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Center for Nutrition  
Policy and Promotion

CNPP-12

# The Healthy Eating Index: 1999-2000



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## Abstract

To assess and monitor the dietary status of Americans, the U.S. Department of Agriculture's Center for Nutrition Policy and Promotion developed the Healthy Eating Index (HEI). The HEI consists of 10 components, each representing different aspects of a healthful diet: Components 1-5 measure the degree to which a person's diet conforms to serving recommendations for the five major food groups of the Food Guide Pyramid (grains, vegetables, fruits, milk, and meat); Components 6 and 7 measure total fat and saturated fat consumption, respectively, as a percentage of total food energy intake; Components 8 and 9 measure total cholesterol and sodium intake; and Component 10 examines variety in a person's diet. The HEI was computed for people 2 years old and over and subgroups of the population; data from the 1999-2000 National Health and Nutrition Examination Survey were used to derive their HEI scores.

Most people had a diet that needs improvement. Ten percent of the population had a good diet, 16 percent had a poor diet, and the remainder had a diet that needs improvement. Americans need especially to improve their consumption of fruit and milk products. Males age 15 to 18, in particular, tended to have lower quality diets. Non-Hispanic Blacks, low-income groups, and those with a high school diploma or less education also had lower quality diets. The diets of Americans have not changed since 1996, but they have improved since 1989. These updated findings provide a better understanding of the types of dietary changes needed to improve people's eating patterns.

## December 2002

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# The Healthy Eating Index: 1999-2000

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# The Healthy Eating Index: 1999-2000

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## Executive Summary

### *Introduction*

To assess and monitor the dietary status of Americans, the U.S. Department of Agriculture's (USDA) Center for Nutrition Policy and Promotion (CNPP) developed the Healthy Eating Index (HEI). CNPP first computed the HEI in 1995 by using 1989-90 data (U.S. Department of Agriculture [USDA], 1995). It then updated the HEI with 1994-96 data in 1998 (Bowman, Lino, Gerrior, & Basiotis, 1998). The HEI is a summary measure of the overall quality of people's diets. This report presents the HEI for 1999-2000—the most recent years for which national data are available to compute the HEI. Data used are from the Federal Government's 1999-2000 National Health and Nutrition Examination Survey, which is nationally representative and contains information on people's consumption of foods and nutrients.

### *Components of the Healthy Eating Index*

The Healthy Eating Index score is the sum of 10 components, each representing different aspects of a healthful diet:

- **Components 1-5** measure the degree to which a person's diet conforms to serving recommendations for the five major food groups of the Food Guide Pyramid: grains (bread, cereal, rice, and pasta), vegetables, fruits, milk (milk, yogurt, and cheese), and meat (meat, poultry, fish, dry beans, eggs, