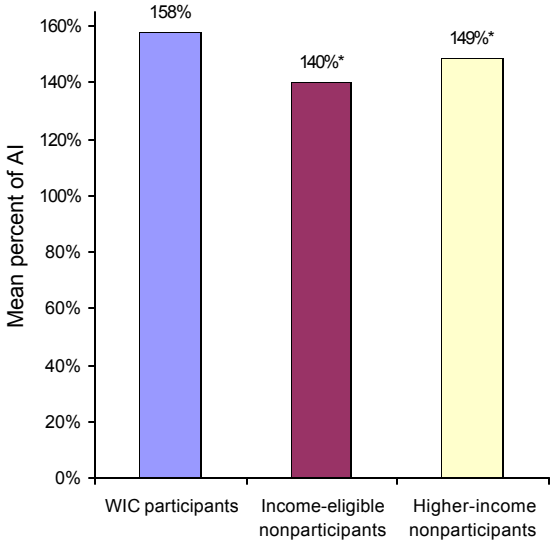
negligible (100% vs. 99.8% and 99.9% (vitamin C) and 99.7% vs. 99.9% (iron)).

Calcium

As noted in the introduction to this section, it is not possible to determine the percentage of children with adequate intakes of calcium because EARs for calcium have not been established. Therefore, in comparing calcium intakes across groups of children, the analysis examined mean intakes, expressed as a percentage of the AI. Populations with mean intakes that meet or exceed the population-specific AI can be assumed to have adequate intakes.

The mean usual calcium intake of 1-4-year-old children exceeded the AI (table D-21).[10] This suggests that, overall, 1-4-year-old children had adequate calcium intakes. On average, the usual calcium intake of WIC children was significantly greater than the usual calcium intakes of both groups of nonparticipant children (figure 6). In all cases, however, mean intakes exceeded the

Figure 6 - Mean intake of calcium as a percent of Adequate Intake: 1-4-year-old children



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

AI by a substantial margin. The difference between WIC participants and income-eligible nonparticipants was concentrated among 2-year-olds (167% of the AI vs. 147%) (table D-21).

[10]Data on mean usual calcium intakes (in mg.) are presented in table D-20 and the full distribution of usual calcium intakes is presented in table D-22.

Consumption of Milk and Soft Drinks

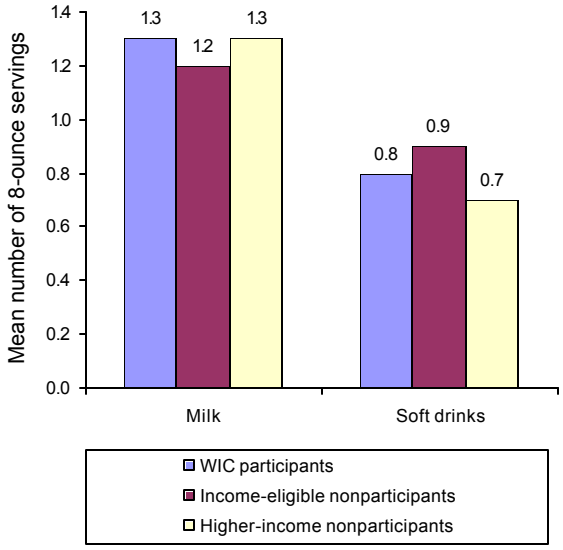
Data on trends in the national food supply indicate that Americans are consuming substantially less milk and substantially more soft drinks than they were 25 years ago (Putnam and Gerrior, 1999). On average, Americans consume more soft drinks per day than milk. Concerns have been raised about the potential impact of this trend on calcium intake, particularly among children (Yen and Lin, 2002).

To determine whether the relative consumption of soft drinks and milk differed for WIC children and nonparticipant children, 24-hour recall data were used to compute the total grams of fluid milk consumed and the total grams of soft drinks consumed in the preceding 24-hour period. Both carbonated and noncarbonated soft drinks were included in the tabulations. Coffee and tea were not included. For ease in interpretation, gram weights were translated into 8-ounce equivalent servings.

The data, presented in tables D-23 to D-26, reveal that differences in the consumption of milk and soft drinks reported by others (Yen and Lin, 2002) and observed in this series of reports among older children and most other age groups (Fox and Cole, 2004a and Fox and Cole 2004b) do not hold for 1-4-year-olds. On average, 1-4-year-old children consumed more milk per day than soft drinks—1.2 servings of milk per day vs. 0.8 servings of soft drinks.

This pattern was observed for WIC participants and both groups of nonparticipants (figure 7). Overall, there were no significant between-group differences in mean consumption of milk or soft drinks. Among 2-year-olds, however, WIC participants consumed more milk, on average, than income-eligible nonparticipants (1.2 servings vs.1.0 serving) (table D-24). This is consistent with the previously described difference between these two groups of 2-year-olds in mean calcium intake.

Figure 7 - Mean daily servings of milk and soft drinks: 1-4-year-old children



No statistically significant differences between WIC participants and either group of nonparticipants.
Source: NHANES-III, 1988-94.

Use of Dietary Supplements

As noted earlier in this chapter, NHANES-III dietary intake data do not include nutrients provided by dietary supplements. To provide some insight into the potential contribution of dietary supplements, data on reported supplement use were analyzed. The available data do not permit a detailed analysis of this issue by specific nutrient, but provide information on the prevalence of supplement use among 1-4-year-old children and general information on the number and type of supplements taken.

Parents and caregivers were asked whether children received vitamin or mineral supplements during the preceding month. If supplements were used, respondents were asked to show the actual bottles or jars to interviewers so the type of supplement and associated dosage information could be recorded. Respondents were not asked specifically about use of other types of dietary supplements, such as herbs, botanicals, and fish oils; however, many respondents volunteered information about these types of supplements (CDC, 2001).

Overall, 46 percent of children between the ages of 1 and 4 took some type of dietary supplement during the preceding month (table D-27). WIC children were significantly less likely than higher-income children to have taken a dietary supplement (figure 8). Thirty-nine percent of WIC children took a dietary supplement, compared with 55 percent of higher-income children. This pattern was noted for each age-specific cohort (table D-27).

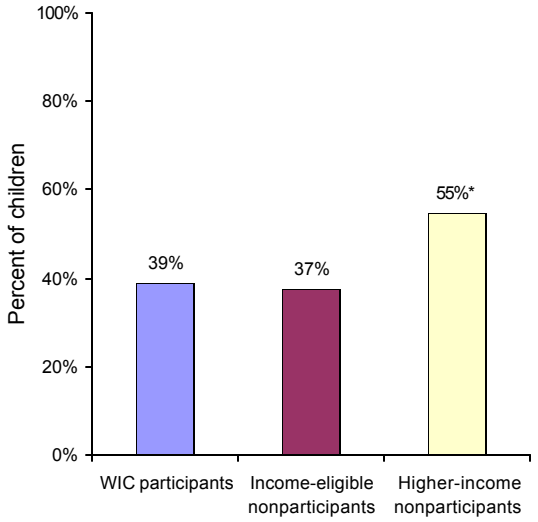
There was no significant difference between WIC participants and income-eligible nonparticipants in the prevalence of supplement use, overall. However, among 2-year-olds, WIC participants were significantly more likely to have taken a supplement than income-eligible nonparticipants (48% vs. 32%) (table D-27).

Among 1-4-year-old children who had used dietary supplements in the past month, the vast majority (91%) used only one supplement (table D-28). There were no significant differences between WIC participants and either group of nonparticipants in the number of dietary supplements used during the past month.

The most common type of supplement used was a multi-vitamin. Fifty-three percent of all 1-4-year-old children who used a supplement during the past month took a multi-vitamin supplement (table D- 29). The next most common type of supplement was a multi-vitamin and mineral combination (40% of all children).

This pattern was observed for all three groups of children. There were a handful of significant differences between WIC children and higher-income children in the prevalence of specific types of dietary supplements; however, the pattern of these differences was consistent with the general pattern described above.

Figure 8 - Percent of 1-4-year-old children taking dietary supplements in past month



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

Chapter Three

Healthy Eating Index Scores and Usual Intake of Dietary Fiber Among Children Ages 2 to 4

This chapter describes the nutritional quality of diets consumed by WIC participants and nonparticipants. The analysis focuses on the Healthy Eating Index (HEI), a summary measure of overall nutritional quality developed by USDA's Center for Nutrition Policy and Promotion (CNPP) (Kennedy et al., 1995). Usual intake of dietary fiber is also examined. The analysis is limited to children between the ages of 2 and 4. Children under 2 are excluded because the HEI is designed to assess the nutritional quality of diets consumed by individuals 2 years of age and older.

Healthy Eating Index Scores

The HEI provides an overall picture of the types and quantities of food individuals consume and their compliance with recommended dietary practices (Basiotis et al., 2002). The index includes an overall score as well as 10 component scores, all of which are weighted equally in the overall score. The 10 component scores measure different aspects of a healthy diet, relative to current public health recommendations. The HEI scores used in this analysis were computed by NCHS staff, following USDA guidelines, and were included in a public-release data file (NCHS, 2000).

Six of the component scores are food-based and evaluate food consumption in comparison with Food Guide Pyramid recommendations for intake of grains, vegetables, fruits, dairy, and meat, as well as the level of variety in the diet (USDA, CNPP, 1996). Four component scores are nutrient-based and assess compliance with *Dietary Guidelines for Americans* recommendations for daily intake of fat, saturated fat, cholesterol, and sodium (USDA and U.S. DHHS, 2000).[1] The specific reference standards used for each HEI component are described in the following discussions and are listed in appendix B. The appendix also provides technical details about how food consumption data needed to estimate HEI scores were derived from the NHANES-III 24-hour recall data.

The HEI data are based on the single 24-hour recall collected in NHANES-III. It was not possible to develop HEI scores that reflect usual intakes, as was done for the nutrients assessed in the preceding chapter. There were two major impediments to such an analysis. First, the HEI scoring algorithm is applied at the *individual* level but the adjustment technique used to generate estimates of usual nutrient intakes adjusts *distributions* (see appendix C) rather than individual observations. Second, the HEI includes six food-based components and it is not possible to generate estimates of usual food intake (as opposed to usual nutrient intake) because distributions of daily food intake tend to be highly skewed and to include a large proportion of zeros (Dodd, 2001).

Although it was not possible to incorporate information on usual nutrient intakes into HEI scores, usual intake distributions were estimated for the nutrients considered in the HEI. These include the percentage of food energy (calories)

[1]When the HEI was first developed, the standards for cholesterol and sodium were based on recommendations made in the NRC's *Diet and Health* report (NRC, 1989b) because the version of the *Dietary Guidelines* in effect at the time did not include quantitative standards for these nutrients (USDA and U.S. DHHS, 1995). Since that time, the NRC standards for sodium and cholesterol have been incorporated into both the Nutrition Facts section of food labels and the most recent version of the *Dietary Guidelines* (USDA and U.S. DHHS, 2000).

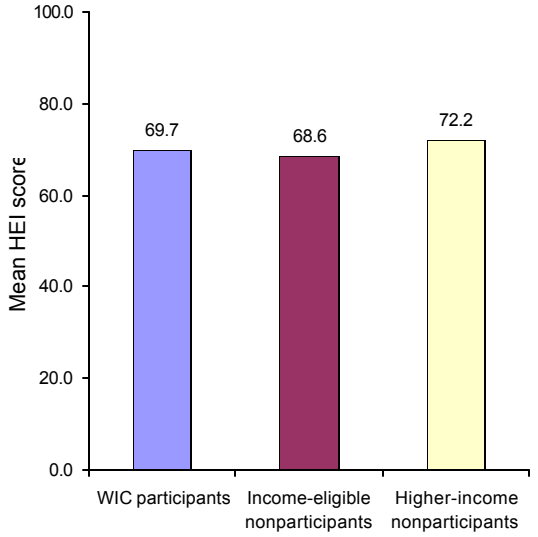
from fat and saturated fat as well as total intakes of cholesterol and sodium. In addition, a separate analysis was conducted to compare HEI data and usual intake data on estimates of the percentage of 2-4-year-old children who consumed diets consistent with the various reference standards.

Total HEI Scores

On average, 2-4-year-old children scored 70.4, out of a possible 100, on the HEI (table D-30). Mean scores were consistently greater for 2-year-olds than 4-year-olds (statistical significance of age-based differences not tested).

Mean HEI scores indicate that the diets consumed by WIC children were comparable in nutritional quality to those consumed by both income-eligible and higher-income nonparticipants. WIC children scored, on average, 69.7 on the 100-point scale, compared with 68.6 for income-eligible nonparticipants and 72.2 for higher-income nonparticipants (figure 9).

Figure 9 - Mean Healthy Eating Index (HEI) scores: 2-4-year-old children



No statistically significant differences between WIC participants and either group of nonparticipants.
Source: NHANES-III, 1988-94.

Researchers at CNPP have defined cutoffs that can be used to interpret what HEI scores say about the overall quality of the diet (Basiotis et al., 2002). Total HEI scores over 80 imply a "good" diet. Scores between 51 and 80 indicate a "need for improvement." And scores below 51 are indicative of a "poor" diet. Using these criteria, a majority of 2-4-year-old children in all three groups needed to make improvements in their diets. Overall, 66 percent of children had HEI scores that indicated a need for improvement (table D-31). Slightly more than a quarter (26%) had "good" diets and 8 percent had "poor" diets. Diet quality decreased markedly with age. The percentage of 2-year-olds and 3-year-olds with good diets was substantially greater than the percentage of 4-year-olds with good diets (32% and 30% vs. 15%) (statistical significance of age-based differences not tested). Likewise, the percentage of 2-year-olds and 3-year-olds with poor diets was substantially lower than the percentages of 4-year-olds with poor diets (7% and 5% vs. 13%).

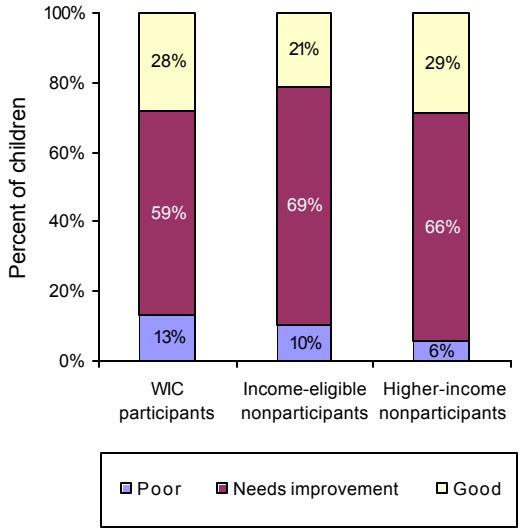
These general patterns were observed for all three groups of 2-4-year-old children (figure 10), and none of the differences between WIC participants and nonparticipants was statistically significant.

Food-based Component Scores

Standards for the food-based HEI component scores reflect daily goals for consumption of foods from each of the five good groups specified in the Food Guide Pyramid (USDA, CNPP, 1996). Serving guidelines are associated with recommended energy intake. For 2-4-year-old children, the recommended numbers of daily servings are:

- Grains: 6 servings for 2-3-year-olds and 7 servings for 4-year-olds
- Vegetables: 3 servings for 2-3-year-olds and 3.3 servings for 4-year-olds

Figure 10 - Distribution of total HEI scores: 2-4-year-old children



No statistically significant differences between WIC participants and either group of nonparticipants.
Source: NHANES-III, 1988-94.

- Fruits: 2 servings for 2-3-year-olds and 2.3 servings for 4-year-olds
- Milk: 2 servings for both 2-3-year-olds and 4-year-olds
- Meat: 2 servings for 2-3-year-olds and 2.1 servings for 4-year-olds [2]

The HEI also includes a food-based score for dietary variety. Although the need for variety in the diet is a theme in all major public health nutrition guidelines, there are no specific quantitative recommendations. For purposes of the HEI, dietary variety is assessed by totaling the number of different types of food a person consumes in a day. Similar foods are grouped together and tabulations consider only food components that contribute at least one-half serving toward any food group. Fats, sweets, seasonings, and similar foods are not included (NCHS, 2000). A perfect score of 10 is assigned when a person consumes at least one-half serving of eight different foods.

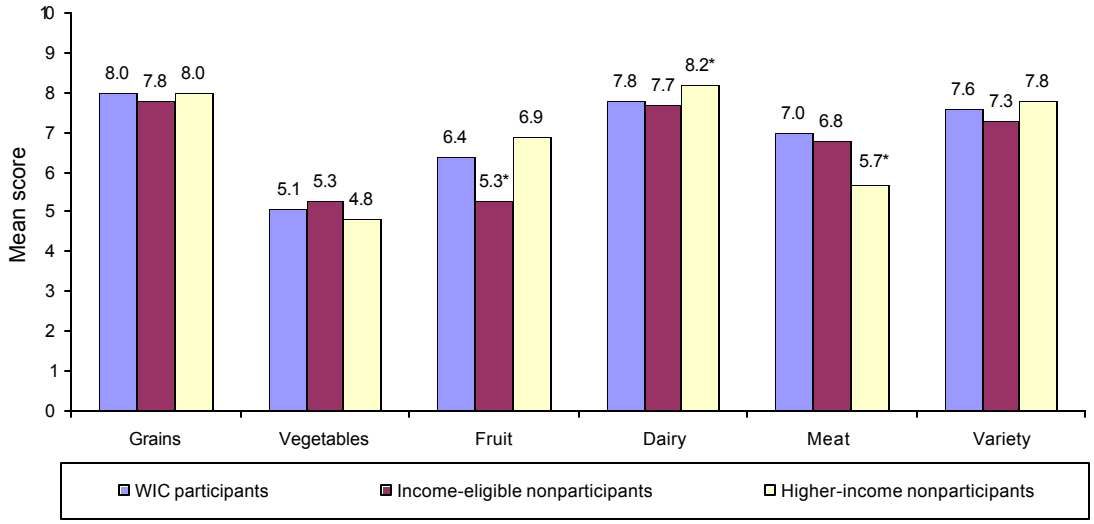
[2]One serving of meat is equivalent to 2.5 ounces of lean meat. Dried beans and peas, peanut butter, eggs, nuts, seeds, and tofu are also included in the meat group (see appendix B).

The food-based HEI component scores (tables D-32 to D-37) indicate that the food consumption goal that presented the greatest difficulty for 2-4-year-old children was the goal for vegetable consumption. Mean scores for the vegetable component ranged from 4.8 to 5.1, compared with a perfect score of 10, and less than one-quarter of the children in each group consumed the recommended number of vegetable servings (figures 11 and 12 and table D-33).

The food consumption goals that appeared to be the least problematic for 2-4-year-old children, although there was still room for improvement, were the goals for dairy foods and overall dietary variety. Mean scores for the dairy component ranged from 7.7 to 8.2 and the percentage of children in each group who consumed the recommended number of servings of dairy foods approximated or exceeded 50 percent (figures 11 and 12 and table D-35). Results for the variety component were equally positive. Mean scores for the variety component ranged from 7.3 to 7.8 and the percentage of individuals in each group who satisfied the HEI standard for dietary variety approximated or exceeded 50 percent (figures 11 and 12 and table D-37).

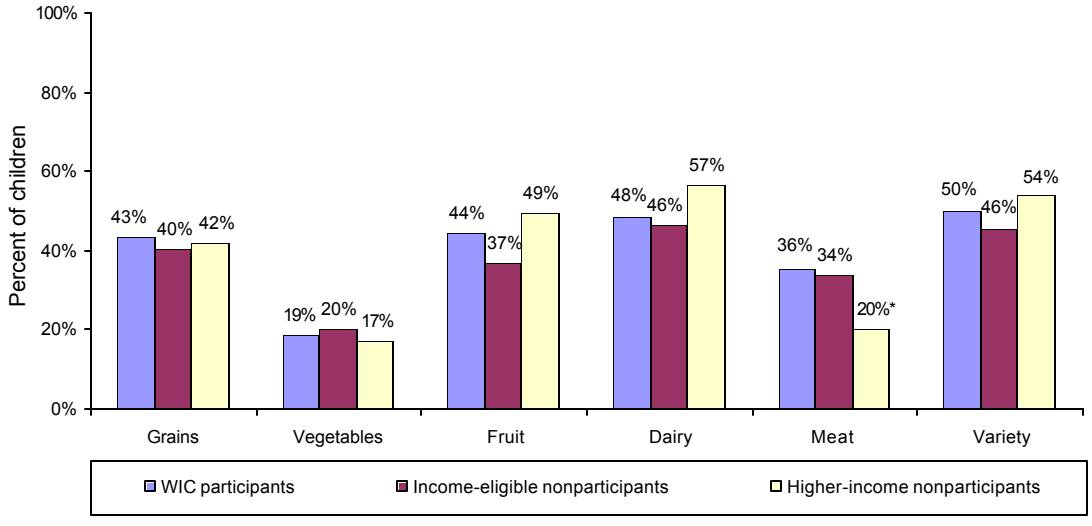
Overall, the only significant difference in food-based HEI component scores of WIC children and income-eligible nonparticipant children was observed for the fruit component. WIC children scored significantly higher on this component of the HEI than income-eligible children (6.4 vs. 5.3) (figure 11). This pattern was observed for all three age-specific cohorts, but the difference was not statistically significant for 2-year-olds (table D-34). Among 3-year-olds, WIC participants were also significantly more likely than income-eligible nonparticipants to consume the recommended number of fruit servings (58% vs. 42%) and to consume more fruit servings overall (3.2 servings vs. 2.1 servings). WIC food

Figure 11 - Mean scores for HEI food-based components: 2-4-year-old children



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

Figure 12 - Percent of 2-4-year-old children meeting HEI standards for food-based components



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

packages include 100% fruit juices, which are counted in the fruit component of the HEI.

In comparison with higher-income children, WIC children had significantly *lower* scores for the dairy component and significantly *higher* scores for the meat component (figure 11). The size of the difference in scores on the dairy component was relatively small (7.8 vs. 8.2) and was concentrated among 3-year-olds (table D-35). There was no significant difference between the two groups in the percentage of children who actually consumed the recommended number of dairy servings (figure 12).

The difference between WIC children and higher-income children in mean scores for the meat component was more substantial (7.0 vs. 5.7) (figure 11). Moreover, a significant difference was also observed in the percentage of children who consumed the recommended number of meat servings (36% vs. 20%) (figure 12) and in the mean number of meat servings consumed (1.7 servings vs. 1.3 servings) (table D-36). These patterns were observed for each of the three age-specific cohorts, but between-group differences were not always statistically significant. None of the differences were statistically significant for 4-year-olds. Among 3-year-olds, only the difference in mean HEI scores for the meat component was statistically significant. WIC food packages include eggs, peanut butter, and dried beans and peas—all foods that are considered in the meat component of the HEI.

Nutrient-based Component Scores

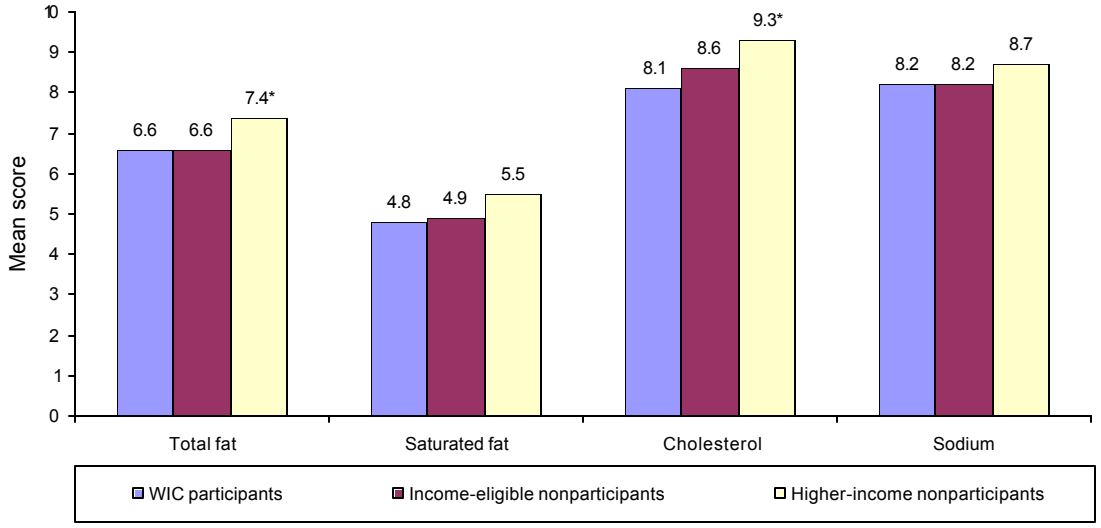
The four nutrient-based component scores of the HEI assess nutritional quality on the basis of how well individuals' diets conform to recommendations for intake of total fat, saturated fat, cholesterol, and sodium. The standards used in making these assessments are based on recommendations included in the *Dietary Guidelines for Americans* (USDA and U.S. DHHS, 2000).[3] The standards for total fat, saturated fat, and sodium are also included in the *Healthy People 2010* objectives (U.S. DHHS, 2000a). Standards for total fat and saturated fat are no more than 30 percent of total energy and less than 10 percent of total energy, respectively. The standard for cholesterol is less than 300 mg. and the standard for sodium is 2,400 mg.

Since the time HEI scores were computed by NCHS staff and the tabulations presented in this report were prepared, new reference standards have been established for fat (IOM, 2002b) and sodium (IOM, 2004) intake. These new standards are discussed in the text that follows. The IOM report in which the new standard for fat intake is defined also discusses intake of saturated fat and cholesterol, but does not define specific standards for intake of these dietary components.

There were relatively few differences between 2-4-year-old WIC participants and either group of comparably aged nonparticipants on mean scores for the nutrient-based HEI components (figure 13 and tables D-38 to D-41). There were no significant differences between scores of WIC children and income-eligible nonparticipant children. In comparison with higher-income nonparticipant children, however, WIC children had significantly lower mean scores for the total fat component of the HEI (6.6 vs. 7.4), as well as for the cholesterol component (8.1 vs. 9.3). The difference in mean scores for the fat component was concentrated among 2-year-olds (table D-38). A significant difference in mean scores for the cholesterol component was observed for both 2-year-olds and 3-year-olds (table D-40).

[3]As noted previously, HEI standards for cholesterol and sodium were initially based on recommendations made in the NRC's *Diet and Health* report (NRC, 1989b). These recommendations have subsequently been incorporated into the Nutrition Facts section on food labels and the most recent version of the *Dietary Guidelines*.

Figure 13 - Mean scores for HEI nutrient-based components: 2-4-year-old children



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

Percentage of Children Meeting Standards for HEI Nutrients: Usual Intakes vs. 24-hour Intakes

As noted in the introduction to this chapter, usual intakes of fat, saturated fat, cholesterol, and sodium were estimated, as described in Chapter Two and appendix C, even though these data could not be incorporated into HEI scores. The following sections describe findings from the usual intake analyses, particularly with respect to estimates of the percentages of children who satisfied the *Dietary Guidelines* recommendations considered in the HEI. These findings are contrasted with those from the HEI analysis. Estimates based on usual intake analyses are more reliable than those available from the HEI because the former have been adjusted to remove within-person variation (see appendix C).

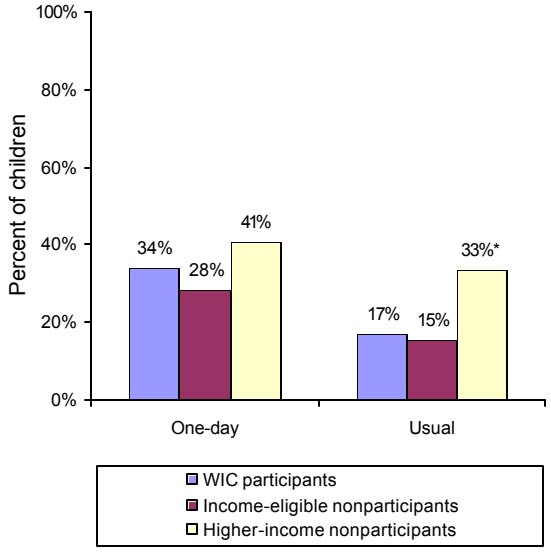
Percent of Energy from Total Fat

On average, the usual diets of 2-4-year-old children were high in fat compared with the *Dietary Guidelines* recommendation. Overall, children's usual diets provided 33 percent of energy from fat, compared with the *Dietary Guidelines* recommendation of no more than 30 percent (table D-42). This was true for all three age-specific cohorts.

There was no significant difference between WIC children and income-eligible nonparticipant children in the percent of energy provided by fat (33.6% vs. 33.8%). In comparison with higher-income nonparticipant children, however, WIC children consumed a significantly greater amount of fat, relative to total energy intake (33.6% vs. 31.7%). This significant difference was noted for all three of the age-specific cohorts.

According to the HEI data, which are based on a single 24-hour recall, the percentage of 2-4-year-old children who satisfied the *Dietary Guidelines* recommendation for fat intake ranged from a low of 28 percent to a high of 41 percent (figure 14 and table D-38). Overall, there were no significant differences between WIC participants and either group of nonparticipants in this regard. Among 2-year-olds, however, WIC children were significantly less likely than higher-income nonparticipant children to consume the recommended amount of fat (27% of children vs. 46%) (table D-38).

Figure 14 - Percent of 2-4-year-old children meeting *Dietary Guidelines* recommendation for total fat: One-day (HEI) estimates vs. usual intake estimates



*Statistically significant difference from WIC participants at the .05 level or better.

Note: *Dietary Guidelines* recommendation has been replaced by AMDR (see text and appendix B).

Source: NHANES-III, 1988-94.

The more reliable estimates of usual intake indicate that the proportion of children who satisfied the *Dietary Guidelines* recommendation for fat intake was substantially lower than suggested by the HEI data. This was particularly true for WIC participants and income-eligible nonparticipants: fewer than 20 percent of children in these two groups had usual fat intakes that satisfied the recommendation (figure 14 and table D-43). Moreover, estimates of usual intake indicate that WIC children were significantly less likely than higher-income children to consume the recommended amount of fat (17% of children vs. 33%). This pattern was observed for all three age-specific cohorts, and between-group differences were statistically significant for 2-year-olds and 4-year-olds (table D-43).

As mentioned in the introduction to this section, a new reference standard has been established for fat intake since the time HEI scores were computed by NCHS staff and the tabulations presented in this report were prepared. This standard, referred to as an Acceptable Macronutrient Distribution Range (AMDR), defines a range of acceptable intakes for different life-stage groups. The AMDR for fat is 30-40 percent of total energy for 2-3-year-olds and 25-35 percent of total energy for 4-year-olds. By comparison, the *Dietary Guidelines* recommendation (no more than 30% of energy from fat) defines a more stringent upper bound for fat intake, particularly for young children (who make up the majority of WIC children), and does not define a lower bound.

Mean usual fat intakes for all groups of children fell within defined AMDRs (table D-42). Distributions of usual intake provide some information about the percentage of children whose usual fat intakes were consistent with the AMDR. Among 2- and 3-year-olds (AMDR = 30-40 percent of total energy), usual intakes that fell outside the AMDR tended to be lower than the recommended range rather than higher. For these two age groups, the 25th percentiles of the distribution of usual fat intake were 29.9 and 30.4 percent of total energy intake, respectively, while the 95th percentiles were 39.8 and 39.6 percent, respectively (table D-44).

The situation was notably different for 4-year-olds, who have an AMDR of 25-35 percent of total energy. The data suggest that relatively few 4-year-olds had usual fat intakes that fell below the lower end of the AMDR. The 5th percentile of the distribution was 26.7 percent of total energy. In contrast, somewhere between 15 and 25 percent of 4-year-olds had usual fat intakes that exceeded the upper end of the AMDR (75th percentile = 34.9% and 85th percentile = 36.2%).

There were no significant differences between WIC children and income-eligible nonparticipant children in distributions of usual fat intake. In contrast, there were significant differences

between WIC children and higher-income nonparticipant children at every percentile of the distributions. Differences were concentrated among 2-year-olds and 4-year-olds and, in all cases, fat intakes of WIC children were significantly greater than those of higher-income nonparticipant children.

Among 2-year-olds, usual fat intakes of WIC participants were significantly greater than those of higher-income nonparticipants at the 25th, 50th, 75th, 85th, 90th, and 95th percentiles. At the 25th percentile, the usual fat intake of WIC participants fell within the AMDR, while the usual intake of higher-income nonparticipants was below the AMDR (30.8% and 28.6%, respectively, vs. AMDR of 30-40%). At the 95th percentile, the opposite was true. At this end of the distribution, the usual fat intake of WIC participants exceeded the AMDR, while the usual intake of higher-income nonparticipants fell within the acceptable range (40.6% vs. 38.0%).

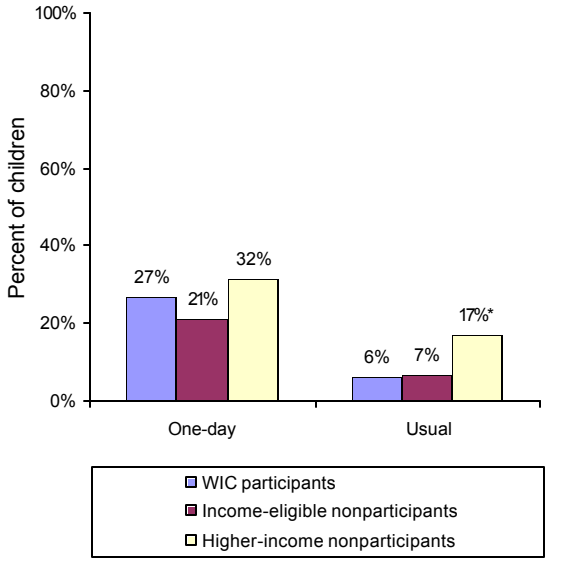
Among 4-year-olds, usual fat intakes of WIC participants were significantly greater than those of higher-income nonparticipants at the 5th, 10th, 15th, and 25th percentiles. In all cases, however, intakes of both groups fell within the AMDR.

Percent of Energy from Saturated Fat

On average, the usual diets of WIC children and both groups of nonparticipant children exceeded the *Dietary Guidelines* recommendation of less than 10 percent of energy from saturated fat.[4] In all three groups, saturated fat contributed an average of 12-13 percent of total energy (table D-45). WIC children consumed significantly more saturated fat, on average, than nonparticipating children in the higher-income group (12.9% vs. 12.1%). This pattern was observed for all three age-specific cohorts and the between-group difference was statistically significant for both 2-year-olds and 4-year-olds.

According to the single-day recall used to compute HEI scores, the percentage of children who satisfied the *Dietary Guidelines* recommendation for saturated fat intake varied from 21 percent to 32 percent, and there were no statistically significant differences between WIC children and either group of nonparticipant children (figure 15 and table D-39). The more reliable estimates of usual intake indicate that the proportion of children who satisfied the recommendation for saturated fat intake was actually quite a bit lower, ranging from a low of 6 percent to a high of 17 percent (figure 15 and table D-46). In addition, WIC children were significantly less likely than higher-income children to consume the recommended amount of saturated fat (6% of children vs. 17%). This difference was noted for all three age-specific cohorts.

Figure 15 - Percent of 2-4-year-old children meeting *Dietary Guidelines* recommendation for saturated fat: One-day (HEI) estimates vs. usual intake estimates



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

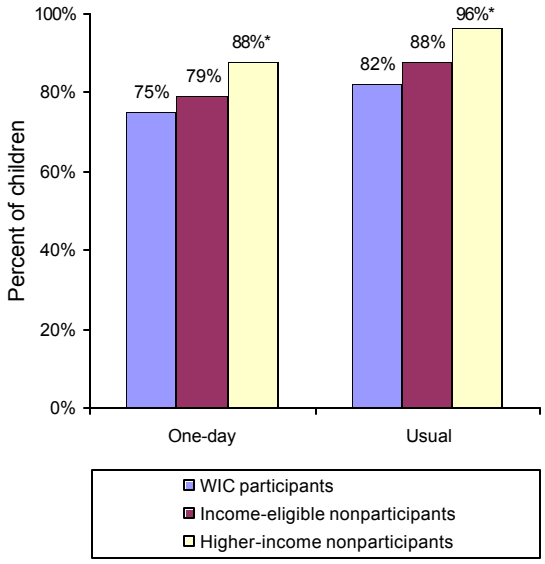
[4]The full distribution of usual saturated fat intakes (as a percent of usual energy intakes) is presented in table D-47.

Cholesterol

The *Dietary Guidelines* recommend that cholesterol intake not exceed 300 mg. per day. Mean usual cholesterol intakes of all three groups of children were consistent with this goal (table D-48).[5] However, the usual diets of WIC children provided significantly more cholesterol than the usual diets of children in either of the nonparticipant groups (231 mg. vs. 208 mg. and 166 mg.). The difference between WIC children and income-eligible children was concentrated among 2-year-olds. The difference between WIC children and higher-income children was observed for all three age-specific cohorts.

The HEI data and usual intake data lead to relatively comparable conclusions about the proportion of children who satisfied the recommendation for cholesterol intake. Both datasets indicate that 75 percent or more of the children in all three groups met the recommendation for cholesterol intake (figure 16 and tables D-40 and D-49). Moreover, both datasets indicate that WIC children were significantly less likely than higher-income children to meet the recommendation. According to the usual intake data, 82 percent of WIC children met the *Dietary Guidelines* recommendation for cholesterol intake, compared with 96 percent of higher-income children.

Figure 16 - Percent of 2-4-year-old children meeting *Dietary Guidelines* recommendation for cholesterol: One-day (HEI) estimates vs. usual intake estimates



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

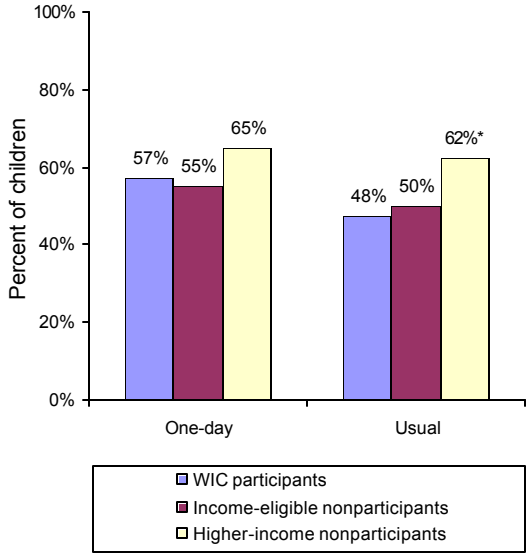
Sodium

The *Dietary Guidelines* recommend a maximum daily sodium intake of 2,400 mg. On average, usual sodium intakes of all three groups of children came close to this goal, but only higher-income children actually met it (table D-51). The mean usual sodium intake of WIC children was 2,513 mg. compared with 2,460 mg. for income-eligible nonparticipant children and 2,277 mg. for higher-income children. The difference between WIC children and higher-income children was statistically significant. This pattern was observed for all three age-specific cohorts, and the between-group difference was statistically significant for 2-year-olds and 3-year-olds.

The HEI data indicate that 55 to 65 percent of children satisfied the *Dietary Guidelines* recommendation for sodium, and that WIC children were no more or less likely than nonparticipant children to meet this goal (figure 17 and table D-41). Data on usual sodium intakes indicate that the percentage of children who satisfied the recommendation for sodium was actually lower, in all three groups, than suggested by the HEI data. The usual intake data also indicate that WIC children were significantly less likely than higher-income children to satisfy the recommendation for sodium (figure 17 and table D-52). Fewer than half (48%) of WIC children had usual sodium intakes that were consistent with the *Dietary Guidelines* recommendation, compared with 62 percent of higher-income

[5]The full distribution of usual cholesterol intakes is presented in table D-50.

Figure 17 - Percent of 2-4-year-old children meeting *Dietary Guidelines* recommendation for sodium: One-day (HEI) estimates vs. usual intake estimates



*Statistically significant difference from WIC participants at the .05 level or better.

Note: *Dietary Guidelines* recommendation has been replaced by UL (see text and appendix B).

Source: NHANES-III, 1988-94.

children. In keeping with previously noted differences in mean usual sodium intakes, this pattern was observed for all three age-specific cohorts and the between-group difference was statistically significant for 2-year-olds and 3-year-olds.

As noted previously, new reference standards have been established for sodium intake since the time HEI scores were computed by NCHS staff and the tabulations presented in this report were prepared. Standards have been defined for both Adequate Intake (AI) and the Tolerable Upper Intake Level (UL) (IOM, 2004). Given that the major concern about sodium is the potential for excess consumption, the standard of greatest interest for this analysis is the UL.[6]

[4]The AI is 1,000 mg. (1.0 gm.) for 2-3-year-olds and 1,200 mg. (1.2 gm.) for 4-year-olds. Given the mean usual intakes of sodium described in the preceding text and shown in table D-51, sodium intakes of all three groups of children can be assumed to be "adequate."

The UL is the highest intake likely to pose no adverse health effects; chronic consumption above the UL may increase adverse effects. In the case of sodium, the primary potential adverse effect is the development of high blood pressure (IOM, 2004). The UL for sodium has been set at 1,500 mg. (1.5 gm.) for 2-3-year-olds and 1,900 mg. (1.9 gm.) for 4-year-olds. Thus, the UL is notably more stringent than the *Dietary Guidelines* recommendation, particularly for the youngest children (who make up the majority of WIC participant children).

Mean usual sodium intakes of all three groups of children, as described previously and shown in table D-51, exceeded the UL by a substantial margin. Moreover, detailed distributions of usual sodium intake indicate that few children consumed diets that did not exceed the UL (table D-53). For 2-year-olds (UL = 1,500 mg), usual sodium intake was 1,450 mg. at the 10th percentile of the distribution and 1,559 mg at the 15th percentile. For 3-year-olds, who have the same UL as 2-year-olds, usual intake was 1,472 mg. at the 5th percentile and 1,637 mg. at the 10th percentile. Finally, for 4-year-olds, who have a higher UL (1,900 mg.), usual sodium intake was 1,808 mg. at the 10th percentile and 1,926 mg. at the 15th percentile.

There were few significant differences in the distributions of usual sodium intake of WIC children and income-eligible nonparticipant children. Among 2-year-olds, there were significant differences at the 5th, 10th, and 15th percentiles, and in each case, intake was greater for WIC participants than income-eligible nonparticipants. The difference at the 15th percentile (1,559 mg. vs. 1,505 mg.) suggests that the percentage of 2-year-olds with usual intakes consistent with the UL for sodium may be greater for income-eligible nonparticipants than for WIC participants.

Significant differences in usual sodium intakes of WIC children and higher-income children were noted at every percentile of the distribution. In all cases, usual intake was greater for WIC children. Differences were concentrated among 3-year-olds. In this group, the difference in usual intakes at the 10th percentile (1,637 mg. vs. 1,584 mg) suggests that a greater proportion of higher-income children than WIC children may consume diets that are consistent with the sodium UL.

It is important to note that NHANES-III estimates of sodium intake include only sodium found in foods and beverages reported by respondents. Sodium from table salt is not included in nutrient calculations because its use cannot be measured (estimated) reliably. To get some insight into additional sources of sodium, the NHANES-III dietary intake interview included a question about use of table salt. These data indicate that, overall, there were no significant differences between WIC children and either group of nonparticipant children in the use of table salt (table D-54).

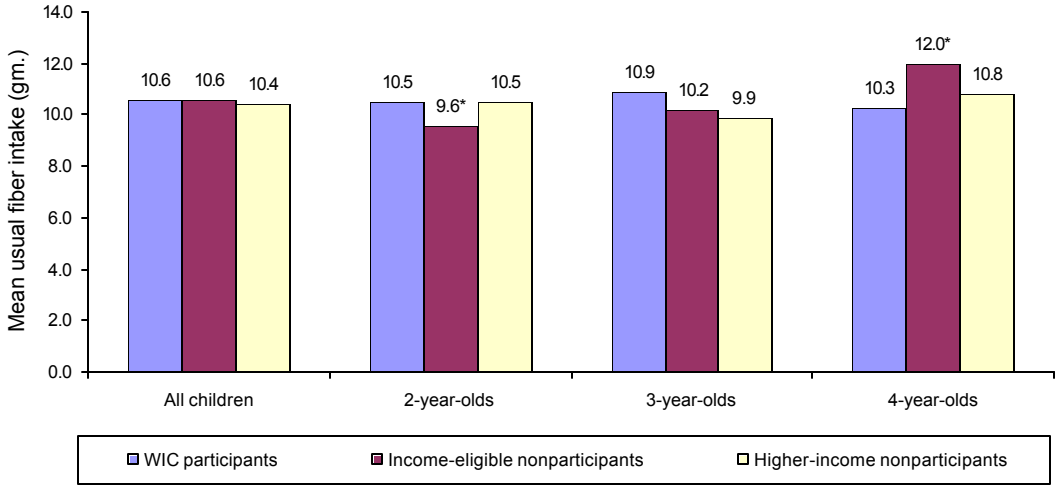
Among 2-year-olds, however, WIC children were significantly more likely to use table salt than either group of nonparticipant children (37% vs. 26% and 19%). Therefore, actual between-group differences in usual sodium intake are likely to be greater for this age group than observed in the preceding analysis.

Usual Intake of Dietary Fiber

On average, 2-4-year-old children usually consumed 10.5 gm. of dietary fiber per day (table D-55).[7] Overall, there were no significant differences between WIC participants and either group of nonparticipants in mean usual intake of dietary fiber (figure 18). However, among 2-year-olds, WIC participants consumed significantly *more* dietary fiber per day than income-eligible nonparticipants (10.5 gm. vs. 9.6 gm.). In contrast, among 4-year-olds, WIC participants consumed significantly *less* dietary fiber per day than income-eligible nonparticipants (10.3 gm. vs. 12.0 gm.).

[5]The full distribution of usual fiber intakes is presented in table D-57.

Figure 18 - Mean usual intake of dietary fiber: 2-4-year-old children



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

At the time the analyses presented in this report were completed, there was no established standard for intake of dietary fiber. To assess the adequacy of fiber intakes, the analysis used a standard referred to as the "age-plus-five rule." This standard, originally developed by Williams et al. (1995), was adapted by the American Heart Association (AHA) (Van Horn, 1997) and has been used in previous research (Gleason and Suitor, 2001). Using the "age-plus-five rule," recommended intake of dietary fiber (in gm.) is equivalent to age in years plus five, up to a maximum of 25 gm.

More than three-quarters of children in all three groups had usual fiber intakes that were consistent with this standard (table D-56). Overall, there were no significant differences between WIC participants and nonparticipants in this regard. However, in keeping with differences noted in the mean usual intake of dietary fiber, as described above, 2-year-old WIC children were significantly *more* likely than their counterparts in the income-eligible nonparticipant group to meet the "age-plus-five" standard (84% vs. 76%). And 4-year-old WIC children were significantly *less* likely to meet the standard than 4-year-old, income-eligible nonparticipants (65% vs. 80%).

Since this analysis was completed, AIs have been defined for fiber (IOM, 2002b). The AIs have been defined for *total* fiber, which includes dietary fiber as well as fructo-oligosaccharides, compounds which are destroyed in the current analytic methods used to quantitate fiber in foods (IOM, 2002b). Although fructo-oligosaccharides are assumed to make up a relatively small percentage of total fiber, it is estimated that, on average, American adults consumed approximately 5.1 gm. more fiber per day than estimated in the most recent Continuing Survey of Food Intakes of Individuals (CSFII) because CSFII data, like the data used in this analysis, include only dietary fiber (IOM, 2002b).

The AIs for total fiber are shown in appendix B. The AIs are substantially greater than standards based on the "age-plus-five rule." The AI for 2-3 year-olds is 19 gm., compared with "age-plus-five" standards of 7 gm. for 2-year-olds and 8 gm. for 3-year-olds. The discrepancy is even greater for 4-year-olds, where the AI is 25 gm. and the "age-plus-five" standard is 9 gm.

As noted in Chapter Two, AIs cannot be used to assess the prevalence of adequate intakes, so assessment of usual intakes must focus on comparison of mean intakes to age-appropriate AIs. As the data in figure 18 indicate, mean usual intakes of dietary fiber among 2-4-year-olds fell short of the new AIs. Indeed, for all three groups of children, usual fiber intakes fell below the AI even at the 95th percentile of usual intake (table D-57). Some of this disparity is due to the differences in fiber data (dietary fiber vs. total fiber). However, even if one were to assume that mean usual intakes of dietary fiber were actually 5 gm. higher (the average increment estimated for American adults, overall, to account for fructo-oligosaccharides, as described previously—a generous assumption for this age group), mean intakes for all groups of children would still fall substantially short of the AI.

The differences observed between WIC participants and nonparticipants in mean usual intakes of dietary fiber are real, regardless of which reference standard is used to assess intakes. However, the advent of the AIs for fiber means that results of the analysis that assessed usual intakes of dietary fiber relative to the "age-plus-five rule" must be interpreted with caution. These estimates cannot be interpreted as valid estimates of the percentage of 2-4-year-old children consuming adequate amounts of fiber.

Chapter Four
Health-Related Behaviors

This chapter presents information on health-related behaviors of WIC participants and nonparticipants. Topics covered for infants and children include breastfeeding and other infant feeding practices and exposure to second-hand smoke. For pregnant and postpartum women, topics include physical activity, alcohol consumption, tobacco use, and exposure to second-hand smoke.

Breastfeeding and Other Infant Feeding Practices

NHANES-III included, for infants and children under the age of 6 years, a detailed set of questions on infant feeding practices. The questions asked about initiation and duration of breastfeeding, use of formula and cow's milk, use of baby bottles, and introduction of solid foods. This section summarizes these data for infants and 1-4-year-old children.

Breastfeeding

Official WIC policy has always encouraged breastfeeding, while at the same time providing access to infant formula for nonbreastfeeding infants. The focus on breastfeeding promotion increased during the late 1980s and early 1990s, largely in response to a national survey that showed that rates of breastfeeding were declining as the WIC program was expanding. During the NHANES-III data collection period (1988-94), several important changes in WIC breastfeeding policies were implemented (USDA, FNS, 2003b). For example, in 1989, P.L. 101-147 required that USDA develop standards for breastfeeding promotion and support and targeted $8 million for State-level efforts in this area. In 1992, P.L. 102-342 required that USDA establish a national breastfeeding promotion program. That same year, USDA instituted an enhanced food package for women who exclusively breastfeed. The enhanced package has additional amounts of juice, cheese, and legumes, and also includes carrots and canned tuna. Finally, in 1994, P.L. 103-448 increased the amount of money each State was required to devote to breastfeeding promotion and required that all States collect data on the incidence and duration of breastfeeding among WIC participants.

More recently, P.L. 105-336 authorized the use of State administrative funds for the purchase or rental of breast pumps. USDA has also implemented several breastfeeding promotion demonstration projects and has disseminated findings and recommendations to State and local WIC agencies.

Clearly, the NHANES-III data were collected during a time when WIC breastfeeding promotion strategies were evolving and do not reflect current program policies and procedures in this area. For this reason, NHANES-III breastfeeding data for WIC participants must be interpreted with caution. This is especially true for data on WIC children, some of whom were infants before 1988 and who may or may not have participated in WIC as infants or had mothers who participated in WIC during pregnancy. (NHANES-III does not include information on prior WIC participation).

It is also important to note that research on the determinants of breastfeeding has demonstrated that women who are minority, less educated, lower-income, and younger are less likely to

breastfeed than other women (U.S. DHHS, 2000a). These demographic characteristics also describe WIC participants.

Initiation and Duration of Breastfeeding

At the time NHANES-III data were collected, 54 percent of all infants and 1-4-year-old children had been breastfed for some period of time (table D-58). Among those ever breastfed, 41 percent had been breastfed for at least 6 months (tables D-59) and 16 percent had been breastfed for at least a year (table D-60).

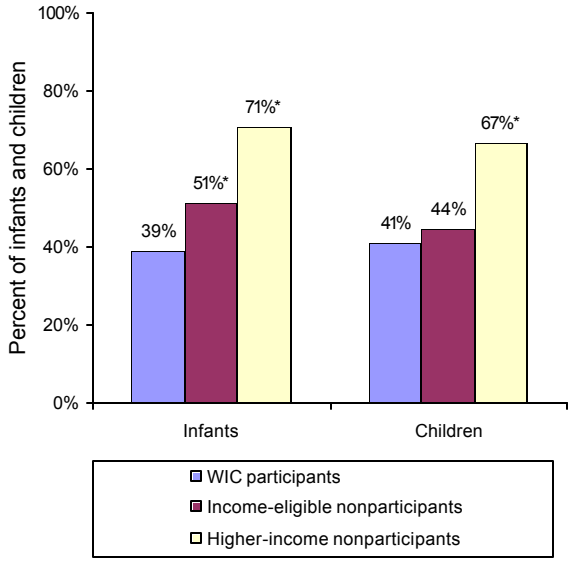
WIC infants were significantly less likely to have ever been breastfed than either income-eligible or higher-income nonparticipant infants (39% vs. 51% and 71%) (figure 19 and table D-58). In addition, WIC children were significantly less likely than higher-income children to have ever been breastfed (41% vs. 67%).

Among infants who had ever been breastfed, there was no significant difference between WIC participants and income-eligible nonparticipants in the percentage who had been breastfed for 6 months or more (31% vs. 39%) (figure 20 and table D-59). However, in comparison with higher-income infants, WIC infants were significantly less likely to have been breastfed for this length of time (31% vs. 42%).

Among children who were breastfed as infants, there were no differences between WIC participants and nonparticipants, overall, in the percentage breastfed for 6 months or more (figure 20 and table D-59), the percentage breastfed for a year or more (table D-60), or in the mean duration of breastfeeding (table D-61).[1] Among 4-year-olds, however, WIC participants were significantly less likely than either group of nonparticipants to have been breastfed for a year or longer (table D-60) (the point estimate for WIC children is statistically unreliable). In addition, the mean duration of breastfeeding was significantly shorter for 4-year-old WIC children

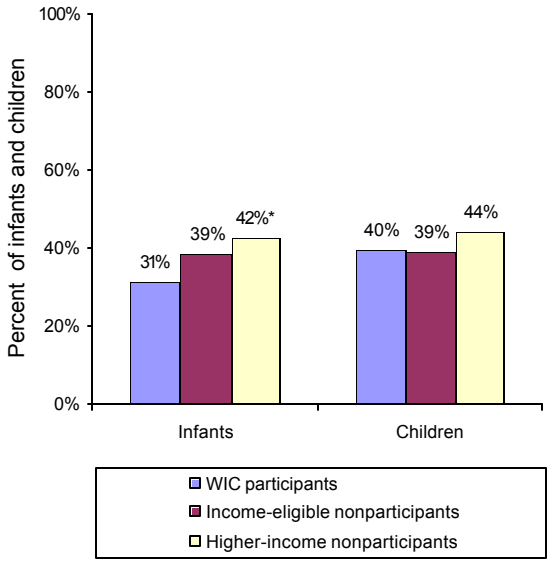
[1]Mean duration of breastfeeding was not tabulated for infants because some infants were still breastfeeding.

Figure 19 - Percent of infants and children ever breastfed



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

Figure 20 - Percent of infants and children breastfed at least 6 months, among those ever breastfed



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

than for comparably aged children in the higher-income group (table D-61) (the point estimate for WIC children is statistically unreliable).

Use of Supplemental Formula Among Breastfed Infants

Among infants and children who were ever breastfed, 17 percent never received supplemental formula (table D-62). For infants and 1-4-year-old children who received both breastmilk and formula, formula was first fed on a daily basis at about 12 weeks of age, on average (table D-63).

Overall, breastfed WIC infants were significantly more likely to receive supplemental formula than breastfed infants in either of the nonparticipant groups. Only 9 percent of breastfed WIC infants had never received formula, compared with 19 percent of income-eligible breastfed infants and 22 percent of higher-income breastfed infants (table D-62). In addition, breastfed WIC infants were fed formula on a daily basis at a significantly younger age than higher-income breastfed infants (6.6 weeks vs. 9.1 weeks) (table D-63).

Among 1-4-year-old children who had been breastfed, there were no significant differences, overall, between WIC participants and either group of nonparticipants in the percentage who never received supplemental formula (table D-62) or in the age at which formula was first fed on a daily basis (table D-63). However, among 4-year-olds who were breastfed as infants, WIC participants were significantly more likely than either group of nonparticipants to have received supplemental formula (table D-62) (the point estimate for WIC children is statistically unreliable).

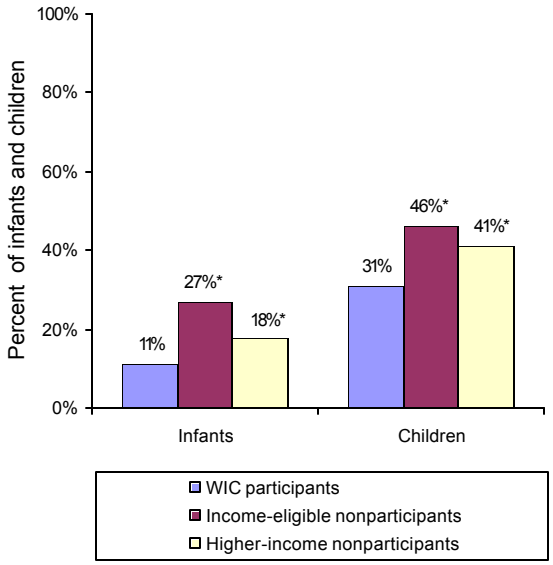
Use of Cow's Milk Before 12 Months of Age

WIC infant feeding guidelines, as well as guidelines issued by the American Academy of Pediatrics (AAP), recommend that cow's milk not be introduced until 12 months of age (USDA, FNS, 2003c and AAP, 2003). The rationale for this recommendation is that, relative to infants' special nutritional needs, cow's milk is low in iron and other essential nutrients and high in protein, sodium, and potassium. In addition, the type of protein and fat found in cow's milk may be difficult for infants to digest and absorb.

At the time the NHANES-III data were collected, many parents and caregivers did not adhere to this recommendation. Overall, 17 percent of infants 2-11 months of age were being fed cow's milk on a daily basis (table D-64). Among children 1-4 years of age, 41 percent had been fed cow's milk on a daily basis before their first birthday.

Early introduction of cow's milk was significantly less common among WIC participants than either group of nonparticipants. This was true for both infants and children. Eleven percent of WIC infants were receiving cow's milk on a daily basis, compared with 27 percent of income-eligible infants and 18 percent of higher-income infants (figure 21). Similarly, 31 percent of WIC

Figure 21 - Percent of infants and children fed cow's milk before 12 months of age



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

children reportedly received cow's milk on a daily basis before 12 months of age, compared with 46 percent of income-eligible children and 41 percent of higher-income children.

Among infants 7 months of age and older, the mean age at which cow's milk was first fed on a daily basis was 32.1 weeks or 7.6 months (table D-65). (This estimate may be biased by the large percentage of infants who had not yet been fed cow's milk.) Among children, the mean age at which cow's milk was first fed on a daily basis was 47.9 weeks or 11.4 months.

Overall, there were no significant differences between WIC participants and either group of nonparticipants in the mean age at which cow's milk was first fed on a daily basis. Among 1-year-olds, however, WIC participants were significantly older than income-eligible nonparticipants when they were first fed cow's milk on a daily basis (47.8 weeks (11.4 months) vs. 44.2 weeks (10.5 months)) (table D-65).

Use of a Baby Bottle

It is recommended that infants be fed beverages from cups rather than bottles as soon as they are able to sit erectly on their own. Infants can generally drink from a cup, with assistance, by 4-6 months and can hold a cup on their own by 10-12 months (USDA, FNS, 2003c and AAP, 2003). A major reason for discouraging prolonged use of baby bottles is that it increases the risk of "baby-bottle-caries," a syndrome in which infant teeth are excessively decayed (USDA, FNS, 2003c and AAP, 2003). In extreme cases, underlying permanent teeth may also be affected. Another concern is that infants who consume too much formula or other beverages from a bottle may crowd out other essential nutrients found in solid foods.

The vast majority of infants and children (96%) used a baby bottle at some point in time (table D-66). Among infants, WIC participants were significantly more likely than either group of nonparticipants to have used a baby bottle (the point estimate for WIC infants is statistically unreliable). The higher rate of breastfeeding among nonparticipant infants may contribute to this pattern.

At the time data were collected, 95 percent of all infants were using baby bottles (table D-67). Again, WIC infants were significantly more likely than either group of nonparticipant infants to be using bottles (the point estimate for WIC infants is statistically unreliable). This pattern was also observed when data were tabulated separately for infants who were between 7 and 11 months of age (99% vs. 92% for both groups of nonparticipants) (data not shown).

At about a year of age, there was a noteworthy decline in use of baby bottles. Overall, 61 percent of 1-year-olds were still using a bottle. This percentage decreased to 23 percent for 2-year-olds and to 9 percent and 4 percent for 3- and 4-year-olds, respectively. This general pattern was noted for all three groups of children. However, the rate of decline was significantly slower for WIC children than for higher-income children. At each year of age, the proportion of children using a baby bottle was significantly greater for WIC participants than for higher-income nonparticipants (table D-67).

Among children who were no longer using a baby bottle, there were no significant differences between WIC participants and either group of nonparticipants in the percentage of children who stopped using a bottle before 1 year of age (table D-68) or in the mean age at which baby bottles were discontinued (table D-69).

Introduction of Solid Foods

Recommended infant feeding practices suggest that solid foods be introduced as children become physically and physiologically able to handle these foods. Signs of readiness include

the ability to sit erectly in a supported position (for example, in a high chair), to draw in the lower lip when being fed with a spoon, to swallow food rather than reflexively push it out with the tongue, and to express satiety (USDA, FNS, 2003c and AAP, 2003). These developmental milestones usually occur between 4 and 6 months of age. Consequently, infants should generally not receive solid foods until they are at least 4 months old.

Overall, almost a quarter (23%) of infants and children were fed solid foods before 4 months of age (table D-70). WIC infants and children were no more or less likely than nonparticipant infants and children to be fed solid foods at an early age. According to parent and caregiver reports, 20 percent of WIC infants and children received solid foods before 4 months of age, compared with 24 percent of income-eligible nonparticipants and 23 percent of higher-income nonparticipants.

Among infants, the mean age at which solid foods were first fed on a daily basis was 4.1 months (table D-71). (This estimate may be biased by the large percentage of infants who were not yet eating solids.) There were no differences between WIC infants and either group of nonparticipant infants in the mean age at which solids were introduced. Children 1-4 years of age were reportedly first fed solid foods on a daily basis at 5.9 months. On average, WIC children were significantly older than higher-income children (6.3 months vs. 5.5 months) when they began to eat solid foods on a daily basis.

Physical Activity Among Pregnant and Postpartum Women

Increasing leisure-time physical activity among adults is one of the *Healthy People 2010* goals in the area of physical activity (U.S. DHHS, 2000a). Specific goals call for decreasing the percentage of adults who engage in no leisure-time activity and increasing the percentage of adults who participate in moderate and vigorous physical activity.

Healthy People 2010 does not include specific physical activity goals for pregnant and postpartum women. The guidelines of the American College of Obstetrics and Gynecologists (ACOG), however, say that there are no data to indicate that pregnant women should limit exercise during pregnancy. ACOG recommends that pregnant women "engage in 30 minutes or more of moderate exercise on most, if not all, days of the week" (ACOG, 2001).

As discussed below, NHANES-III data lack sufficient information about levels of exertion to evaluate compliance with *Healthy People 2010* goals for vigorous and moderate activity or ACOG recommendations for moderate activity.[2] However, the available data provide some information about the extent to which women participated in leisure-time physical activities during and after pregnancy.

NHANES-III asked adult respondents (17 years and older) whether they participated in a number of different physical activities during the preceding month and, if so, how often they engaged in the activity. The specific activities included in the query were walking a mile or more without stopping, jogging or running, riding a bike or an exercise bike, swimming, aerobics or aerobic dance, other types of dancing, calisthenics, gardening or yard work, and weight lifting. Respondents were also asked to identify any other type of physical activity they engaged in during the preceding month. The reported prevalence of many activities was too low to support detailed analyses. However, data were analyzed separately for walking.

[2] *Healthy People 2010* used data from the National Health Interview Survey (NHIS), rather than NHANES-III, to establish baselines for goals related to physical activity among adults, and will use NHIS data to monitor trends in this area over time (U.S. DHHS, 2000b).

Walking

Overall, 51 percent of pregnant and postpartum women reported walking a mile or more without stopping at least once during the preceding month (table D-72). There were no significant differences between WIC participants and either group of nonparticipants on this measure. Forty-nine percent of WIC women walked a mile or more without stopping, compared with 48 percent of income-eligible women and 54 percent of higher-income women.

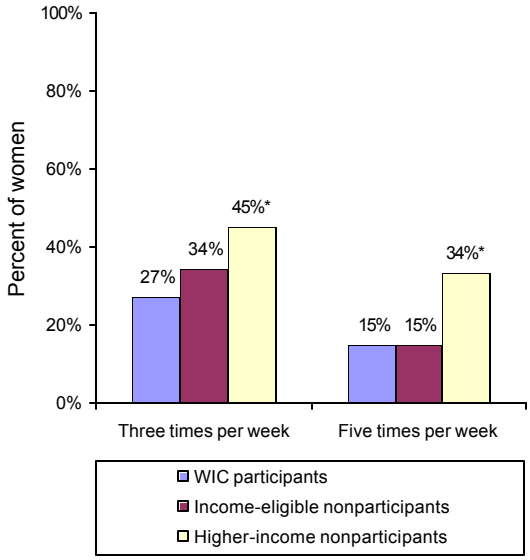
Weekly Frequency of Physical Activity

As noted in the introduction to this section, NHANES-III data cannot be used to examine compliance with *Healthy People 2010* goals for frequency of vigorous and moderate activity or with ACOG guidelines for frequency of moderate activity. This is because NHANES-III lacks information on the intensity and duration of bouts of physical activity.[3]

As an alternative, available data on the reported frequency of physical activity were used to assess the proportion of women who engaged in physical activity three or more times per week and the proportion who engaged in physical activity five or more times per week. All reported activities were included in these tabulations.

The data indicate that pregnant and postpartum women enrolled in WIC were about as physically active as income-eligible nonparticipants, but were significantly less physically active than higher-income nonparticipants (figure 22 and table D-72). Twenty-seven percent of WIC women engaged in some physical activity at least three times per week, and 15 percent engaged in physical activity at least five times per week. This compares with 34 percent and 15 percent of income-eligible nonparticipants, respectively, and 45 percent and 34 percent of higher-income nonparticipants, respectively. Both of the differences between WIC women and higher-income women were statistically significant.

Figure 22 - Percent of pregnant and postpartum women engaging in physical activity



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

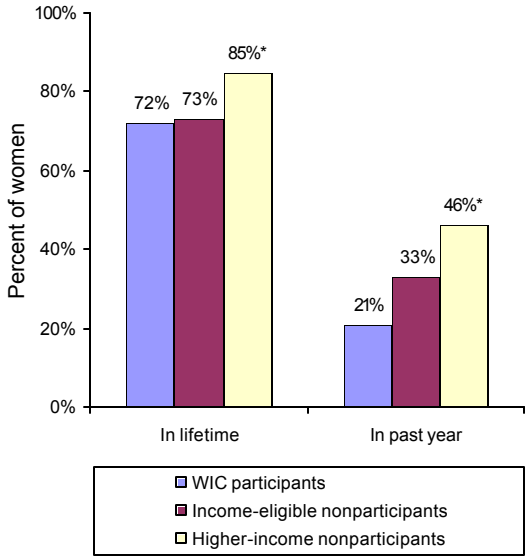
Alcohol and Tobacco Consumption

Women are advised to avoid alcoholic beverages and tobacco during pregnancy. Alcohol consumption during pregnancy is associated with adverse effects on fetal growth, ranging from subtle developmental problems to fetal alcohol syndrome. Smoking during pregnancy is associated with increased risk of premature membrane rupture and a modest increase in risk of preterm delivery and low birthweight (U.S. DHHS, 2001). Consequently, *Healthy People 2010* set targets for pregnant women of nearly 100 percent abstinence from alcohol and cigarettes during pregnancy (U.S. DHHS, 2000a).

[3]NHANES-III physical activity data include intensity codes that were assigned to all queried activities and to all additional ("other") activities reported by respondents. However, because all queried activities received the same intensity rating, these data could not be used to identify individuals who engaged in specific activities at greater and lesser levels of intensity.

NHANES-III did not ask sampled women about alcohol and tobacco consumption during pregnancy. Rather, respondents were asked if they ever smoked or consumed alcohol and if they smoked or consumed alcohol in the recent past (past 5 days for cigarettes, past year for alcohol). These data provide some information on the percentage of WIC women and nonparticipant women who may need education about the dangers of alcohol and tobacco consumption during pregnancy. (The next chapter presents information about the percentage of infants and children born to women who smoked during pregnancy.) Data are not tabulated separately for pregnant women and postpartum women because of limited samples.

Figure 23 - Percent of pregnant and postpartum women who consumed 12 or more alcoholic beverages, in their lifetime and in the past year



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

Alcohol Consumption

Respondents were asked whether they had consumed at least 12 alcoholic beverages, not counting small sips, over their lifetime and during the past 12 months. Overall, 78 percent of pregnant and postpartum women reported consuming at least 12 alcoholic drinks during their lifetime (table D-73). The percentage consuming that number of alcoholic drinks during the past year was notably lower, at 37 percent.

Patterns of alcohol consumption among pregnant and postpartum women were comparable for WIC participants and income-eligible nonparticipants (figure 23). However, in comparison with higher-income nonparticipants, WIC participants were significantly less likely to have consumed 12 or more alcoholic drinks in their lifetime (72% vs. 85%) or to have consumed this amount of alcohol during the past year (21% vs. 46%).

Among women who consumed alcohol during the past year, the mean number of drinks consumed on an average drinking day was significantly *greater* for WIC participants than for higher-income nonparticipants (point estimates for both groups of women are statistically unreliable) (table D-73).

Tobacco Consumption

Overall, 38 percent of pregnant and postpartum women reported that they were or had been smokers (table D-74). This includes all women who reported having smoked at least 100 cigarettes (5 packs) in their lifetime. More than one in five (22%) pregnant and postpartum women reported having smoked in the past 5 days. The mean number of cigarettes smoked by current smokers in the past 5 days was 52.6, or about 2.6 packs. There were no significant differences between WIC participants and either group of nonparticipants on any of these measures.

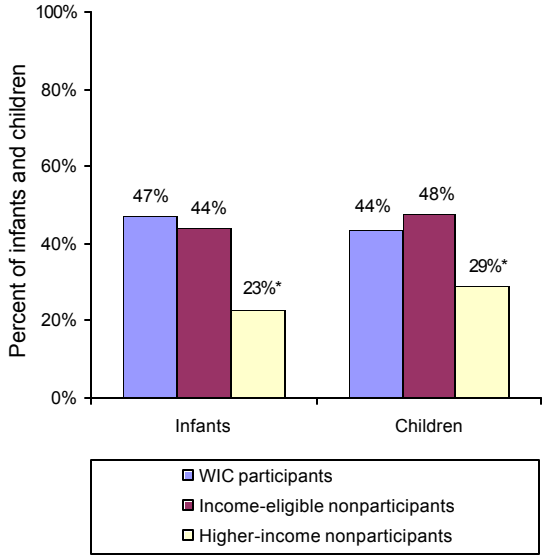
There was a significant difference, however, between WIC women and higher-income women in the reported mean age at which smoking was initiated. Specifically, WIC women

started smoking at a younger age than higher-income women (the point estimate for WIC women is statistically unreliable) (table D-74).

Exposure to Second-Hand Smoke

NHANES-III collected information on the number of smokers living in each household and the number of cigarettes smoked by those individuals. These data reveal that exposure to second-hand smoke was comparable for non-smoking WIC participants and nonsmoking, income-eligible nonparticipants. However, nonsmoking WIC participants were significantly more likely than nonsmoking, higher-income nonparticipants to be exposed to second-hand smoke produced by other household members (figure 24 and D-75). This was true for all three categories of WIC participants (women, infants, and children). Data for women are not presented in figure 24 because the point estimate for higher-income women is statistically unreliable.

Figure 24 - Percent of infants and children exposed to cigarette smoke at home



*Statistically significant difference from WIC participants at the .05 level or better.

Note: Women are not shown because the point estimate is statistically unreliable for higher-income women.

Source: NHANES-III, 1988-94.

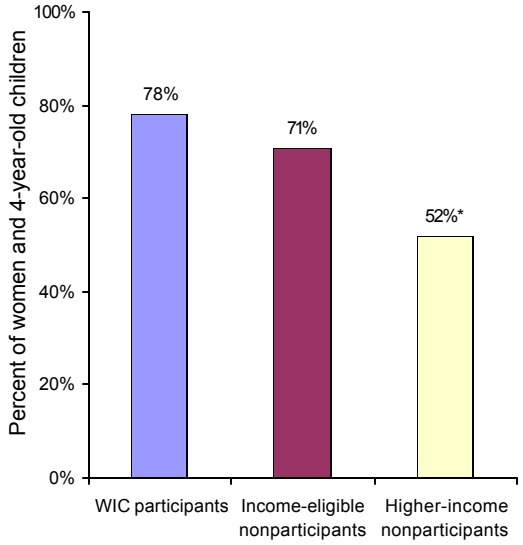
The exposure of infants and young children to second-hand smoke is of special concern. Among infants, WIC participants were twice as likely as higher-income nonparticipants to be exposed to smoke in the home (47% vs. 23%). The trend was similar for children, although the disparity between the two groups was smaller (44% vs. 29%).

Although a significantly greater percentage of nonsmoking WIC participants than nonsmoking, higher-income nonparticipants were exposed to second-hand smoke in their homes, the average "dose" for those exposed was comparable across groups. That is, for all groups of non-smokers, the mean number of cigarettes smoked by smokers in the household was approximately the same: 15-16 cigarettes per day (table D-76).

NHANES-III measured serum cotinine in all respondents 4 years of age and older. Cotinine is a breakdown product of nicotine, and is used as a biological marker for tobacco use and exposure to environmental tobacco smoke. Overall, 62 percent of nonsmoking women and 4-year-old children had high serum cotinine levels (table D-77). The prevalence of this problem was notably greater for 4-year-old children than for pregnant and postpartum women (76% vs. 52%) (statistical significance of age-based difference not tested).

There were no differences between WIC participants and income-eligible nonparticipants in the prevalence of high serum cotinine levels. In comparison with higher-income nonparticipants, however, the prevalence of high serum cotinine was significantly greater for WIC participants (figure 25 and table D-77). This is consistent with the previous finding that non-smoking WIC participants were more likely than nonsmoking, higher-income nonparticipants to reside with one or more smokers. Overall, 78 percent of WIC participants had high a high serum cotinine, compared with 52 percent of

Figure 25 - Percent of nonsmoking women and 4-year-old children with high serum cotinine levels



*Statistically significant difference from WIC participants at the .05 level or better.

Note: Data are not shown separately for women and 4-year-old children because the point estimate is statistically unreliable for 4-year-old WIC participants.

Source: NHANES-III, 1988-94.

higher-income nonparticipants. This pattern was noted separately for both women and 4-year-olds. Data are not reported separately in figure 25 because the point estimate for 4-year-old WIC participants is statistically unreliable.

Chapter Five
Health Status, Conditions, and Risks

This chapter describes the health status of WIC participants and nonparticipants. The discussion is divided into several topic areas: general health status, women's health conditions and risks, children's birth characteristics, health status of children and infants, and dental health.

Several of the measures examined in this chapter are indicators of nutritional risk that may qualify individuals for participation in WIC. Consequently, a greater prevalence of these characteristics among WIC participants than nonparticipants may simply be a reflection of criteria for selection into the program. Risk criteria that were in use at the time of the NHANES-III data collection, based on mention in the IOM (1996) report on WIC nutrition risk criteria (see Chapter One), are noted in the text.

General Health Status

General health status was measured in NHANES-III by self-report as well as by direct physician assessment.[1] In both cases, response options were: excellent, very good, good, fair, and poor.

Overall, women's self-reported health status was less positive than the health status reported for infants and children (table D-78 and D-79). Only a little more than half (56%) of women rated their health as excellent or very good. In contrast, more than three-quarters of infants and 1-4-year-old children were reported to be in excellent or very good health (statistical significance of age-based difference not tested).

[1]For ease in discussion, the term "self-report" is used to describe data reported by sampled women as well as data provided by mothers or other caregivers for sampled infants and children.

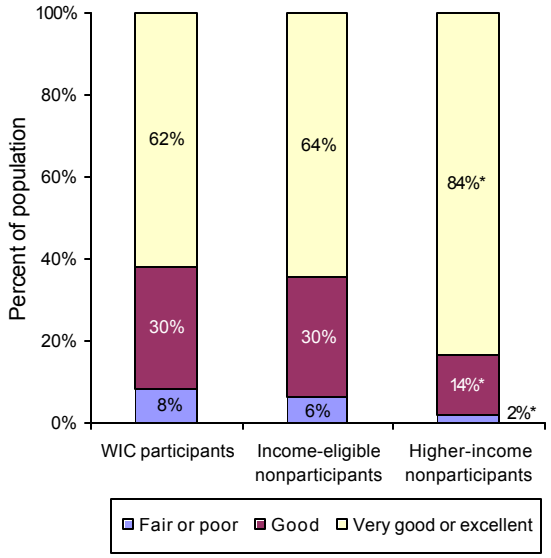
Physicians tended to rate health status more positively than survey respondents (table D-80 and D-81).

WIC participants and income-eligible nonparticipants had approximately equivalent health status, as measured by both self-reports and physician assessments (figure 26 and tables D-78 and D-79). Roughly 63 percent of WIC participants and income-eligible nonparticipants rated their health as very good or excellent, 30 percent rated their health as good, and about 7 percent rated their health as fair or poor. According to the more-positive physician assessments, more than 85 percent of both WIC participants and income-eligible nonparticipants were in very good or excellent health and 12 percent of both groups were in good health (figure 27 and tables D-80 and D-81).

In comparison with higher-income nonparticipants, WIC participants rated their health status more negatively. WIC participants were significantly *less* likely than higher-income nonparticipants to rate their health status as very good or excellent (62% vs. 84%) and significantly *more* likely to rate their health status as fair or poor (8% vs. 2%) (figure 26). These significant between-group differences were noted consistently for women, infants, and children (tables D-78 and D-79).

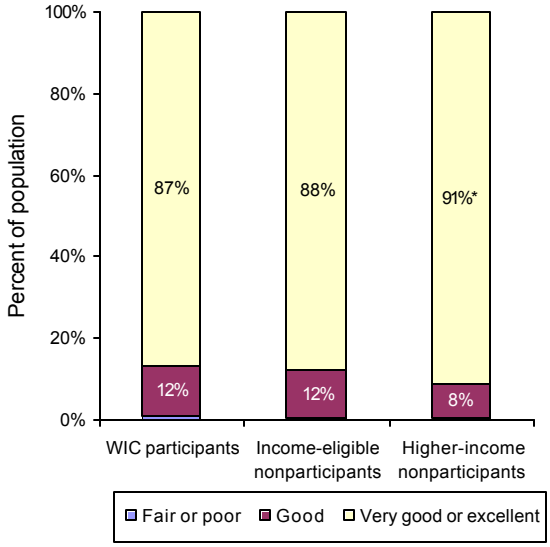
Physician assessments revealed the same pattern of differences between WIC participants and higher-income nonparticipants, but the between-group differences were smaller. The difference in the percentage considered to be in excellent or very good health was statistically significant (87% vs. 91%); while the difference

Figure 26 - Self- or caregiver-reported general health status



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

Figure 27 - Physician-assessed general health status



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

in the percentage considered to be in fair or poor health (a very rare event) was not (figure 27). The between-group difference in physician-assessed health status was concentrated among women (table D-80). In addition, there was a significant difference between WIC infants and higher-income infants in the percentage considered to be in fair or poor health (although this was a rare occurrence in both groups) (table D-81).

Women's Health Conditions and Risks

This section provides information on selected health conditions and risks of pregnant and postpartum women. Topics include the prevalence of chronic health conditions and pregnancy and childbirth history.

Chronic Health Conditions

NHANES-III asked adult respondents (17 years and older) if a physician had ever told them that they had specific types of health conditions. Queried conditions include high blood pressure, diabetes, heart attack, stroke, emphysema, congestive heart failure, and cancer other than skin cancer.

With the exception of high blood pressure, which was reported by 10 percent of women overall, the reported prevalence of the health conditions queried in NHANES-III was low among pregnant and postpartum women (table D-82). In reality, high blood pressure was also rare in this group of women. Physician-measured blood pressure revealed that very few women actually had high blood pressure (table D-82). No statistically significant differences were found between WIC women and either group of nonparticipating women on any of these measures.

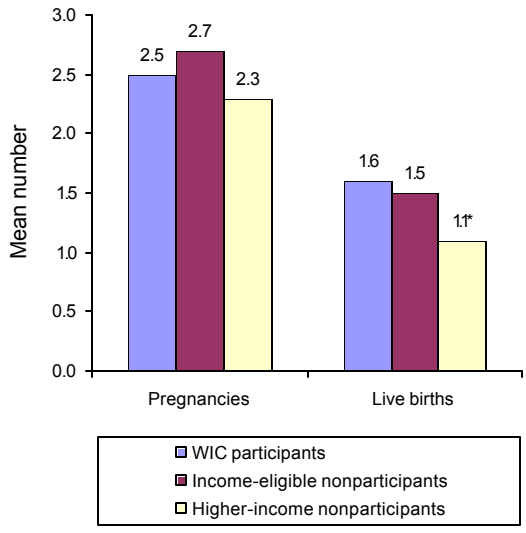
Pregnancy and Childbirth History

NHANES-III collected a detailed reproductive history for all female respondents 12 years of age and older. Tabulations prepared for this report include the mean number of pregnancies, mean number of live births, mean age at time of first live birth, and the percent of women who were teenagers or more than 35 years of age at

the time of their first live birth. Although high parity (having many pregnancies) was not recommended as a nutritional risk criterion by the IOM in its 1996 report, some States were using this characteristic to define WIC eligibility during the time the NHANES-III data were collected. Young maternal age and advanced maternal age were also used as nutritional risk criteria by some States (IOM, 1996).

There were no significant differences between WIC women and income-eligible women for any of the pregnancy and childbirth measures examined in this analysis (table D-83). In comparison with higher-income women, however, women who were participating in WIC had a significantly greater number of live births (1.6 vs. 1.1) (figure 28). In addition, at the time of the first live birth, WIC women were significantly younger than higher-income women and were significantly more likely to have been teenagers (point estimates for WIC participants are statistically unreliable for both of these measures) (table D-83).

Figure 28 - Mean number of pregnancies and mean live births



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

Birth Characteristics of Infants and Children

For infants and children under the age of 12, NHANES-III collected data on a number of characteristics of both mother and child at the time of birth. This includes information on maternal age, maternal smoking during pregnancy, the child's birthweight (reported by mother or other caregiver), and receipt of neonatal intensive care services.

The following sections summarize data on birth characteristics for infants and 1-4-year-old children. During the period of the NHANES-III data collection, all of these characteristics were employed by some States to establish eligibility for WIC participation (IOM, 1996).

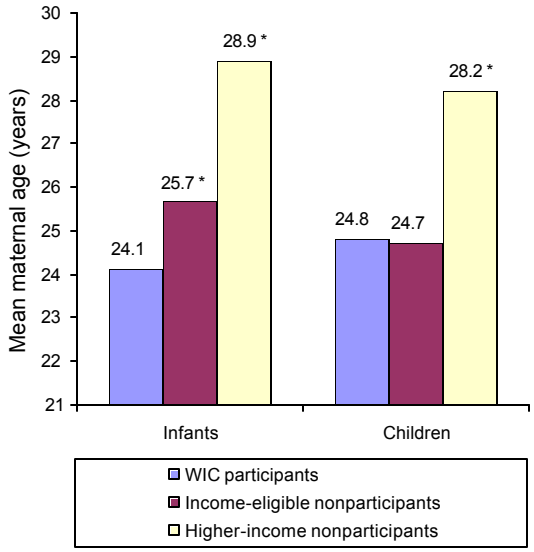
Maternal Age

WIC infants were born to younger mothers, on average, than either income-eligible infants or higher-income infants (mean age of 24.1 years vs. 25.7 years and 28.9 years) (figure 29 and table D-84). In addition, WIC children were born to younger mothers, on average, than higher-income children (24.8 years vs. 28.2 years).

WIC infants were also significantly more likely than infants in either nonparticipant group to be born to teenage mothers (23% vs. 14% and 3%) (figure 30 and table D-85). A similar pattern was observed among children; however, the difference between WIC children and income-eligible children was not statistically significant.

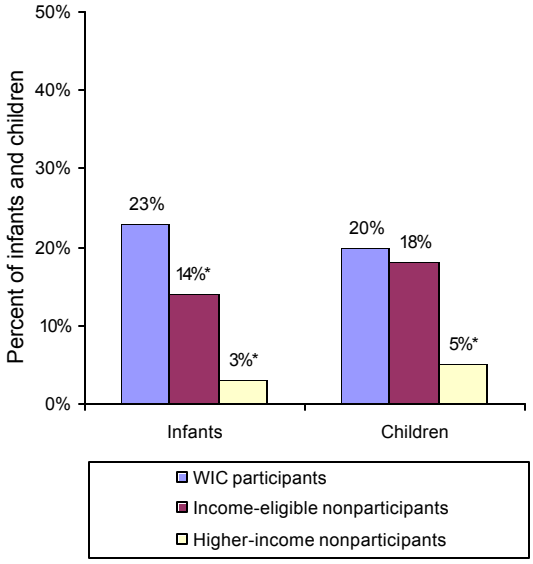
Finally, both WIC infants and WIC children were less likely than their higher-income nonparticipant counterparts to be born to mothers over age 35 (table D-86). Four percent of WIC infants and 4 percent of WIC children were born to women over the age of 35. This compares with 11 percent of higher-income nonparticipant infants and 9 percent of higher-income nonparticipant children.

Figure 29 - Mean age of mother at birth



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

Figure 30 - Percent of infants and children born to teenage mothers



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

Maternal Smoking During Pregnancy

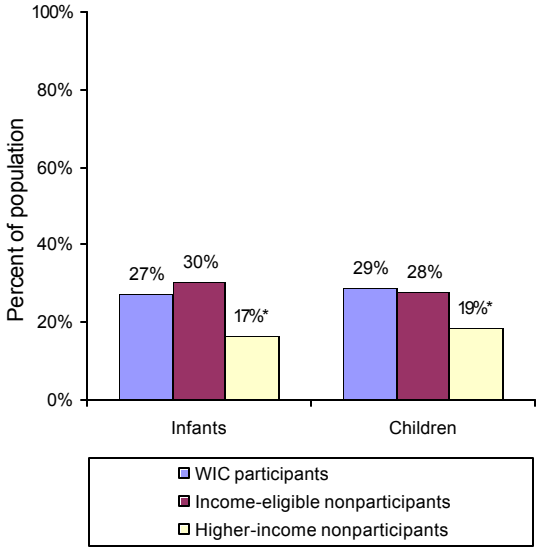
Overall, 24 percent of infants and 1-4-year-old children were born to women who smoked during the pregnancy (table D-87). There were no significant differences between WIC infants and children and income-eligible infants and children in this regard (figure 31). WIC infants and children were, however, significantly more likely than higher-income infants and children to have been born to women who smoked during the pregnancy. This was true for 27 percent of WIC infants and 29 percent of WIC children, compared with 17 percent of higher-income infants and 19 percent of higher-income children.

Birthweight (Self-Report)

According to data reported by parents and caregivers, infants and children participating in WIC had a significantly lower mean birthweight than either income-eligible or higher-income infants and children. The reported mean birthweight for WIC infants was 3,258 gm. (7.2 pounds), compared with 3,343 gm. (7.4 pounds) for income-eligible infants and 3,470 gm. (7.7 pounds) for higher-income infants (figure 32 and table. D-88). Reported mean birthweights for children showed similar between-group differences.

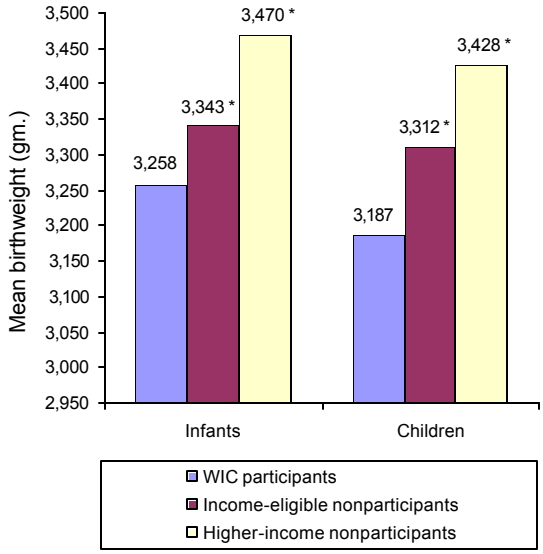
WIC infants and children were also more likely than infants and children in either of the nonpar-

Figure 31 - Percent of infants and children whose mothers smoked during pregnancy



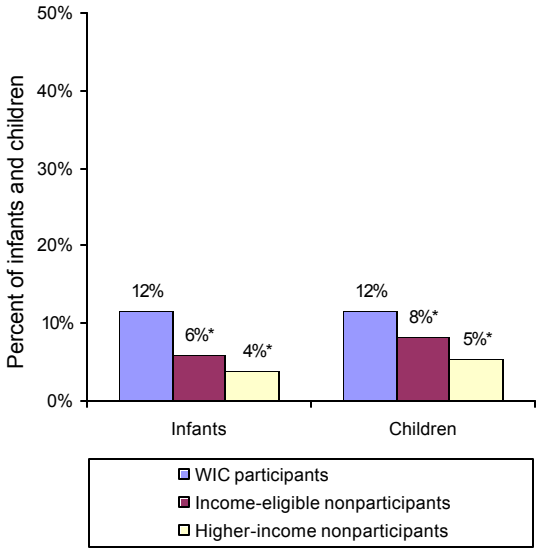
*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

Figure 32 - Reported mean birthweight of infants and children



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

Figure 33 - Percent of infants and children born low birthweight, based on reported birthweight



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

ticipant groups to have been low birthweight (less than 2,500 gm. or 5.5 pounds) (figure 33 and table D-89). According to reported birthweights, the prevalence of low birthweight among WIC infants was twice that of income-eligible infants and three times that of higher-income infants (12% vs. 6% and 4%). A comparable pattern was noted for children, but the between-group disparities were smaller (12% vs. 8% and 5%).

These results are not surprising, given that low birthweight is a nutritional risk criteria used to establish program eligibility. Moreover, low birthweight infants may stay on WIC longer than normal weight infants because they tend to have more problems.

There were no statistically significant between-group differences in the prevalence of very-low birthweight (less than 1,500 gm. or 3.3 pounds) (table D-90).

Neonatal Intensive Care Stays

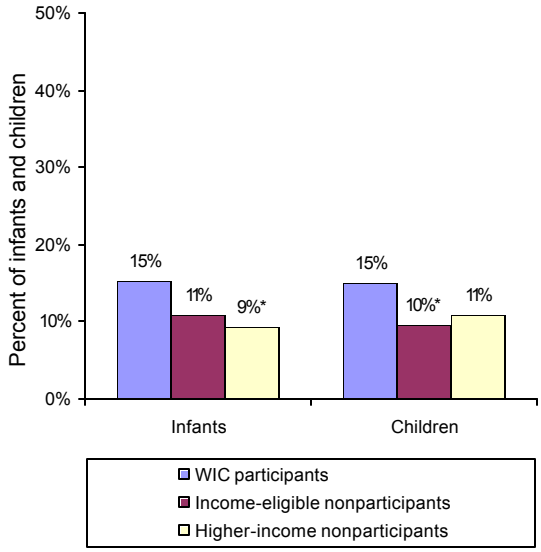
Approximately 11 percent of all infants and 1-4-year-old children were reportedly hospitalized in neonatal intensive care units (NICUs) at the time of their birth (table D-91). The reported prevalence of NICU stays was greater for WIC infants and children than for infants and children in either of the nonparticipant groups (15% vs. 10% and 11%). Although this general pattern was observed for both infants and children, the between-group differences were not consistently significant (figure 34).

Health Status of Children and Infants

This section presents data on a number of measures of child health and well being. For children, topics include weight status, growth retardation (stunted linear growth), iron status, hospitalizations since birth, accidents, injuries, and poisonings requiring medical attention, chronic respiratory conditions, and lead poisoning.[2] For infants, data availability was limited to information on hospitalizations since birth, accidents, injuries and poisonings requiring

[2]Caregivers were also asked whether children had several other health conditions, including high cholesterol, diabetes, and high blood pressure. However, because the percentages of children reported to have any of these conditions were very low, the data were not tabulated for this report.

Figure 34 - Percent of infants and children receiving neonatal intensive care



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

medical attention, and chronic respiratory conditions. The data presented are drawn from both physical examinations and interviews with parents/caregivers.

Weight Status of Children

The prevalence of overweight and obesity in the U.S. has increased dramatically since the first Health Examination Survey (a precursor to the present NHANES survey) was conducted in 1963-65 (Flegal et al., 1998). This is especially true for children and adolescents, for whom the prevalence of overweight has more than doubled (Troiano and Flegal, 1998).

Healthy People 2010 includes goals to decrease the proportion of children who are overweight. Classifying children as overweight is fundamentally different from classifying adults as overweight (Cole, 2001). Adults have traditionally been categorized on the basis of life insurance mortality data and data relating weight status to morbidity and mortality (Troiano and Flegal, 1998). Such criteria cannot be used to define overweight in childhood, however, because childhood mortality is not associated with weight and weight-related morbidity in childhood is too low to define meaningful cutoffs (Barlow and Dietz, 1998). Therefore, the approach used to classify children as overweight relies on comparing children's weights and heights to appropriate reference populations.

A series of growth charts has been developed by the CDC for different anthropometric measures and different age groups (Kuczmarski et al., 2002). Three different growth charts can be used to assess weight status in very young children: the BMI-for-age chart (designed for ages 2 and over), the weight-for-length chart (birth through 3 years), and the weight-for-height chart (2-5 years). Because this analysis included children between 1 and 4 years of age, the weight-for-length and weight-for-height charts were used. These two charts are parallel in the overlapping ages of 24-36 months so that, within this age group, recumbent length and standing height (when used with the appropriate chart) yield the same percentile.[3]

In assessing weight status among children, use of the word "obesity" is avoided because of potential negative connotations (CDC, 2003). Instead, assessment of weight status focuses on the prevalence of overweight (defined as weight-for-height at or above the 95th percentile), the prevalence of being at risk of overweight (defined as weight-for-height between the 85th and 95th percentiles), and the prevalence of underweight (defined as weight-for-height below the 5th percentile) (see appendix B). Overweight and underweight are included in the nutritional risk criteria recommended by the IOM for qualifying children for WIC participation; these criteria were in widespread use at the

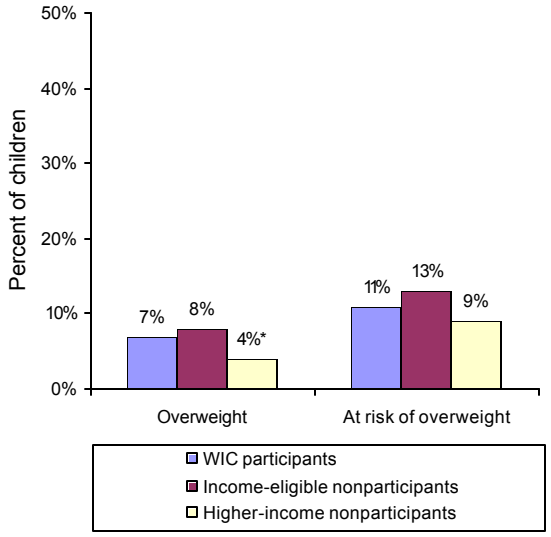
[3]In children under 2 years of age, recumbent length rather than standing height is used to assess stature. For ease in discussion, the term "weight-for-height" is used in this chapter to refer to the appropriate use of either the weight-for-length or weight-for-height charts.

time NHANES-III data were collected (IOM, 1996).

Among 1-4-year-old children, there was no significant difference between WIC participants and income-eligible nonparticipants in the prevalence of overweight (7-8%) (figure 35 and table D-92). However, WIC children were significantly more likely to be overweight than higher-income children (7% vs. 4%). There were no differences between WIC participants and either group of nonparticipants in the percentage of children at risk of overweight (11%, overall).

WIC children were significantly more likely than income-eligible children to be underweight (table D-92). Seven percent of WIC children were underweight, compared with 3 percent of income-eligible children. There was no significant difference between WIC children and higher-income children in the prevalence of underweight.

Figure 35 - Percent of children overweight and at risk of overweight



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

Growth Retardation Among 2-4-year-old Children

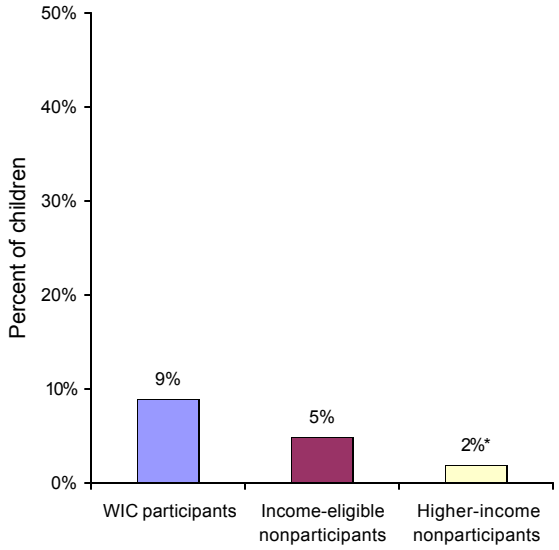
Young children are susceptible to growth problems that can affect stature. Retardation of linear growth in preschool children may reflect inadequate maternal weight gain or other prenatal problems, dietary inadequacy, infectious or chronic disease, or poor healthcare (U.S. DHHS, 2000a). The *Healthy People 2010* objectives include a goal to decrease the prevalence of (linear) growth retardation among low-income children under the age of 5. Retarded growth is defined as height-for-age below the 5th percentile on the CDC height-for-age growth charts (U.S. DHHS, 2000a). This condition (commonly referred to as short stature) is among the nutritional risk criteria recommended by the IOM for determining WIC eligibility and was in common use at the time the NHANES-III data were collected (IOM, 1996). Because the height-for-age growth chart is designed for children 2 to 5 years of age, tabulations related to growth retardation are limited to 2-4-year-olds.

Overall, the prevalence of growth retardation among 2-4-year-old children was relatively low, at about 4 percent (table D-93). WIC children had a greater prevalence of growth retardation than either group of nonparticipant children (9% vs. 5% and 2%); however, only the difference between WIC children and higher-income children was statistically significant (figure 36).

Prevalence of Iron Deficiency, Iron-Deficiency Anemia, and Anemia Among Children

Iron deficiency is the most common known form of nutritional deficiency (CDC, 1998). Iron deficiency can lead to developmental delays, behavioral problems, and decreases in verbal learning and memory, and can affect immune function, energy metabolism, and work performance (U.S. DHHS, 2000a, CDC, 1998, and Looker et al., 1997). The prevalence of iron

Figure 36 - Percent of 2-4-year-old children with growth retardation



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

deficiency has decreased dramatically over the past three decades, in part because of increased iron intake among infants and young children and the influence of the WIC program (Yip et al., 1987). Nonetheless, iron deficiency remains a problem for young children, particularly those who are low-income. *Healthy People 2010* includes a goal to decrease the prevalence of iron deficiency among preschool children (ages 1 to 4) (U.S. DHHS, 2000a).

The terms anemia, iron deficiency, and iron-deficiency anemia are often used interchangeably, but are not equivalent (U.S. DHHS, 2000a). Although iron deficiency can contribute to anemia, anemia can also be caused by other factors, including other nutrient deficiencies, infection, inflammation, and hereditary anemias. When the prevalence of iron deficiency is high, anemia is a good predictor of iron deficiency. However, when the prevalence of iron deficiency is low, the majority of anemia is due to other causes (U.S. DHHS, 2000a).

This analysis assessed the prevalence of iron deficiency using the criterion defined in *Healthy People 2010* (U.S. DHHS, 2000a). This criterion defines iron deficiency as abnormal results on two or more of the following measures of iron status: serum transferrin saturation, erythrocyte protoporphorin, and serum ferritin. Iron-deficiency anemia was defined as documented iron deficiency (as defined above) *plus* abnormally low hemoglobin (Looker et al., 1997). Cutoff values used in the analysis are shown in appendix B. The analysis sample was limited to children with data for all relevant variables.

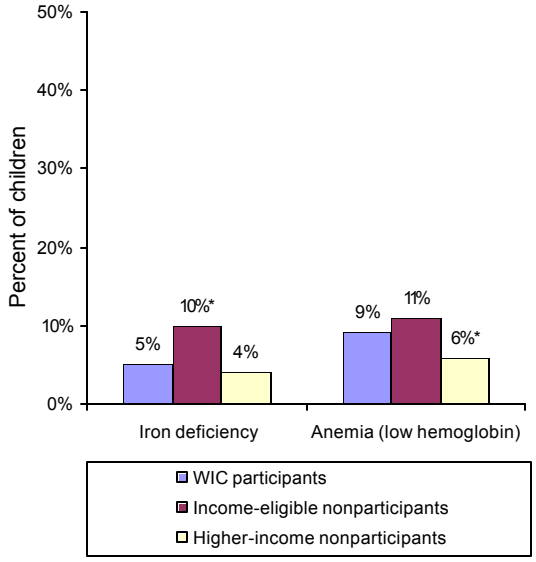
Anemia, defined on the basis of low hemoglobin or hematocrit, was used as a nutrition risk criterion by a majority of WIC State agencies at the time the NHANES-III data were collected (IOM, 1996).

Overall, the prevalence of iron deficiency among 1-4-year-old children was about 6 percent (table D-94).[4] Prevalence was greatest among 1-year-olds (13%) and was substantially lower for older children (statistical significance of age-based differences not tested).

WIC children were significantly less likely than income-eligible children to be iron deficient (figure 37). In fact, income-eligible children were twice as likely as WIC children to be iron deficient (10% vs. 5%). This difference was largely concentrated among 3-year-olds (table D-94). WIC children in this age-specific cohort were also less likely to be iron deficient than higher-income children. But, overall, there was no significant difference between WIC children and higher-income children in the prevalence of iron deficiency.

[4]Results for each of the three measures of iron status considered in defining iron deficiency (serum ferritin, free erythrocyte protoporphorin, and transferrin saturation) are presented in tables D-96 to D-98.

Figure 37 - Percent of children with iron deficiency and percent with anemia/low hemoglobin



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

Iron-deficiency anemia was observed in about 2 percent of 1-4-year-old children, overall (table D-98). Because of low prevalence, the point estimates for most subgroups are unreliable. However, it is clear that the prevalence of iron-deficiency anemia, like the prevalence of iron deficiency, was greatest among 1-year-olds. The data also indicate that WIC children were significantly more likely than higher-income children to have iron-deficiency anemia, although this was a relatively uncommon finding for all children, particularly those older than 2.

The prevalence of anemia, defined on the basis of low hemoglobin or hematocrit, was substantially greater than the prevalence of iron-deficiency anemia, as assessed in this analysis. (As noted previously, low hemoglobin levels may be caused by factors unrelated to iron status, including infection, inflammation, deficiencies of other nutrients (unlikely with this age group), and hereditary anemias). Eight percent of all children between the ages of 1 and 4 had low levels of hemoglobin and 7 percent had low hematocrits (tables D-99 and D-100). The prevalence of anemia generally decreased with age; however, differences between 1-year-olds and other age groups were not as dramatic as the differences observed for iron deficiency (statistical significance of age-based differences not tested).

WIC children were no more or less likely than income-eligible nonparticipant children to have anemia, based on a low level of hemoglobin (figure 37). In comparison with higher-income children, however, WIC children were more likely to be anemic (9% vs. 6%).

Hospitalizations Since Birth

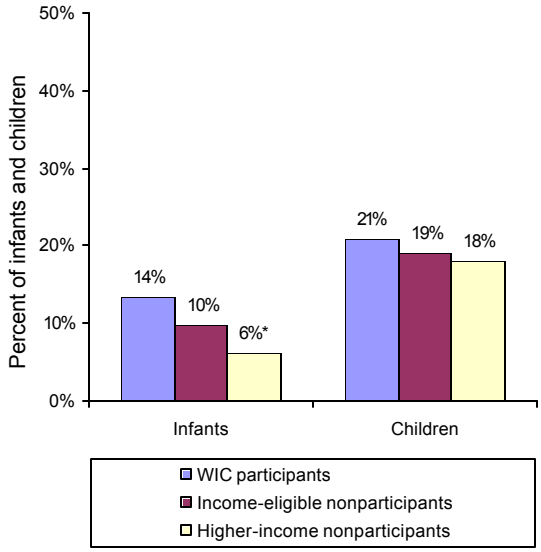
Overall, 17 percent of infants and 1-4-year-old children were hospitalized at least one time since birth (table D-101). WIC infants were significantly more likely to have been hospitalized than higher-income infants (14% vs. 6%) (figure 38). The difference in rates of hospitalization for WIC infants and income-eligible infants was not significant (14% vs. 10%).

The percent of children with hospitalizations since birth is a cumulative measure that increases with age. By the time children were 1 year of age, the difference between WIC participants and higher-income nonparticipants observed among infants had narrowed significantly. At that point, WIC children had a hospitalization rate of 19 percent, compared with 17 percent for higher-income children, and the difference was not statistically significant (table D-101). Similarly for 2-, 3-, and 4-year-olds and for children overall, there were no significant differences between WIC participants and either group of nonparticipants in the percent of children with one or more hospitalizations since birth.

Accidents, Injuries, and Poisonings Requiring Medical Attention

Parents and caregivers were asked whether infants or children had experienced, anytime

Figure 38 - Percent of infants and children with at least one hospitalization since birth



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

during the preceding 12 months, an accident, injury, or poisoning that was serious enough to require medical attention. Overall, 10 percent of infants and 1-4-year-old children had at least one such experience (table D-102). Not surprisingly, the percentage of children experiencing such medical emergencies was substantially greater than the percentage of infants (12% vs. 2%) (statistical significance of age-based difference not tested). No significant differences were observed between WIC participants and either group of nonparticipants on this measure.

Chronic Respiratory Conditions

Parents and caregivers were asked whether a health professional had ever told them that their infant or child had asthma, chronic bronchitis, or hay fever. The reported prevalence of all of these conditions was relatively low, overall (tables D-103 – D-105).

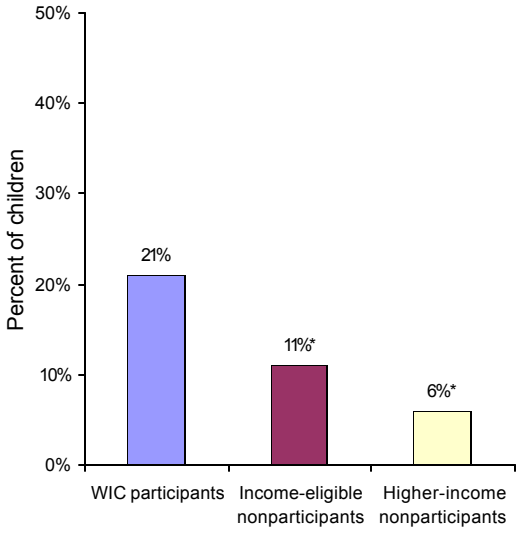
The only significant difference noted between WIC participants and nonparticipants, overall, was in the reported prevalence of asthma. WIC participants were significantly more likely than higher-income nonparticipants to have reported asthma (7% vs. 4%). This difference was observed for both infants and children.

Lead Poisoning Among Children

The NHANES-III interview asked parents and caregivers whether children had been screened for lead poisoning. Caregivers of children who had been screened were asked whether the results indicated that the child had "high lead or lead poisoning."

Overall, 10 percent of 1-4-year-old children had reportedly been screened for lead poisoning (table D-106). Children participating in WIC were significantly more likely than either group of nonparticipating children to have been screened (figure 39). In fact, WIC children were almost twice as likely as income-eligible children and 3.5 times as likely as higher-income children to have been screened for lead poisoning (21% vs. 11% and 6%). This pattern was observed for each age-specific cohort (table D-106).

Figure 39 - Percent of children ever screened for lead poisoning



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

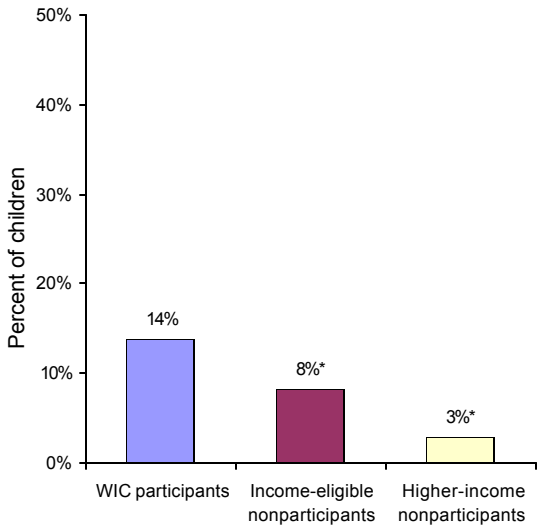
According to caregiver reports, the percentage of children found to have lead poisoning at any point in time was very low, less than 1 percent overall (table D-107). Nonetheless, the percentage of WIC children reported to have been diagnosed with lead poisoning was significantly greater than the percentage of higher-income children (the point estimate for higher-income children is statistically unreliable).

Based on NHANES-III laboratory tests and CDC-defined standards for elevated blood lead levels, the actual prevalence of lead poisoning was substantially greater than reported by caregivers. Overall, 7 percent of children were found to have blood lead levels indicative of lead poisoning (table D-108). Moreover, the prevalence of high blood lead levels was significantly greater for WIC children than for either group of nonparticipating children (figure 40). Fourteen percent of WIC children had abnormally high blood lead levels. Comparable statistics for nonparticipant children were 8 percent for income-eligible children 3 percent for higher-income children. Lead poisoning was being used as a nutritional risk criteria for WIC at the time NHANES-III data were collected.

The problem of lead poisoning has been declining sharply in recent years. Between NHANES-II (1976-80) and the first phase of NHANES-III (1988-91), the overall prevalence of lead poisoning in the population as a whole decreased from 77.8 percent to 4.4 percent (CDC, 1997). Between Phase I (1988-91) and Phase II (1991-94) of NHANES-III, the overall prevalence of high blood lead levels continued to decline, with percentage point decreases generally being greater among groups with the highest prevalence of elevated lead levels during Phase I (CDC, 1997).

Tables D-109 and D-110 present data on the prevalence of elevated blood lead levels among 1-4-year-old children in Phase I and Phase II of

Figure 40 - Percent of children with high blood lead levels



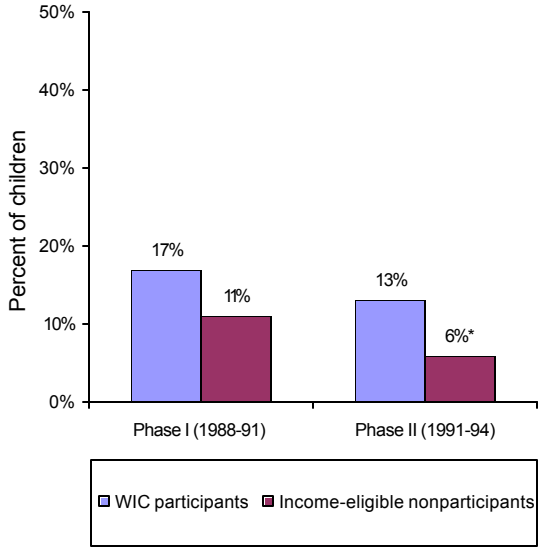
*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

NHANES-III. (The data reported in table D-108 and figure 40 reflect the complete NHANES-III sample). The overall prevalence of elevated blood lead levels in this group of children decreased from 8.9 percent in Phase I to 5.2 percent in Phase II, a decrease of 42 percent.

Figure 41 illustrates the decrease in the prevalence of high blood lead levels over the period of the NHANES-III data collection for WIC children and income-eligible nonparticipant children. The decrease for WIC children was approximately 23 percent, from a prevalence of about 17 percent in Phase I to about 13 percent in Phase II. The decrease for income-eligible children was approximately 45 percent (from about 11% to about 6%). The decrease for higher-income children can not be determined reliably because the point estimate for higher-income children in Phase II is statistically unreliable (table D-110).

Because of declining prevalence over time, the Phase II data offer the most representative data on lead poisoning available from NHANES-III.

Figure 41 - Percent of children with high blood lead levels: NHANES-III, Phase I and II



*Statistically significant difference from WIC participants at the .05 level or better.

Note: Point estimate for higher-income nonparticipants in Phase II is statistically unreliable.

Source: NHANES-III, 1988-94.

These data indicate that WIC children were significantly more likely than either group of nonparticipating children to have lead poisoning. About 13 percent of WIC children had elevated blood lead levels, compared with 6 percent of income-eligible children. The difference between WIC children and higher-income children was also statistically significant. However, as noted, the point estimate for higher-income children is statistically unreliable.

Dental Health

All NHANES-III respondents 2 years of age and older received a dental exam as part of the physical examination component. In this exam, all decayed, missing, and filled teeth were charted.

Overall, pregnant and postpartum women had an average of 8.6 missing, decayed, or filled teeth (table D-111). WIC women and income-eligible women had comparable numbers of missing, decayed, and filled teeth. In comparison with higher-income women, however, WIC women had fewer teeth that were missing, decayed, or filled.[5]

Children 2 to 4 years of age had, on average, about one missing, decayed, or filled tooth. Differences between groups were small, but the difference between WIC children and higher-income children was statistically significant, overall and for each of the age-specific cohorts except 3-year-olds.

Visits to a Dentist or Dental Hygienist

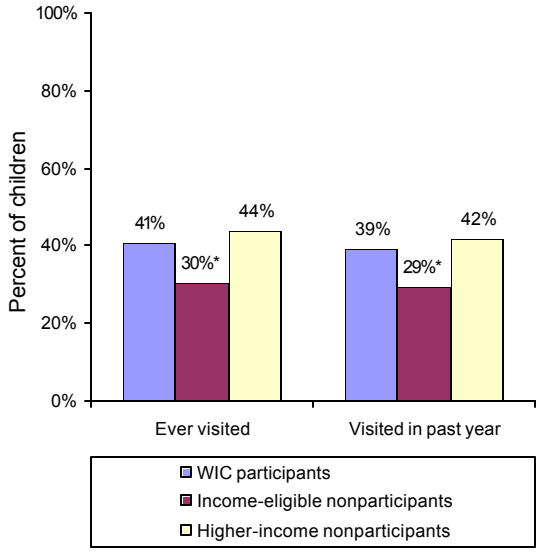
Overall, close to 100 percent of pregnant and postpartum women reported visiting a dentist or dental hygienist at least once in their lifetime (table D-112). Sixty-three percent reported visiting a dental health professional in the past year (table D-113). There were no statistically significant differences between WIC women and either group of nonparticipating women in these health practices.

Among children 2-4 years old, 38 percent visited a dental health professional at least once and 36 percent visited a dental health professional in the past year (tables D-112 and D-113). WIC children were no more or less likely to have had dental care visits than higher-income children. However, WIC children were significantly more likely than income-eligible children to have visited a dental health practitioner (figure 42). Forty-one percent of WIC children visited a

[5]It was not possible, for this report, to examine the difference between the dental health status of WIC women and higher-income women in more detail. The NHANES-III exam file does not provide separate totals for decayed, missing, and filled teeth. Nor does it provide information on these characteristics for each tooth. Rather, the file provides separate variables that describe the status of four different surfaces for each tooth. These detailed data can be used in future analyses to elucidate the underlying cause of the difference observed between the two groups of women. For example, higher-income women may have more *filled* teeth than WIC women. This may indicate attention to caries detected by x-ray—rather than those causing pain or clearly visible on the exterior of a tooth—resulting from higher quality dental care.

dental health professional at least once in their lives. In contrast, only 30 percent of income-eligible children had had a dental care visit. A comparable pattern was noted for reported dental visits during the past year (39% vs. 29%).

Figure 42 - Percent of children who have visited a dentist or dental hygienist



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

Chapter Six

Access to Health Care Services

This chapter focuses on issues that affect individuals' access to and use of health care services—health insurance coverage, the availability of a regular source (location) of health care, and the availability of a regular physician or other health care provider. The chapter also describes utilization of health care services in the past year.

Many WIC local agencies are co-located with public health clinics or other health care delivery sites. In addition, as noted in Chapter One, under adjunctive-eligibility rules, Medicaid recipients are automatically income-eligible for WIC.

Health Insurance Coverage

NHANES-III asked all respondents about sources of health insurance coverage. Survey questions considered Medicare, Medicaid, Veteran's Administration (VA) benefits, CHAMPUS, CHAMPVA, and private health insurance.[1]

During the survey period, four different versions of the survey instrument were used and health insurance questions varied across versions. The major difference was the time frame referenced; for example, "now" vs. "in the last month." In addition, some questions had slight variations in wording across versions.[2] When differences in versions were considered slight, NHANES-III staff created the variable for the full survey time period. All variables used in this analysis were available for the full survey sample except the question about receipt of CHAMPUS, CHAMPVA, Veteran's Administration (VA) benefits, and military health care. The prevalence of this type of insurance coverage was calculated using data for respondents who answered that question. These data were not tabulated separately because of very low prevalence, but contributed to overall estimates of health insurance coverage.

Overall, 88 percent of pregnant and postpartum women, 94 percent of infants, and 92 percent of 1-4-year-old children had some type of health insurance coverage (table D-113). Among women, there was no difference between WIC participants and income-eligible nonparticipants in the rate of health insurance coverage (79% vs. 80%). However, in comparison with higher-income women, women participating in WIC were significantly less likely to have health insurance (point estimate for higher-income women is statistically unreliable).

Among infants and children, WIC participants were *more* likely than income-eligible nonparticipants and *less* likely than higher-income nonparticipants to have health insurance. Ninety-three percent of WIC infants had health insurance, compared with 84 percent of income-eligible infants. The percentage of higher-income infants with health insurance was significantly greater

[1]CHAMPUS (now known as TRICARE) is a health care benefits program for active duty and retired members of the military. CHAMPVA is a health care benefits program for permanently disabled veterans and their dependents.

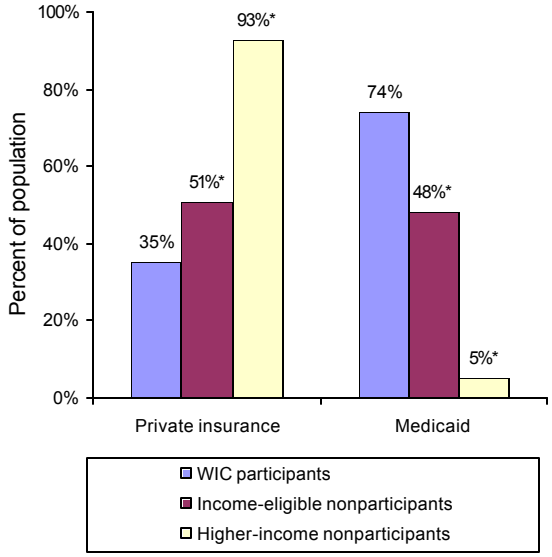
[2]Version differences for health insurance questions varied for different sources of health insurance. Two versions of the Medicare and Medicaid questions were asked: "At any time DURING THE LAST 12 MONTHS were you covered by Medicare/Medicaid?" and "DURING THE LAST MONTH were you covered by Medicare/Medicaid?"

Three versions of the private health insurance question were asked: "Are you NOW covered by a health insurance plan?", "Are you covered by a health insurance plan?" and "During the LAST MONTH were you covered by a health insurance plan obtained privately or through an employer or union?"

than the percentage of WIC infants, but the point estimate for higher-income infants is unreliable. Among 1-4-year-old children, 94 percent of WIC children had health insurance, compared with 86 percent of income-eligible children and 96 percent of higher-income children.

WIC participants were significantly *less* likely than comparable individuals in either of the nonparticipant groups to have private health insurance coverage and were *more* likely to be receiving Medicaid benefits (figure 43 and tables D-115 and D-116). Overall, only 35 percent of WIC participants had private health insurance coverage, compared with 51 percent of income-eligible nonparticipants and 93 percent of higher-income nonparticipants. In contrast, almost three-quarters of WIC participants received Medicaid benefits, compared with 48 percent of income-eligible nonparticipants and 5 percent of higher-income nonparticipants. These patterns were observed separately for each participant category. However, among women, the difference between WIC participants and income-eligible nonparticipants in the receipt of private health insurance was not statistically significant (table D-115).

Figure 43 - Percent of persons with private health insurance and Medicaid



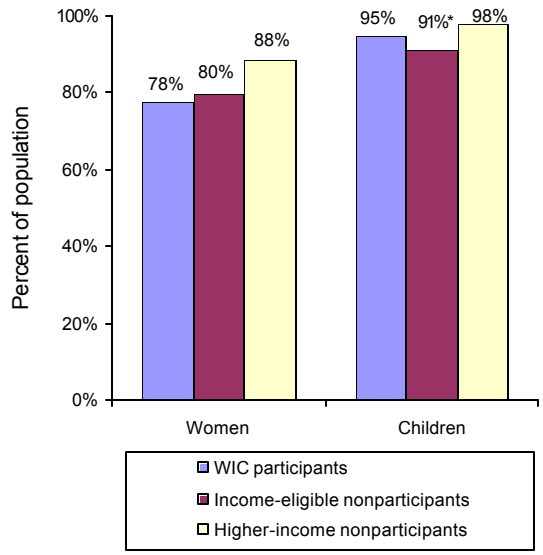
*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

Regular Source of Health Care

More than 8 out of 10 pregnant and postpartum women reported having a regular source of health care—that is, a clinic, health center, or doctor's office that was usually used for health care needs or to obtain health-related advice and information (table D-117). There were no significant between-group differences in the percentage of pregnant and postpartum women who had a regular source of health care (figure 44).

Overall, 97 percent of all infants and 95 percent of 1-4-year-old children had a regular source of health care (table D-117). WIC infants were significantly more likely than income-eligible nonparticipant infants and just as likely as higher-

Figure 44 - Percent of women and children with a regular source of health care



*Statistically significant difference from WIC participants at the .05 level or better.

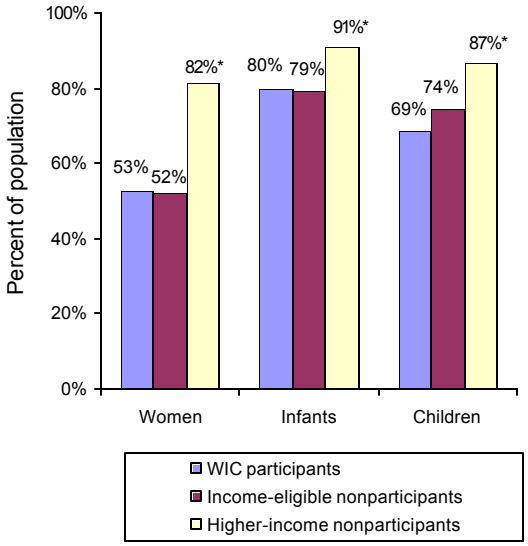
Note: Infants are not shown because the point estimates for WIC infants and higher-income infants are statistically unreliable.

Source: NHANES-III, 1988-94.

income nonparticipant infants to have a regular source of health care (point estimates for WIC infants and higher-income infants are statistically unreliable). Among 1-4-year-old children, WIC participants were *more* likely than income-eligible nonparticipants and *less* likely than higher-income nonparticipants to have a regular source of health care (95% vs. 91% and 98%) (figure 44).

Overall, 78 percent of women, infants, and 1-4-year-old children had a regular physician or other health care provider (table D-118). WIC participants were no more or less likely to have a regular health care provider than their counterparts in the income-eligible nonparticipant group (figure 45). However, in comparison with higher-income nonparticipants, all three categories of WIC participants were less likely to have a regular health care provider. Differences between WIC participants and higher-income nonparticipants were most substantial for women and children. Just over half (53%) of WIC women reported having a regular provider, compared with 82 percent of higher-income women. Similarly, 69 percent of WIC children had a regular health care provider, compared with 87 percent of higher-income children.

Figure 45 - Percent of persons with a regular physician or health care provider



*Statistically significant difference from WIC participants at the .05 level or better.
Source: NHANES-III, 1988-94.

Use of Health Care Services In the Past Year

Overall, 95 percent of pregnant and postpartum women, infants, and 1-4-year-old children saw a physician or other health care provider at least once during the preceding 12 months (excluding overnight hospital stays) (table D-119). WIC participants were more likely than income-eligible nonparticipants to have seen a health care provider during the past year (96% vs. 91%). This difference was concentrated among women and children. There was no difference between WIC participants and higher-income nonparticipants in the use of health care services in the past year.

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Appendix A
NHANES-III Data Files

NHANES-III included a number of different interviews as well as a comprehensive physical examination. Most interview data were collected through 'household interviews,' which were conducted in respondents' homes. Physical exams were generally conducted in Mobile Exam Centers (MEC), although home examinations were offered if the sample person was 2-11 months, 60 years or older and wheelchair-bound, or primarily bedridden. The home examination included a subset of the measures collected in the MEC. Additional interview data were collected at the time of the exam. The content of these interviews varied for adults and youth and included questions about use of alcohol and tobacco, physical activity, reproductive health, and selected aspects of diet.

The organization of NHANES-III data files corresponds to the origin of the data—household interviews or examinations. The four main data files are:

- ***Household adult data file***—contains data from the household interview on individual demographics, household composition, family background, family characteristics, health insurance, health services, selected health conditions, reproductive health, functional impairment, physical activity, use of tobacco and alcohol, and vitamin and mineral supplements.

- ***Household youth data file***—parallels the adult data file, with the exception of questions that cover physical activity, use of tobacco and alcohol, reproductive health, and selected diet-related topics (e.g., dieting). These topics were included as part of the MEC youth interview, which was completed by youth 8 years of age and older, generally without caregiver involvement. In addition, the youth file contains data on some topics not included in the adult file. This includes data on birth characteristics, infant feeding practices, and television viewing.

- ***Examination data file***—contains results of the physical examinations conducted in the MEC or at home, and data from interviews conducted in the MEC.

- ***Laboratory data file***—contains results of laboratory tests on blood samples collected in the MEC.

The origin of each data item determines the sample for analysis. NHANES-III provides sample weights for three samples: interview-only, MEC-examined, and home-examined. The sample sizes for these samples are shown in Chapter One, table 1. The sample weight used for each tabulation is specific to the data item tabulated. Source notes at the bottom of each detailed table (appendix D) identify the NHANES-III data file used in the tabulation.

In addition to the four main data files, NHANES-III released several dietary recall data files and supplementary files containing constructed variables or raw data unavailable at the initial release date. The additional files used for this series of reports are:

- ***Dietary recall data files***—contain information about individual foods, combination foods, and ingredients reported during 24-hour recalls. The file includes nutrient values from two different nutrient databases—the USDA Survey Nutrient Data Base and the nutrient data base maintained by the University of Minnesota's Nutrition Coordinating Center (NCC). All of the nutrient analyses presented in this series of reports are based on nutrient values from the USDA Survey Nutrient Data Base.

- ***Healthy Eating Index (HEI) file*—**contains HEI scores (based on NHANES-III 24-hour dietary recalls) based on the measure developed by the U.S. Department of Agriculture to measure overall dietary quality (Kennedy et al., 1995).

Subgroups Used for Tabulations

Each volume of this report examines specific subgroups of the low-income population (volume I: Food Stamp Program participants and nonparticipants; volume II: WIC Program participants and nonparticipants; volume III: school-age children; and volume IV: older adults.) In the detailed tables provided in each volume (appendix D), table columns correspond to subgroups defined by program participation and/or income level, and table rows present information for gender- and age-specific subgroups. The subgroup definitions used for each volume of the report, and the NHANES-III variables used to identify persons in each subgroup, are summarized in table A-1.

Survey questions about program participation and income level each suffered some degree of nonresponse. Table A-2 shows cell sizes for the various age/gender/income or program participation subgroups reported on in this particular volume. Cell sizes are shown for all subgroups, including those with missing income or program participation. In appendix D tables, the final column is suppressed due to small cell sizes, although the "Total Persons" or "All Children" columns include individuals with missing program participation or income.

Table A-1—Subgroup definitions

	Definition	Data Items[a]
Groups included in volume		
Volume I: Food Stamp Program participants and nonparticipants	Total population	
Volume II: WIC Program participants and nonparticipants	Children	12 ≤ HSAITMOR < 60
	Infants	2 ≤ HSAITMOR < 12
	Postpartum women	
	Breastfeeding up to 12 months postpartum	(MYPC25 = 1 or MAPF20 = 1) and (1 ≤ MYPC20 ≤ 4 or 1 ≤ MAPF15 ≤ 4)
	Non-lactating up to 6 months postpartum	(MYPC25 = 2 and MAPF20= 2) and (1 ≤ MYPC20 ≤ 2 or 1 ≤ MAPF15 ≤ 2)
	Pregnant women	MYPC17 = 1 or MAPF12 = 1
Volume III: School-age children and adolescents	Age 5-18 years and in school	(5 ≤ HSAGEIR ≤ 16 & 1 ≤ HYJ7 ≤ 2) or (17 ≤ HSAGEIR ≤ 18 & HAS22 = 4 & 0 < HFA8R < 12)
Volume IV: Older Adults	Age 60 years and older	HSAGEIR ≥ 60
Column definitions		
Volume I	Currently receiving food stamps	HFF11 = 1
	Income-eligible nonparticipant	HFF11 = 2 and 0 ≤ DMPPIR ≤ 130
	Higher-income nonparticipant	HFF11 = 2 and DMPPIR > 130
Volume II	Current WIC participant[c]	MAPF17 = 1 or MYPC22 = 1 or MPPB6 = 1
	Income-eligible nonparticipant	(MAPF17 = 2 & MYPC22 = 2 & MPPB6 = 2) and 0 < DMPPIR ≤ 185
	Higher-income nonparticipant	(MAPF17 = 2 & MYPC22 = 2 & MPPB6 = 2) and DMPPIR > 185
Volumes III and IV	Income ≤ 130% poverty or current FSP participant	HFF11=1 or (HFF11=2 and 0 ≤ DMPPIR ≤130)
	Income 131-185% poverty	HFF11=2 and 130 < DMPPIR ≤ 185
	Income > 185% poverty	HFF11=2 and DMPPIR > 185
Row definitions		
	Gender[b]	HSSEX
	Age	HSAGEIR (Age at household interview[b])

[a] Program participation and income variables:

HFF11 = "(Are you / Is your family) receiving food stamps at the present time?" (Household interview)

MAPF17, MYPC22, MPPB6 = "Are you now receiving benefits from the WIC program?" (MEC-adult, MEC-youth, MEC-proxy) If WIC participation is missing, and response to household interview question (HFF9) "Did you or any member of this family receive benefits from the WIC program LAST MONTH?" is "no" then sampled person is assumed to be a nonparticipant.

DMPPIR = Poverty income ratio (Household interview)

[b] Gender not tabulated in Volume II.

[c] Age at household interview defines table rows; age in months at the MEC examination was used to assess children's height and weight relative to growth curves.

[d] WIC participation of the sampled person is measured during the MEC examination interview and all WIC tables are limited to MEC respondents. The household interview included a question about WIC participation by any member of the family (HFF9), and this question was used to establish nonparticipation in the case of nonresponse to the MEC WIC question.

Table A-2—Number of NHANES-III respondents categorically eligible for WIC, grouped by WIC participation and income

	NHANES-III respondents to MEC interview				
	Total Persons	Currently Receiving WIC Benefits	Income-eligible Nonparticipants	Higher-income Nonparticipants	WIC participation or income missing
Women[1]	667	181	247	185	54
Infants	1,961	787	348	731	95
Children					
1 year old	1,258	419	391	357	91
2 years old	1,269	253	545	387	84
3 years old	1,119	201	513	325	80
4 years old	1,098	137	547	342	72
All children	4,744	1,010	1,996	1,411	327
Total	7,372	1,978	2,591	2,327	476

[1] Pregnant women responded yes to 'Are you now pregnant? Pregnant women identified only by urinalysis results are not included in table.

Source: NHANES-III, 1988-94: Examination File. WIC participation is asked during the MEC exam.

Appendix B
Reference Standards

Some of the variables included in this report required variable construction based on outside reference standards. This appendix describes the variables that were constructed, the standards that were used, and the manner in which the standards were applied. To the extent possible, standards used are those defined in the *Healthy People 2010* objectives (U.S. DHHS, 2000a).

The appendix covers all four volumes of the report; some variables are used only in selected volumes. With the exception of Healthy Eating Index (HEI) variables, which were constructed by staff at the National Center for Health Statistics (NCHS), all variable construction was carried out by the authors.

Body Weight and Height

NHANES-III examinations included measurement of body weight and stature (or recumbent length).[1] These data were used to determine Body Mass Index (BMI)[2] for both adults and children and to assess children's anthropometric status relative to reference growth charts.

Table B-1 shows the reference standards used in these analyses. As shown, BMI is interpreted differently for children, depending on age, because normal body fatness changes as children age. For children, overweight and underweight status is determined by comparing BMI to gender- and age-specific growth charts developed by the Centers for Disease Control and Prevention (CDC).[3] In addition, stature-for-age growth charts are used to assess children's linear growth. Copies of the CDC growth charts used in these analyses are provided at the end of the appendix.

Bone Density Measures

NHANES-III measured bone density for all men and non-pregnant women age 20 and over. Bone density of the proximal femur was measured during the MEC exam using dual energy x-ray absorptiometry (DXA).

Volumes I (FSP participants and nonparticipants) and IV (the elderly) present the prevalence of normal, reduced, and severely reduced bone mineral density. Standards used to define these conditions are those specified by NCHS (NCHS, 1999):

- Reduced bone mass, or osteopenia, is defined as bone mineral density 1–2.5 standard deviations below the mean of non-Hispanic white women 20–29 years of age as measured in NHANES-III.

- Severely reduced bone mass, or osteoporosis, is defined as bone mineral density more than 2.5 standard deviations below the mean of non-Hispanic white women 20–29 years of age as measured in NHANES-III.

The latter standard is used in the *Healthy People 2010* objectives.

Coronary Heart Disease Risk

The National Cholesterol Education Program (NCEP), sponsored by the National Institutes of Health (NIH), provides a methodology for estimating individuals' 10-year risk for coronary heart disease (NIH, 2001). The 10-year risk

[1] Recumbent length was measured for infants and children up to age 3; stature was measured for persons age 2 and over. Both length and height were measured for children age 24 to 36 months.

[2] BMI is equal to [weight in kilograms] / [height in meters]^2.

[3] Reference charts for assessing children's anthropometric status were originally developed by NCHS in 1977. Revised charts were released in May 2000, based on pooled data from five national U.S. health examination surveys including NHANES-III (Kuczmarski et al., 2002).

Table B-1¾ Reference Standards Used to Assess Body Mass Index and Linear Growth

Measure	Standard	Source
Adults		
Underweight	BMI < 18.5	*Healthy People 2010* (U.S. DHHS, 2000a)[1]
Healthy weight	BMI ≥ 18.5 and < 25	*Healthy People 2010* (U.S. DHHS, 2000a)
Overweight	BMI ≥ 25 and < 30	National Institutes of Health (NIH) and World Health Organization (WHO) guidelines (NIH, 1998 and WHO, 1998)
Obese	BMI ≥ 30	*Healthy People 2010* (U.S. DHHS, 2000a)
Children age 2 and over		
Underweight	< 5th percentile on BMI-for-age chart	CDC guidelines on using BMI-for-age growth charts (CDC, 2003)
At-risk of overweight	≥ 85th and < 95th percentile on BMI-for-age chart	CDC guidelines on using BMI-for-age growth charts (CDC, 2003)
Overweight	≥ 95th percentile on BMI-for-age chart	*Healthy People 2010* (U.S. DHHS, 2000a)
Growth retarded	< 5th percentile on stature-for-age chart	*Healthy People 2010* (U.S. DHHS, 2000a)
Children age 1-4-years-old (WIC volume)		
Underweight	< 5th percentile on weight-for-height chart	CDC guidelines on using weight-for-height growth charts (CDC, 2003)
At-risk of overweight	≥ 85th and < 95th percentile on weight-for-height chart	CDC guidelines on using weight-for-height growth charts (CDC, 2003)
Overweight	≥ 95th percentile on weight-for-height chart	CDC guidelines on using weight-for-height growth charts (CDC, 2003)

[1]Adapted from Health People 2010 goal, which specifies BMI ≥ 18.5 as a healthy weight.

estimate is based on six factors: gender, age, total cholesterol, smoking status, HDL cholesterol, and systolic blood pressure. In Volumes I (FSP participants and nonparticipants) and IV (the elderly), the NCEP methodology was used to estimate the 10-year- risk of coronary heart disease among adults.

Nutrient Intake Standards

In recent years, the Institute of Medicine (IOM) has issued a comprehensive set of *Dietary Reference Intakes* (DRIs), reference values for use in planning and assessing nutrient intake. DRIs replace the *Recommended Dietary Allowances* (RDAs), first developed by the Food and Nutrition Board in 1941 (National Research Council (NRC), 1989a). The DRIs were released in a series of nutrient-specific reports; the first report was released in 1999 and the most recent in late 2004 (IOM, 1999, 2000a, 2000b, 2002a, 2002b, 2004).[4] The DRIs specify up to four different reference values for each nutrient for age- and gender-specific subgroups of the population. These reference values include:

- **Estimated Average Requirement (EAR).** The EAR is the daily level of intake estimated to meet the requirements of 50 percent of healthy individuals in a specific age- and gender subgroup. EAR values are

[4] With the exception of the 2004 reports, dates are final publication dates. Pre-publication copies of all reports were available two or more years prior to final publication.

used to set RDAs and may be used to assess the adequacy of intake of groups of individuals.

- **Recommended Dietary Allowance (RDA)**. The RDA is the daily level of intake sufficient to meet the nutrient requirements of nearly all (97-98 percent) healthy individuals in a specific subgroup. RDAs are based on EARs.

- **Adequate Intake (AI)**. An AI is defined when the available data are insufficient to estimate requirements and establish an EAR and an RDA. The AI is the daily level of intake that is assumed to be adequate, based on observed or experimentally determined estimates of intake.

- **Tolerable Upper Intake Level (UL)**. The UL is the maximum daily level of intake that is safe for nearly all members of a group. Intake above the UL increases risk of toxicity.

At the time the analyses presented in this series of reports were completed, DRIs had been established for four of the nutrients examined: vitamin C, iron, zinc, and calcium. For vitamin C, iron, and zinc, EARs were used to assess prevalence of adequate usual intake (the methodology used in estimating usual intake and in determining the prevalence of adequate intake is described in appendix C). It is not possible to assess the prevalence of adequate calcium intake, however, because the DRI committee established an AI for calcium rather than an EAR (IOM, 1999). Consequently, analysis of calcium intakes focuses on comparing mean intakes for each subgroup to age- and gender-specific AIs.

Because DRIs had not yet been established, intakes of food energy and the other nutrients and food components examined (total fat, saturated fat, cholesterol, sodium, and fiber) were assessed relative to then-current standards. Data on usual energy intake were compared to the 1989 Recommended Energy Allowance (REA) (NRC, 1989a). The prevalence of appropriate usual intakes of total fat, saturated fat, cholesterol, and sodium was assessed relative to the recommended maximum intakes defined in the *Dietary Guidelines for Americans* (U.S. Departments of Agriculture and Health and Human Services, 2000). (The standards for total fat, saturated fat, and sodium intake are also included in the *Healthy People 2010* objectives). Finally, the prevalence of adequate fiber intake was assessed on the basis of the "age-plus-5" standard. This standard, originally developed by Williams (1995), was adapted by the American Heart Association (AHA) (Van Horn, 1997) and was used in other research that preceded establishment of the DRIs for fiber (Gleason and Suitor, 2001). Under this standard, recommended fiber intake (in gm.) is equivalent to age in years plus five, up to a maximum of 25 gm.

Prior to the time the reports were to be published, DRIs were released for energy, total fat, sodium, and fiber. While it was not possible to re-do the analyses to incorporate these new standards, the text was expanded, to the extent possible, to assess usual nutrient intakes in light of the new standards. Specifically, discussions of total fat, sodium, and fiber intakes were updated by comparing means and distributions of usual intake to the new standards. It was not possible to update discussions of energy intake because the new energy standards (Estimated Energy Requirements or EERs) incorporate information on individuals' weight, height, and level of physical activity (IOM, 2002b).

Tables B-2 – B-4 show the nutrient standards used in the analysis as well as other relevant standards. Table B-2 lists EARs for vitamin C, iron, and zinc, and AIs for calcium, all of which were used in the main analysis. It also shows

Table B-2—Dietary Reference Intakes for Individuals

	Estimated Average Requirements			Adequate Intakes[1]	
	Vitamin C (mg/day)	Iron (mg/day)	Zinc (mg/day)	Calcium (mg/day)	Total fiber (g/day)
Children					
1-3 yrs	13	3.0	2.2	500	19
4-8 yrs	22	4.1	4.0	800	25
Males					
9-13 yrs	39	5.9	7.0	1,300	31
14-18 yrs	63	7.7	8.5	1,300	38
19-30 yrs	75	6.0	9.4	1,000	38
31-50 yrs	75	6.0	9.4	1,000	38
51-70 yrs	75	6.0	9.4	1,200	30
>70 yrs	75	6.0	9.4	1,200	30
Females					
9-13 yrs	39	5.7	7.0	1,300	26
14-18 yrs	56	7.9	7.5	1,300	36
19-30 yrs	60	8.1	6.8	1,000	25
31-50 yrs	60	8.1	6.8	1,000	25
51-70 yrs	60	5.0	6.8	1,200	21
>70 yrs	60	5.0	6.8	1,200	28
Pregnant Women					
14-18 yrs	66	23.0	10.5	1,300	22
19-30 yrs	70	22.0	9.5	1,000	28
31-50 yrs	70	22.0	9.5	1,000	28
Lactating Women					
14-18 yrs	96	7.0	11.6	1,300	29
19-30 yrs	100	6.5	10.4	1,000	29

[1] Estimated Average Requirements have not been set for calcium, sodium, or fiber.
Source: Dietary Reference Intakes. Institute of Medicine, Food and Nutrition Board (1999, 2000b, 2002a, 2002b, 2004).

Table B-3—1989 Recommended Dietary Allowances

	Energy allowance (REA) (kcal)	Vitamin C (mg)	Iron (mg)	Zinc (mg)	Calcium (mg)
Children					
1-3 yrs	1,300	40	10	10	800
4-6 yrs	1,800	45	10	10	800
7-10 yrs	2,000	45	10	10	800
Males					
11-14 yrs	2,500	50	12	15	1,200
15-18 yrs	3,000	60	12	15	1,200
19-24 yrs	2,900	60	10	15	1,200
25-50 yrs	2,900	60	10	15	800
51+ yrs	2,300	60	10	15	800
Females					
11-14 yrs	2,200	50	15	12	1,200
15-18 yrs	2,200	60	15	12	1,200
19-24 yrs	2,200	60	15	12	1,200
25-50 yrs	2,200	60	15	12	800
51+ yrs	1,900	60	10	12	800
Pregnant					
1st trimester ..	+0	70	30	15	1,200
2nd trimester	+300	70	30	15	1,200
3rd trimester	+300	70	30	15	1,200
Lactating					
1st 6 months	+500	95	15	19	1,200
2nd 6 months	+500	90	15	16	1,200

Source: Recommended Dietary Allowances, 10th edition. National Research Council (1989b).

Table B-4¾ Standards Used to Assess Usual Intake of Fat, Saturated Fat, Cholesterol, and Sodium

Nutrient/Food Component	*Dietary Guidelines* Standard[1]	DRI Standard	
Total fat	≤ 30% of total energy[2]	AMDRs	
		1-3 years	30-40% of total energy
		4-18 years	25-35% of total energy
		19+ years	20-35% of total energy
Saturated fat	< 10% of total energy[2]	N/A	
Cholesterol	≤ 300 mg.	N/A	
Sodium	≤ 2,400 mg.[2]	ULs	
		1-3 years	1,500 mg. (1.5 g.)
		4-8 years	1,900 mg. (1.9 g.)
		9-13 years	2,200 mg. (2.2 g.)
		14+ years	2,300 mg. (2.3 g.)

[1]Dietary Guidelines standards apply to all individuals 2 years of age and older.

[2]Also included as objective in *Healthy People 2010* (U. S. DHHS, 2000a).

newly established AIs for fiber.[5] Table B-3 shows the 1989 RDAs for vitamin C, iron, zinc, and calcium (the precursors to the DRIs), as well as the 1989 REA. Table B-4 shows the *Dietary Guidelines for Americans* recommendations for total fat, saturated fat, cholesterol, and sodium, as well as the newly-defined Acceptable Macronutrient Distribution Range (AMDR) for total fat and ULs for sodium.

Healthy Eating Index

The Healthy Eating Index (HEI), developed by USDA's Center for Nutrition Policy and Promotion (CNPP), is a summary measure of the overall quality of people's diets (Basiotis, et al., 2002). The HEI is based on 10 component scores, all of which are weighted equally in the total score. The 10 component scores measure different aspects of a healthy diet based on accepted public health recommendations. Five of the component scores are food-based and evaluate food consumption in comparison with recommendations of the USDA Food Guide Pyramid (grains, vegetables, fruits, dairy, and meat) (USDA, CNPP, 1996). A sixth component is also food-based and measures the level of dietary variety. The remaining four component scores are nutrient-based and assess compliance with the *Dietary Guidelines for Americans* recommendations for intake of fat, saturated fat, cholesterol, and sodium.[6]

Table B-5 shows the criteria used for scoring the five food-group-based components. Criteria vary by age, depending on total energy intake. Because the Food Guide Pyramid presents serving recommendations for only three levels of energy intake (1,600, 2,200, and 2,800 kilocalories) (USDA, CNPP, 1996), interpolation techniques were used to estimate the recommended number of servings for gender and age

[5]It is important to note that the fiber AIs have been defined for *total* fiber and that the data presented in this report reflect *dietary* fiber. Total fiber includes dietary fiber as well as fructo-oligosaccharides, compounds which are destroyed in the current analytical methods used to quantitate fiber in foods (IOM, 2002b). Although fructo-oligosaccharides are assumed to make up a relatively small percentage of total fiber, authors of the DRI report estimated that, on average, American adults were consuming approximately 5.1 gm. more fiber per day than estimated in the most recent Continuing Survey of Food Intakes of Individuals (CSFII), because CSFII data, like the data used in this analysis, include only *dietary* fiber (IOM, 2002b).

[6]When the HEI was first developed, the standards for cholesterol and sodium were based on recommendations made in the NRC's *Diet and Health* report (NRC, 1989b) because the version of the *Dietary Guidelines* in effect at the time did not include quantitative standards for these nutrients (USDA and U. S. DHHS, 1995). Since that time, the NRC standards for sodium and cholesterol have been incorporated into both the Nutrition Facts section of food labels and the most recent version of the *Dietary Guidelines* (USDA and U.S. DHHS, 2000).

Table B-5¾ Scoring criteria for food-based components of the Healthy Eating Index (HEI)

	Criteria for maximum score of 10 (number of servings per day)				
Age	**Grains**	**Vegetables**	**Fruits**	**Milk**	**Meat**
2-3 years	6.0	3.0	2.0	2.0	2.0
4-6 years	7.0	3.3	2.3	2.0	2.1
7-10 years	7.8	3.7	2.7	2.0	2.3
Males					
11-14 years	9.9	4.5	3.5	3.0	2.6
15-18 years	11.0	5.0	4.0	3.0	2.8
19-24 years	11.0	5.0	4.0	3.0	2.8
25-50 years	11.0	5.0	4.0	2.0	2.8
51+ years	9.1	4.2	3.2	2.0	2.5
Females					
11-24 years	9.0	4.0	3.0	3.0	2.4
25-50 years	9.0	4.0	3.0	2.0	2.4
51+ years	7.4	3.5	2.5	2.0	2.2

Notes: The minimum score of 0 was assigned only when zero servings were consumed.
For the variety component, the maximum score of 10 was assigned if 8 or more different items were consumed; the minimum score of 0 was assigned if 3 or fewer different items were consumed.
Scores were assigned proportionately for consumption between the minimum and maximum criteria.
Source: NHANES-III documentation for the HEI file. NCHS (2000).

groups with other recommended energy allowances.

Two exceptions were made to the straight interpolation. The first involved 2-3-year-old children. The 1989 REA for 2-3 year-olds is less than the lowest level of energy intake (1,600 kilocalories) referenced in the Food Guide Pyramid.[7] Extrapolation of the Food Guide Pyramid's recommended number of servings to a lower calorie level would result in smaller numbers of servings than the minimums defined in the Pyramid. Rather than use these minimal numbers of servings, NCHS staff set the numbers of servings to be equivalent with defined minimums, but reduced reference portion sizes for food groups other than milk to two-thirds of the adult reference (NCHS, 2000). This is consistent with Pyramid guidance (i.e., that individuals with lower energy needs eat smaller servings) as well as with the approach used by other researchers (Basiotis et al., 2002).

The second exception was made for males between 15 and 50 years of age. The 1989 REA for this group is slightly higher than the highest level of energy intake (2,800 kilocalories) references in the Food Guide Pyramid. Simple extrapolation would have resulted in greater numbers of servings than the maximums defined in the Pyramid. Because the Food Guide Pyramid provides no guidance on how to accommodate greater energy needs, NCHS researchers truncated the number of servings at the maximums defined in the Pyramid. This is consistent with the approach used by other researchers (Basiotis et al., 2002). Moreover, preliminary analyses completed by NCHS indicated that truncation did not have a significant impact on HEI scores (NCHS, 2000).

The methodology used to determine serving definitions for counting servings in each of the five major food groups is the same as that used in the initial research that calculated the HEI using data from the 1989-90 Continuing Survey of Food Intake of Individuals (CSFII) (USDA, CNPP, 1995). It differs, however, from the methodology used in subsequent research to

[7] HEI computations were completed be NCHS staff prior to the release of the new REEs (see discussion on *Dietary Reference Intakes*), so the reference standard used for energy intake was the 1989 REAs.

calculate the HEI using the 1994-96 CSFII data (USDA, ARS, 1998) as well as recent research that calculated the HEI using data from NHANES 1999-2000 (Basiotis et al., 2002).

In particular, milk serving definitions in the NHANES-III data used in this report were based on grams of nonfat milk solids contained in a food divided by the amount of grams of nonfat milk solids contained in 1 cup of milk (NCHS, 2000). The alternative methodology used in the two analyses noted above based milk serving definitions on calcium equivalents. This approach defines a milk serving as one that provides the same amount of calcium as 1 cup of skim milk (302 mg). In choosing to use the "nonfat milk solids" approach rather than the "calcium equivalents" approach, NCHS researchers cited concerns that the latter may lead to low milk group component scores because of the omission of foods such as butter and cream cheese nonfat milk solids but small to negligible amounts of calcium (NCHS, 2000).

For the four other food groups, serving definitions used by NCHS researchers are similar to those used by USDA researchers and were designed to be as consistent as possible with the serving definitions used in the Food Guide Pyramid (USDA, ARS, 2003). Servings of breads and grains are defined on the basis of "flour equivalents," using the flour content of a typical slice of bread (16 gm) as the base. Servings of most vegetables are counted as ½ cup cooked or 1 cup raw. Fruits are treated similarly.

Servings of meat are based on "lean meat equivalents." The base serving is 2.5 oz. of lean meat, fish, or poultry, with a specified minimum amount of fat.[8] Numbers of servings for non-lean-meats are assigned based on fat content. As an example, 2 oz. of cooked sausage has the equivalent of 1.5 oz. of cooked lean meat, or .61 servings of meat. (For a more detailed explanation of how meat servings are determined, see USDA, ARS, 2003).

Several non-meat foods are also included in the meat group. Serving equivalents for these items are defined as ½ cup cooked dry beans or peas, 1 egg, 2 Tbsp. peanut butter, 1/3 cup nuts, ¼ cup seeds, and ½ cup of tofu (USDA, ARS, 2003). The Food Guide Pyramid considers dried beans and peas (legumes) to be considered contributors to the meat group, but they may also be counted toward vegetable intake. In computing the HEI, NCHS investigators applied any legume consumption that was not "needed" in the meat group toward the vegetable group (NCHS, 2000).

Variety Score

Both The Food Guide Pyramid and the *Dietary Guidelines for Americans* recommend consuming a variety of foods, but neither provides guidance on how to measure dietary variety. Following the protocols established in the initial HEI research (USDA, CNPP, 1995), variety scores were assigned based on the total number of different types of food a person consumed in a day. Similar foods were grouped together and the totals were computed for each individual. Fats, sweets, seasonings, and similar foods were not included in the calculations (for a complete list of excluded foods see NCHS, 2000), and neither were food components that contributed less than one-half of a serving.

A maximum score of 10 points was assigned for variety scores of 8 or more (indicating that the person consumed at least half a serving of 8 or more different types of food in the preceding 24-hour period). A minimum score of 0 was assigned for variety scores of 3 or less. Intermediate scores were assigned proportionately.

[8]Two different definitions have been used to define lean meats – no more than 2.65 gm. fat per oz. and no more than 2.4 gm. fat per oz. (USDA, ARS, 2003). The NCHS documentation does not specify which of these definitions was used in computing lean meat equivalents in the NHANES-III database (NCHS, 2000).

Table B-6¾ Scoring criteria for nutrient-based components of the Healthy Eating Index (HEI)

Component	Standard for maximum score of 10	Standard for minimum score of 0
Total fat	≤ 30% of total calories	≥ 45% of total calories
Saturated fat	< 10 percent of total calories	≥ 15 percent of total calories
Cholesterol	≤ 300 mg per day	≥ 450 mg per day
Sodium	≤ 2,400 mg per day	≥ 2,400 mg per day

Note: Standards for nutrient-based components apply to all age groups.

Source: NHANES-III documentation for the HEI file. NCHS (2000).

Nutrient-based Scores

The four nutrient-based component scores of the HEI assess compliance with the *Dietary Guidelines for Americans* recommendations for intake of total fat, saturated fat, cholesterol, and sodium (USDA and U.S. DHHS, 2000). The manner in which these recommendations were used to determine HEI component scores is summarized in table B-6.

Rating Total Scores

As noted in the preceding discussion, the maximum score for the full HEI (all ten components combined) is 100 and the minimum score is zero. Using standards defined by USDA's CNPP, individuals with total HEI scores of more than 80 were considered to have good diets. Those with scores between 51 and 80 were considered to have diets that need improvement. And those who scored below 51 on the HEI were considered to have poor diets (Basitotis et al., 2002).

Serum and Blood Measurements

Several serum and blood measurements are examined in this series of reports. Most reflect serum levels of nutrients or assess iron or lipid status. In addition, levels of blood lead were examined to assess the prevalence of lead poisoning. Serum cotinine levels were also analyzed to examine exposure to second-hand smoke. Cotinine, a breakdown product of nicotine, is used as a biological marker for tobacco use and exposure to environmental tobacco smoke.

Table B-7 lists the serum and blood measures examined, the reference standards used in assessing them, and the source of the standard. The prevalence of iron deficiency was assessed using the *Healthy People 2010* definition: abnormal results on two of three specific measures of iron status (serum ferritin, free erythrocyte protoporphorin, and transferring saturation) (U.S. DHHS, 2000a). Iron deficiency anemia was defined as the presence of iron deficiency plus an abnormally low hemoglobin. Cutoffs used to define abnormal values are summarized in table B-7.

Table B-7 ¾ Reference values for serum and blood measures

Measure	Age group	Abnormal range		Source
		Male	Female	
Hemoglobin (g/dL)[1]	1-2 years	< 11.0	< 11.0	CDC Recommendations to Prevent and Control Iron Deficiency in the U.S. (CDC, 1998)
	2-5 years	< 11.1	< 11.1	
	5-8 years	< 11.5	< 11.5	
	8-12 years	< 11.9	< 11.9	
	12-15 years	< 12.5	< 11.8	
	15-18 years	< 13.3	< 12.0	
	≥ 18 years	< 13.5	< 12.0	
Hematocrit (%)[1]	1-2 years	< 32.9	< 32.9	CDC Recommendations to Prevent and Control Iron Deficiency in the U.S. (CDC, 1998)
	2-5 years	< 33.0	< 33.0	
	5-8 years	< 34.5	< 34.5	
	8-12 years	< 35.4	< 35.4	
	12-15 years	< 37.3	< 35.7	
	15-18 years	< 39.7	< 35.9	
	≥ 18 years	< 39.9	< 35.7	
Serum ferritin (mcg/mL)	1-4 years	< 10	< 10	*Healthy People 2010* (U.S. DHHS, 2000a) and CDC Recommendations to Prevent and Control Iron Deficiency in the U.S. (CDC, 1998)
	5-11 years	< 15	< 15	
	12-49 years	< 15	< 12	
	≥ 50 years	< 15	< 15	
Free erythrocyte protoporphorin (mcg/dL)	1-2 year	> 80	> 80	*Healthy People 2010* (U.S. DHHS, 2000a)
	> 2 years	> 70	> 70	
Transferrin saturation (%)	1-2 years	< 10	< 10	*Healthy People 2010* (U.S. DHHS, 2000a) and CDC Recommendations to Prevent and Control Iron Deficiency in the U.S. (CDC, 1998)
	3-4 years	< 12	< 12	
	12-15 years	< 16	< 14	
	≥ 16 years	< 16	< 15	
Total cholesterol (mg/dL)	2-19 years	High: ≥ 200 Borderline: 170-199		National Institutes of Health, National Cholesterol Education Program (2001 (adults) and 1991 (children))
	20 years and over	High: ≥ 240 Borderline: 200-239		
LDL cholesterol (mg/dL)	2-19 years	High: ≥ 130 Borderline: 110-129		National Institutes of Health, National Cholesterol Education Program (2001 (adults) and 1991 (children))
	20 years and over	High: ≥ 160 Borderline: 130-159		
HDL cholesterol (mg/dL)	2-19 years	< 35		National Institutes of Health, National Cholesterol Education Program, 2001 (adults) and American Heart Association, 2002 (children)
	20 years and over	< 40		
Triglycerides (mg/dL)	12-19 years	≥ 150		National Institutes of Health, National Cholesterol Education Program, 2001 (adults) and American Heart Association, 2002 (children)
	20 years and over	High: ≥ 200 Borderline: 150-199		
RBC folate (ng/mL)[2]	All ages	< 95		*Dietary Reference Intakes* (IOM, 2000a)
Serum vitamin B_{12} (pg/mL)	All ages	< 200		*Dietary Reference Intakes* (IOM, 2000a)
Serum albumin (g/dL)	60 years and over	< 3.8 (liberal definition) < 3.5 (conservative)		Institute of Medicine, Committee on Nutrition Services for Medicare Beneficiaries (2000)

¾ **Continued**

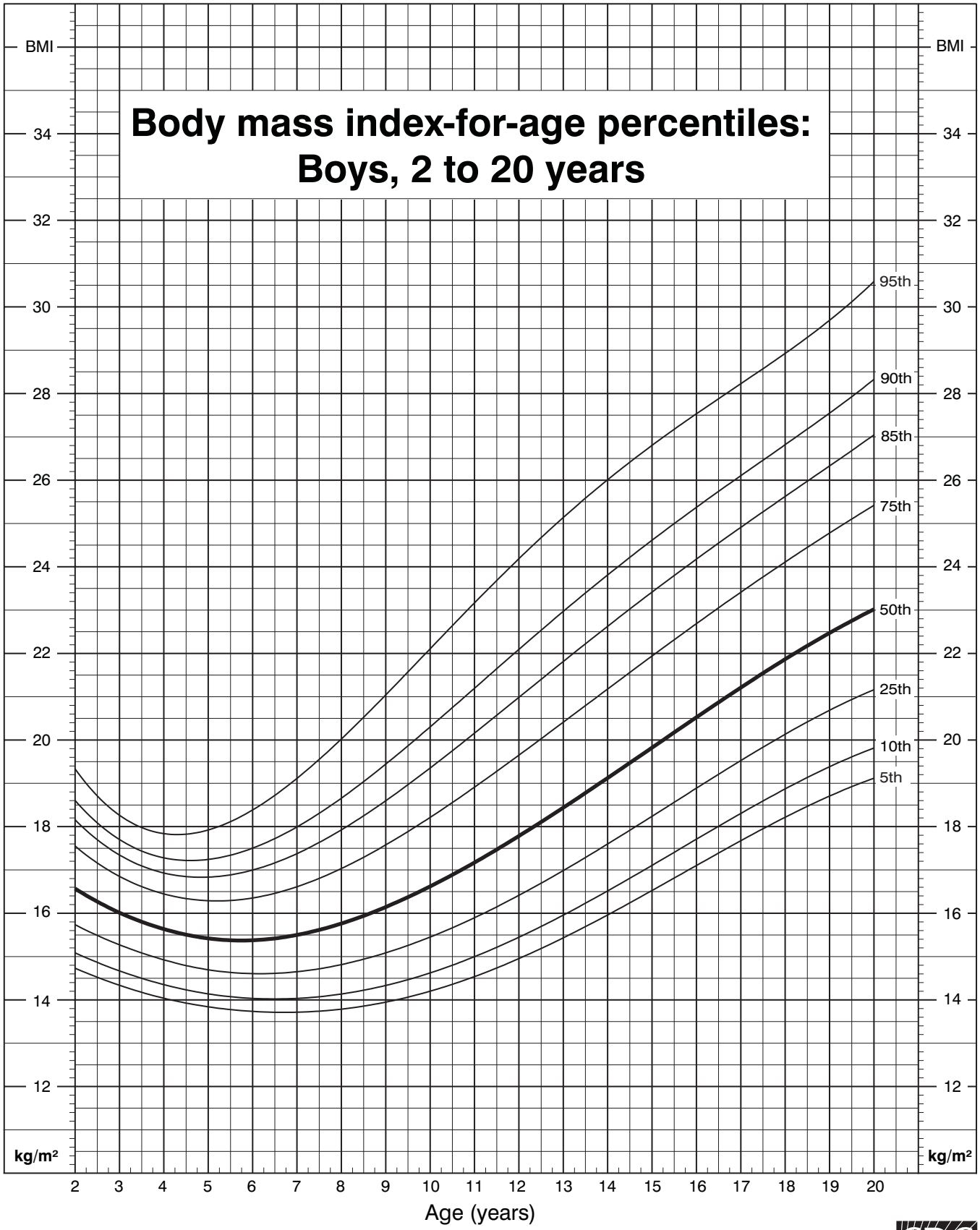
Table B-7 ¾ Reference values for serum and blood measures (continued)

Measure	Age group	Abnormal range		Source
		Male	Female	
Lead exposure				CDC Report on Blood Levels in the U.S.: 1991-1994. (CDC, 1997)
Lead (mcg/dL)	All ages	≥ 10.0		
Exposure to second-hand smoke				*Healthy People 2010* (U.S. DHHS, 2000a)
Cotinine (ng/dL)	All ages	> 0.10		

[1]Hemoglobin and hematocrit cutoffs were adjusted for smokers, per CDC recommendations (1998). Adjustment for high altitudes is also suggested, but data on the altitude at which respondents live is not available in NHANES-III. Hemoglobin cutoffs for smokers were adjusted based on reported daily cigarette use, as follows: +0.3 for 0.5 to less than 1 pack per day; +0.5 for 1 to less than 2 packs per day; +0.7 for 2 or more packs per day. Parallel adjustments for hematocrit were +1.0, +1.5, and +2.0.

[2]The cutoff of 95 ng/mL is specific to the radioassay kit used by NHANES-III beginning in December 1993, and is applied to all NHANES-III RBC folate measures because NCHS adjusted the data for comparability (Wright, et al., 1998). This cutoff differs from that recommended based on NHANES-II data (less than 140 ng/mL) due to use of the revised test kit.

CDC Growth Charts: United States



Published May 30, 2000.

SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).

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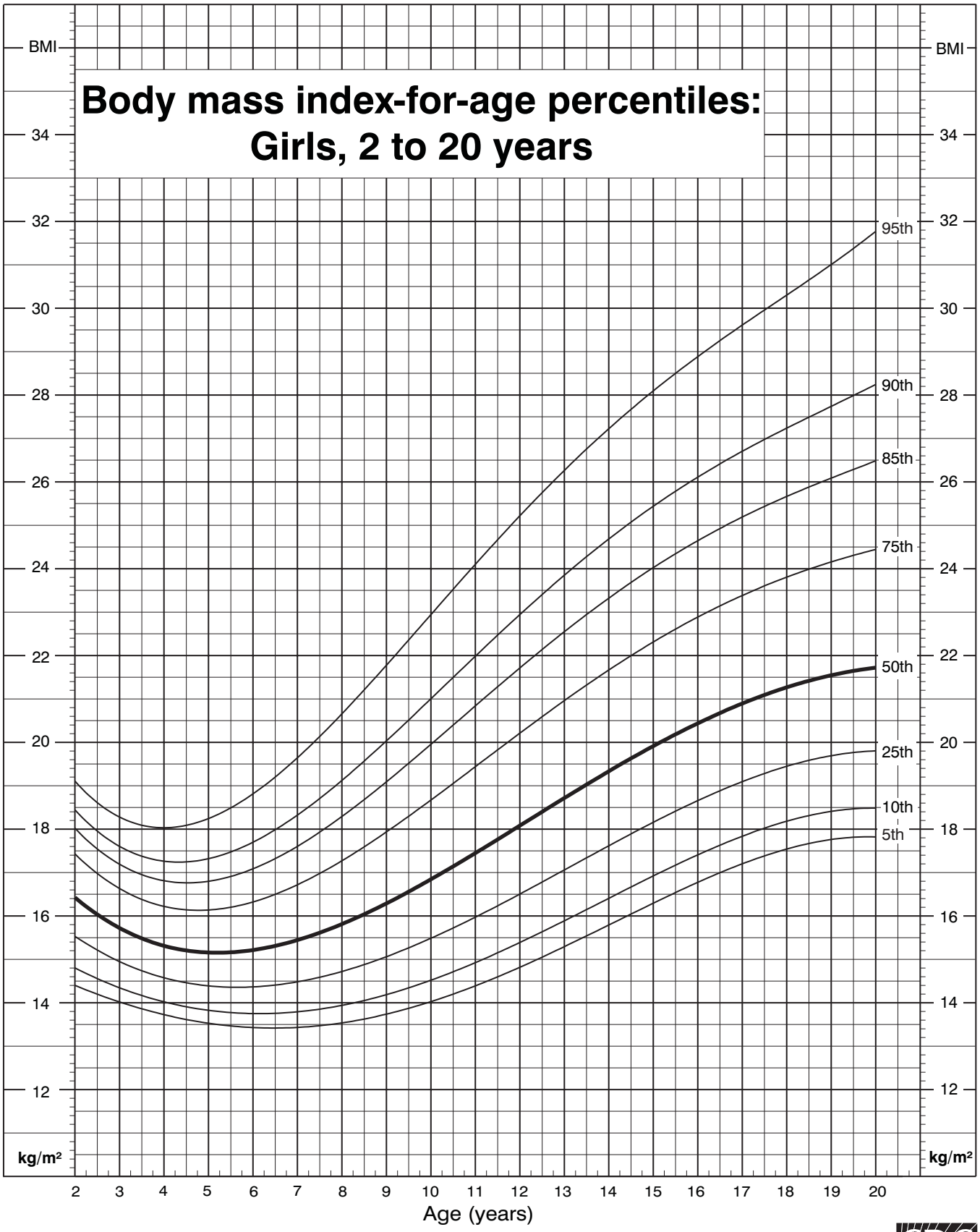

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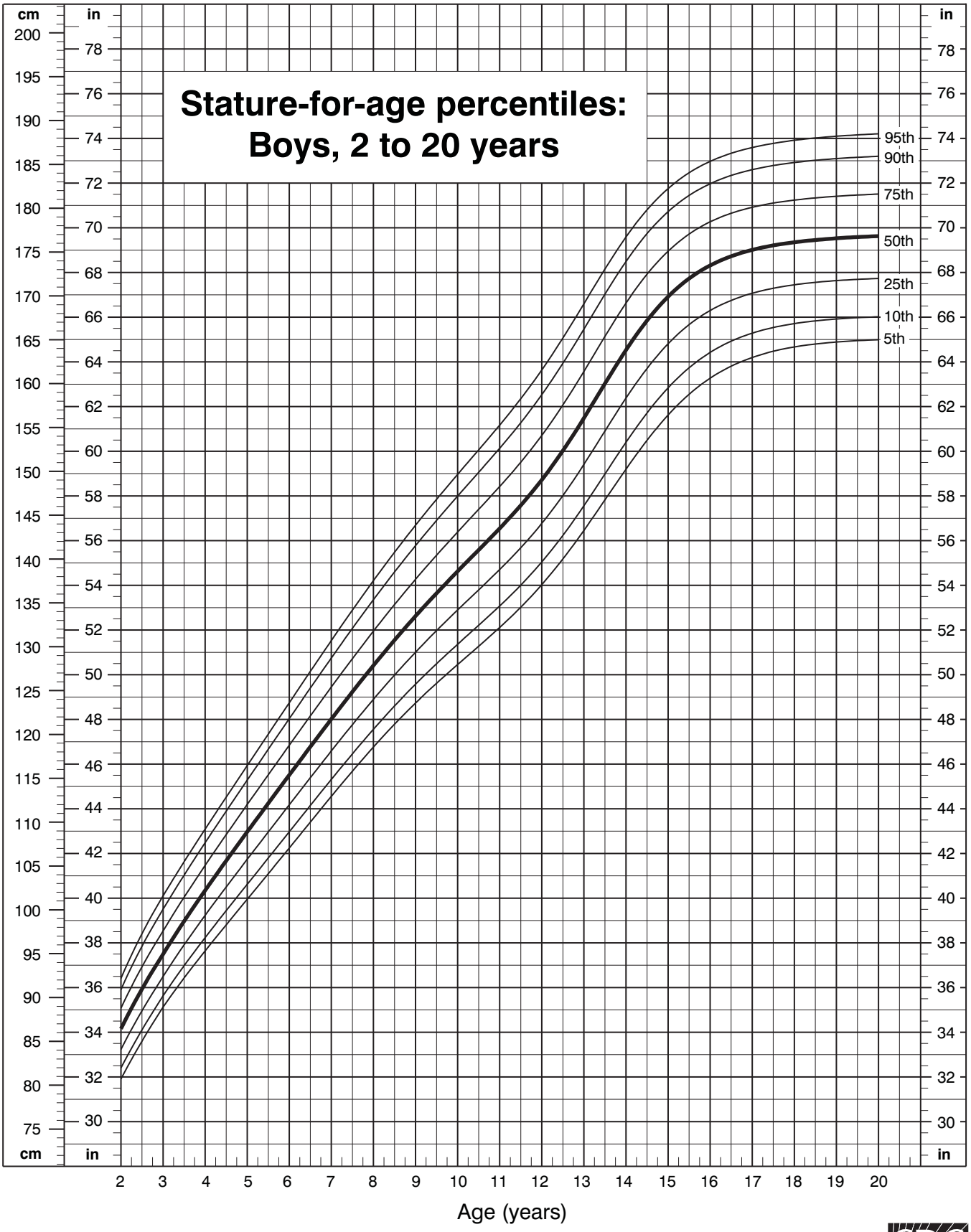

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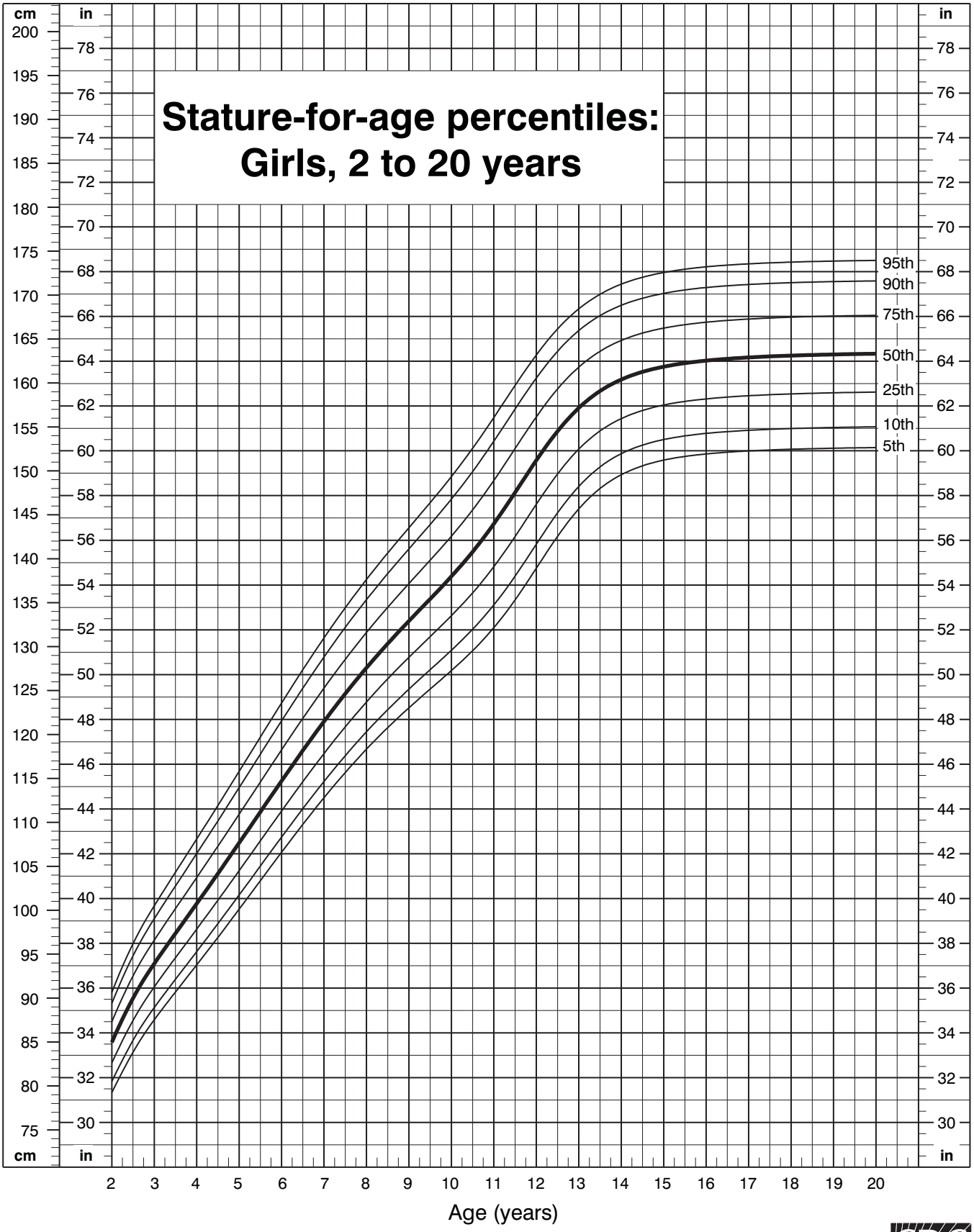

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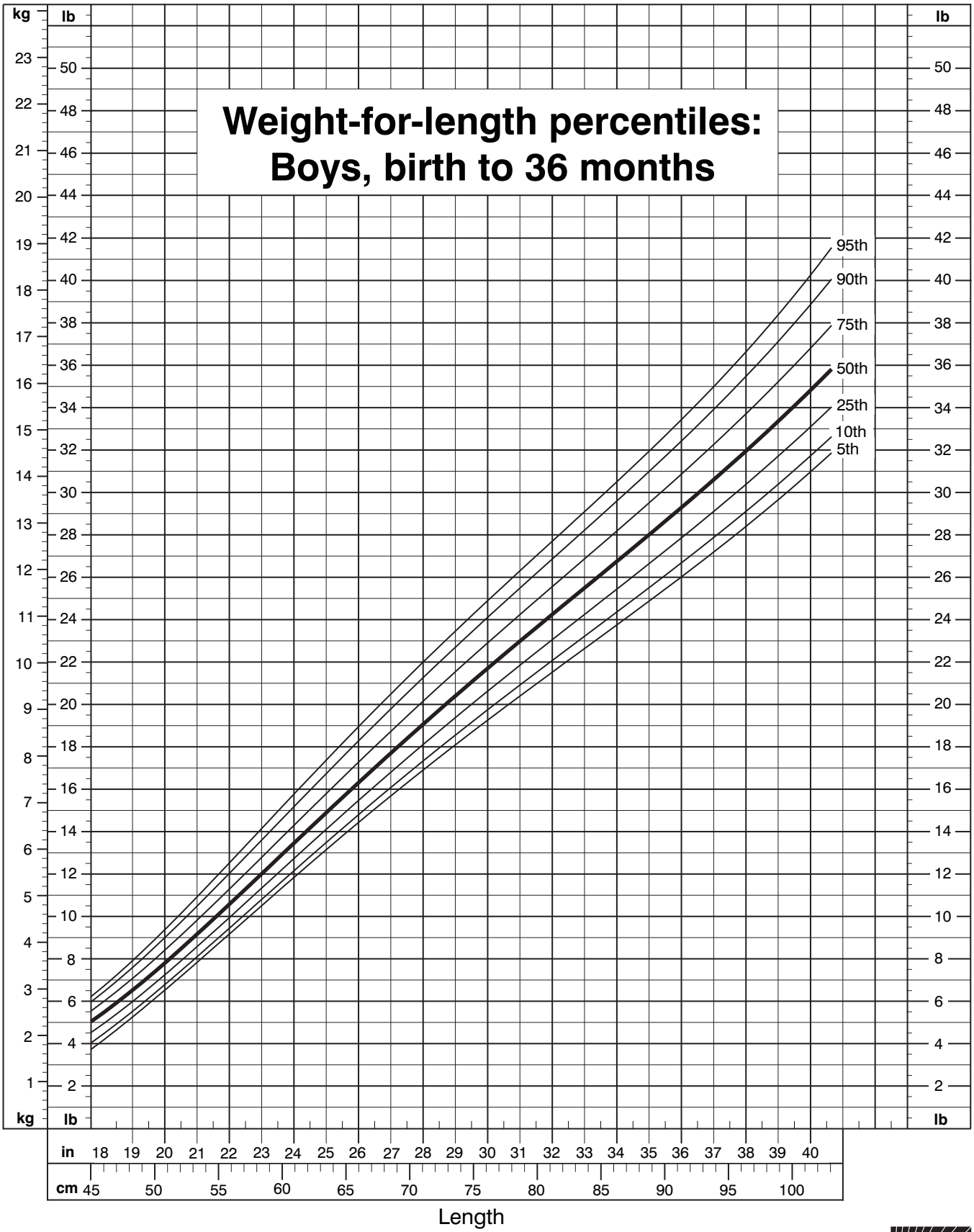

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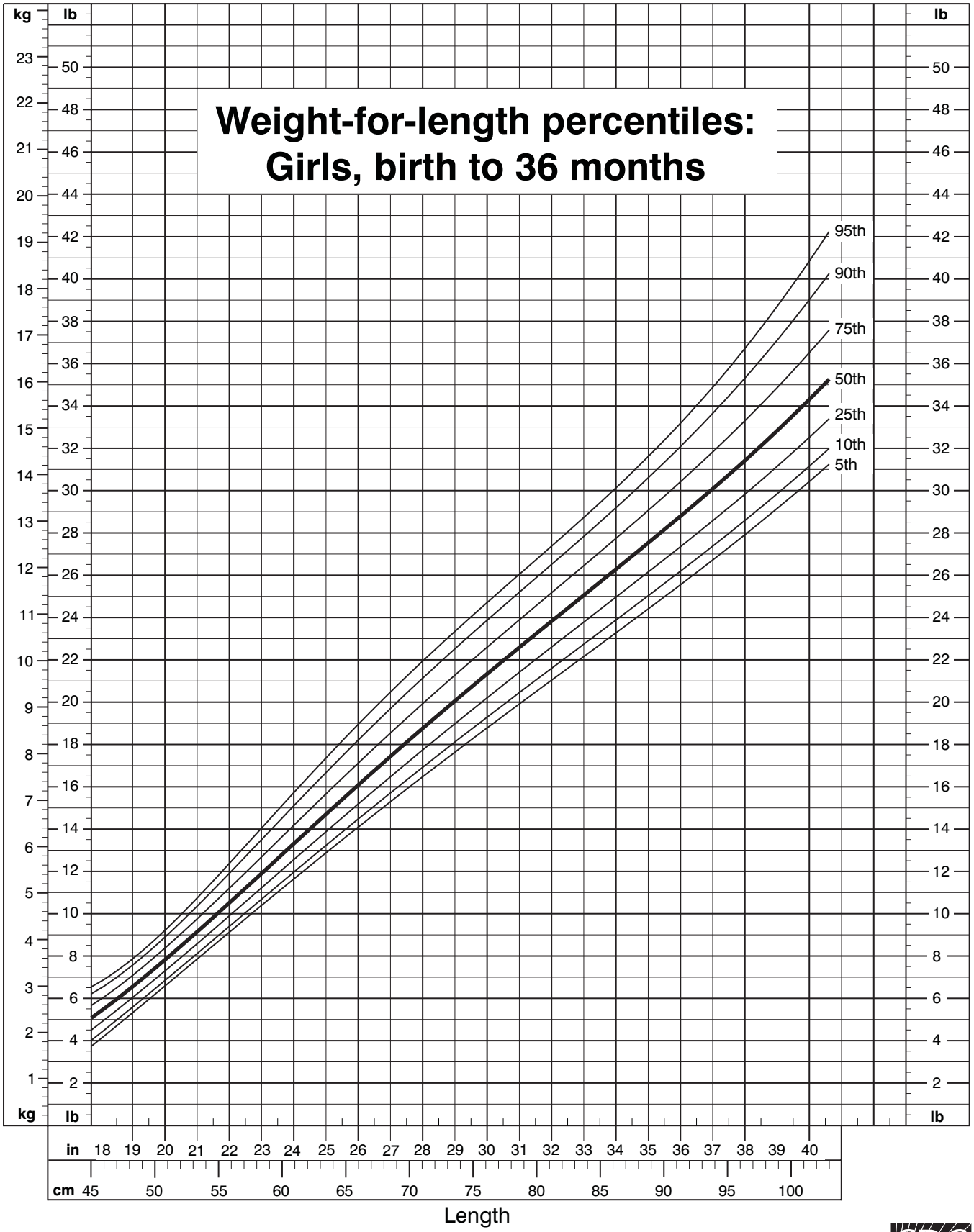

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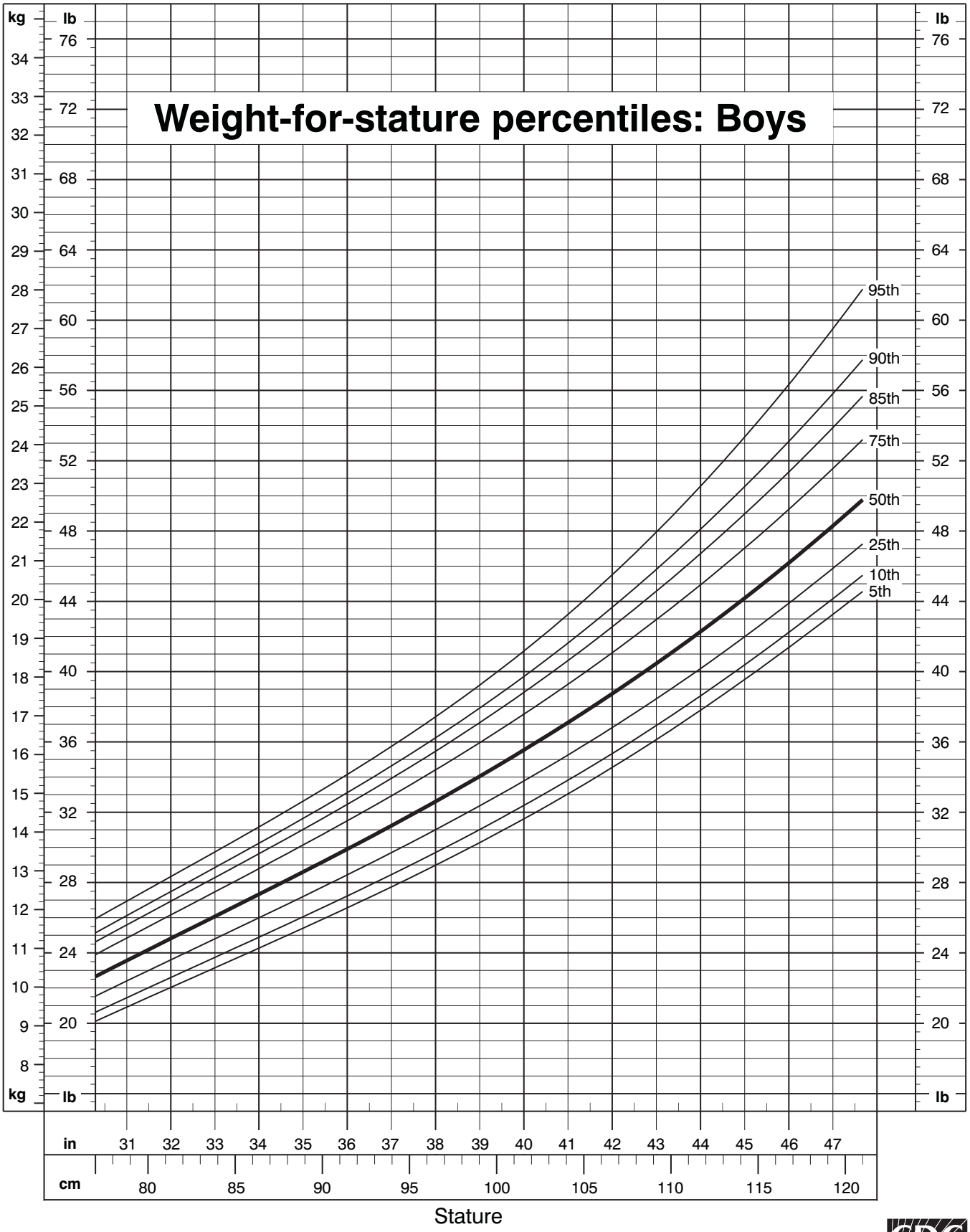

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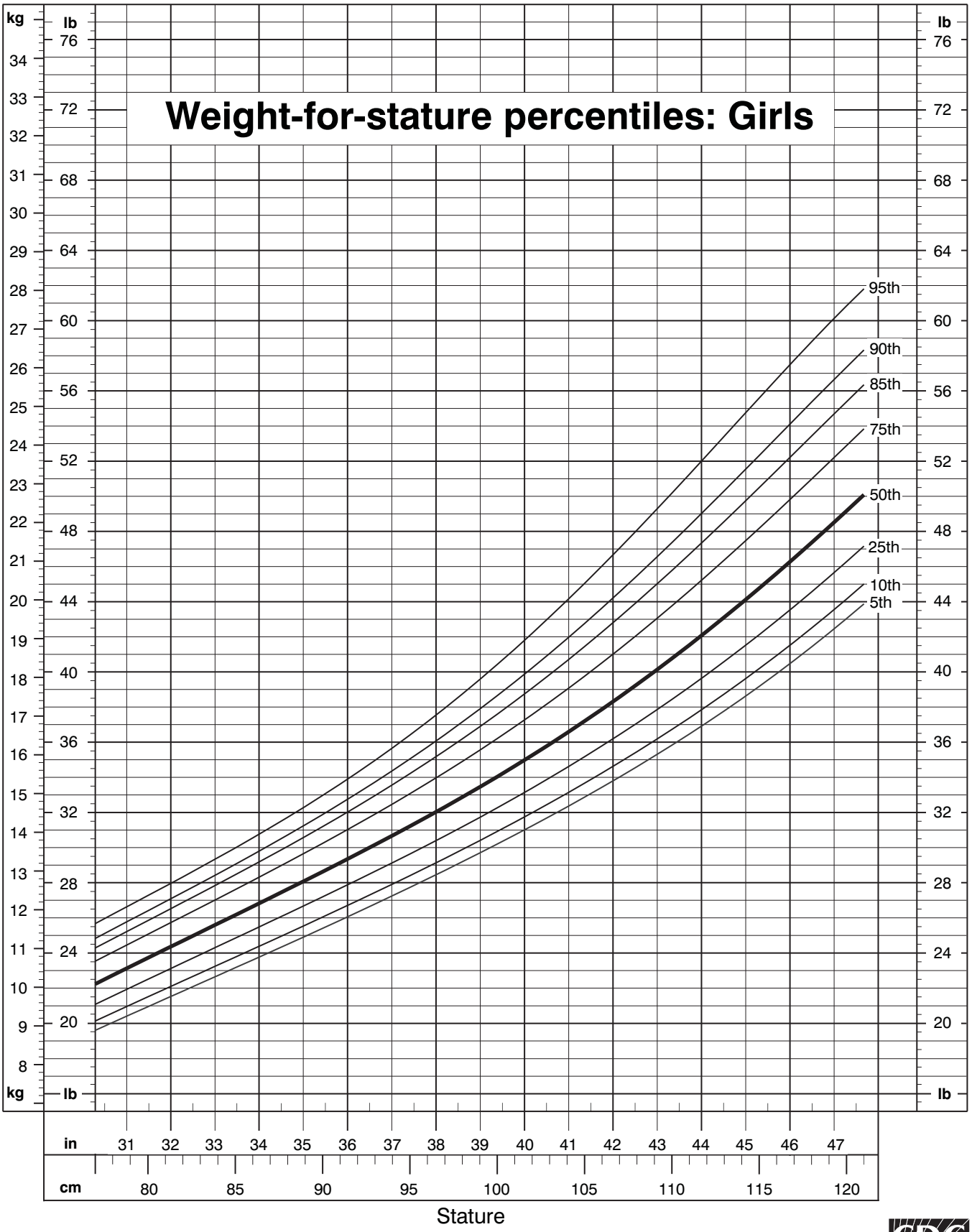

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Appendix C
Statistical and Reporting Guidelines

This report presents population means and proportions, standard errors of estimates, and percentiles of dietary intake distributions. Sample weights were used to account for sample design and nonresponse. Information about the NHANES-III survey design was used in estimating variances and testing for statistical significance.

Several software packages were used to produce the tabulations:

- ***C-SIDE: Software for Intake Distribution Estimation (Version 1.0)***—used to estimate means, percentiles, and standard errors for nutrient intake tables.

- ***SUDAAN (Version 7.5)***—used to calculate means, standard errors, and tests of statistical significance for non-nutrient tables, using the DESCRIPT procedure.

- ***SAS (Version 8.2)***—used to read the NHANES-III data files, call SUDAAN procedures, process SUDAAN output, and write SUDAAN results to ASCII files.

- ***TPL (Table Producing Language)***—this software produced all data tables in appendix D.

General Procedures

NHANES-III sample weights account for the fact that each sample person does not have an equal probability of selection into the sample. NHANES-III provides sample weights for three samples: the interviewed sample weight (WTPEQX6), the MEC-examined sample weight (WTPFEX6), and the MEC and home-examined sample weight (WTPFHX6). The sampling weight used for each table in this report was specific to the data item presented in the table, and is indicated by the source of data listed in the table footnote.

Variance is generally underestimated in a complex survey when information about the survey design is not used in variance estimation. For this report, two alternate methods were used to account for the sample design.

- Balance repeated replication (BRR)—this method was specified when using C-SIDE software to obtain estimates for nutrient tables. The BRR method used the 52 replicate weights provided in the NHANES-III data.

- Taylor series linearization—this method is used in SUDAAN procedures. The complex survey design is accounted for by specifying strata and PSU in the "nest" statement of SUDAAN procedures.

Coefficients of variation (CVs) and t-statistics were generated and examined, but are not provided in the tables. CVs were examined to determine the statistical reliability of estimates, as described below in the section on Reporting Guidelines. T-statistics were examined to determine the statistical significance of differences in means and proportions. When examining categorical data, t-statistics were used and the Bonferroni adjustment was applied to adjust for multiplicity of tests.

All tests for statistical significance are tests for differences between two independent samples defined by program participation and/or income-level. In volumes I and II, differences between

program participants and income-eligible nonparticipants are denoted by symbols on values for income-eligible nonparticipants; differences between program participants and higher-income nonparticipants are denoted by symbols on values for higher-income nonparticipants. In volumes III and IV, differences between the lowest-income group and the low-income group are denoted by symbols on values for the low-income group; differences between the lowest-income group and high-income group are denoted by symbols on values for the high-income group.

Differences in means and proportions were tested for statistical significance using α levels of 0.01, 0.05, and 0.001. For categorical data, differences involve multiple non-independent comparisons and were tested using α levels of 0.01, 0.05, and 0.001 adjusted using the Bonferroni method, by dividing α levels by the number of comparisons.

Age Standardization

Tables presented in appendix A include age-adjusted estimates for the total population (i.e., all age groups), calculated using the direct method (Klein, 2001). The age-adjusted estimates were obtained by weighting estimates for each age category by the year 2000 population distribution.

The population distribution used for age-adjustment is from *Monthly Estimates of the United States Population: April 2000*. Age-adjusted estimates were calculated by the SUDAAN software.

Nutrient Analyses

A primary goal for the analysis of dietary intake was to estimate the proportion of individuals whose intake is inadequate. Reference standards used to define adequate intake reflect expectations for usual intake. To apply these standards appropriately, it is necessary to have information about the distribution of intake in the population of interest. The variance of the distribution of observed intake is too large to produce reliable estimates of the prevalence of inadequate intake. This is because the variance of observed intake includes both within-person (day-to-day) and between-person variation. Methods have been established for adjusting observed intake distributions to estimate distributions of usual intake by removing within-person variation (NRC, 1986 and Nusser et al, 1996). These adjustments require two or more days of intake data for at least some subjects.

NHANES-III collected replicate 24-hour recalls on a convenience sample of approximately 5 percent of respondents. The nonrandom nature and small size of the replicate recall sample prohibited its use in estimating usual dietary intake. Instead, we used the Continuing Survey of Food Intake of Individuals (CSFII) 1994-96, to obtain estimates of within-person variation. CSFII is a nationally representative survey that includes two days of dietary intake data for all subjects.

CSFII data were used to estimate variance components for 96 demographic cells defined by age group (8), gender (male, female, both), and program participation or income (3 plus overall).[1] The variance components from CSFII were used to adjust observed intakes collected in the NHANES-III single-day dietary recalls. Estimation for all nutrients was done using *C-SIDE: Software for Intake Distribution Estimation* (Iowa State University, 1996). Because iron requirements for menstruating females are known to be asymmetrical, the adjustments performed by the C-SIDE software (using this "Iowa State Method") were not appropriate.

[1] Age groups correspond to the DRI age groups for volumes I, III, IV. CSFII used to estimate variance components for volume II (WIC participants and nonparticipants) were aggregated by year of age (4) and program participation or income (3 plus overall), but not by gender.

Therefore, distributions of iron intake were adjusted using the full probability approach as described in the IOM report *Dietary Reference Intakes: Applications in Dietary Assessment* (IOM, 2001). CSFII variance components are shown in table C1.

Reporting Guidelines

This report follows the recommendations in the NHANES-III Analytic Guidelines in the appendix titled "Joint Policy on Variance Estimation and Statistical Reporting Standards for NHANES-III and CSFII Reports: HNIS/NCHS Analytic Working Group Recommendations" (NCHS, 1996). The recommendations for presentation of statistical data call for estimates to be flagged if any of the following conditions are met:

1. **Inadequate sample size for normal approximation.** For means and for proportions based on commonly occurring events (where $0.25 < P < 0.75$), an estimate is flagged if it is based on a cell size of less than 30 times a "broadly calculated average design effect."

2. **Large coefficient of variation.** Estimates are flagged if the coefficient of variation (ratio of the standard error to the mean expressed as a percent) is greater than 30.

3. **Inadequate sample size for uncommon or very common events.** For proportions below 0.25 or above 0.75, the criteria for statistical reliability is that the cell size be sufficiently large that the minimum of nP and n(1-P) be greater than or equal to 8 times a broadly calculated average design effect, where n is the cell size and P is the estimated proportion. (I.e., an estimate is flagged when $n < 8 * (\text{avg design effect}) / \min(P,(1-P))$.) The coefficient of variation is not used in these cases.

For each data item, the design effect was calculated for each table cell as the ratio of the complex sampling design variance calculated by SUDAAN, to the simple random sample variance. The average design effect for a data item is the average of estimated design effects across age groups (pooled genders) within a demographic group, where demographic groups correspond to the columns of tables (groups defined by program participation and income).

Table C-1—CSFII variance components for 10 nutrients

	Total Children		Currently Receiving WIC Benefits		Income-eligible Nonparticipants		Higher-income Nonparticipants	
	Sample size	Within-individual variance	Sample size	Within-individual variance	Sample size	Within-individual variance	Sample size	Within-individual variance
Total energy								
1 year old	1,084	0.48900	306	0.45850	260	0.45459	512	0.54907
2 years old	1,107	0.54948	229	0.57212	328	0.51634	541	0.56212
3 years old	1,836	0.60511	348	0.50637	525	0.61904	944	0.64523
4 years old	1,859	0.60330	297	0.56819	644	0.60647	899	0.62004
Total, population adjusted	5,886	0.52208	1,180	0.46875	1,757	0.53582	2,896	0.54546
Vitamin C								
1 year old	1,084	0.59405	306	0.67637	260	0.58360	512	0.56983
2 years old	1,107	0.58606	229	0.62189	328	0.61011	541	0.56039
3 years old	1,836	0.62624	348	0.66059	525	0.67436	944	0.60359
4 years old	1,859	0.68635	297	0.79624	644	0.67490	899	0.66570
Total, population adjusted	5,886	0.62978	1,180	0.69246	1,757	0.64240	2,896	0.60805
Iron								
1 year old	1,084	0.51455	306	0.53153	260	0.50188	512	0.52476
2 years old	1,107	0.57238	229	0.69597	328	0.53098	541	0.55217
3 years old	1,836	0.66739	348	0.64471	525	0.74547	944	0.65861
4 years old	1,859	0.68272	297	0.73055	644	0.69444	899	0.68300
Total, population adjusted	5,886	0.59208	1,180	0.60402	1,757	0.61692	2,896	0.58602
Zinc								
1 year old	1,084	0.57894	306	0.54355	260	0.62037	512	0.59326
2 years old	1,107	0.64335	229	0.62776	328	0.70489	541	0.61708
3 years old	1,836	0.70109	348	0.68978	525	0.74988	944	0.68852
4 years old	1,859	0.71539	297	0.72768	644	0.76057	899	0.71794
Total, population adjusted	5,886	0.64428	1,180	0.60555	1,757	0.70509	2,896	0.63842
Calcium								
1 year old	1,084	0.42758	306	0.45101	260	0.39886	512	0.44847
2 years old	1,107	0.53634	229	0.59965	328	0.59377	541	0.49900
3 years old	1,836	0.57302	348	0.60608	525	0.67964	944	0.50818
4 years old	1,859	0.65281	297	0.70747	644	0.70275	899	0.61069
Total, population adjusted	5,886	0.55554	1,180	0.57100	1,757	0.61130	2,896	0.52236
Total fat								
2 years old	1,107	0.67828	229	0.67482	328	0.71323	541	0.67620
3 years old	1,836	0.73212	348	0.70363	525	0.77072	944	0.73979
4 years old	1,859	0.75730	297	0.82016	644	0.73778	899	0.78028
Total, population adjusted	4,802	0.72671	874	0.72620	1,497	0.73859	2,384	0.73788
Saturated fat								
2 years old	1,107	0.63957	229	0.71438	328	0.65009	541	0.60578
3 years old	1,836	0.70018	348	0.70013	525	0.72726	944	0.68959

Source: Variance components were estimated from two days of 24-hour recalls from the *Continuing Survey of Food Intakes by Individuals (CSFII)* using *C-SIDE: Software for Intake Distribution Estimation.*

Table C-1—CSFII variance components for 10 nutrients — Continued

	Total Children		Currently Receiving WIC Benefits		Income-eligible Nonparticipants		Higher-income Nonparticipants	
	Sample size	Within-individual variance	Sample size	Within-individual variance	Sample size	Within-individual variance	Sample size	Within-individual variance
Saturated fat								
4 years old	1,859	0.75756	297	0.79536	644	0.76249	899	0.75590
Total, population adjusted	4,802	0.70320	874	0.73021	1,497	0.72061	2,384	0.69121
Cholesterol								
2 years old	1,107	0.71330	229	0.74672	328	0.75802	541	0.71383
3 years old	1,836	0.70328	348	0.76400	525	0.66716	944	0.75804
4 years old	1,859	0.70384	297	0.77765	644	0.72813	899	0.70859
Total, population adjusted	4,802	0.70743	874	0.75450	1,497	0.71139	2,384	0.72676
Sodium								
2 years old	1,107	0.61045	229	0.67490	328	0.55385	541	0.61955
3 years old	1,836	0.66354	348	0.60198	525	0.66535	944	0.70296
4 years old	1,859	0.69900	297	0.71507	644	0.70761	899	0.70976
Total, population adjusted	4,802	0.64772	874	0.63806	1,497	0.64339	2,384	0.66511
Fiber								
2 years old	1,107	0.57529	229	0.57157	328	0.59539	541	0.57195
3 years old	1,836	0.68310	348	0.58998	525	0.76087	944	0.68554
4 years old	1,859	0.66612	297	0.66567	644	0.70181	899	0.64422
Total, population adjusted	4,802	0.64212	874	0.60212	1,497	0.68989	2,384	0.63225

Source: Variance components were estimated from two days of 24-hour recalls from the *Continuing Survey of Food Intakes by Individuals (CSFII)* using *C-SIDE: Software for Intake Distribution Estimation.*

Appendix D
Detailed Tables

Chapter Two
Usual Intake of Food Energy and Nutrients Among Children Ages 1-4

Chapter Three
Healthy Eating Index Scores and Usual Intake of Dietary Fiber Among Children Ages 2-4

Chapter Four
Health-Related Behaviors

Chapter Five
Health Status, Conditions, and Risks

Chapter Six
Access to Health Care Services

Table D-1—Percent of income-eligible 1-4-year-old children receiving benefits from the Food Stamp Program

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Children									
1 year old	659	61.4	3.4	335	72.8	3.9	287	›››48.0	4.6
2 years old	652	65.6	2.6	215	78.4	3.0	413	›››57.2	3.7
3 years old	614	63.8	3.4	174	71.0	7.3	407	58.7	3.8
4 years old	592	59.7	3.9	118	65.4 *	6.4	445	55.6	4.9
Total, age-adjusted	2,517	62.6	2.4	842	71.9	3.4	1,552	›››54.9	3.0

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview files. 'Total' column includes children with missing WIC participation or income.

Table D-2—Distribution of 1-4-year-old children by household food sufficiency status

	Total Children				Currently Receiving WIC Benefits				Income-eligible Nonparticipants				Higher-income Nonparticipants			
	Sample size	Enough food to eat	Sometimes not enough	Often not enough	Sample size	Enough food to eat	Sometimes not enough	Often not enough	Sample size	Enough food to eat	Sometimes not enough	Often not enough	Sample size	Enough food to eat	Sometimes not enough	Often not enough
	Percent distribution															
Children																
1 year old	1,253	93.1	6.6	0.3	418	88.9	11.0	0.1	389	85.4	13.6	1.1	357	99.5	0.5	0.0
2 years old	1,268	92.6	6.7	0.7	253	83.4	15.3	1.3	545	86.5	11.9	1.6	387	99.4	0.6	0.0
3 years old	1,119	93.9	5.7	0.4	201	90.9	7.5	1.7	513	88.3	11.3	0.4	325	99.7	0.3	0.0
4 years old	1,098	93.0	6.5	0.5	137	87.2	9.0	3.8	547	88.0	11.7	0.3	342	99.4	0.6	0.0
Total, age-adjusted	4,738	93.2	6.4	0.5	1,009	87.6	10.7	1.7	1,994	87.1	12.1	0.8	1,411	99.5	0.5	0.0
	Standard errors															
Children																
1 year old	1,253	0.9	0.9	0.1	418	2.2	2.2	0.1	389	2.1	2.1	0.5	357	0.4	0.4	0.0
2 years old	1,268	1.0	1.0	0.3	253	4.6	4.4	0.8	545	2.0	2.1	0.9	387	0.4	0.4	0.0
3 years old	1,119	0.7	0.8	0.2	201	2.4	1.7	1.5	513	2.1	2.1	0.2	325	0.2	0.2	0.0
4 years old	1,098	0.9	1.0	0.2	137	4.0	2.7	2.8	547	1.9	1.9	0.2	342	0.4	0.4	0.0
Total, age-adjusted	4,738	0.7	0.7	0.1	1,009	1.7	1.7	0.8	1,994	1.2	1.2	0.3	1,411	0.2	0.2	0.0

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences, compared to WIC participants, are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). The Bonferroni adjustment was used to adjust for the multiplicity of tests when examining multiple outcome categories.

Source: NHANES-III, 1988-94: Youth interview files. 'Total' column includes children with missing WIC participation or income.

Table D-3—Percent of 1-4-year-old children eating fewer than three meals per day

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Children												
1 year old	1,105	13.1	1.53	367	15.1	2.14	347	14.8	1.96	308	11.1	2.51
2 years old	1,174	10.2	1.06	241	12.0	2.00	513	15.5	2.35	344	›› 6.0	1.22
3 years old	998	14.2	1.54	181	20.2	3.77	474	15.1	2.42	272	11.1	3.11
4 years old	998	14.3	1.70	130	18.4	5.04	492	14.7	1.90	314	10.4	2.88
Total, age-adjusted	4,275	13.0	0.76	919	16.4	1.96	1,826	15.0	1.13	1,238	›› 9.7	1.08

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Table D-4—Average number of meals consumed per day: Children 1-4 years old

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error
Children												
1 year old	1,105	3.0	0.03	367	3.0	0.05	347	3.0	0.04	308	3.1	0.05
2 years old	1,174	3.0	0.02	241	3.0	0.04	513	2.9	0.04	344	3.0	0.03
3 years old	998	3.0	0.03	181	2.9	0.07	474	3.0	0.04	272	3.0	0.04
4 years old	998	2.9	0.02	130	3.0	0.09	492	3.0	0.03	314	2.9	0.04
Total, age-adjusted	4,275	3.0	0.02	919	3.0	0.04	1,826	3.0	0.03	1,238	3.0	0.02

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Exam file, 24-hour dietary recall. 'Total' column includes children with missing WIC participation or income.

Table D-5—Percent of 1-4-year-old children who eat breakfast every day

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Children												
1 year old	1,255	95.0	0.8	417	92.9 *	1.7	390	93.9 *	1.8	357	› 96.7 *	0.7
2 years old	1,269	91.3	0.9	253	85.7	3.8	545	89.6	1.9	387	93.6	1.1
3 years old	1,119	90.3	1.4	201	88.5 *	2.7	513	90.7	2.1	325	90.3	2.3
4 years old	1,096	91.9	1.5	137	85.0 *	7.2	547	88.8	2.7	341	96.1 *	1.1
Total, population adjusted	4,739	92.2	0.6	1,008	88.0	2.2	1,995	90.8	1.3	1,410	› 94.2	0.7

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview files. 'Total' column includes children with missing WIC participation or income.

Table D-6—Percent of 1-4-year-old children eating at least one snack per day

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Children												
1 year old	1,105	97.0	0.6	367	96.6 *	1.2	347	94.5	1.7	308	98.4 *	0.8
2 years old	1,174	96.3	0.7	241	97.0 *	1.0	513	93.4	1.8	344	98.0 *	0.8
3 years old	998	94.1	1.1	181	92.7 *	3.0	474	92.0	1.7	272	95.8 *	2.0
4 years old	998	93.4	1.2	130	96.9 *	2.1	492	92.7	1.3	314	93.2	2.1
Total, age-adjusted	4,275	95.2	0.5	919	95.8	1.0	1,826	93.2	1.0	1,238	96.3	0.9

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Table D-7—Average number of snacks consumed per day: Children 1-4 years old

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error
Children												
1 year old	1,105	3.2	0.09	367	3.2	0.14	347	› 2.9	0.12	308	3.3	0.12
2 years old	1,174	2.9	0.06	241	3.0	0.15	513	› 2.7	0.09	344	3.1	0.09
3 years old	998	2.6	0.08	181	2.4	0.13	474	2.4	0.14	272	› 2.9	0.15
4 years old	998	2.4	0.06	130	2.6	0.15	492	2.4	0.09	314	2.4	0.10
Total, age-adjusted	4,275	2.8	0.04	919	2.8	0.08	1,826	›› 2.6	0.07	1,238	2.9	0.06

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Exam file, 24-hour dietary recall. 'Total' column includes children with missing WIC participation or income.

Table D-8—Mean usual intake of food energy in kilocalories: Children 1-4 years old

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard error	Sample size	Mean	Standard error	Sample size	Mean	Standard error	Sample size	Mean	Standard error
Children												
1 year old	1,135	1,218	12.2	380	1,215	21.5	355	1,268	21.8	315	1,199	20.6
2 years old	1,175	1,398	11.9	242	1,480	36.4	513	›› 1,370	14.1	344	1,406	20.1
3 years old	999	1,487	15.2	181	1,556	28.3	475	1,502	29.1	272	›› 1,463	20.1
4 years old	1,000	1,603	22.5	130	1,659	40.3	494	1,654	27.5	314	1,580	30.7
Total, age-adjusted ...	4,309	1,428	8.7	933	1,473	17.2	1,837	1,449	15.0	1,245	›› 1,412	11.0

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-9—Mean usual intake of food energy as a percent of the 1989 Recommended Energy Allowance: Children 1-4 years old

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error
Children												
1 year old	1,135	93.7	0.9	380	93.5	1.6	355	97.5	1.7	315	92.2	1.6
2 years old	1,175	107.6	0.9	242	113.9	2.8	513	›› 105.4	1.1	344	108.2	1.6
3 years old	999	114.4	1.2	181	119.7	2.2	475	115.5	2.2	272	›› 112.5	1.6
4 years old	1,000	89.0	1.2	130	92.2	2.2	494	91.9	1.5	314	87.8	1.7
Total, age-adjusted ...	4,309	100.6	0.6	933	107.2	1.2	1,837	›››101.0	1.0	1,245	›››98.8	0.8

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-10—Distribution of usual food energy intake in kilocalories: Children 1-4 years old

	1989 REA (kcal)	Percentiles									Standard errors of percentiles								
		5th	10th	15th	25th	50th	75th	85th	90th	95th	5th	10th	15th	25th	50th	75th	85th	90th	95th
Total Children																			
1 year old	1,300	773	856	914	1,004	1,188	1,400	1,525	1,614	1,758	8.42	7.81	7.98	8.89	11.00	16.10	20.80	23.90	27.90
2 years old	1,300	945	1,035	1,097	1,192	1,378	1,580	1,698	1,784	1,920	9.61	9.34	9.20	9.13	10.30	14.30	18.10	21.30	27.10
3 years old	1,300	1,024	1,115	1,178	1,274	1,460	1,670	1,798	1,892	2,042	14.30	14.00	13.90	13.80	14.30	18.20	22.10	25.60	32.60
4 years old	1,800	1,100	1,198	1,266	1,370	1,578	1,808	1,943	2,040	2,192	21.40	20.40	20.20	20.70	22.80	25.70	27.40	28.70	31.10
Total, age-adjusted	na	921	1,018	1,086	1,190	1,398	1,630	1,771	1,873	2,038	6.80	6.77	6.91	7.28	8.48	10.90	12.90	14.60	17.70
Receiving WIC Benefits																			
1 year old	1,300	725	820	885	983	1,186	1,416	1,551	1,648	1,804	28.60	22.70	20.20	18.90	20.50	24.20	28.30	32.70	42.60
2 years old	1,300	1,009	1,098	1,159	1,253	1,443	1,665	1,804	1,908	2,080	26.90	25.50	25.00	25.30	30.00	45.70	60.20	72.40	92.60
3 years old	1,300	1,060	1,147	1,209	1,306	1,508	1,752	1,907	2,024	2,218	27.00	29.30	30.30	30.10	26.60	31.90	38.60	46.30	65.30
4 years old	1,800	1,191	1,286	1,353	1,453	1,641	1,847	1,971	2,059	2,193	31.30	33.00	34.60	36.50	40.20	48.20	54.30	58.80	65.00
Total, age-adjusted	na	925	1,031	1,107	1,221	1,440	1,687	1,841	1,955	2,139	13.80	12.50	12.30	12.80	16.00	22.80	28.40	33.30	42.80
Income-eligible Nonparticipant																			
1 year old	1,300	751	841	908	1,015	1,236	1,479	1,621	1,725	1,894	13.70	14.50	15.50	17.50	22.50	28.30	33.60	39.10	49.60
2 years old	1,300	›››880	›››973	›››1,040	›› 1,143	1,352	1,575	1,697	1,782	1,917	16.30	16.70	16.80	16.70	15.50	14.50	15.00	16.50	20.70
3 years old	1,300	1,030	1,122	1,186	1,283	1,477	1,694	1,823	1,915	2,060	24.50	23.00	22.40	22.20	25.70	35.40	43.10	49.50	61.10
4 years old	1,800	1,101	1,210	1,285	1,401	1,629	1,879	2,026	2,131	2,296	35.20	32.30	30.60	28.50	26.40	29.10	32.30	35.40	41.70
Total, age-adjusted	na	912	1,014	1,086	1,198	1,421	1,668	1,813	1,918	2,084	12.80	12.80	13.00	13.40	14.50	17.40	20.80	24.00	30.20
Higher-income Nonparticipant																			
1 year old	1,300	› 823	894	944	1,022	1,176	1,346	1,449	1,526	1,654	14.10	15.40	16.20	17.20	19.80	25.10	29.30	33.00	40.50
2 years old	1,300	987	1,068	1,125	1,213	1,389	1,581	1,690	1,767	1,885	16.60	16.10	15.70	15.20	16.90	23.50	28.70	33.00	41.00
3 years old	1,300	1,031	1,111	1,168	1,257	1,438	1,642	› 1,761	› 1,846	› 1,979	19.10	19.60	19.80	19.90	19.90	23.50	27.60	31.70	41.20
4 years old	1,800	1,118	1,206	1,269	1,365	1,559	1,772	1,896	1,983	2,117	29.30	27.00	26.40	26.70	30.40	36.10	39.90	42.90	48.00
Total, age-adjusted	na	949	1,036	1,097	1,191	› 1,382	›› 1,599	›› 1,730	›› 1,825	›› 1,977	9.85	9.60	9.64	9.94	11.10	13.30	15.30	17.10	21.10

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
The Bonferroni adjustment was used to adjust levels of significant and control for multiplicity in the number of tests.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-11—Mean usual intake of Vitamin C in milligrams: Children 1-4 years old

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard error	Sample size	Mean	Standard error	Sample size	Mean	Standard error	Sample size	Mean	Standard error
Children												
1 year old	1,135	86	2.2	380	87	3.0	355	85	3.5	315	87	4.0
2 years old	1,175	96	1.9	242	102	6.1	513	90	3.6	344	99	2.4
3 years old	999	93	2.4	181	129	11.0	475	›››89	3.8	272	›››87	2.9
4 years old	1,000	101	2.3	130	103	6.2	494	107	3.9	314	99	3.5
Total, age-adjusted ...	4,309	94	0.9	933	105	3.4	1,837	›› 93	2.2	1,245	›››93	1.2

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-12—Percent of 1-4-year-old children with adequate usual intake of Vitamin C[1]

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error
Children												
1 year old	1,135	99.8	0.03	380	100.0	0.05	355	› 99.8	0.06	315	99.9	0.05
2 years old	1,175	99.9	0.04	242	100.0	0.00	513	› 99.9	0.06	344	99.9	0.05
3 years old	999	99.9	0.03	181	100.0	0.00	475	100.0	0.03	272	›› 99.8	0.06
4 years old	1,000	99.8	0.04	130	100.0	0.08	494	› 99.8	0.07	314	›› 99.6	0.10
Total, age-adjusted ...	4,309	99.9	0.02	933	100.0	0.02	1,837	›››99.9	0.03	1,245	›››99.8	0.03

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 Estimated Average Requirements (EARs) were used to assess the adequacy of intake in groups, using the EAR cut-point method described in IOM, *Dietary Reference Intakes: Applications in Dietary Assessment,* Chapter 4. EARs are defined separately for age groups as listed in appendix B.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-13—Distribution of usual Vitamin C intake in milligrams: Children 1-4 years old

	EAR (mg/dy)	Percentiles									Standard errors of percentiles								
		5th	10th	15th	25th	50th	75th	85th	90th	95th	5th	10th	15th	25th	50th	75th	85th	90th	95th
Total Children																			
1 year old	13	30	37	43	53	76	108	130	147	177	0.84	0.97	1.07	1.26	1.80	2.74	3.59	4.42	6.18
2 years old	13	34	43	49	60	86	121	143	161	189	1.00	1.09	1.17	1.31	1.69	2.40	3.06	3.67	4.92
3 years old	13	36	45	52	62	87	117	136	150	173	1.20	1.39	1.54	1.77	2.17	2.90	3.64	4.26	5.38
4 years old	22	44	53	60	71	96	125	143	157	178	1.16	1.25	1.33	1.50	1.99	2.83	3.50	4.08	5.14
Total, age-adjusted	na	36	44	51	62	87	118	139	154	179	0.54	0.59	0.63	0.70	0.87	1.15	1.40	1.65	2.22
Receiving WIC Benefits																			
1 year old	13	34	42	48	59	81	108	125	137	158	1.53	1.71	1.85	2.13	2.97	3.95	4.65	5.32	6.63
2 years old	13	39	48	55	66	92	128	151	169	198	2.04	2.48	2.85	3.54	5.38	8.16	10.30	12.00	15.50
3 years old	13	59	71	78	90	117	154	181	202	237	4.93	5.34	5.57	6.10	9.10	14.60	18.50	21.60	27.70
4 years old	22	53	61	68	78	100	125	140	150	167	5.14	5.46	5.64	5.85	6.18	6.87	7.54	8.12	9.16
Total, age-adjusted	na	45	54	61	73	98	130	150	165	190	2.08	2.34	2.47	2.63	3.07	4.32	5.26	5.93	6.95
Income-eligible Nonparticipant																			
1 year old	13	29	36	42	› 51	74	106	129	148	181	1.26	1.35	1.43	1.61	2.35	4.22	6.20	8.19	12.60
2 years old	13	33	40	46	57	81	113	134	150	177	1.52	1.65	1.76	2.03	2.98	4.61	5.84	6.89	8.87
3 years old	13	›››37	›››45	›››51	›››61	›› 83	› 111	129	142	164	2.08	2.34	2.54	2.88	3.73	4.80	5.46	6.00	7.20
4 years old	22	46	56	63	75	101	133	153	167	190	1.91	2.16	2.40	2.83	3.85	5.02	5.74	6.28	7.17
Total, age-adjusted	na	›››36	›› 44	›› 51	›››61	›› 85	116	136	152	178	1.02	1.12	1.22	1.43	2.01	2.90	3.51	4.00	4.93
Higher-income Nonparticipant																			
1 year old	13	29	36	42	51	75	109	132	151	184	1.30	1.54	1.73	2.06	3.03	5.01	6.93	8.76	12.50
2 years old	13	35	44	50	62	89	125	148	167	197	1.54	1.66	1.77	1.95	2.35	3.11	3.98	4.89	6.90
3 years old	13	›››34	›››42	›››48	›››58	›› 81	› 110	› 127	› 140	160	1.53	1.73	1.87	2.13	2.86	3.90	4.47	4.89	5.87
4 years old	22	42	51	58	69	94	122	140	153	174	1.88	2.02	2.15	2.41	3.06	4.18	5.29	6.37	8.65
Total, age-adjusted	na	›››35	›››43	›››49	›››60	›››85	› 117	137	152	177	0.76	0.84	0.90	0.99	1.20	1.59	2.02	2.48	3.51

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
The Bonferroni adjustment was used to adjust levels of significant and control for multiplicity in the number of tests.
na EAR is specified for particular age groups, but is not applicable to pooled data.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-14—Mean usual intake of iron in milligrams: Children 1-4 years old

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard error	Sample size	Mean	Standard error	Sample size	Mean	Standard error	Sample size	Mean	Standard error
Children												
1 year old	1,135	9.5	0.15	380	10.1	0.27	355	›› 9.0	0.24	315	9.7	0.24
2 years old	1,175	10.6	0.13	242	11.6	0.43	513	››› 10.0	0.24	344	11.0	0.20
3 years old	999	10.9	0.14	181	12.4	0.43	475	››› 10.7	0.25	272	››› 10.8	0.21
4 years old	1,000	12.2	0.26	130	12.2	0.38	494	12.3	0.27	314	12.4	0.44
Total, age-adjusted	4,309	10.8	0.09	933	11.6	0.20	1,837	››› 10.5	0.13	1,245	› 11.0	0.16

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-15—Percent of 1-4-year-old children with adequate usual intake of iron[1]

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error
Children												
1 year old	1,135	99.3	0.10	380	98.8	0.35	355	99.2	0.16	315	› 99.7	0.08
2 years old	1,175	100.0	0.00	242	100.0	0.00	513	››› 99.8	0.07	344	100.0	0.00
3 years old	999	100.0	0.00	181	100.0	0.00	475	100.0	0.00	272	100.0	0.00
4 years old	1,000	100.0	0.02	130	100.0	0.00	494	100.0	0.05	314	100.0	0.01
Total, age-adjusted	4,309	99.8	0.03	933	99.7	0.09	1,837	99.7	0.05	1,245	› 99.9	0.02

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
[1] Estimated Average Requirements (EARs) were used to assess the adequacy of intake in groups, using the EAR cut-point method described in IOM, *Dietary Reference Intakes: Applications in Dietary Assessment,* Chapter 4. EARs are defined separately for age groups as listed in appendix B.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-16—Distribution of usual iron intake in milligrams: Children 1-4 years old

	EAR (mg/dy)	Percentiles									Standard errors of percentiles								
		5th	10th	15th	25th	50th	75th	85th	90th	95th	5th	10th	15th	25th	50th	75th	85th	90th	95th
Total Children																			
1 year old	3.0	4.5	5.2	5.8	6.7	8.7	11.4	13.2	14.6	17.1	0.09	0.10	0.10	0.11	0.13	0.20	0.26	0.30	0.38
2 years old	3.0	5.9	6.7	7.2	8.1	10.0	12.4	14.1	15.3	17.5	0.09	0.09	0.09	0.09	0.12	0.17	0.21	0.24	0.28
3 years old	3.0	6.6	7.3	7.8	8.7	10.5	12.7	14.1	15.2	16.9	0.11	0.11	0.11	0.11	0.13	0.17	0.20	0.22	0.24
4 years old	na	7.4	8.1	8.7	9.6	11.7	14.2	15.8	16.9	18.9	0.13	0.14	0.14	0.16	0.23	0.35	0.42	0.47	0.53
Total, age-adjusted	na	5.8	6.6	7.2	8.2	10.2	12.8	14.4	15.7	17.9	0.06	0.06	0.06	0.06	0.07	0.12	0.15	0.18	0.23
Receiving WIC Benefits																			
1 year old	3.0	4.3	5.2	5.8	6.8	9.0	12.1	14.3	16.1	19.3	0.20	0.20	0.20	0.22	0.26	0.35	0.46	0.55	0.71
2 years old	3.0	6.6	7.5	8.1	9.0	11.1	13.6	15.2	16.4	18.4	0.27	0.29	0.31	0.33	0.40	0.53	0.63	0.70	0.81
3 years old	3.0	7.3	8.2	8.8	9.8	12.0	14.6	16.1	17.3	19.2	0.35	0.36	0.37	0.38	0.42	0.51	0.59	0.67	0.80
4 years old	na	8.3	9.1	9.6	10.4	12.0	13.8	14.9	15.7	16.9	0.28	0.30	0.31	0.32	0.36	0.48	0.56	0.62	0.72
Total, age-adjusted	na	6.1	7.0	7.7	8.7	10.9	13.6	15.4	16.8	19.3	0.14	0.15	0.15	0.16	0.18	0.25	0.31	0.35	0.42
Income-eligible Nonparticipant																			
1 year old	3.0	4.2	5.0	5.5	6.4	8.4	11.0	12.7	› 13.9	›› 15.9	0.10	0.11	0.12	0.15	0.23	0.33	0.41	0.48	0.59
2 years old	3.0	››› 5.0	››› 5.8	››› 6.3	››› 7.2	››› 9.2	› 11.8	13.6	15.0	17.4	0.14	0.14	0.14	0.15	0.19	0.30	0.40	0.50	0.72
3 years old	3.0	7.0	7.6	8.1	8.8	›› 10.4	››› 12.2	››› 13.3	››› 14.2	››› 15.5	0.20	0.20	0.20	0.20	0.24	0.30	0.34	0.38	0.44
4 years old	na	7.4	8.3	8.9	9.9	11.8	14.2	15.7	16.8	18.5	0.21	0.20	0.20	0.20	0.24	0.32	0.39	0.44	0.54
Total, age-adjusted	na	5.7	6.5	›› 7.1	›› 8.0	››› 10.0	››› 12.4	›› 14.0	›› 15.2	››› 17.1	0.11	0.11	0.11	0.10	0.12	0.16	0.19	0.22	0.28
Higher-income Nonparticipant																			
1 year old	3.0	4.8	5.5	6.1	7.0	9.1	11.7	13.4	14.7	16.8	0.12	0.13	0.13	0.15	0.20	0.31	0.40	0.48	0.64
2 years old	3.0	6.5	7.3	7.8	8.6	10.4	12.8	14.3	15.5	17.5	0.16	0.15	0.15	0.16	0.20	0.27	0.32	0.36	0.42
3 years old	3.0	6.3	› 7.0	› 7.6	›› 8.4	›› 10.3	›› 12.6	› 14.1	› 15.2	17.0	0.15	0.16	0.16	0.18	0.21	0.26	0.29	0.32	0.38
4 years old	na	7.5	8.2	8.8	9.7	11.7	14.4	16.2	17.5	19.7	0.20	0.21	0.23	0.26	0.41	0.60	0.71	0.80	0.96
Total, age-adjusted	na	6.1	6.8	7.4	8.3	10.3	12.9	14.6	15.9	18.1	0.07	0.07	0.08	0.09	0.14	0.21	0.27	0.32	0.42

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
The Bonferroni adjustment was used to adjust levels of significant and control for multiplicity in the number of tests.
na EAR is specified for particular age groups, but is not applicable to pooled data.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-17—Mean usual intake of zinc in milligrams: Children 1-4 years old

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard error	Sample size	Mean	Standard error	Sample size	Mean	Standard error	Sample size	Mean	Standard error
Children												
1 year old	1,135	6.4	0.08	380	6.5	0.15	355	6.6	0.15	315	6.2	0.10
2 years old	1,175	7.1	0.09	242	7.8	0.22	513	›› 7.1	0.12	344	›› 7.0	0.16
3 years old	999	7.3	0.10	181	7.9	0.26	475	7.6	0.16	272	›› 7.0	0.12
4 years old	1,000	8.1	0.19	130	8.4	0.43	494	8.6	0.28	314	7.8	0.25
Total, age-adjusted ...	4,309	7.2	0.07	933	7.6	0.15	1,837	7.5	0.11	1,245	›››7.0	0.08

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-18—Percent of 1-4-year-old children with adequate usual intake of zinc[1]

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error
Children												
1 year old	1,135	99.9	0.05	380	99.6	0.20	355	100.0	0.00	315	100.0	0.00
2 years old	1,175	100.0	0.00	242	100.0	0.00	513	100.0	0.00	344	100.0	0.00
3 years old	999	100.0	0.00	181	100.0	0.00	475	100.0	0.00	272	100.0	0.00
4 years old	1,000	99.4	0.17	130	100.0	0.08	494	99.8	0.10	314	99.3	0.36
Total, age-adjusted ...	4,309	99.8	0.04	933	99.9	0.05	1,837	99.9	0.03	1,245	99.8	0.09

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
[1] Estimated Average Requirements (EARs) were used to assess the adequacy of intake in groups, using the EAR cut-point method described in IOM, *Dietary Reference Intakes: Applications in Dietary Assessment,* Chapter 4. EARs are defined separately for age groups as listed in appendix B.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-19—Distribution of usual zinc intake in milligrams: Children 1-4 years old

	EAR (mg/dy)	Percentiles									Standard errors of percentiles								
		5th	10th	15th	25th	50th	75th	85th	90th	95th	5th	10th	15th	25th	50th	75th	85th	90th	95th
Total Children																			
1 year old	2.2	3.9	4.3	4.6	5.1	6.2	7.4	8.1	8.6	9.5	0.05	0.05	0.05	0.06	0.08	0.09	0.11	0.12	0.15
2 years old	2.2	4.5	4.9	5.2	5.7	6.8	8.2	9.0	9.6	10.7	0.07	0.07	0.07	0.07	0.08	0.10	0.12	0.14	0.17
3 years old	2.2	4.8	5.3	5.6	6.1	7.2	8.4	9.1	9.6	10.5	0.08	0.08	0.08	0.09	0.10	0.12	0.14	0.16	0.20
4 years old	4.1	5.1	5.7	6.0	6.6	7.8	9.3	10.3	11.0	12.2	0.12	0.12	0.13	0.14	0.17	0.23	0.28	0.32	0.41
Total, age-adjusted ...	na	4.5	5.0	5.3	5.8	7.0	8.3	9.2	9.8	10.9	0.04	0.04	0.04	0.05	0.07	0.09	0.11	0.12	0.15
Receiving WIC Benefits																			
1 year old	2.2	3.6	4.1	4.5	5.1	6.2	7.6	8.4	9.1	10.1	0.14	0.12	0.12	0.12	0.13	0.17	0.21	0.24	0.33
2 years old	2.2	4.7	5.2	5.5	6.1	7.3	8.9	10.0	10.8	12.3	0.16	0.16	0.16	0.16	0.19	0.26	0.33	0.40	0.55
3 years old	2.2	5.3	5.7	6.0	6.6	7.7	9.0	9.8	10.4	11.3	0.17	0.18	0.19	0.21	0.26	0.34	0.38	0.40	0.44
4 years old	4.1	5.6	6.1	6.4	7.0	8.2	9.6	10.5	11.1	12.2	0.25	0.28	0.30	0.34	0.41	0.52	0.59	0.65	0.76
Total, age-adjusted ...	na	4.5	5.1	5.4	6.0	7.3	8.8	9.8	10.6	11.9	0.07	0.07	0.08	0.10	0.14	0.20	0.25	0.28	0.34
Income-eligible Nonparticipant																			
1 year old	2.2	4.0	4.4	4.8	5.3	6.4	7.7	8.4	9.0	9.8	0.08	0.09	0.10	0.11	0.15	0.20	0.23	0.25	0.29
2 years old	2.2	4.5	5.0	5.3	5.8	6.9	8.1	8.9	9.4	10.2	0.10	0.10	0.10	0.10	0.11	0.13	0.15	0.17	0.21
3 years old	2.2	5.2	5.6	6.0	6.5	7.5	8.6	9.3	9.8	10.6	0.14	0.14	0.14	0.14	0.16	0.19	0.22	0.25	0.30
4 years old	4.1	5.6	6.2	6.5	7.2	8.4	9.9	10.8	11.4	12.4	0.19	0.19	0.20	0.21	0.26	0.33	0.38	0.42	0.50
Total, age-adjusted ...	na	4.7	5.2	5.6	6.1	7.3	8.6	9.4	10.0	11.0	0.07	0.07	0.08	0.08	0.10	0.14	0.16	0.19	0.23
Higher-income Nonparticipant																			
1 year old	2.2	4.1	4.5	4.8	5.2	6.0	7.1	7.7	8.2	8.9	0.08	0.08	0.08	0.09	0.10	0.12	0.14	0.16	0.22
2 years old	2.2	4.4	4.9	5.2	5.7	6.8	8.0	8.8	9.4	10.4	0.11	0.11	0.11	0.12	0.14	0.19	0.23	0.27	0.33
3 years old	2.2	4.5	5.0	5.4	5.9	6.9	8.0	8.7	9.1	9.9	0.10	0.10	0.09	0.10	0.12	0.14	0.16	0.17	0.20
4 years old	4.1	5.0	5.5	5.8	6.3	7.5	8.9	9.8	10.6	11.7	0.17	0.17	0.17	0.17	0.22	0.31	0.39	0.46	0.61
Total, age-adjusted ...	na	4.4	4.9	5.2	5.7	6.8	8.0	8.8	9.4	10.4	0.05	0.05	0.05	0.05	0.07	0.11	0.14	0.16	0.21

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
The Bonferroni adjustment was used to adjust levels of significant and control for multiplicity in the number of tests.
na EAR is specified for particular age groups, but is not applicable to pooled data.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Food intake does not account for vitamin/mineral supplements. Usual intake was estimated using *C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intake of Individuals (CSFII).*

Table D-20—Mean usual intake of calcium in milligrams: Children 1-4 years old

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard error	Sample size	Mean	Standard error	Sample size	Mean	Standard error	Sample size	Mean	Standard error
Children												
1 year old	1,135	903	15.8	380	899	21.5	355	887	32.7	315	902	20.9
2 years old	1,175	783	11.5	242	833	27.8	513	›› 734	11.5	344	809	21.9
3 years old	999	824	15.1	181	849	27.6	475	783	25.8	272	847	20.5
4 years old	1,000	843	15.2	130	842	30.0	494	832	21.9	314	868	23.7
Total, age-adjusted ...	4,309	838	8.1	933	854	16.6	1,837	811	15.1	1,245	857	10.4

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-21—Mean usual intake of calcium as a percent of Adequate Intake (AI): Children 1-4 years old

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error
Children												
1 year old	1,135	180.7	3.2	380	179.7	4.3	355	177.3	6.5	315	180.4	4.2
2 years old	1,175	156.6	2.3	242	166.6	5.6	513	›› 146.8	2.3	344	161.9	4.4
3 years old	999	164.8	3.0	181	169.7	5.5	475	156.6	5.2	272	169.4	4.1
4 years old	1,000	105.4	1.9	130	105.2	3.8	494	104.0	2.7	314	108.5	3.0
Total, age-adjusted ...	4,309	146.7	1.4	933	157.5	3.0	1,837	›››139.9	2.6	1,245	› 148.5	1.8

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-22—Distribution of usual calcium intake in milligrams: Children 1-4 years old

	AI (mg/dy)	Percentiles									Standard errors of percentiles								
		5th	10th	15th	25th	50th	75th	85th	90th	95th	5th	10th	15th	25th	50th	75th	85th	90th	95th
Total Children																			
1 year old	500	418	507	571	670	870	1,101	1,242	1,345	1,507	9.58	10.60	11.30	12.40	15.00	20.40	25.10	28.90	35.10
2 years old	500	400	467	516	594	757	945	1,055	1,133	1,254	8.24	8.36	8.65	9.52	12.30	15.00	16.10	17.10	19.40
3 years old	500	431	501	551	630	793	983	1,099	1,185	1,322	9.02	10.10	10.80	12.00	14.40	18.80	22.80	26.00	32.10
4 years old	800	479	546	594	671	826	996	1,093	1,162	1,268	11.10	12.10	12.80	13.90	15.40	17.50	19.20	20.50	22.50
Total, age-adjusted	na	432	504	557	640	812	1,007	1,122	1,206	1,336	4.70	5.16	5.52	6.12	7.70	9.93	11.80	13.50	16.50
Receiving WIC Benefits																			
1 year old	500	414	501	562	659	864	1,107	1,250	1,349	1,499	20.90	18.90	18.10	18.40	22.20	27.90	31.10	33.80	38.90
2 years old	500	421	498	554	640	814	1,005	1,115	1,192	1,310	24.40	25.40	25.80	26.60	29.40	32.30	34.50	36.40	39.60
3 years old	500	464	529	578	657	822	1,011	1,121	1,200	1,323	21.10	22.90	23.60	24.50	28.30	33.20	36.30	39.50	47.80
4 years old	800	555	608	646	705	824	959	1,039	1,098	1,190	18.50	20.80	22.50	25.30	30.50	36.10	40.00	42.90	47.20
Total, age-adjusted	na	450	524	576	659	829	1,023	1,137	1,218	1,342	11.90	12.60	13.30	14.80	17.30	19.20	20.70	22.30	26.30
Income-eligible Nonparticipant																			
1 year old	500	346	437	506	618	853	1,113	1,263	1,372	1,544	15.50	18.30	20.30	22.50	28.10	43.30	56.50	66.90	83.00
2 years old	500	401	461	504	572	› 713	›› 874	›› 968	›› 1,035	›› 1,140	9.65	9.93	10.10	10.40	11.40	13.90	16.40	18.70	23.50
3 years old	500	441	499	542	610	753	921	1,025	1,102	1,230	16.90	18.00	18.60	19.60	22.90	30.50	37.10	42.70	52.90
4 years old	800	487	548	593	663	813	981	1,076	1,142	1,243	17.80	19.10	20.00	21.40	23.10	24.40	25.40	26.30	28.50
Total, age-adjusted	na	425	491	540	618	782	970	1,083	1,166	1,297	8.76	9.75	10.50	11.60	14.10	18.80	22.80	26.10	31.80
Higher-income Nonparticipant																			
1 year old	500	456	537	594	684	868	1,082	1,213	1,310	1,466	15.60	16.20	16.60	17.60	20.70	25.90	29.00	31.30	35.80
2 years old	500	408	478	529	610	784	981	1,095	1,176	1,299	15.70	16.10	16.90	18.80	23.40	26.90	28.80	30.70	34.50
3 years old	500	432	508	563	648	821	1,018	1,134	1,218	1,351	15.20	16.10	17.00	18.30	20.70	24.60	27.50	30.30	37.00
4 years old	800	488	561	613	693	853	1,027	1,126	1,195	1,300	19.40	20.00	20.40	21.30	23.50	27.40	30.40	32.80	37.10
Total, age-adjusted	na	445	520	573	658	832	1,029	1,144	1,226	1,353	7.67	7.81	8.08	8.71	10.40	12.50	14.10	15.40	17.90

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
The Bonferroni adjustment was used to adjust levels of significant and control for multiplicity in the number of tests.
na Adequate Intake (AI) is specified for particular age groups, but is not applicable to pooled data.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Food intake does not account for vitamin/mineral supplements. Usual intake was estimated using *C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intake of Individuals (CSFII).*

Table D-23—Mean daily intake of milk (grams) by 1-4-year-old children

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error
Children												
1 year old	1,105	414.8	18.9	367	404.8	24.2	347	423.0	33.2	308	393.9	26.9
2 years old	1,174	273.2	12.0	241	300.6	25.2	513	› 246.8	12.4	344	284.9	23.5
3 years old	998	268.9	15.0	181	261.8	32.3	474	251.1	26.3	272	284.9	17.3
4 years old	998	234.0	12.6	130	241.7	42.0	492	228.8	18.3	314	242.6	22.8
Total, age-adjusted	4,275	297.7	7.8	919	302.2	19.5	1,826	287.5	15.1	1,238	301.5	11.3

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Table D-24—Mean number of 8-ounce servings of milk consumed per day by 1-4-year-old children

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error
Children												
1 year old	1,105	1.7	0.08	367	1.7	0.10	347	1.8	0.14	308	1.6	0.11
2 years old	1,174	1.1	0.05	241	1.2	0.10	513	› 1.0	0.05	344	1.2	0.10
3 years old	998	1.1	0.06	181	1.1	0.13	474	1.0	0.11	272	1.2	0.07
4 years old	998	1.0	0.05	130	1.0	0.18	492	1.0	0.08	314	1.0	0.10
Total, age-adjusted	4,275	1.2	0.03	919	1.3	0.08	1,826	1.2	0.06	1,238	1.3	0.05

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Exam file, 24-hour dietary recall. 'Total' column includes children with missing WIC participation or income.

Table D-25—Mean daily intake of soft drinks (grams) by 1-4-year-old children

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error
Children												
1 year old	1,105	109.8	7.26	367	116.9	12.96	347	128.4	13.63	308	96.5	9.49
2 years old	1,174	181.2	9.66	241	180.3	26.59	513	225.3	17.46	344	150.1	16.17
3 years old	998	207.3	14.78	181	223.4	31.02	474	234.7	19.56	272	177.5	23.30
4 years old	998	250.8	17.31	130	248.5	44.05	492	288.3	19.42	314	228.4	25.17
Total, age-adjusted	4,275	187.4	7.68	919	192.4	16.72	1,826	219.3	10.49	1,238	163.3	9.47

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Table D-26—Mean number of 8-ounce servings of soft drinks consumed per day by 1-4-year-old children

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error
Children												
1 year old	1,105	0.5	0.03	367	0.5	0.05	347	0.5	0.06	308	0.4	0.04
2 years old	1,174	0.8	0.04	241	0.8	0.11	513	0.9	0.07	344	0.6	0.07
3 years old	998	0.9	0.06	181	0.9	0.13	474	1.0	0.08	272	0.7	0.10
4 years old	998	1.0	0.07	130	1.0	0.18	492	1.2	0.08	314	1.0	0.10
Total, age-adjusted	4,275	0.8	0.03	919	0.8	0.07	1,826	0.9	0.04	1,238	0.7	0.04

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Exam file, 24-hour dietary recall. 'Total' column includes children with missing WIC participation or income.

Table D-27—Prevalence of dietary supplement use in the past month among 1-4-year-old children

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Children												
1 year old	1,254	37.1	2.2	416	28.4	3.4	391	36.4	3.7	356	›› 44.0	4.5
2 years old	1,267	46.9	1.9	253	47.8	3.8	543	›› 32.4	2.9	387	› 56.5	2.5
3 years old	1,113	50.7	3.3	201	40.9	6.0	510	44.6	4.0	322	›› 59.2	3.9
4 years old	1,093	47.2	2.6	136	38.3	8.0	546	36.3	3.7	340	›› 60.0	3.3
Total, age-adjusted	4,727	45.5	1.4	1,006	38.8	3.3	1,990	37.4	1.8	1,405	›››54.9	2.1

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview files. 'Total' column includes children with missing WIC participation or income.

Table D-28—Number of dietary supplements taken by 1-4-year-old children using dietary supplements in past month

	Total Children				Currently Receiving WIC Benefits				Income-eligible Nonparticipants				Higher-income Nonparticipants			
	Sample size	Number supplements used			Sample size	Number supplements used			Sample size	Number supplements used			Sample size	Number supplements used		
		One	Two	Three +		One	Two	Three +		One	Two	Three +		One	Two	Three +
	Percent distribution															
Children																
1 year old	423	91.9	6.7	1.4 *	112	93.7	6.3	0.0	126	94.4	5.2	0.4 *	159	91.5	7.0	1.5 *
2 years old	524	93.4	5.5	1.0 *	96	92.3	7.7	0.0	173	94.5	4.3	1.3 *	216	93.0	5.7	1.3 *
3 years old	458	87.8	11.3	0.8 *	62	97.4	2.3	0.3 *	192	92.2	7.6	0.2 *	183	82.7	15.9	1.4 *
4 years old	435	92.4	7.3	0.4 *	43	95.2	4.8	0.0 *	183	95.7	4.3	0.0	191	90.2	9.1	0.6 *
Total, age-adjusted	1,840	91.4	7.7	0.9 *	313	94.6	5.3	0.1 *	674	94.2	5.3	0.5 *	749	89.4	9.4	1.2 *
	Standard errors															
Children																
1 year old	423	1.8	1.7	0.7	112	2.7	2.7	0.0	126	2.4	2.3	0.4	159	2.7	2.6	1.1
2 years old	524	1.5	1.4	0.8	96	3.3	3.3	0.0	173	2.0	1.7	1.1	216	2.5	2.2	1.3
3 years old	458	1.9	1.9	0.6	62	1.4	1.4	0.3	192	3.4	3.4	0.2	183	3.1	2.9	1.0
4 years old	435	1.8	1.8	0.4	43	3.1	3.1	0.0	183	2.0	2.0	0.0	191	2.6	2.5	0.6
Total, age-adjusted	1,840	0.9	0.9	0.3	313	1.7	1.6	0.1	674	1.2	1.2	0.3	749	1.2	1.2	0.6

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.

Source: NHANES-III, 1988-94: Youth interview files. 'Total' column includes children with missing WIC participation or income.

Table D-29—Types of dietary supplements taken by 1-4-year-old children using dietary supplements in past month[1]

	Sample size	Single vitamin		Multiple vitamin		Single mineral		Vitamin/mineral combo		Other supplements	
		Percent	Std Error	Percent	Std Error	Percent	Std Error	Percent	Std Error	Percent	Std Error
Total Children											
Children											
1 year old	423	2.6 *	1.0	54.7	3.0	8.8	1.7	39.5	3.3	0.4 *	0.4
2 years old	524	3.4 *	1.1	48.1	3.2	8.6	2.1	43.0	2.9	0.3 *	0.3
3 years old	458	7.4	1.9	55.5	3.2	6.1	1.8	41.2	3.2	0.4 *	0.3
4 years old	435	6.4	1.8	53.9	3.0	5.1	1.5	37.9	2.3	0.0	0.0
Total, age-adjusted	1,840	5.0	0.9	53.1	1.6	7.1	1.2	40.4	1.6	0.3 *	0.1
Receiving WIC Benefits											
Children											
1 year old	112	2.8 *	2.7	57.6	5.8	12.2 *	2.9	29.8	6.7	0.0	0.0
2 years old	96	1.1 *	1.0	45.5	7.1	9.8 *	3.1	45.7	6.4	0.0	0.0
3 years old	62	2.5 *	1.5	37.3 *	8.8	4.5 *	2.5	57.4 *	9.7	0.0	0.0
4 years old	43	0.0 *	0.0	59.0 *	9.6	12.7 *	4.1	17.0 *	8.2	0.0 *	0.0
Total, age-adjusted	313	1.6 *	0.8	49.9	3.5	9.8	1.7	37.4	3.8	0.0	0.0
Income-eligible Nonparticipants											
Children											
1 year old	126	0.0	0.0	50.0	6.8	14.0	4.4	38.4	6.3	0.0	0.0
2 years old	173	3.7 *	1.2	57.2	4.4	7.4 *	2.9	34.9	4.0	0.0	0.0
3 years old	192	2.0 *	1.3	56.1	5.3	2.6 *	1.0	44.6	6.8	0.2 *	0.2
4 years old	183	8.6 *	5.0	54.6	5.4	4.5 *	1.6	35.0	4.9	0.0	0.0
Total, age-adjusted	674	3.6	1.3	54.5	3.4	7.1	1.8	38.2	3.1	>0	>0
Higher-income Nonparticipants											
Children											
1 year old	159	3.0 *	1.4	56.1	4.9	› 4.1 *	1.6	42.2	5.0	0.7 *	0.7
2 years old	216	4.2 *	1.8	44.2	4.6	9.2	3.5	45.7	4.2	0.6 *	0.6
3 years old	183	› 12.0	3.5	› 57.2	4.4	8.6 *	3.0	37.4	4.4	0.6 *	0.5
4 years old	191	››› 6.2 *	1.8	52.4	3.6	4.5 *	1.9	›› 42.4	3.6	0.0	0.0
Total, age-adjusted	749	›› 6.4	1.3	52.5	2.3	6.6	1.6	41.9	2.4	0.5 *	0.2

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 Percents do not sum to 100 because some respondents took two or more supplements.
>0 Value to small to display.

Source: NHANES-III, 1988-94: Youth interview files.

Table D-30—Total Healthy Eating Index score: Children 2-4 years old

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error
Children												
2 years old	1,175	72.6	0.6	242	71.6	1.6	513	69.5	0.8	344	› 75.6	1.0
3 years old	999	71.9	0.6	181	71.8	2.3	475	70.9	0.9	272	72.7	1.0
4 years old	1,000	66.8	0.8	130	65.9	1.6	494	65.4	1.0	314	68.4	1.2
Total, age-adjusted	3,174	70.4	0.5	553	69.7	1.3	1,482	68.6	0.7	930	72.2	0.8

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
HEI scores were not computed for children under 2 years old because dietary guidelines are not applicable to those ages.

Source: NHANES-III, 1988-94: Healthy Eating Index Data File. 'Total' column includes children with missing WIC participation or income.

Table D-31—Percent of 2-4-year-old children by Healthy Eating Index ratings

	Total Children				Currently Receiving WIC Benefits				Income-eligible Nonparticipants				Higher-income Nonparticipants			
	Sample size	Poor	Needs Improve-ment	Good	Sample size	Poor	Needs Improve-ment	Good	Sample size	Poor	Needs Improve-ment	Good	Sample size	Poor	Needs Improve-ment	Good
	Percent distribution															
Children																
2 years old	1,175	6.5	61.2	32.2	242	9.3	60.3	30.4	513	10.4	64.9	24.7	344	2.8	58.3	38.9
3 years old	999	5.0	65.0	29.9	181	7.1	58.6	34.4	475	5.7	69.9	24.3	272	4.0	63.3	32.7
4 years old	1,000	13.0	72.1	14.9	130	23.5	57.0	19.5	494	15.0	70.9	14.1	314	9.6	75.5	14.9
Total, age-adjusted	3,174	8.2	66.2	25.6	553	13.4	58.6	28.0	1,482	10.4	68.6	21.0	930	5.5	65.8	28.7
	Standard errors															
Children																
2 years old	1,175	1.0	2.0	2.2	242	2.9	3.8	3.8	513	1.8	3.1	2.8	344	1.1	3.9	4.2
3 years old	999	1.0	2.4	2.4	181	3.6	5.8	6.8	475	1.6	3.2	3.1	272	1.4	4.8	4.3
4 years old	1,000	1.9	2.5	1.8	130	5.5	7.1	5.9	494	2.8	3.9	2.4	314	2.8	3.3	2.7
Total, age-adjusted	3,174	0.9	1.5	1.4	553	3.1	3.8	3.6	1,482	1.5	2.2	1.9	930	1.2	2.3	2.3

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
HEI scores were not computed for children under 2 years old because dietary guidelines are not applicable to those ages.

Source: NHANES-III, 1988-94: Healthy Eating Index Data File. 'Total' column includes children with missing WIC participation or income.

Table D-32—Healthy Eating Index component scores and food pyramid servings for grains: Children 2-4 years old[1]

	Mean HEI score				Mean # food pyramid servings				Percent meeting HEI recommendations			
	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant
Children												
2 years old	8.2	7.9	7.9	› 8.6	6.3	6.2	6.1	6.7	46.9	47.6	41.8	52.0
3 years old	8.6	8.8	8.7	8.5	7.1	7.2	7.3	7.1	57.2	56.9	59.4	56.6
4 years old	6.8	7.2	6.9	6.7	5.1	5.6	5.2	5.1	19.3	25.7 *	20.1	18.0
Total, age-adjusted	7.9	8.0	7.8	8.0	6.2	6.3	6.2	6.3	41.0	43.3	40.3	42.0
	Standard errors											
Children												
2 years old	0.10	0.25	0.17	0.16	0.13	0.36	0.19	0.22	2.2	5.0	3.3	3.6
3 years old	0.10	0.18	0.16	0.16	0.16	0.31	0.29	0.25	2.5	5.8	4.2	4.1
4 years old	0.13	0.25	0.21	0.21	0.13	0.30	0.17	0.20	2.3	8.3	2.8	3.2
Total, age-adjusted	0.07	0.14	0.13	0.11	0.09	0.21	0.14	0.12	1.4	4.0	2.0	1.9

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 See Table D-30 for sample sizes.
HEI scores were not computed for children under 2 years old because dietary guidelines are not applicable to those ages.

Source: NHANES-III, 1988-94: Healthy Eating Index Data File. 'Total' column includes children with missing WIC participation or income.

Table D-33—Healthy Eating Index component scores and food pyramid servings for vegetables: Children 2-4 years old[1]

	Mean HEI score				Mean # food pyramid servings				Percent meeting HEI recommendations			
	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant
Children												
2 years old	5.4	6.0	5.5	5.2	2.0	2.2	2.0	› 1.9	21.9	29.1	21.6	› 19.0
3 years old	5.4	5.8	5.8	5.0	2.1	2.2	2.3	1.8	23.7	21.8	26.7	21.4
4 years old	4.2	3.7	4.5	4.1	1.6	1.4	1.7	1.5	10.7	6.0 *	› 12.2	11.2
Total, age-adjusted	5.0	5.1	5.3	4.8	1.9	1.9	2.0	1.7	18.7	18.9	20.2	17.2
	Standard errors											
Children												
2 years old	0.15	0.38	0.25	0.25	0.07	0.15	0.11	0.11	1.9	4.3	2.9	2.8
3 years old	0.22	0.50	0.30	0.34	0.10	0.22	0.14	0.16	2.4	4.8	3.7	3.2
4 years old	0.20	0.52	0.33	0.23	0.09	0.17	0.14	0.11	1.3	1.3	2.5	2.5
Total, age-adjusted	0.12	0.27	0.22	0.15	0.06	0.11	0.10	0.07	1.2	2.4	2.3	1.4

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 See Table D-30 for sample sizes.
HEI scores were not computed for children under 2 years old because dietary guidelines are not applicable to those ages.

Source: NHANES-III, 1988-94: Healthy Eating Index Data File. 'Total' column includes children with missing WIC participation or income.

Table D-34—Healthy Eating Index component scores and food pyramid servings for fruit: Children 2-4 years old[1]

	Mean HEI score				Mean # food pyramid servings				Percent meeting HEI recommendations			
	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant
Children												
2 years old	6.9	6.7	5.8	›› 7.8	3.0	2.9	2.4	3.6	55.2	54.3	42.9	64.4
3 years old	6.5	7.1	›› 5.6	7.2	2.7	3.2	› 2.1	3.2	49.0	57.8	› 41.6	52.6
4 years old	5.2	5.6	› 4.6	5.7	1.7	1.7	1.5	1.9	28.0	21.2 *	26.5	31.1
Total, age-adjusted	6.2	6.4	›› 5.3	6.9	2.5	2.6	› 2.0	2.9	44.0	44.3	36.9	49.3
	Standard errors											
Children												
2 years old	0.19	0.40	0.29	0.26	0.12	0.33	0.16	0.20	2.2	4.7	3.1	3.2
3 years old	0.25	0.49	0.35	0.37	0.20	0.41	0.20	0.34	3.1	5.8	4.3	4.7
4 years old	0.26	0.36	0.31	0.40	0.13	0.16	0.13	0.23	2.9	5.0	3.4	5.2
Total, age-adjusted	0.17	0.28	0.22	0.22	0.11	0.21	0.11	0.17	1.8	3.5	2.4	2.5

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 See Table D-30 for sample sizes.
HEI scores were not computed for children under 2 years old because dietary guidelines are not applicable to those ages.

Source: NHANES-III, 1988-94: Healthy Eating Index Data File. 'Total' column includes children with missing WIC participation or income.

Table D-35—Healthy Eating Index component scores and food pyramid servings for dairy: Children 2-4 years old[1]

	Mean HEI score				Mean # food pyramid servings				Percent meeting HEI recommendations			
	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant
Children												
2 years old	7.8	7.7	7.7	8.0	2.3	2.4	2.1	2.4	51.8	55.2	46.1	55.9
3 years old	7.9	7.6	7.6	› 8.3	2.4	2.3	2.3	2.5	50.3	46.8	43.5	56.1
4 years old	8.0	7.9	7.8	8.2	2.5	2.2	2.3	2.7	52.5	43.2	49.3	58.2
Total, age-adjusted	7.9	7.8	7.7	› 8.2	2.4	2.3	2.2	2.5	51.5	48.3	46.3	56.8
	Standard errors											
Children												
2 years old	0.12	0.29	0.17	0.20	0.06	0.16	0.07	0.11	1.9	4.5	3.0	3.6
3 years old	0.14	0.25	0.28	0.19	0.08	0.16	0.16	0.13	2.9	4.8	4.2	4.2
4 years old	0.11	0.24	0.22	0.20	0.10	0.19	0.09	0.21	2.1	8.4	3.8	3.6
Total, age-adjusted	0.06	0.16	0.15	0.10	0.05	0.11	0.07	0.09	1.5	3.7	2.5	2.2

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 See Table D-30 for sample sizes.
HEI scores were not computed for children under 2 years old because dietary guidelines are not applicable to those ages.

Source: NHANES-III, 1988-94: Healthy Eating Index Data File. 'Total' column includes children with missing WIC participation or income.

Table D-36—Healthy Eating Index component scores and food pyramid servings for meat: Children 2-4 years old[1]

	Mean HEI score				Mean # food pyramid servings				Percent meeting HEI recommendations			
	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant
Children												
2 years old	6.5	7.5	7.1	›››5.8	1.5	1.8	1.7	›››1.3	29.8	42.0	37.6	›››20.9
3 years old	7.0	7.7	7.3	›› 6.5	1.7	2.0	1.8	1.6	35.4	39.3	42.2	29.9
4 years old	5.5	5.8	6.1	4.9	1.3	1.4	1.4	1.1	17.0	25.7 *	22.1	10.7
Total, age-adjusted	6.3	7.0	6.8	›››5.7	1.5	1.7	1.6	›› 1.3	27.4	35.6	33.9	›› 20.4
	Standard errors											
Children												
2 years old	0.13	0.28	0.24	0.17	0.05	0.12	0.08	0.05	1.6	4.7	2.9	2.6
3 years old	0.16	0.33	0.20	0.29	0.07	0.20	0.08	0.11	2.5	5.9	3.7	4.0
4 years old	0.16	0.70	0.19	0.21	0.05	0.21	0.06	0.07	1.8	7.8	2.6	2.6
Total, age-adjusted	0.09	0.32	0.16	0.09	0.03	0.12	0.05	0.04	1.3	4.4	2.2	1.7

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 See Table D-30 for sample sizes.
HEI scores were not computed for children under 2 years old because dietary guidelines are not applicable to those ages.

Source: NHANES-III, 1988-94: Healthy Eating Index Data File. 'Total' column includes children with missing WIC participation or income.

Table D-37—Healthy Eating Index component scores for variety: Children 2-4 years old[1]

	Mean HEI score				Percent meeting HEI recommendations			
	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant
Children								
2 years old	7.5	7.3	7.1	7.9	49.8	50.2	40.9	56.0
3 years old	7.4	7.6	7.3	7.4	46.6	43.9	45.4	47.9
4 years old	7.8	7.8	7.6	8.1	53.8	55.0	50.5	57.9
Total, age-adjusted	7.6	7.6	7.3	7.8	50.1	49.8	45.6	54.0
	Standard errors							
Children								
2 years old	0.12	0.33	0.17	0.22	1.8	4.4	2.4	3.4
3 years old	0.18	0.36	0.24	0.33	2.5	5.6	3.8	4.8
4 years old	0.18	0.30	0.33	0.24	2.8	5.0	4.0	4.8
Total, age-adjusted	0.11	0.20	0.18	0.18	1.6	3.0	2.3	3.2

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
[1] See Table D-30 for sample sizes.
HEI scores were not computed for children under 2 years old because dietary guidelines are not applicable to those ages.

Source: NHANES-III, 1988-94: Healthy Eating Index Data File. 'Total' column includes children with missing WIC participation or income.

Table D-38—Healthy Eating Index component scores for total fat: Children 2-4 years old[1]

	Mean HEI score				Percent meeting HEI recommendations			
	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant
Children								
2 years old	7.0	6.5	6.4	›› 7.7	35.8	26.7	28.2	›› 45.6
3 years old	6.8	6.4	6.7	7.0	31.4	35.3	28.7	31.6
4 years old	7.2	7.1	6.8	7.6	36.8	39.7	27.5	44.9
Total, age-adjusted	7.0	6.6	6.6	› 7.4	34.7	33.9	28.1	40.8
	Standard errors							
Children								
2 years old	0.14	0.39	0.21	0.20	2.1	5.2	2.9	3.7
3 years old	0.16	0.49	0.27	0.23	2.0	6.3	2.7	3.8
4 years old	0.20	0.38	0.25	0.29	3.4	6.3	4.0	5.1
Total, age-adjusted	0.11	0.31	0.17	0.14	1.5	3.7	2.4	2.4

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
[1] See Table D-30 for sample sizes.
HEI scores were not computed for children under 2 years old because dietary guidelines are not applicable to those ages.

Source: NHANES-III, 1988-94: Healthy Eating Index Data File. 'Total' column includes children with missing WIC participation or income.

Table D-39—Healthy Eating Index component scores for saturated fat: Children 2-4 years old[1]

	Mean HEI score				Percent meeting HEI recommendations			
	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant
Children								
2 years old	5.2	4.9	4.6	5.7	26.5	27.0	19.8	32.1
3 years old	5.0	4.7	5.1	5.0	24.5	27.0	21.4	26.7
4 years old	5.4	4.9	5.0	5.7	28.5	26.6	22.0	35.5
Total, age-adjusted	5.2	4.8	4.9	5.5	26.5	26.8	21.1	31.5
	Standard errors							
Children								
2 years old	0.20	0.43	0.26	0.37	2.0	4.9	2.3	3.3
3 years old	0.20	0.56	0.30	0.33	1.6	6.0	3.0	3.2
4 years old	0.25	0.56	0.28	0.46	2.6	6.4	3.0	4.9
Total, age-adjusted	0.13	0.36	0.17	0.21	1.3	4.3	1.8	2.4

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
[1] See Table D-30 for sample sizes.
HEI scores were not computed for children under 2 years old because dietary guidelines are not applicable to those ages.

Source: NHANES-III, 1988-94: Healthy Eating Index Data File. 'Total' column includes children with missing WIC participation or income.

Table D-40—Healthy Eating Index component scores for cholesterol: Children 2-4 years old[1]

	Mean HEI score				Percent meeting HEI recommendations			
	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant
Children								
2 years old	9.1	8.5	8.8	›››9.6	85.2	77.2	81.5	›››91.2
3 years old	8.8	8.1	8.5	›› 9.2	80.9	76.7	75.2	› 86.4
4 years old	8.7	7.8	8.5	9.0	82.6	71.3	80.4	› 87.2
Total, age-adjusted	8.9	8.1	8.6	›››9.3	82.9	75.0	79.0	›››88.2
	Standard errors							
Children								
2 years old	0.09	0.23	0.16	0.10	1.4	2.7	2.2	2.1
3 years old	0.14	0.34	0.30	0.18	1.9	3.5	3.8	3.1
4 years old	0.17	0.70	0.19	0.24	2.0	7.7	2.3	2.9
Total, age-adjusted	0.09	0.32	0.14	0.12	1.2	3.3	1.8	1.7

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

[1] See Table D-30 for sample sizes.
HEI scores were not computed for children under 2 years old because dietary guidelines are not applicable to those ages.

Source: NHANES-III, 1988-94: Healthy Eating Index Data File. 'Total' column includes children with missing WIC participation or income.

Table D-41—Healthy Eating Index component scores for sodium: Children 2-4 years old[1]

	Mean HEI score				Percent meeting HEI recommendations			
	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant	Total persons	Currently Receiving WIC	Income eligible non-participant	Higher income non-participant
Children								
2 years old	9.0	8.6	8.7	› 9.2	69.8	65.2	62.7	75.2
3 years old	8.4	8.0	8.2	8.6	60.1	51.5	55.3	› 65.0
4 years old	8.1	8.1	7.7	8.2	54.0	55.1	48.0	55.6
Total, age-adjusted	8.5	8.2	8.2	8.7	61.2	57.2	55.3	65.2
	Standard errors							
Children								
2 years old	0.09	0.27	0.15	0.13	1.4	4.5	3.0	2.2
3 years old	0.16	0.27	0.29	0.24	2.6	5.7	3.8	3.9
4 years old	0.18	0.59	0.26	0.20	2.8	9.5	4.8	3.8
Total, age-adjusted	0.09	0.22	0.15	0.10	1.4	4.5	2.5	2.0

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
[1] See Table D-30 for sample sizes.
HEI scores were not computed for children under 2 years old because dietary guidelines are not applicable to those ages.

Source: NHANES-III, 1988-94: Healthy Eating Index Data File. 'Total' column includes children with missing WIC participation or income.

Table D-42—Mean percent of usual energy intake from total fat: Children 2-4 years old

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard error	Sample size	Mean	Standard error	Sample size	Mean	Standard error	Sample size	Mean	Standard error
Children												
2 years old	1,175	32.8	0.24	242	33.7	0.56	513	34.0	0.41	344	›››31.3	0.34
3 years old	999	33.1	0.23	181	34.3	0.80	475	33.8	0.31	272	› 32.4	0.38
4 years old	1,000	32.5	0.28	130	33.2	0.54	494	33.6	0.41	314	›› 31.3	0.38
Total, age-adjusted ...	3,174	32.8	0.17	553	33.6	0.41	1,482	33.8	0.28	930	›››31.7	0.20

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-43—Percent of 2-4-year-old children meeting Dietary Guidelines recommendation for usual intake of total fat[1]

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error
Children												
2 years old	1,175	26.0	1.88	242	19.8	3.87	513	17.2	2.59	344	›››37.4	3.10
3 years old	999	21.8	1.69	181	17.5	4.32	475	13.7	1.90	272	27.3	3.12
4 years old	1,000	23.8	2.71	130	14.3	4.16	494	15.0	2.97	314	›››35.4	4.27
Total, age-adjusted ...	3,174	23.9	1.24	553	17.2	2.38	1,482	15.3	1.46	930	›››33.4	2.05

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
[1] Recommended intake of total fat is less than or equal to 30 percent of total calories.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-44—Distribution of usual intake of total fat as a percent of usual energy intake: Children 2-4 years old

	Percentiles									Standard errors of percentiles								
	5th	10th	15th	25th	50th	75th	85th	90th	95th	5th	10th	15th	25th	50th	75th	85th	90th	95th
Total Children																		
2 years old	25.6	27.2	28.3	29.9	32.8	35.7	37.2	38.2	39.8	0.32	0.29	0.27	0.26	0.24	0.23	0.24	0.24	0.26
3 years old	26.2	27.8	28.9	30.4	33.2	35.9	37.3	38.2	39.6	0.29	0.26	0.25	0.24	0.23	0.24	0.24	0.25	0.26
4 years old	26.7	28.0	28.9	30.1	32.5	34.9	36.2	37.0	38.3	0.30	0.30	0.31	0.30	0.29	0.28	0.28	0.28	0.27
Total, age-adjusted ...	26.2	27.7	28.7	30.1	32.8	35.5	36.9	37.8	39.2	0.20	0.18	0.18	0.17	0.17	0.17	0.17	0.17	0.17
Receiving WIC Benefits																		
2 years old	26.1	27.9	29.1	30.8	33.9	36.8	38.3	39.2	40.6	0.74	0.71	0.69	0.65	0.57	0.51	0.49	0.49	0.48
3 years old	27.0	28.5	29.5	31.2	34.4	37.5	38.9	39.9	41.3	0.83	0.79	0.79	0.80	0.83	0.90	1.04	1.18	1.50
4 years old	28.5	29.4	30.1	31.1	33.1	35.2	36.4	37.2	38.4	0.49	0.51	0.52	0.53	0.56	0.58	0.60	0.61	0.65
Total, age-adjusted ...	27.0	28.4	29.4	30.8	33.6	36.4	37.9	38.8	40.2	0.43	0.44	0.44	0.45	0.44	0.40	0.38	0.37	0.37
Income-eligible Nonparticipant																		
2 years old	26.7	28.5	29.6	31.2	34.1	37.0	38.5	39.5	41.0	0.59	0.52	0.48	0.43	0.38	0.38	0.39	0.41	0.44
3 years old	28.0	29.3	30.2	31.5	33.8	36.2	37.4	38.3	39.5	0.35	0.32	0.31	0.30	0.31	0.34	0.36	0.37	0.40
4 years old	27.7	29.1	30.0	31.3	33.7	36.0	37.2	38.0	39.2	0.51	0.49	0.47	0.45	0.42	0.39	0.38	0.37	0.36
Total, age-adjusted ...	27.5	29.0	30.0	31.4	33.9	36.4	37.7	38.6	39.9	0.36	0.33	0.32	0.30	0.28	0.28	0.28	0.28	0.28
Higher-income Nonparticipant																		
2 years old	24.8	26.2	27.2	› 28.6	››› 31.3	››› 34.0	››› 35.5	››› 36.5	››› 38.0	0.41	0.36	0.35	0.33	0.33	0.35	0.36	0.37	0.40
3 years old	25.1	26.9	28.0	29.7	32.6	35.4	36.8	37.7	39.1	0.48	0.46	0.45	0.43	0.39	0.36	0.36	0.36	0.38
4 years old	››› 25.8	›› 27.0	›› 27.8	› 29.0	31.3	33.6	34.9	35.8	37.1	0.39	0.38	0.38	0.38	0.39	0.42	0.43	0.44	0.46
Total, age-adjusted ...	›› 25.2	›› 26.6	›› 27.6	›› 29.1	›› 31.7	››› 34.4	››› 35.8	››› 36.7	››› 38.1	0.21	0.20	0.20	0.20	0.21	0.22	0.22	0.23	0.25

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
The Bonferroni adjustment was used to adjust levels of significant and control for multiplicity in the number of tests.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-45—Mean percent of usual energy intake from saturated fat: Children 2-4 years old

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard error	Sample size	Mean	Standard error	Sample size	Mean	Standard error	Sample size	Mean	Standard error
Children												
2 years old	1,175	12.6	0.13	242	12.9	0.30	513	13.1	0.18	344	› 12.0	0.20
3 years old	999	12.5	0.12	181	12.9	0.38	475	12.5	0.15	272	12.3	0.18
4 years old	1,000	12.3	0.14	130	12.9	0.31	494	12.7	0.16	314	›› 11.8	0.24
Total, age-adjusted ...	3,174	12.5	0.08	553	12.9	0.21	1,482	12.8	0.11	930	›››12.1	0.11

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-46—Percent of 2-4-year-old children meeting Dietary Guidelines recommendation for usual intake of saturated fat[1]

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error
Children												
2 years old	1,175	13.6	1.21	242	8.5	2.24	513	8.7	1.55	344	›››20.6	2.31
3 years old	999	11.4	1.13	181	8.2	2.71	475	7.9	1.16	272	› 14.8	1.91
4 years old	1,000	9.1	1.48	130	2.4	1.31	494	4.2	0.96	314	›››15.5	3.40
Total, age-adjusted ...	3,174	11.3	0.74	553	6.4	1.25	1,482	6.9	0.72	930	›››17.0	1.52

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
[1] Recommended intake of saturated fat is less than 10 percent of total calories.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-47—Distribution of usual intake of saturated fat as a percent of usual energy intake: Children 2-4 years old

	Percentiles									Standard errors of percentiles								
	5th	10th	15th	25th	50th	75th	85th	90th	95th	5th	10th	15th	25th	50th	75th	85th	90th	95th
Total Children																		
2 years old	8.8	9.6	10.1	10.9	12.5	14.1	15.0	15.6	16.5	0.13	0.13	0.12	0.12	0.13	0.14	0.15	0.16	0.17
3 years old	9.1	9.8	10.4	11.1	12.5	13.9	14.7	15.2	15.9	0.13	0.12	0.12	0.12	0.12	0.13	0.14	0.14	0.15
4 years old	9.5	10.1	10.5	11.1	12.2	13.4	14.1	14.5	15.2	0.14	0.14	0.14	0.14	0.14	0.14	0.15	0.15	0.15
Total, age-adjusted ...	9.2	9.9	10.4	11.1	12.4	13.8	14.6	15.1	15.9	0.08	0.08	0.08	0.07	0.07	0.08	0.08	0.08	0.09
Receiving WIC Benefits																		
2 years old	9.5	10.2	10.7	11.4	12.8	14.3	15.1	15.6	16.5	0.26	0.27	0.28	0.29	0.31	0.34	0.34	0.35	0.34
3 years old	9.5	10.2	10.7	11.4	12.8	14.3	15.1	15.6	16.4	0.38	0.36	0.36	0.35	0.37	0.43	0.49	0.56	0.68
4 years old	10.4	10.9	11.3	11.8	12.8	13.9	14.4	14.8	15.4	0.30	0.32	0.33	0.34	0.33	0.31	0.31	0.31	0.32
Total, age-adjusted ...	9.8	10.5	10.9	11.6	12.9	14.2	14.9	15.4	16.1	0.21	0.22	0.22	0.22	0.22	0.22	0.22	0.23	0.24
Income-eligible Nonparticipant																		
2 years old	9.4	10.2	10.7	11.5	13.1	14.7	15.5	16.1	17.0	0.24	0.21	0.20	0.18	0.17	0.19	0.21	0.23	0.25
3 years old	9.6	10.2	10.7	11.3	12.5	13.7	14.4	14.9	15.6	0.15	0.14	0.14	0.14	0.15	0.17	0.18	0.20	0.22
4 years old	10.1	10.7	11.0	11.6	12.6	13.7	14.3	14.7	15.3	0.15	0.15	0.15	0.15	0.17	0.18	0.19	0.19	0.20
Total, age-adjusted ...	9.7	10.4	10.8	11.5	12.7	14.0	14.7	15.2	16.0	0.13	0.12	0.11	0.11	0.10	0.11	0.12	0.12	0.13
Higher-income Nonparticipant																		
2 years old	›››8.2	›› 9.0	›› 9.5	› 10.3	11.9	13.6	14.5	15.2	16.2	0.20	0.19	0.19	0.19	0.21	0.23	0.24	0.24	0.26
3 years old	8.6	9.4	10.0	10.9	12.4	13.9	14.7	15.2	16.0	0.22	0.20	0.20	0.19	0.19	0.19	0.19	0.19	0.19
4 years old	›››9.0	›› 9.6	›› 10.0	› 10.6	11.8	13.0	13.7	14.1	14.8	0.21	0.22	0.22	0.23	0.25	0.25	0.25	0.25	0.25
Total, age-adjusted ...	›››8.6	›››9.3	›››9.9	›››10.6	›› 12.0	› 13.5	14.3	14.8	15.6	0.12	0.11	0.11	0.11	0.11	0.12	0.13	0.13	0.13

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
The Bonferroni adjustment was used to adjust levels of significant and control for multiplicity in the number of tests.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-48—Mean usual intake of cholesterol in milligrams: Children 2-4 years old

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard error	Sample size	Mean	Standard error	Sample size	Mean	Standard error	Sample size	Mean	Standard error
Children												
2 years old	1,175	176	3.7	242	221	7.0	513	›› 195	5.9	344	›››145	4.2
3 years old	999	196	4.2	181	228	11.7	475	216	5.5	272	›››171	6.1
4 years old	1,000	202	5.4	130	240	17.3	494	214	7.6	314	›› 183	8.1
Total, age-adjusted ...	3,174	191	2.9	553	231	8.1	1,482	› 208	4.6	930	›››166	4.1

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-49—Percent of 2-4-year-old children meeting Dietary Guidelines recommendation for usual intake of cholesterol[1]

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error
Children												
2 years old	1,175	95.1	0.7	242	85.4	2.3	513	›› 92.8	1.5	344	99.2	0.3
3 years old	999	90.3	1.1	181	82.4	4.0	475	83.9	1.9	272	›››97.0	0.9
4 years old	1,000	89.0	1.5	130	79.6	7.2	494	87.4	2.3	314	92.4	1.8
Total, age-adjusted ...	3,174	91.4	0.6	553	82.4	2.9	1,482	88.0	1.1	930	›››96.2	0.7

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
[1] National Research Council's Diet and Health recommendation for intake of cholesterol is less than or equal to 300 milligrams.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-50—Distribution of usual intake of cholesterol in milligrams: Children 2-4 years old

	Percentiles									Standard errors of percentiles								
	5th	10th	15th	25th	50th	75th	85th	90th	95th	5th	10th	15th	25th	50th	75th	85th	90th	95th
Total Children																		
2 years old	87	101	111	128	165	212	242	264	299	2.09	2.21	2.35	2.67	3.72	4.62	5.14	5.64	6.54
3 years old	95	110	121	140	184	239	274	298	337	2.60	2.80	2.98	3.35	4.30	5.32	5.88	6.25	6.84
4 years old	98	114	126	145	189	244	279	306	350	3.02	3.27	3.48	3.85	4.92	6.97	8.29	9.21	10.60
Total, age-adjusted ...	93	108	120	138	179	231	265	290	330	1.48	1.61	1.74	2.02	2.77	3.70	4.33	4.83	5.65
Receiving WIC Benefits																		
2 years old	117	133	145	166	211	265	299	322	360	4.58	4.99	5.31	5.78	6.76	8.49	9.91	11.10	13.20
3 years old	118	135	148	169	216	275	311	338	380	7.01	7.95	8.54	9.45	11.50	14.30	16.20	17.50	19.60
4 years old	134	151	164	185	230	286	320	345	382	8.58	9.77	10.80	12.70	17.30	22.50	24.80	26.20	27.40
Total, age-adjusted ...	121	139	152	173	220	278	313	338	378	4.08	4.74	5.22	6.02	7.91	10.30	11.70	12.60	13.80
Income-eligible Nonparticipant																		
2 years old	103	118	129	146	› 185	› 233	› 262	283	318	3.56	3.87	4.11	4.55	5.59	7.22	8.34	9.19	10.60
3 years old	100	117	131	153	205	268	305	330	370	2.83	3.18	3.53	4.21	5.89	7.33	8.03	8.51	9.40
4 years old	110	127	140	160	204	257	290	314	353	4.87	5.35	5.69	6.11	7.09	8.89	10.30	11.30	13.00
Total, age-adjusted ...	›› 103	›› 120	›› 132	› 152	197	252	286	311	351	2.54	2.85	3.12	3.61	4.68	5.68	6.25	6.69	7.42
Higher-income Nonparticipant																		
2 years old	››› 75	››› 86	››› 95	››› 108	››› 138	››› 174	››› 196	››› 212	››› 238	2.99	3.07	3.13	3.27	3.92	5.26	6.19	6.91	8.13
3 years old	›› 91	›› 104	›› 113	›› 129	››› 163	››› 204	››› 230	››› 249	››› 279	3.98	4.22	4.43	4.87	6.16	7.79	8.72	9.36	10.30
4 years old	››› 88	››› 102	››› 113	››› 130	›› 168	220	254	282	329	3.84	4.12	4.46	5.22	7.37	10.60	13.00	15.00	18.90
Total, age-adjusted ...	››› 84	››› 97	››› 107	››› 122	››› 156	››› 200	››› 228	››› 249	››› 283	1.73	1.89	2.04	2.39	3.52	5.39	6.73	7.79	9.60

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
The Bonferroni adjustment was used to adjust levels of significant and control for multiplicity in the number of tests.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-51—Mean usual intake of sodium in milligrams: Children 2-4 years old

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard error	Sample size	Mean	Standard error	Sample size	Mean	Standard error	Sample size	Mean	Standard error
Children												
2 years old	1,175	2,147	21.8	242	2,334	79.2	513	2,197	43.7	344	›› 2,068	40.1
3 years old	999	2,373	37.0	181	2,644	65.8	475	› 2,453	53.9	272	››› 2,265	52.3
4 years old	1,000	2,567	45.3	130	2,596	121.3	494	2,720	69.1	314	2,501	56.4
Total, age-adjusted ...	3,174	2,362	20.7	553	2,513	56.4	1,482	2,460	37.3	930	››› 2,277	24.0

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-52—Percent of 2-4-year-old children meeting Dietary Guidelines recommendation for usual intake of sodium[1]

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error
Children												
2 years old	1,175	70.2	1.4	242	59.7	5.0	513	64.5	2.6	344	›› 76.8	2.6
3 years old	999	55.8	2.4	181	42.3	3.4	475	50.1	3.4	272	››› 62.9	3.7
4 years old	1,000	43.9	2.8	130	40.8	8.6	494	35.0	3.9	314	47.4	3.8
Total, age-adjusted ...	3,174	56.6	1.3	553	47.5	3.5	1,482	49.8	1.9	930	››› 62.3	2.0

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
[1] National Research Council's Diet and Health recommendation for intake of sodium is less than or equal to 2400 milligrams.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-53—Distribution of usual sodium intake in milligrams: Children 2-4 years old

	Percentiles									Standard errors of percentiles								
	5th	10th	15th	25th	50th	75th	85th	90th	95th	5th	10th	15th	25th	50th	75th	85th	90th	95th
Total Children																		
2 years old	1,299	1,450	1,559	1,733	2,089	2,491	2,732	2,910	3,199	17.00	16.40	16.50	17.30	20.40	27.00	33.10	38.40	48.40
3 years old	1,472	1,637	1,754	1,936	2,311	2,745	3,006	3,194	3,488	27.90	28.00	28.60	30.40	35.70	42.80	49.10	54.60	64.60
4 years old	1,640	1,808	1,926	2,110	2,493	2,945	3,222	3,425	3,749	32.60	33.60	34.60	37.10	45.30	54.40	59.70	64.10	72.10
Total, age-adjusted ...	1,444	1,611	1,728	1,911	2,289	2,733	3,005	3,206	3,529	15.30	15.40	15.70	16.50	19.40	24.70	28.90	32.50	39.20
Receiving WIC Benefits																		
2 years old	1,453	1,606	1,715	1,888	2,251	2,687	2,961	3,164	3,497	52.50	54.10	55.00	58.20	73.50	98.40	118.00	134.00	163.00
3 years old	1,687	1,841	1,951	2,127	2,525	3,032	3,355	3,598	4,001	44.60	43.50	43.50	46.00	58.30	79.40	105.00	130.00	182.00
4 years old	1,874	1,989	2,073	2,209	2,515	2,902	3,144	3,319	3,594	54.10	64.80	73.20	87.30	118.00	154.00	175.00	189.00	210.00
Total, age-adjusted ...	1,614	1,766	1,874	2,044	2,412	2,874	3,171	3,393	3,755	26.50	28.70	31.50	37.60	53.00	71.50	86.10	98.70	123.00
Income-eligible Nonparticipant																		
2 years old	›››1,183	›› 1,370	› 1,505	1,715	2,144	2,621	2,896	3,091	3,391	37.50	37.00	37.50	39.30	44.50	52.40	58.20	62.70	70.80
3 years old	1,520	1,694	1,817	2,007	2,398	2,844	3,105	3,290	3,573	45.90	44.30	44.30	45.50	51.60	65.60	75.50	82.50	92.30
4 years old	1,701	1,888	2,020	2,226	2,647	3,132	3,426	3,642	3,988	64.60	63.70	63.70	64.70	68.70	77.00	84.00	89.80	99.60
Total, age-adjusted ...	›› 1,453	› 1,638	1,769	1,972	2,390	2,873	3,164	3,374	3,708	33.40	33.00	32.90	33.30	36.50	43.20	48.00	51.80	57.90
Higher-income Nonparticipant																		
2 years old	1,334	1,464	1,557	› 1,704	› 2,011	› 2,366	› 2,583	› 2,742	2,998	25.90	26.20	27.10	29.90	38.70	46.60	55.30	64.20	82.50
3 years old	›››1,425	›››1,584	›››1,695	›››1,867	›››2,214	›››2,607	›››2,842	›› 3,011	›› 3,280	39.40	39.90	40.70	42.70	50.40	64.20	74.20	81.90	94.70
4 years old	›› 1,605	1,772	1,889	2,070	2,437	2,861	3,119	3,310	3,617	44.40	44.30	45.40	47.90	55.00	66.20	75.10	82.70	97.10
Total, age-adjusted ...	›››1,427	›››1,582	›››1,691	›››1,861	›› 2,211	›› 2,621	› 2,871	› 3,056	› 3,352	17.60	17.90	18.60	20.00	23.80	29.60	34.50	39.40	49.30

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
The Bonferroni adjustment was used to adjust levels of significant and control for multiplicity in the number of tests.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-54—Percent of 2-4-year-old children using table salt

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Ordinary salt	Sample size	Percent	Ordinary salt	Sample size	Percent	Ordinary salt	Sample size	Percent	Ordinary salt
Children												
2 years old	1,159	23.9	2.2	238	37.1	5.0	503	› 25.9	3.1	342	›› 19.0	3.0
3 years old	989	28.8	2.7	180	27.2	5.6	469	31.5	3.6	269	28.9	4.6
4 years old	988	29.5	2.7	128	26.0	5.8	486	29.1	3.9	313	31.1	3.9
Total, age-adjusted	3,136	27.4	1.6	546	30.1	3.6	1,458	28.8	2.4	924	26.4	2.5

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Exam file, 24-hour dietary recall. 'Total' column includes children with missing WIC participation or income.

Table D-55—Mean usual intake of dietary fiber in grams: Children 2-4 years old

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard error	Sample size	Mean	Standard error	Sample size	Mean	Standard error	Sample size	Mean	Standard error
Children												
2 years old	1,175	10.0	0.14	242	10.5	0.40	513	› 9.6	0.18	344	10.5	0.23
3 years old	999	10.2	0.20	181	10.9	0.61	475	10.2	0.35	272	9.9	0.22
4 years old	1,000	11.2	0.23	130	10.3	0.45	494	›› 12.0	0.31	314	10.8	0.34
Total, age-adjusted ...	3,174	10.5	0.11	553	10.6	0.32	1,482	10.6	0.19	930	10.4	0.16

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-56—Percent of 2-4-year-old children with usual intake of dietary fiber at or above reference standard[1]

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error
Children												
2 years old	1,175	81.1	1.12	242	83.6	2.82	513	› 76.0	1.56	344	86.5	1.59
3 years old	999	76.2	1.83	181	79.4	3.77	475	78.9	3.39	272	76.2	2.65
4 years old	1,000	72.9	2.26	130	65.2	6.79	494	› 80.1	2.67	314	70.1	3.43
Total, age-adjusted ...	3,174	76.7	1.04	553	76.0	2.77	1,482	78.4	1.53	930	77.6	1.55

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
[1] Recommended fiber intake (in gm) is equivalent to age in years plus five

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-57—Distribution of usual dietary fiber intake in grams: Children 2-4 years old

	Std[1] (g/dy)	Percentiles									Standard errors of percentiles								
		5th	10th	15th	25th	50th	75th	85th	90th	95th	5th	10th	15th	25th	50th	75th	85th	90th	95th
Total Children																			
1 year old	6.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2 years old	7.0	5.2	6.0	6.6	7.6	9.6	12.0	13.5	14.6	16.4	0.09	0.10	0.11	0.12	0.15	0.18	0.20	0.21	0.24
3 years old	8.0	6.0	6.7	7.3	8.1	9.9	11.9	13.1	13.9	15.3	0.14	0.13	0.13	0.14	0.18	0.26	0.30	0.33	0.40
4 years old	9.0	6.2	7.1	7.8	8.8	10.9	13.2	14.5	15.6	17.1	0.17	0.18	0.19	0.20	0.23	0.28	0.31	0.33	0.36
Total, age-adjusted ...	na	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Receiving WIC Benefits																			
1 year old	6.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2 years old	7.0	5.3	6.2	6.8	7.9	10.1	12.8	14.4	15.5	17.2	0.29	0.30	0.31	0.33	0.40	0.51	0.57	0.60	0.64
3 years old	8.0	6.1	6.9	7.5	8.4	10.4	12.9	14.4	15.5	17.4	0.29	0.30	0.32	0.36	0.53	0.79	1.00	1.19	1.56
4 years old	9.0	6.2	6.9	7.5	8.3	10.0	12.0	13.2	14.1	15.5	0.42	0.44	0.45	0.46	0.46	0.50	0.54	0.58	0.65
Total, age-adjusted ...	na	5.7	6.6	7.2	8.1	10.2	12.5	14.0	15.1	16.8	0.20	0.22	0.22	0.24	0.30	0.41	0.49	0.56	0.68
Income-eligible Nonparticipant																			
1 year old	6.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2 years old	7.0	4.8	5.6	6.2	7.1	9.1	11.5	13.1	14.2	16.1	0.14	0.14	0.14	0.14	0.16	0.24	0.29	0.34	0.41
3 years old	8.0	6.2	7.0	7.5	8.3	10.0	11.8	12.9	13.6	14.8	0.22	0.22	0.23	0.26	0.35	0.44	0.50	0.55	0.63
4 years old	9.0	6.9	7.8	8.5	9.5	› 11.7	›› 14.2	›› 15.6	›› 16.7	›› 18.3	0.28	0.28	0.28	0.29	0.32	0.35	0.38	0.40	0.42
Total, age-adjusted ...	na	5.9	6.7	7.3	8.3	10.3	12.6	14.0	15.0	16.6	0.15	0.14	0.15	0.15	0.19	0.24	0.27	0.30	0.34
Higher-income Nonparticipant																			
1 year old	6.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2 years old	7.0	5.8	6.6	7.2	8.1	10.1	12.4	13.8	14.8	16.4	0.18	0.18	0.19	0.20	0.23	0.28	0.31	0.33	0.38
3 years old	8.0	6.0	6.8	7.3	8.1	9.7	11.5	12.6	13.4	14.6	0.21	0.20	0.19	0.19	0.21	0.25	0.28	0.30	0.36
4 years old	9.0	6.1	7.0	7.6	8.6	10.6	12.9	14.1	15.0	16.4	0.24	0.26	0.27	0.29	0.34	0.41	0.45	0.48	0.50
Total, age-adjusted ...	na	5.9	6.7	7.3	8.2	10.2	12.3	13.6	14.5	16.0	0.12	0.13	0.14	0.15	0.16	0.19	0.21	0.23	0.26

Notes: Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
The Bonferroni adjustment was used to adjust levels of significant and control for multiplicity in the number of tests.
1 Recommended fiber intake (in gm) is equivalent to age in years plus five
– Estimate of usual intake could not be obtained for the age group cell. The cell was pooled with a neighboring age group to determine its contribution to the 'Total, age-adjusted' row.
na Fiber standard is specific to year of age and is not shown for the pooled age group.

Source: NHANES-III, 1988-94 Exam file, 24-hour dietary recall. Data reflect nutrient intake from foods. Does not include the contribution of vitamin and mineral supplements. Usual intake was estimated *using C-SIDE: Software for Intake Distribution Estimation,* accounting for within-person variance as estimated from the *Continuing Survey of Food Intakes by Individuals (CSFII).*
'Total' column includes children with missing WIC participation or income.

Table D-58—Percent of infants and children ever breastfed

	Total Infants and Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Number	Percent	Standard Error	Number	Percent	Standard Error	Number	Percent	Standard Error	Number	Percent	Standard Error
Infants	1,961	55.4	2.3	787	38.8	2.8	348	››› 51.4	2.5	731	››› 70.6	2.4
Children												
1 year old	1,256	54.3	2.4	419	37.4	3.7	391	› 47.5	3.4	355	››› 68.2	2.6
2 years old	1,268	53.3	1.8	253	41.4	4.8	545	44.2	2.6	386	››› 63.8	2.6
3 years old	1,114	54.2	2.8	200	40.4	5.7	509	44.2	4.2	325	››› 69.0	2.9
4 years old	1,096	53.6	1.9	136	45.2	8.8	546	41.8	3.9	342	› 65.3	3.3
All children	4,734	53.9	1.4	1,008	41.1	3.3	1,991	44.4	2.2	1,408	››› 66.6	1.6
Total, age-adjusted	6,695	54.2	1.5	1,795	40.6	2.9	2,339	45.8	2.0	2,139	››› 67.4	1.6

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-59—Percent of infants and children breastfed for at least 6 months, among those ever breastfed: Ages 7 months and older

	Total Infants and Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Number	Percent	Standard Error	Number	Percent	Standard Error	Number	Percent	Standard Error	Number	Percent	Standard Error
Infants	512	38.5	3.2	141	31.3	5.6	97	38.7	5.0	246	› 42.4	4.0
Children												
1 year old	578	41.3	3.2	152	31.4	6.1	157	34.4	6.3	224	› 46.8	4.5
2 years old	594	39.6	2.5	95	39.1	6.8	214	31.8	4.4	239	44.1	3.1
3 years old	494	46.0	3.0	69	57.9	8.7	192	48.5	5.8	201	43.4	3.9
4 years old	492	41.4	3.8	48	30.1 *	7.4	212	41.6	5.6	200	42.7	4.7
All children	2,158	42.1	1.9	364	39.6	4.1	775	39.1	3.0	864	44.2	2.7
Total, age-adjusted	2,670	41.4	1.8	505	37.9	3.6	872	39.0	2.6	1,110	43.9	2.5

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-60—Percent of children breastfed for at least one year, among those ever breastfed

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Number	Percent	Standard Error	Number	Percent	Standard Error	Number	Percent	Standard Error	Number	Percent	Standard Error
Children												
1 year old	578	13.7	2.2	152	14.0	4.6	157	7.9 *	3.2	224	16.7	3.6
2 years old	594	17.5	1.9	95	21.2	5.0	214	14.2	3.2	239	18.5	2.8
3 years old	494	16.5	3.0	69	26.8 *	9.9	192	16.5	3.9	201	15.0	4.4
4 years old	492	16.2	2.1	48	2.6 *	1.9	212	›››17.6	4.0	200	›››17.2	3.0
Total, age-adjusted	2,158	16.0	1.4	364	16.1	3.0	775	14.0	1.8	864	16.8	2.2

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-61—Mean duration of breastfeeding among children ever breastfed[1]

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Number Breastfed	Mean Duration (weeks)	Standard Error	Number Breastfed	Mean Duration (weeks)	Standard Error	Number Breastfed	Mean Duration (weeks)	Standard Error	Number Breastfed	Mean Duration (weeks)	Standard Error
Children												
1 year old	578	22.9	1.4	152	20.9	2.4	157	18.3	2.1	224	25.4	2.1
2 years old	592	25.7	1.3	94	25.6	3.4	213	21.7	2.2	239	28.0	1.9
3 years old	489	29.1	2.1	68	33.3 *	6.1	190	28.8	3.6	199	28.8	2.8
4 years old	487	25.8	1.9	47	17.3 *	2.9	209	25.2	2.5	199	›› 26.7	2.6
Total, age-adjusted	2,146	25.9	1.0	361	24.2	2.3	769	23.5	1.3	861	27.2	1.6

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 Mean duration of breastfeeding is not shown for infants under 1 year old because estimates are biased by the large percent still breastfeeding.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-62—Percent of breastfed infants and children who were never fed formula

	Total Infants and Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Number Breastfed	Percent	Standard Error	Number Breastfed	Percent	Standard Error	Number Breastfed	Percent	Standard Error	Number Breastfed	Percent	Standard Error
Infants	1,015	18.6	1.7	294	9.3	1.9	174	›› 19.0	2.8	491	››› 22.0	2.4
Children												
1 year old	575	14.4	1.9	151	9.7 *	3.5	157	10.0 *	3.4	222	18.3	3.5
2 years old	591	16.3	2.0	93	13.3 *	3.6	213	14.4	2.9	239	17.6	3.0
3 years old	490	20.7	3.0	69	29.6 *	9.6	189	21.1	6.0	200	19.3	4.0
4 years old	483	15.0	2.2	47	2.1 *	1.8	209	› 16.4	4.6	197	››› 15.1	2.9
All children	2,139	16.6	1.2	360	13.6	2.6	768	15.5	1.8	858	17.6	1.9
Total, age-adjusted	3,154	17.0	1.0	654	12.8	2.3	942	16.2	1.6	1,349	› 18.4	1.6

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-63—Mean age when first fed formula on a daily basis, among breastfed infants and children

	Total Infants and Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Number Fed Formula	Mean Age (weeks)	Standard Error	Number Fed Formula	Mean Age (weeks)	Standard Error	Number Fed Formula	Mean Age (weeks)	Standard Error	Number Fed Formula	Mean Age (weeks)	Standard Error
Infants	844	7.9	0.4	264	6.6	0.7	143	6.5	0.8	394	›› 9.1	0.5
Children												
1 year old	502	12.3	0.8	134	10.8	1.7	139	11.8	1.4	189	12.9	1.2
2 years old	498	13.2	0.9	81	12.7	2.3	179	9.4	1.0	200	15.3	1.2
3 years old	402	13.3	0.9	55	12.1	1.9	156	12.6	1.3	166	14.0	1.2
4 years old	409	12.5	1.2	45	11.3 *	1.8	177	13.0	2.7	163	12.4	1.4
All children	1,811	12.8	0.5	315	11.7	0.9	651	11.7	0.8	718	13.6	0.7
Total, age-adjusted	2,655	11.8	0.4	579	10.7	0.8	794	10.7	0.7	1,112	› 12.7	0.6

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-64—Percent of infants and children fed cow's milk on a daily basis before 12 months of age

	Total Infants and Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Number	Percent	Standard Error	Number	Percent	Standard Error	Number	Percent	Standard Error	Number	Percent	Standard Error
Infants	1,961	17.1	0.9	787	11.4	1.2	348	›››26.8	2.8	731	›››17.5	1.2
Children												
1 year old	1,258	45.9	2.2	419	32.4	3.1	391	›››54.1	3.4	357	›› 48.7	4.1
2 years old	1,269	38.6	2.0	253	31.4	4.1	545	› 43.7	2.7	387	37.7	3.5
3 years old	1,119	40.1	2.6	201	26.5	6.2	513	›› 42.6	4.8	325	40.4	3.4
4 years old	1,098	38.8	3.1	137	33.6	9.0	547	43.3	3.5	342	36.9	3.7
All children	4,744	40.9	1.4	1,010	31.0	2.6	1,996	›››45.9	2.1	1,411	›› 40.9	2.4
Total, age-adjusted	6,705	36.1	1.2	1,797	27.0	2.1	2,344	›››42.1	1.8	2,142	›› 36.2	2.0

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-65—Mean age when first fed cow's milk on a daily basis: Ages 7 months and older[1,2]

	Total Infants and Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Number Drinking Milk	Mean Age (weeks)	Standard Error	Number Drinking Milk	Mean Age (weeks)	Standard Error	Number Drinking Milk	Mean Age (weeks)	Standard Error	Number Drinking Milk	Mean Age (weeks)	Standard Error
Infants	353	32.1	0.6	95	32.5	1.4	100	30.2	1.1	134	33.0	1.0
Children												
1 year old	1,188	46.0	0.4	392	47.8	0.6	370	›››44.2	0.8	335	46.5	0.7
2 years old	1,225	48.2	0.6	246	49.5	1.5	532	46.2	0.9	368	49.5	1.1
3 years old	1,089	48.2	0.9	194	48.9	1.4	502	48.2	1.6	314	48.7	1.3
4 years old	1,057	49.2	1.2	131	50.0	4.2	529	47.9	1.0	330	49.8	1.7
All children	4,559	47.9	0.5	963	49.0	1.3	1,933	46.6	0.6	1,347	48.6	0.8
Total, age-adjusted	4,912	44.7	0.4	1,058	45.7	1.0	2,033	› 43.3	0.5	1,481	45.5	0.7

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 Estimates of mean age for infants under 1 year old may be biased by the large percent of infants not yet drinking cow's milk.
2 Table excludes infants not reported to have been fed cow's milk on a daily.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-66—Percent of infants and children who ever used a baby bottle

	Total Infants and Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Number	Percent	Standard Error	Number	Percent	Standard Error	Number	Percent	Standard Error	Number	Percent	Standard Error
Infants	1,961	95.9	0.6	787	98.8 *	0.4	348	›› 93.1	1.9	731	››› 94.8	0.9
Children												
1 year old	1,258	96.6	0.8	419	99.1 *	0.5	391	98.5 *	0.8	357	› 93.7	1.9
2 years old	1,269	96.4	0.6	253	96.6 *	1.7	545	97.1 *	0.7	387	95.6 *	1.2
3 years old	1,117	94.7	1.5	201	91.9 *	4.6	511	94.8	1.7	325	95.1 *	1.9
4 years old	1,098	96.4	0.8	137	94.6 *	4.5	547	96.8 *	1.1	342	96.2 *	1.0
All children	4,742	96.0	0.5	1,010	95.6	1.5	1,994	96.8	0.6	1,411	95.1	1.0
Total, age-adjusted	6,703	96.0	0.5	1,797	96.2	1.2	2,342	96.1	0.6	2,142	95.1	0.9

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-67—Percent of infants and children still using a baby bottle

	Total Infants and Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Number	Percent	Standard Error	Number	Percent	Standard Error	Number	Percent	Standard Error	Number	Percent	Standard Error
Infants	1,960	94.5	0.8	787	98.3 *	0.5	347	›› 91.3	2.3	731	››› 92.6	1.2
Children												
1 year old	1,258	60.5	2.7	419	67.3	2.9	391	67.8	3.9	357	››› 50.0	4.0
2 years old	1,264	22.9	1.7	252	28.3	4.4	544	26.4	2.3	384	›› 16.6	2.3
3 years old	1,113	8.5	1.9	201	11.7 *	3.4	508	11.2	3.4	324	› 5.0 *	1.7
4 years old	1,088	4.0	1.2	134	6.5 *	1.8	542	5.5	2.1	340	› 1.5 *	1.0
All children	4,723	24.0	1.3	1,006	28.4	1.8	1,985	27.7	1.9	1,405	››› 18.3	1.5
Total, age-adjusted	6,683	38.2	1.1	1,793	42.5	1.4	2,332	40.5	1.5	2,136	››› 33.2	1.2

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-68—Percent of children who stopped using a baby bottle before 1 year of age[1]

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Number	Percent	Standard Error	Number	Percent	Standard Error	Number	Percent	Standard Error	Number	Percent	Standard Error
Children												
1 year old	1,143	9.3	1.1	378	8.8	1.8	358	10.3	1.8	321	9.6	1.9
2 years old	1,216	12.0	1.3	244	12.1	2.8	527	12.2	2.1	367	12.8	2.1
3 years old	1,072	13.2	1.8	193	13.8	4.6	492	10.6	2.8	312	15.7	3.2
4 years old	1,050	13.3	1.8	132	10.1 *	2.4	524	› 17.2	3.2	325	10.9	2.4
Total, age-adjusted	4,481	12.0	0.9	947	11.2	1.5	1,901	12.6	1.2	1,325	12.2	1.3

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 Sample for table includes children who ever used a bottle.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-69—Mean age when stopped using a baby bottle[1]

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Number	Mean age (mos)	Standard Error	Number	Mean age (mos)	Standard Error	Number	Mean age (mos)	Standard Error	Number	Mean age (mos)	Standard Error
Children												
1 year old	386	13.5	0.3	113	14.5	1.1	113	13.7	0.9	141	13.1	0.3
2 years old	888	15.8	0.4	181	15.4	0.5	370	15.8	0.4	296	16.0	0.8
3 years old	959	17.7	0.4	170	16.7	0.8	434	17.6	0.7	293	18.0	0.7
4 years old	1,007	18.0	0.6	122	16.0	1.1	498	17.5	0.6	320	18.4	1.0
Total, age-adjusted	3,240	16.3	0.3	586	15.6	0.5	1,415	16.1	0.4	1,050	16.4	0.4

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 Sample for table includes children who ever used a bottle, were not still using a bottle, and reported age when stopped.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-70—Percent of infants and children fed solid foods on a daily basis before 4 months of age

	Total Infants and Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Number	Percent	Standard Error	Number	Percent	Standard Error	Number	Percent	Standard Error	Number	Percent	Standard Error
Infants	1,961	26.9	1.2	787	27.0	2.0	348	28.2	2.0	731	26.2	1.6
Children												
1 year old	1,258	22.1	2.0	419	19.8	2.7	391	26.2	2.9	357	20.9	3.1
2 years old	1,269	21.5	1.8	253	19.7	3.6	545	24.0	2.1	387	18.9	3.0
3 years old	1,119	23.8	2.4	201	15.5	4.3	513	23.1	3.4	325	› 26.0	3.2
4 years old	1,098	21.0	1.6	137	18.2	5.5	547	19.7	2.1	342	22.4	2.2
All children	4,744	22.1	1.2	1,010	18.3	2.3	1,996	23.2	1.6	1,411	22.0	1.4
Total, age-adjusted	6,705	23.1	1.1	1,797	20.0	2.0	2,344	24.2	1.5	2,142	22.9	1.3

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-71—Mean age when first fed solid foods on a daily basis[1]

	Total Infants and Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Number Fed Solids	Mean Age (mos)	Standard Error	Number Fed Solids	Mean Age (mos)	Standard Error	Number Fed Solids	Mean Age (mos)	Standard Error	Number Fed Solids	Mean Age (mos)	Standard Error
Infants	1,546	4.1	0.1	596	4.1	0.1	277	4.4	0.2	596	4.0	0.1
Children												
1 year old	1,247	5.5	0.1	415	6.0	0.2	390	5.6	0.2	352	›› 5.3	0.1
2 years old	1,258	6.0	0.1	249	6.3	0.4	542	6.2	0.2	386	5.7	0.2
3 years old	1,102	6.0	0.2	197	6.5	0.2	506	6.4	0.3	320	›››5.4	0.2
4 years old	1,081	6.0	0.2	131	6.5	0.6	539	6.1	0.2	339	5.7	0.2
All children	4,688	5.9	0.1	992	6.3	0.2	1,977	6.1	0.2	1,397	›››5.5	0.1
Total, age-adjusted	6,234	5.5	0.1	1,588	5.9	0.2	2,254	5.7	0.1	1,993	›››5.2	0.1

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 Estimates of mean age for infants under 1 year old may be biased by the large percent of infants not yet eating solid foods.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-72—Physical activity reported by pregnant and postpartum women for past month

	Total Pregnant and Postpartum Women			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Percent of pregnant and postpartum women:												
Walked a mile or more in past month without stopping	630	51.0	3.5	165	49.0	7.2	233	47.7	6.4	181	53.6	5.1
Exercised at least 3 times per week	630	39.7	4.2	165	27.1	6.4	233	34.2	7.1	181	›› 44.9	5.3
Exercised at least 5 times per week	630	26.4	3.0	165	14.8	3.9	233	14.7	3.4	181	›››33.5	4.1
Number of different physical activities in the past month[1]												
None	630	19.5	2.7	165	20.2	3.6	233	29.3	4.5	181	12.9	3.4
One	630	28.5	3.4	165	30.6	6.6	233	22.9	4.6	181	32.8	4.5
Two	630	17.6	2.9	165	21.0	4.9	233	19.3	5.1	181	15.3	3.7
Three or more	630	34.3	3.7	165	28.0	7.6	233	28.5	7.0	181	39.0	5.3

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 The Bonferroni adjustment was used to adjust for the multiplicity of tests when examining multiple outcome categories.

Source: NHANES-III, 1988-94: Adult interview file. 'Total' column includes women with missing WIC participation or income.

Table D-73—Percent of pregnant and postpartum women consuming at least 12 alcoholic beverages, in their lifetime and in past year

	Total Pregnant and Postpartum Women			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Percent of pregnant and postpartum women consuming alcoholic beverages												
In their lifetime	664	78.1	3.2	181	72.4	5.2	246	72.8	5.4	185	› 84.6	3.7
In past year	664	37.0	3.8	181	21.4	6.1	246	33.1	6.9	185	›› 45.5	5.1
Among pregnant and postpartum women consuming alcohol in past year												
Mean number drinks consumed on average drinking day	156	2.6	0.23	24	3.7 *	0.74	64	3.2	0.54	61	› 2.1 *	0.19

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Examination file. 'Total' column includes women with missing WIC participation or income.

Table D-74—Percent of pregnant and postpartum women smoking cigarettes, in their lifetime and in past 5 days

	Total Pregnant and Postpartum Women			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Percent of all pregnant and postpartum women:												
Ever smoked	667	38.0	3.0	181	42.8	6.3	247	38.0	6.7	185	37.2	4.4
Smoked in past 5 days	665	22.4	3.5	179	27.0	4.9	247	30.1	6.3	185	16.1	4.3
Among smokers:												
Mean number cigarettes smoked in past 5 days	145	52.6	6.0	38	40.8 *	6.1	64	52.6 *	11.4	33	61.2 *	10.3
Mean age became regular smoker	188	16.4	0.3	49	15.4 *	0.3	68	15.4	0.4	60	›››17.4	0.4

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
Persons are identified as "ever smoking" if they report smoking at least 100 cigarettes during their entire life.
Persons who smoked in past 5 days may include persons having smoked less than 100 cigarettes in entire life.
Persons are identified as smokers if they reported smoking cigarettes, cigars, or pipes, or chewing tobacco in the past 5 days.

Source: NHANES-III, 1988-94: Adult Interview file and Examination file. Sample for table contains women completing an MEC exam. 'Total' column includes women with missing WIC participation or income.

Table D-75—Percent of nonsmoking women, infants, and children exposed to second hand smoke at home

	Total Persons			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Pregnant and postpartum women	519	14.0	2.2	141	26.4	6.6	182	18.3	6.0	152	› 8.6 *	2.6
Infants	1,960	35.7	1.7	787	47.2	2.2	348	43.8	2.6	731	›››22.8	2.4
Children												
1 year old	1,256	36.8	2.4	419	50.5	4.1	391	46.9	2.6	357	›››23.0	2.7
2 years old	1,268	39.5	1.9	253	42.9	4.3	545	47.7	3.1	387	› 32.7	2.5
3 years old	1,119	37.0	2.5	201	39.4	5.1	513	44.1	4.7	325	30.9	2.8
4 years old	1,098	39.6	2.8	137	41.4	7.3	547	51.5	3.3	342	30.4	3.4
All children	4,741	38.2	1.7	1,010	43.6	3.8	1,996	47.6	2.1	1,411	›››29.2	1.8
Total, population adjusted	7,220	32.6	1.5	1,938	40.4	3.2	2,526	40.7	2.2	2,294	›››23.8	1.7

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Table D-76—Mean number of cigarettes smoked per day in households where nonsmoking women, infants, and children reside with smokers

	Total Persons			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean # Cigarettes	Standard Error	Sample size	Mean # Cigarettes	Standard Error	Sample size	Mean # Cigarettes	Standard Error	Sample size	Mean # Cigarettes	Standard Error
Pregnant and postpartum women	124	15.4	2.9	46	18.1 *	6.3	46	12.6 *	4.5	21	16.2 *	4.2
Infants	741	15.8	0.6	372	15.4	0.8	157	18.0	1.8	177	14.7	1.0
Children												
1 year old	459	15.5	0.9	178	16.4	1.3	168	15.1	1.3	84	13.4	1.4
2 years old	481	15.3	0.7	103	14.8	1.2	235	17.9	1.4	112	12.8	1.0
3 years old	422	15.6	1.1	81	12.0 *	1.8	215	› 17.6	1.8	100	14.7	1.3
4 years old	421	16.9	0.8	48	15.8 *	2.7	240	18.6	0.9	108	14.9	1.0
All children	1,783	15.8	0.5	410	14.8	1.2	858	17.3	0.7	404	13.9	0.6
Total, population adjusted	2,648	15.7	0.8	828	15.6	1.6	1,061	16.4	1.2	602	14.6	1.1

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Examination sample. Smokers are identified from the MEC file; exposure is determined from the adult and youth interview files. 'Total' column includes persons with missing WIC participation or income. Women are identified as nonsmokers if they answered no to all four types of nicotine exposure in past 5 days: cigarettes, cigars or pipes, chewing tobacco or snuff, and nicotine gum. Persons reside with smokers if they reside with persons reported to have smoked cigarettes in the past 5 days.

Table D-77—Percent of nonsmoking women and 4-year-old children with high serum cotinine levels [1,2]

	Total Persons			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Pregnant and postpartum women	478	51.8	4.9	132	67.4	7.0	168	60.8	8.4	140	›› 44.3	6.3
Children 4 years old	614	75.6	4.0	91	91.9 *	3.1	311	86.0	3.9	182	››› 63.5	5.9
Total, population adjusted	1,092	61.9	3.9	223	77.8	3.9	479	71.4	5.7	322	››› 52.4	5.2

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 Women are identified as nonsmokers if they answered no to all four types of nicotine exposure in past 5 days: cigarettes, cigars or pipes, chewing tobacco or snuff, and nicotine gum.
2 High serum cotinine level is defined as > 0.10 ng/dL. Source: *Healthy People 2010* (U.S. DHHS, 2000a).

Source: NHANES-III, 1988-94: Examination sample. Smokers are identified from the MEC file; exposure is determined from the adult and youth interview files. 'Total' column includes persons with missing WIC participation or income.

Table D-78—Percent of women, infants, and children with self-reported general health status of very good or excellent

	Total Persons			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Pregnant and postpartum women	667	56.2	3.6	181	49.1	7.3	247	42.5	6.1	185	› 65.8	4.8
Infants	1,961	82.0	1.0	787	72.7	1.7	348	› 80.1	2.6	731	››› 91.2	0.9
Children												
1 year old	1,258	79.0	1.7	419	64.4	3.3	391	› 73.7	3.3	357	››› 89.7	1.7
2 years old	1,268	78.0	1.6	253	62.6	4.0	545	69.8	3.0	386	››› 89.3	1.6
3 years old	1,119	74.6	1.9	201	64.3	4.6	513	68.6	3.2	325	››› 84.3	2.6
4 years old	1,098	73.6	1.9	137	62.4	6.2	547	60.0	3.2	342	››› 87.6	2.6
All children	4,743	76.3	1.2	1,010	63.4	2.7	1,996	68.0	1.8	1,410	››› 87.7	1.1
Total, population adjusted	7,371	72.8	1.2	1,978	61.8	2.2	2,591	64.4	2.0	2,326	››› 83.5	1.2

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Table D-79—Percent of women, infants, and children with self-reported general health status of fair or poor

	Total Persons			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Pregnant and postpartum women	667	6.3	1.2	181	10.9	2.6	247	6.8 *	1.9	185	› 3.6 *	1.8
Infants	1,961	3.6	0.6	787	5.8	1.2	348	4.5 *	1.0	731	››› 1.1 *	0.5
Children												
1 year old	1,258	3.4	0.4	419	6.9	1.2	391	5.6	1.1	357	››› 0.4 *	0.2
2 years old	1,268	4.4	0.5	253	6.5 *	2.1	545	6.4	1.3	386	2.4 *	0.8
3 years old	1,119	4.9	1.0	201	8.5 *	3.2	513	7.6	1.8	325	› 1.2 *	0.7
4 years old	1,098	4.7	0.8	137	9.8 *	3.0	547	5.5	1.2	342	3.3 *	1.5
All children	4,743	4.3	0.4	1,010	7.9	1.4	1,996	6.2	0.6	1,410	››› 1.8	0.5
Total, population adjusted	7,371	4.6	0.4	1,978	8.2	1.2	2,591	6.1	0.6	2,326	››› 2.1	0.5

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Adult and youth interview files. 'Total' column includes persons with missing WIC participation or income.

Table D-80—Percent of women, infants, and children with physician-reported general health status of very good or excellent

	Total Persons			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Pregnant and postpartum women	640	87.0 *	2.6	169	77.7 *	5.9	236	87.1 *	4.4	183	› 91.2 *	3.4
Infants	1,921	87.5	3.1	772	85.7	3.2	339	86.4 *	3.6	720	88.9	3.5
Children												
1 year old	1,221	90.0 *	2.5	408	90.1 *	2.8	378	86.7 *	3.9	345	92.0 *	2.3
2 years old	1,230	89.4 *	2.4	246	89.4 *	2.6	528	88.4 *	2.7	378	91.0 *	2.5
3 years old	1,092	89.6 *	2.7	199	84.0 *	6.2	500	89.1 *	3.0	316	91.8 *	3.0
4 years old	1,078	90.4 *	2.4	135	96.4 *	1.6	534	›› 87.9 *	3.2	338	91.8 *	2.7
All children	4,621	89.8	2.4	988	90.0	2.4	1,940	88.0	2.8	1,377	91.6	2.3
Total, population adjusted	7,182	88.8	2.3	1,929	86.7	2.8	2,515	87.6	2.8	2,280	› 91.1	2.1

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Table D-81—Percent of women, infants, and children with physician-reported general health status of fair or poor

	Total Persons			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Pregnant and postpartum women	640	1.4 *	0.9	169	2.6 *	1.1	236	0.5 *	0.3	183	1.7 *	1.6
Infants	1,921	0.7 *	0.2	772	1.4 *	0.5	339	1.2 *	0.6	720	›› 0.0	0.0
Children												
1 year old	1,221	0.1 *	0.1	408	0.2 *	0.2	378	0.3 *	0.2	345	0.1 *	0.1
2 years old	1,230	0.3 *	0.2	246	0.0	0.0	528	0.5 *	0.4	378	0.3 *	0.3
3 years old	1,092	0.4 *	0.2	199	1.8 *	1.4	500	0.5 *	0.4	316	>0	>0
4 years old	1,078	0.6 *	0.4	135	0.6 *	0.6	534	0.3 *	0.2	338	0.8 *	0.8
All children	4,621	0.4 *	0.1	988	0.6 *	0.4	1,940	0.4 *	0.2	1,377	0.3 *	0.2
Total, population adjusted	7,182	0.6	0.2	1,929	1.2 *	0.3	2,515	0.5 *	0.2	2,280	0.6 *	0.4

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
>0 Value to small to display.

Source: NHANES-III, 1988-94: Examination file. 'Total' column includes persons with missing WIC participation or income.

Table D-82—Prevalence of specific health conditions among pregnant and postpartum women

	Total Pregnant and Postpartum Women			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Percent reporting:												
High blood pressure	629	9.7	3.32	165	4.2 *	1.82	232	5.3 *	1.76	181	12.0 *	5.53
Diabetes	629	0.3 *	0.19	164	0.8 *	0.64	233	0.8 *	0.60	181	>0	0.05
Heart attack	618	>0	0.04	158	0.3 *	0.33	228	0.0	0.00	181	0.0	0.00
Stroke	630	0.4 *	0.35	165	0.0	0.00	233	0.0	0.00	181	0.7 *	0.67
Emphysema or CHF[1]	630	0.1 *	0.1	165	0.3 *	0.3	233	0.4 *	0.3	181	0.0	0.0
Cancer other than skin cancer	630	1.8 *	0.9	165	1.5 *	1.2	233	1.5 *	1.1	181	2.3 *	1.5
Percent with measured high blood pressure	626	1.1 *	0.4	163	1.8 *	1.1	231	1.3 *	0.6	181	0.8 *	0.7

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 CHF is congestive heart failure
>0 Value to small to display.

Source: NHANES-III, 1988-94: Adult interview file. 'Total' column includes women with missing WIC participation or income.

Table D-83—Pregnancy histories of pregnant and postpartum women

	Total Pregnant and Postpartum Women			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error
Mean number of pregnancies	630	2.5	0.10	165	2.5	0.16	233	2.7	0.17	181	2.3	0.17
Mean number of live births	630	1.3	0.09	165	1.6	0.12	233	1.5	0.14	181	›› 1.1	0.14
At time of first live birth:												
Mean age	496	22.4	0.6	145	20.5 *	0.6	187	19.3	0.4	123	››› 25.0	0.7
Percent teenagers	496	36.2	4.2	145	53.7 *	7.9	187	58.3	7.1	123	››› 17.8	4.6
Percent older than 35 yrs ...	496	1.7 *	1.1	145	0.4 *	0.4	187	0.4 *	0.3	123	3.1 *	2.2

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Examination file. 'Total' column includes women with missing WIC participation or income.

Table D-84—Mean age of mother at birth: Infants and children up to 4 years old

	Total Infants and Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error
Infants	1,961	26.4	0.19	787	24.1	0.20	348	›››25.7	0.29	731	›››28.9	0.23
Children												
1 year old	1,255	26.4	0.25	418	24.5	0.35	390	24.3	0.40	356	›››28.7	0.35
2 years old	1,259	26.5	0.20	250	24.5	0.52	540	25.2	0.31	385	›››28.0	0.27
3 years old	1,110	26.8	0.35	199	25.6	0.74	507	25.3	0.43	324	›› 28.3	0.50
4 years old	1,088	26.0	0.31	136	24.4	0.97	540	24.2	0.36	341	›› 27.6	0.50
All children	4,712	26.4	0.18	1,003	24.8	0.39	1,977	24.7	0.18	1,406	›››28.2	0.27
Total, age-adjusted	6,673	26.4	0.16	1,790	24.6	0.32	2,325	24.9	0.15	2,137	›››28.3	0.23

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-85—Percent of infants and children born to adolescent mothers

	Total Infants and Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Infants	1,961	12.8	0.8	787	22.6	1.9	348	›› 14.3	1.7	731	››› 3.4	0.8
Children												
1 year old	1,255	13.0	1.3	418	18.6	2.7	390	21.4	2.8	356	››› 3.9	1.4
2 years old	1,259	11.3	1.0	250	23.8	5.0	540	13.3	1.6	385	›› 6.4	1.5
3 years old	1,110	12.1	1.7	199	18.6	5.2	507	17.6	3.1	324	›› 5.4	1.5
4 years old	1,088	13.2	1.5	136	19.8	8.0	540	21.3	2.1	341	5.7	1.7
All children	4,712	12.4	0.8	1,003	20.2	3.5	1,977	18.4	1.2	1,406	››› 5.4	0.8
Total, age-adjusted	6,673	12.5	0.7	1,790	20.7	2.8	2,325	17.6	1.0	2,137	››› 5.0	0.6

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Table D-86—Percent of infants and children born to mothers over age 35

	Total Infants and Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Infants	1,961	7.1	0.8	787	3.7	0.7	348	4.8	1.2	731	››› 11.4	1.4
Children												
1 year old	1,255	5.4	0.9	418	4.2	1.2	390	3.6 *	1.0	356	7.8	1.9
2 years old	1,259	6.1	0.8	250	6.8	2.5	540	2.9	1.1	385	8.0	1.5
3 years old	1,110	6.6	1.4	199	5.0 *	1.7	507	3.3	1.0	324	10.2	2.6
4 years old	1,088	6.1	1.4	136	1.5 *	0.6	540	3.6	1.3	341	›› 8.6	2.5
All children	4,712	6.1	0.6	1,003	4.4	0.8	1,977	3.4	0.6	1,406	›› 8.6	1.1
Total, age-adjusted	6,673	6.3	0.5	1,790	4.2	0.6	2,325	3.7	0.6	2,137	››› 9.2	0.9

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-87—Percent of infants and children born to mothers who smoked during pregnancy

	Total Infants and Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Infants	1,957	23.2	1.4	787	27.4	1.9	348	30.4	2.8	727	›››16.7	2.2
Children												
1 year old	1,253	22.9	2.0	418	31.4	3.8	391	28.0	3.3	353	›››14.4	1.9
2 years old	1,259	22.9	1.4	251	25.3	4.5	542	28.9	2.1	382	17.4	2.4
3 years old	1,112	21.8	2.0	198	26.1	4.9	510	21.7	3.7	324	21.0	2.8
4 years old	1,090	26.6	2.0	135	32.9	7.4	544	32.2	3.3	339	21.7	3.3
All children	4,714	23.6	1.1	1,002	29.0	3.7	1,987	27.7	1.9	1,398	› 18.6	1.3
Total, age-adjusted	6,671	23.5	0.9	1,789	28.6	3.1	2,335	28.3	1.8	2,125	›› 18.2	1.1

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Table D-88—Mean birthweight of infants and children

	Total Infants and Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error
Infants	1,929	3,371	15.6	771	3,258	20.8	341	› 3,343	32.2	724	›››3,470	21.4
Children												
1 year old	1,216	3,354	27.6	405	3,209	46.5	376	3,308	36.4	352	›››3,485	35.5
2 years old	1,219	3,399	22.6	241	3,208	48.7	514	› 3,333	26.7	383	›››3,498	38.3
3 years old	1,044	3,332	36.0	186	3,263	39.7	470	3,305	60.4	316	3,382	51.2
4 years old	1,036	3,300	28.6	128	3,069	115.6	511	3,301	47.2	335	› 3,350	35.6
All children	4,515	3,346	15.9	960	3,187	28.6	1,871	›› 3,312	23.1	1,386	›››3,428	20.5
Total, age-adjusted	6,444	3,351	13.9	1,731	3,201	23.3	2,212	›››3,318	21.7	2,110	›››3,437	17.9

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-89—Percent of infants and children born low birthweight[1]

	Total Infants and Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Infants	1,939	7.0	0.7	774	11.7	1.3	345	›› 5.9	1.3	727	›››3.8	1.0
Children												
1 year old	1,231	7.2	1.1	412	13.3	2.0	381	›› 5.3	1.2	353	›››3.6	1.1
2 years old	1,236	6.0	0.8	248	8.6	2.0	521	7.4	1.4	386	4.5	1.2
3 years old	1,075	8.7	1.4	191	9.4 *	2.8	487	11.6	3.3	321	6.2	1.9
4 years old	1,068	8.9	1.3	134	14.9	5.3	529	8.5	1.8	341	7.2	1.7
All children	4,610	7.7	0.5	985	11.6	1.3	1,918	› 8.2	1.0	1,401	›››5.4	0.7
Total, age-adjusted	6,549	7.6	0.4	1,759	11.6	1.0	2,263	›› 7.7	0.8	2,128	›››5.1	0.6

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 Low birthweight is less than 2500 grams, or 5.5 pounds

Table D-90—Percent of infants and children born very low birthweight[1]

	Total Infants and Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Infants	1,929	0.8	0.2	771	1.2 *	0.6	341	1.2 *	0.7	724	0.3 *	0.2
Children												
1 year old	1,216	0.8 *	0.3	405	0.6 *	0.3	376	0.9 *	0.6	352	1.1 *	0.5
2 years old	1,219	1.0 *	0.4	241	2.2 *	1.0	514	0.4 *	0.3	383	1.2 *	0.8
3 years old	1,044	1.4	0.5	186	0.8 *	0.4	470	0.8 *	0.4	316	1.9 *	1.0
4 years old	1,036	1.2 *	0.4	128	3.6 *	2.5	511	2.1 *	1.0	335	0.2 *	0.1
All children	4,515	1.1	0.2	960	1.8	0.7	1,871	1.1	0.3	1,386	1.1	0.4
Total, age-adjusted	6,444	1.0	0.2	1,731	1.7	0.6	2,212	1.1	0.2	2,110	0.9	0.3

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 Very low birthweight is less than 1500 grams, or 3.3 pounds

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-91—Percent of infants and children receiving neonatal intensive care (NICU)

	Total Infants and Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Infants	1,960	11.5	0.8	787	15.2	1.6	348	11.0	2.0	730	›› 9.3	0.8
Children												
1 year old	1,256	12.2	1.6	419	16.0	3.0	391	9.5	2.0	355	10.7	2.1
2 years old	1,266	10.3	0.9	251	11.1	2.6	545	8.5	1.8	386	11.1	2.0
3 years old	1,117	11.5	2.6	201	13.2	3.7	511	9.6	3.4	325	12.7	3.4
4 years old	1,094	10.6	1.4	136	19.9	5.4	545	10.4	1.9	341	9.7	2.2
All children	4,733	11.2	1.0	1,007	15.1	1.8	1,992	› 9.5	1.1	1,407	11.0	1.5
Total, age-adjusted	6,693	11.2	0.8	1,794	15.1	1.5	2,340	›› 9.8	1.1	2,137	› 10.7	1.2

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-92—Mean weight-for-height, and percent of children overweight, at risk of overweight, and underweight[1]

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error
	Mean weight-for-height											
Children												
1 year old	1,230	53.1	1.22	409	54.6	2.05	385	58.5	1.79	351	› 48.5	1.97
2 years old	1,224	53.2	1.25	244	49.9	2.01	527	53.2	2.06	376	53.2	1.79
3 years old	1,095	51.6	1.47	198	50.2	3.48	504	56.0	1.92	323	49.0	2.19
4 years old	1,079	54.4	1.04	136	53.1	4.18	533	55.1	1.12	339	54.9	1.83
Total, age-adjusted	4,628	53.1	0.74	987	52.0	1.82	1,949	55.7	0.85	1,389	51.4	1.08
	Percent of children overweight											
Children												
1 year old	1,230	7.5	1.07	409	7.9	1.52	385	10.1	2.05	351	5.4	1.61
2 years old	1,224	5.6	0.79	244	5.4 *	1.75	527	6.8	1.15	376	3.7	1.23
3 years old	1,095	5.4	1.15	198	6.5 *	2.17	504	8.5	2.45	323	2.6 *	0.97
4 years old	1,079	4.6	1.08	136	6.6 *	2.18	533	5.8	2.10	339	3.0 *	1.01
Total, age-adjusted	4,628	5.8	0.61	987	6.6	1.02	1,949	7.8	1.13	1,389	›› 3.7	0.62
	Percent of children at risk of overweight											
Children												
1 year old	1,230	10.9	1.06	409	12.9	2.36	385	16.7	2.23	351	› 6.5	1.33
2 years old	1,224	11.4	1.26	244	11.1	2.43	527	13.3	2.53	376	10.4	1.63
3 years old	1,095	9.7	1.41	198	12.9	4.52	504	10.1	2.24	323	9.0	2.16
4 years old	1,079	11.4	1.47	136	8.2 *	2.50	533	12.9	2.11	339	10.9	2.35
Total, age-adjusted	4,628	10.8	0.63	987	11.3	1.58	1,949	13.2	1.03	1,389	9.2	0.84
	Percent underweight											
Children												
1 year old	1,230	4.5	0.63	409	5.8 *	1.42	385	2.7 *	1.09	351	5.3	1.23
2 years old	1,224	3.8	0.53	244	4.9 *	1.42	527	5.0	1.32	376	2.8 *	0.88
3 years old	1,095	4.3	0.84	198	8.1 *	2.43	504	› 2.2 *	0.94	323	4.4	1.26
4 years old	1,079	4.3	1.01	136	7.0 *	3.77	533	3.2 *	1.07	339	3.7	1.25
Total, age-adjusted	4,628	4.2	0.30	987	6.5	1.20	1,949	› 3.3	0.44	1,389	4.1	0.50

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

1 Weight for height is based on standing height for children age 2 years and over, and recumbent length for infants and children under age 2. Overweight is defined as ≥ 95th percentile of the weight-for-height growth chart; risk of overweight is defined as between the 85th and 95th percentile of the weight-for-height growth chart; underweight is defined as < 5th percentile of the weight-for-height growth chart, as determined by age at measurement.

Source: NHANES-III, 1988-94: Examination file. 'Total' column includes children with missing WIC participation or income.

Table D-93—Percent of 2-4-year-old children with growth retardation[1]

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Std Error	Sample size	Percent	Std Error	Sample size	Percent	Std Error	Sample size	Percent	Std Error
Children												
2 years old	1,229	4.9	0.69	244	6.9	1.85	529	6.5	1.14	377	3.3 *	0.99
3 years old	1,104	3.5 *	1.12	198	10.0 *	5.41	510	3.8 *	1.45	323	1.5 *	0.82
4 years old	1,088	4.2	1.24	136	11.1 *	4.62	540	3.3 *	1.56	341	› 2.2 *	1.10
Total, age-adjusted	3,421	4.2	0.69	578	9.3	2.74	1,579	4.5	0.99	1,041	›› 2.3	0.51

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 Growth retardation is identified as < 5th percentile of the CDC height-for-age growth chart.

Source: NHANES-III, 1988-94: Examination file. 'Total' column includes children with missing WIC participation or income.

Table D-94—Percent of children with iron deficiency[1]

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Children												
1 year old	631	13.2	1.8	219	14.2	3.2	214	20.6	4.5	172	8.2 *	2.8
2 years old	708	5.0	1.1	145	4.7 *	2.5	317	8.4 *	2.1	211	2.0 *	0.9
3 years old	659	5.8	1.9	135	0.0	0.0	310	› 8.1 *	3.7	182	› 6.1 *	2.8
4 years old	856	1.7 *	0.6	117	2.8 *	1.2	447	2.3 *	0.9	249	1.1 *	0.8
Total, age-adjusted	2,854	6.4	0.7	616	5.4	1.2	1,288	› 9.8	1.6	814	4.3	1.1

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 Iron deficiency is indicated by at least 2 of the following: low serum transferrin saturation, high erythrocyte protoporphorin (EPP), and low serum ferritin. See appendix B.

Source: NHANES-III, 1988-94: Examination file. 'Total' column includes children with missing WIC participation or income.

Table D-95—Percent of children with low serum ferritin[1]

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Children												
1 year old	858	17.3	1.5	291	13.8	4.4	282	› 26.2	3.5	237	14.1	1.7
2 years old	947	9.0	1.3	189	6.3 *	2.3	427	11.2	2.1	276	8.2	2.0
3 years old	876	4.4	0.9	159	2.4 *	1.7	412	7.0	1.7	251	3.1 *	1.5
4 years old	899	2.2 *	0.6	119	3.4 *	2.1	467	3.2 *	1.2	265	1.3 *	0.7
Total, age-adjusted	3,580	8.2	0.6	758	6.5	1.4	1,588	›› 11.9	1.2	1,029	6.7	0.7

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 Low serum ferritin is identified by < 10 mcg/mL. Source: *Healthy People 2010* (U.S. DHHS, 2000a).

Source: NHANES-III, 1988-94: Examination file. 'Total' column includes children with missing WIC participation or income.

Table D-96—Percent of children with high free erythrocyte protoporphorin [1]

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Children												
1 year old	899	15.6	1.71	304	17.9	3.50	291	20.0	4.22	252	11.0	2.24
2 years old	978	6.6	1.02	198	5.5 *	1.62	438	8.8	1.79	287	4.3 *	1.43
3 years old	889	8.0	1.79	163	3.0 *	0.99	419	›› 13.7	3.61	251	4.5 *	2.06
4 years old	919	6.2	1.24	121	6.3 *	2.11	476	6.7 *	1.24	274	5.4 *	2.33
Total, age-adjusted	3,685	9.1	0.70	786	8.2	0.99	1,624	› 12.3	1.66	1,064	6.3	0.72

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
[1] High free erythrocyte protoporphorin is identified as > 80 (age 1-2) and > 70 (age 3-4). Source: *Healthy People 2010* (U.S. DHHS, 2000a).

Source: NHANES-III, 1988-94: Examination file. 'Total' column includes children with missing WIC participation or income.

Table D-97—Percent of children with low transferrin saturation[1]

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Children												
1 year old	671	24.7	2.4	229	20.9	2.7	227	34.9	5.8	182	17.7	3.0
2 years old	757	18.0	1.8	154	18.6	4.7	339	22.3	3.2	226	14.1	3.2
3 years old	699	22.7	3.4	138	21.6	4.4	329	23.4	4.3	195	23.2	5.3
4 years old	879	13.9	1.6	118	19.4 *	9.1	460	17.9	2.9	255	9.2 *	2.3
Total, age-adjusted	3,006	19.8	1.2	639	20.1	3.3	1,355	24.6	2.2	858	16.0	2.1

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
[1] Low transferrin saturation is identified as < 10% (age 1-2) and < 12% (age 3-4). Source: *Healthy People 2010* (U.S. DHHS, 2000a).

Source: NHANES-III, 1988-94: Examination file. 'Total' column includes children with missing WIC participation or income.

Table D-98—Percent of children with low iron deficiency anemia[1]

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Children												
1 year old	631	3.7	1.0	219	3.4 *	1.3	214	7.4 *	2.6	172	1.3 *	0.9
2 years old	708	1.8 *	0.5	145	2.9 *	2.3	317	2.5 *	1.0	211	0.7 *	0.5
3 years old	659	0.5 *	0.3	135	0.0	0.0	310	1.3 *	0.9	182	>0	>0
4 years old	856	0.3 *	0.2	117	1.0 *	0.8	447	0.5 *	0.4	249	0.0	0.0
Total, age-adjusted	2,854	1.6	0.3	616	1.8 *	0.6	1,288	2.9	0.7	814	› 0.5 *	0.3

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 Iron deficiency anemia is defined as iron deficiency and low hemoglobin. See appendix B.
>0 Value to small to display.

Source: NHANES-III, 1988-94: Examination file. 'Total' column includes children with missing WIC participation or income.

Table D-99—Percent of children with low hemoglobin[1]

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Children												
1 year old	855	12.2	1.6	298	12.7	2.2	275	19.3	3.4	239	8.0	2.1
2 years old	934	9.7	1.0	188	8.2 *	2.7	417	12.6	2.1	276	6.9	1.2
3 years old	852	5.8	1.0	157	13.0 *	3.1	405	6.7	1.6	242	›› 3.2 *	1.3
4 years old	898	4.9	0.9	119	3.0 *	1.2	466	5.0	1.2	267	5.4 *	1.9
Total, age-adjusted	3,539	8.1	0.8	762	9.2	1.3	1,563	10.9	1.4	1,024	› 5.9	0.9

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 Criteria for low hemoglobin varies by age, gender, and smoking status. See appendix B.

Source: NHANES-III, 1988-94: Examination file. 'Total' column includes children with missing WIC participation or income.

Table D-100—Percent of children with low hematocrit[1]

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Children												
1 year old	855	10.3	1.6	298	11.4	2.2	275	15.5	3.4	239	7.0 *	2.3
2 years old	934	7.2	0.9	188	6.9 *	2.8	417	8.9	1.6	276	5.6 *	1.6
3 years old	852	6.0	1.2	157	10.8 *	3.5	405	8.0	1.9	242	› 3.5 *	1.4
4 years old	898	5.9	1.2	119	2.2 *	1.6	466	5.6 *	1.4	267	7.2 *	2.0
Total, age-adjusted	3,539	7.4	0.7	762	7.8	1.5	1,563	9.5	1.3	1,024	5.8	1.0

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 Criteria for low hematocrit varies by age, gender, and smoking status. See appendix B.

Source: NHANES-III, 1988-94: Examination file. 'Total' column includes children with missing WIC participation or income.

Table D-101—Percent of infants and children with any hospital stays since birth

	Total Infants and Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Infants	1,961	9.8	0.8	787	13.5	1.4	348	9.7	2.0	731	›››6.3	1.0
Children												
1 year old	1,256	17.2	1.7	419	19.3	2.8	390	15.6	2.5	356	16.7	2.2
2 years old	1,267	17.8	1.5	251	21.3	4.2	545	20.1	2.3	387	15.9	2.5
3 years old	1,118	18.9	2.1	201	21.1	3.7	512	18.8	3.6	325	17.9	3.1
4 years old	1,096	21.7	3.0	136	24.0	4.7	546	23.2	3.0	342	20.8	5.1
All children	4,737	18.9	1.3	1,007	21.4	1.6	1,993	19.4	1.8	1,410	17.8	1.8
Total, age-adjusted	6,698	17.1	1.1	1,794	19.8	1.3	2,341	17.5	1.6	2,141	› 15.5	1.5

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-102—Percent of infants and children with accident, injury, or poisoning requiring medical attention in past 12 months

	Total Infants and Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Infants	1,960	1.8	0.4	787	1.6 *	0.5	348	1.5 *	0.8	730	2.3	0.5
Children												
1 year old	1,258	12.8	1.4	419	10.1	2.0	391	12.6	2.6	357	15.8	2.8
2 years old	1,269	13.7	1.0	253	16.6	4.0	545	9.3	1.6	387	16.9	2.5
3 years old	1,119	10.1	1.7	201	10.9 *	3.7	513	8.6	2.1	325	11.5	2.5
4 years old	1,098	12.5	2.1	137	24.2	8.7	547	13.4	2.8	342	10.7	2.4
All children	4,744	12.3	0.8	1,010	15.5	3.1	1,996	11.0	1.2	1,411	13.7	1.2
Total, age-adjusted	6,704	10.2	0.6	1,797	12.7	2.4	2,344	9.1	1.0	2,141	11.4	0.9

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-103—Percent of infants and children ever diagnosed by doctor to have asthma

	Total Infants and Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Infants	1,961	2.0	0.4	787	3.0	0.7	348	3.5 *	1.1	731	›› 0.8 *	0.4
Children												
1 year old	1,258	4.7	0.7	419	4.7	1.2	391	8.2	1.5	357	2.3 *	0.7
2 years old	1,267	6.4	0.8	253	9.1	2.2	544	7.5	1.3	386	4.8	1.2
3 years old	1,119	5.6	1.0	201	3.7 *	1.2	513	7.3	1.7	325	5.3	1.4
4 years old	1,097	7.6	1.4	137	14.8	6.2	547	7.9	1.6	341	6.5	2.0
All children	4,741	6.1	0.5	1,010	8.1	1.6	1,995	7.7	0.8	1,409	› 4.7	0.7
Total, age-adjusted	6,702	5.3	0.4	1,797	7.0	1.3	2,343	6.9	0.7	2,140	› 3.9	0.6

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-104—Percent of infants and children ever diagnosed by doctor to have chronic bronchitis

	Total Infants and Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Infants	1,961	2.2	0.4	787	2.8	0.5	348	1.5 *	0.6	731	2.0	0.7
Children												
1 year old	1,258	4.0	0.6	419	4.0	1.2	391	5.6	1.4	357	3.2 *	0.9
2 years old	1,268	4.2	0.6	253	7.9	2.2	544	3.7	0.7	387	› 3.0	0.7
3 years old	1,119	2.8	0.7	201	1.9 *	0.9	513	2.9	0.8	325	2.8 *	1.2
4 years old	1,097	4.0	0.8	137	4.9 *	2.5	546	6.6	1.5	342	1.9 *	0.6
All children	4,742	3.8	0.4	1,010	4.7	1.1	1,994	4.7	0.6	1,411	2.7	0.5
Total, age-adjusted	6,703	3.5	0.3	1,797	4.3	0.8	2,342	4.1	0.5	2,142	2.6	0.5

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-105—Percent of infants and children ever diagnosed by doctor to have hay fever

	Total Infants and Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Infants	1,961	0.7 *	0.2	787	0.6 *	0.3	348	1.9 *	1.0	731	0.5 *	0.2
Children												
1 year old	1,258	1.4	0.5	419	0.7 *	0.7	391	0.6 *	0.6	357	2.6 *	1.1
2 years old	1,269	2.0	0.5	253	1.0 *	0.6	545	1.8 *	1.0	387	2.0 *	0.8
3 years old	1,119	0.9 *	0.3	201	0.3 *	0.2	513	0.3 *	0.2	325	1.5 *	0.6
4 years old	1,097	3.8	1.1	137	10.8 *	5.6	547	4.0	1.7	341	2.8 *	1.0
All children	4,743	2.1	0.4	1,010	3.2	1.5	1,996	1.7	0.5	1,410	2.2	0.5
Total, age-adjusted	6,704	1.8	0.3	1,797	2.7	1.2	2,344	1.7	0.4	2,141	1.9	0.4

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-106—Percent of children ever tested for lead poisoning

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Children												
1 year old	1,232	10.2	1.4	409	16.6	2.3	388	›› 8.3	2.0	345	››› 8.2	1.8
2 years old	1,245	9.8	1.5	252	22.4	3.2	534	››› 10.8	2.1	375	››› 5.9	1.7
3 years old	1,101	8.7	1.1	197	17.3	3.4	506	› 9.3	1.8	320	›› 6.2	1.3
4 years old	1,081	10.5	1.2	136	26.3	4.6	539	› 14.1	2.8	338	››› 5.1	1.1
Total, age-adjusted	4,659	9.8	1.0	994	20.7	1.7	1,967	››› 10.6	1.6	1,378	››› 6.3	1.0

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-107—Percent of children ever reported to have high lead levels or lead poisoning[1]

	Total Children			Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Children												
1 year old	1,228	0.56 *	0.30	408	1.25 *	1.06	387	0.84 *	0.55	344	0.10 *	0.10
2 years old	1,239	0.31 *	0.13	250	1.22 *	0.72	531	0.41 *	0.24	374	0.00	0.00
3 years old	1,096	0.62 *	0.37	195	4.17 *	3.10	503	0.24 *	0.17	320	0.00	0.00
4 years old	1,077	0.71 *	0.23	135	0.66 *	0.67	538	1.14 *	0.29	336	0.08 *	0.08
Total, age-adjusted	4,640	0.55	0.14	988	1.82	0.87	1,959	0.66 *	0.16	1,374	› 0.05 *	0.03

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 Percent is calculated over all children, including those not tested for lead poisoning.

Source: NHANES-III, 1988-94: Youth interview file. 'Total' column includes those with missing WIC participation or income.

Table D-108—Percent of children with high blood lead levels[1]

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Children												
1 year old	918	8.9	1.74	311	16.5	4.11	295	8.9 *	2.39	258	›› 4.9	1.45
2 years old	993	7.1	1.27	201	10.6 *	2.53	443	9.2	1.77	293	›› 4.3	1.24
3 years old	901	5.2	0.95	163	14.1 *	4.23	426	6.7 *	1.44	255	›› 1.2 *	0.73
4 years old	926	5.7	1.67	122	15.1 *	5.12	480	8.7	2.44	275	›› 1.3 *	0.75
Total, age-adjusted	3,738	6.7	1.14	797	14.1	2.78	1,644	› 8.4	1.24	1,081	›››2.9	0.74

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 High lead is identified as ≥ 10.0 mcg/dL. Source: CDC Report on Blood Levels in the U.S.: 1991-94. (CDC, 1997)

Source: NHANES-III, 1988-94: Examination file. 'Total' column includes children with missing WIC participation or income.

Table D-109—Percent of children with high blood lead levels, NHANES-III Phase I (1988-1991)[1]

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Children												
1 year old	446	10.9	2.4	128	20.1	7.1	154	› 8.0 *	2.7	126	9.2	2.7
2 years old	478	11.2	2.1	80	14.6 *	4.7	223	16.1	3.4	141	6.0	2.4
3 years old	426	5.1 *	1.3	52	8.0 *	3.3	213	7.3 *	2.1	120	2.0 *	1.5
4 years old	444	8.5	3.3	43	23.4 *	9.3	233	13.4	5.0	138	› 2.2 *	1.5
Total, age-adjusted	1,794	8.9	2.0	303	16.6	4.7	823	11.2	2.2	525	›› 4.9	1.4

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
[1] High lead is identified as ≥ 10.0 mcg/dL. Source: CDC Report on Blood Levels in the U.S.: 1991-94. (CDC, 1997)

Source: NHANES-III, 1988-94: Examination file. 'Total' column includes children with missing WIC participation or income.

Table D-110—Percent of children with high blood lead levels, NHANES-III Phase II (1991-1994)[1]

	Total Children			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Children												
1 year old	472	7.9	2.2	183	14.3	4.3	141	9.9 *	3.9	132	›› 2.8 *	1.7
2 years old	515	4.1	1.1	121	9.0 *	3.2	220	3.6 *	1.0	152	2.9 *	1.5
3 years old	475	5.4	1.5	111	16.9 *	5.6	213	6.3 *	2.6	135	›› 0.4 *	0.3
4 years old	482	3.5	1.0	79	10.9 *	4.4	247	4.7 *	1.6	137	› 0.5 *	0.4
Total, age-adjusted	1,944	5.2	1.1	494	12.8	2.8	821	› 6.1	1.6	556	››› 1.7 *	0.6

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
[1] High lead is identified as ≥ 10.0 mcg/dL. Source: CDC Report on Blood Levels in the U.S.: 1991-94. (CDC, 1997)

Source: NHANES-III, 1988-94: Examination file. 'Total' column includes children with missing WIC participation or income.

Table D-111—Mean number of decayed, missing, and filled teeth for women and 2-4-year-old children[1]

	Total Persons			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error	Sample size	Mean	Standard Error
Pregnant and postpartum women	651	8.6	0.4	178	6.2	0.5	240	7.6	0.6	181	›››10.0	0.6
Children												
2 years old	1,152	0.3	>0	233	0.3	0.1	495	0.5	0.1	347	› 0.1 *	>0
3 years old	1,057	0.7	0.1	188	0.9	0.2	482	1.1	0.3	316	› 0.4	0.1
4 years old	1,061	1.2	0.1	130	1.2	0.3	533	1.7	0.2	329	0.6	0.1
All children	3,270	0.7	0.1	551	0.8	0.1	1,510	1.1	0.1	992	›› 0.4	0.1
Total, population adjusted	3,921	3.2	0.1	729	2.5	0.2	1,750	› 3.1	0.2	1,173	›› 3.4	0.2

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
1 For adults, table shows the sum of decayed, missing, and filled primary teeth due to any cause. For children, count includes the number of decayed and filled deciduous (baby) and primary teeth.
>0 Value to small to display.

Source: NHANES-III, 1988-94: Examination file. The dental exam was administered in the Mobile Exam Center; 2.8 percent of MEC respondents did not have a dental exam. Total includes persons with missing food stamp participation or income.

Table D-112—Percent of women and 2-4-year-old children who ever visited a dentist or dental hygienist

	Total Persons			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Pregnant and postpartum women	660	97.2 *	0.7	178	97.1 *	1.0	244	95.2 *	1.7	184	98.8 *	0.9
Children												
2 years old	1,248	15.2	1.6	246	14.0	2.8	537	11.6	1.8	385	18.6	2.8
3 years old	1,108	38.2	2.5	199	52.1	4.7	506	›››23.6	3.1	323	46.4	4.4
4 years old	1,091	60.0	2.7	136	55.2	7.7	546	55.4	4.6	338	66.6	3.6
All children	3,447	37.9	1.2	581	40.5	3.4	1,589	›› 30.4	2.1	1,046	44.0	1.8
Total, population adjusted	4,107	56.6	0.9	759	58.3	2.3	1,833	›› 50.8	1.6	1,230	61.3	1.2

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Adult and youth interview files. 'Total' column includes persons with missing WIC participation or income.

Table D-113—Percent of women and 2-4-year-old children who visited a dentist or dental hygienist within the past year

	Total Persons			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Pregnant and postpartum women	660	63.1	3.2	178	54.9	6.2	244	62.2	5.3	184	68.3	4.3
Children												
2 years old	1,248	14.5	1.5	246	14.0	2.8	537	11.1	1.7	385	17.5	2.6
3 years old	1,108	36.3	2.5	199	51.8	4.7	506	›››22.5	3.2	323	43.2	4.6
4 years old	1,091	57.4	2.7	136	51.6	7.6	546	53.4	4.6	338	63.8	3.6
All children	3,447	36.2	1.3	581	39.2	3.4	1,589	›› 29.2	2.1	1,046	41.6	1.8
Total, population adjusted	4,107	44.7	1.3	759	44.2	3.2	1,833	39.6	2.4	1,230	50.0	1.6

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Adult and youth interview files. 'Total' column includes persons with missing WIC participation or income.

Table D-114—Percent of women, infants, and children with any health insurance[1]

	Total Persons			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error	Sample size	Percent	Standard error
Pregnant and postpartum women	627	88.3	1.8	166	79.0	5.6	235	80.1	4.2	179	›› 95.6 *	1.8
Infants	1,843	94.1	0.8	738	93.4	1.1	311	››› 84.3	2.6	715	››› 98.0 *	0.6
Children												
1 year old	1,151	92.6	1.2	384	93.8 *	1.3	344	››› 86.5	2.3	351	95.2 *	1.8
2 years old	1,156	92.6	0.9	240	92.7 *	1.9	474	› 86.8	2.0	377	› 96.9 *	0.9
3 years old	1,030	91.5	1.5	192	91.0 *	3.1	456	85.1	2.7	319	› 96.4 *	1.4
4 years old	1,003	91.7	1.2	127	96.4 *	1.3	494	››› 84.9	2.4	330	95.9 *	1.1
All children	4,340	92.1	0.9	943	93.5	1.0	1,768	››› 85.9	1.7	1,377	›› 96.1	0.8
Total, population adjusted	6,810	91.6	0.8	1,847	90.4	1.4	2,314	›› 84.4	1.7	2,271	››› 96.3	0.7

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.
[1] Health insurance includes any of Medicare, Medicaid, CHAMPUS/CHAMPVA/VA/military, or private health insurance.

Source: NHANES-III, 1988-94: Adult and youth interview files. 'Total' column includes persons with missing WIC participation or income.
Percents may sum to more than 100 because some persons have multiple sources of health insurance. Sample size varies slightly by source.

Table D-115—Percent of women, infants, and children with private health insurance

	Total Persons			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Private	Sample size	Percent	Private	Sample size	Percent	Private	Sample size	Percent	Private
Pregnant and postpartum women	607	66.4	3.2	158	28.5 *	5.7	224	44.2	6.9	179	›››90.0 *	3.0
Infants	1,681	69.9	3.4	614	38.6	4.2	287	›››58.5	5.1	709	›››95.5	1.3
Children												
1 year old	1,044	69.3	3.6	332	36.1	5.6	306	›››56.3	4.1	349	›››91.7	2.6
2 years old	1,062	72.3	2.7	200	31.9 *	5.1	426	›››52.7	5.0	375	›››95.0 *	1.3
3 years old	950	70.1	3.9	171	32.6 *	7.4	412	› 49.3	6.0	318	›››92.4 *	2.6
4 years old	934	71.7	3.6	114	42.9 *	9.0	441	49.5	5.8	328	›››92.4 *	2.2
All children	3,990	70.9	2.8	817	35.9	4.6	1,585	›››52.0	4.2	1,370	›››92.9	1.5
Total, population adjusted	6,278	69.8	2.6	1,589	34.7	3.6	2,096	›››51.3	3.9	2,258	›››92.7	1.4

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Adult and youth interview files. 'Total' column includes persons with missing WIC participation or income.

Table D-116—Percent of women, infants, and children with Medicaid

	Total Persons			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Medicaid	Sample size	Percent	Medicaid	Sample size	Percent	Medicaid	Sample size	Percent	Medicaid
Pregnant and postpartum women	584	24.6	3.0	154	60.0	6.7	229	›› 34.9	4.4	155	›››6.6 *	2.0
Infants	1,297	48.0	2.9	644	79.2	1.8	210	›››46.0	4.5	391	›››5.9	1.5
Children												
1 year old	878	42.4	3.6	344	77.8	2.7	282	›››51.4	4.4	200	›››5.6 *	1.4
2 years old	895	34.8	2.9	216	77.4	3.7	395	›››51.8	4.0	235	›››3.0 *	1.2
3 years old	823	35.5	2.7	175	73.8	5.9	385	›› 56.4	3.8	211	›››3.4 *	1.3
4 years old	812	34.7	3.7	118	77.8	4.8	427	›››54.2	4.7	225	›››6.1	2.3
All children	3,408	36.9	2.6	853	76.7	2.9	1,489	›››53.4	3.0	871	›››4.6	1.0
Total, population adjusted	5,289	36.0	2.2	1,651	73.5	2.2	1,928	›››48.2	2.6	1,417	›››5.2	0.8

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Adult and youth interview files. 'Total' column includes persons with missing WIC participation or income.

Table D-117—Percent of women, infants, and children with a regular source of health care

	Total Persons			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Pregnant and postpartum women	667	84.4	2.2	181	77.7	5.0	247	79.7	3.7	185	88.4	2.6
Infants	1,961	96.8	0.5	787	97.8 *	0.5	348	›› 91.3	2.2	731	98.4 *	0.5
Children												
1 year old	1,258	96.4	0.7	419	96.8 *	0.8	391	›› 93.0	1.6	357	› 98.7 *	0.6
2 years old	1,269	94.1	0.7	253	93.1 *	2.2	545	90.8	1.5	387	97.1 *	1.1
3 years old	1,119	95.1	0.8	201	93.8 *	1.7	513	91.4	2.3	325	›› 98.5 *	0.7
4 years old	1,098	93.3	0.9	137	96.0 *	1.2	547	››› 88.7	2.1	342	96.8 *	1.1
All children	4,744	94.7	0.5	1,010	94.9	0.9	1,996	›› 91.0	1.2	1,411	› 97.8	0.5
Total, population adjusted	7,372	92.8	0.6	1,978	91.7	1.2	2,591	› 88.6	1.2	2,327	›› 95.8	0.7

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Table D-118—Percent of women, infants, and children who see a particular doctor

	Total Persons			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Pregnant and postpartum women	667	68.0	2.8	181	52.8	6.0	247	52.2	5.2	185	››› 81.5	2.9
Infants	1,961	84.7	1.0	787	80.0	1.8	348	79.3	2.6	731	››› 90.7	1.8
Children												
1 year old	1,258	81.8	1.6	419	74.4	3.6	391	76.9	2.6	357	››› 89.7	1.6
2 years old	1,269	79.6	1.8	253	68.4	4.5	545	74.2	2.6	387	››› 87.8	2.4
3 years old	1,118	77.0	2.9	201	60.8	5.8	512	› 73.9	3.3	325	››› 84.0	3.3
4 years old	1,098	78.5	2.0	137	70.8	9.4	547	72.4	2.8	342	84.5	3.0
All children	4,743	79.3	1.4	1,010	68.6	3.6	1,995	74.4	1.8	1,411	››› 86.5	1.7
Total, population adjusted	7,371	77.7	1.3	1,978	67.0	2.7	2,590	70.4	1.6	2,327	››› 86.1	1.5

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Adult and youth interview files. 'Total' column includes persons with missing WIC participation or income.

Table D-119—Percent of women, infants, and children who saw a doctor within the past year

	Total Persons			Currently Receiving WIC Benefits			Income-eligible Nonparticipants			Higher-income Nonparticipants		
	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error	Sample size	Percent	Standard Error
Pregnant and postpartum women	666	97.6 *	0.6	181	99.3 *	0.4	246	›› 93.9 *	1.7	185	99.2 *	0.6
Infants	1,961	99.7 *	0.1	787	99.8 *	0.1	348	98.6 *	0.8	731	100.0 *	0.0
Children												
1 year old	1,253	98.6	0.4	418	99.3 *	0.2	388	› 95.9 *	1.4	356	99.5 *	0.4
2 years old	1,269	95.0	0.8	253	95.8 *	1.6	545	›› 89.9	1.7	387	98.6 *	0.6
3 years old	1,118	91.6	1.2	201	85.8	6.4	512	87.6	2.4	325	95.8 *	1.1
4 years old	1,097	87.2	1.6	137	96.2 *	1.1	546	››› 79.2	2.5	342	91.6	2.1
All children	4,737	93.1	0.6	1,009	94.3	1.6	1,991	›› 88.1	1.1	1,410	96.3	0.5
Total, population adjusted	7,364	95.1	0.4	1,977	96.2	1.0	2,585	››› 91.0	0.8	2,326	97.5	0.3

Notes: * Denotes individual estimates not meeting the standards of reliability or precision due to inadequate cell size or large coefficient of variation.
Significant differences in means and proportions are noted by › (.05 level), ›› (.01 level), or ››› (.001 level). Differences are tested in comparison to WIC participants.

Source: NHANES-III, 1988-94: Adult and youth interview files. 'Total' column includes persons with missing WIC participation or income.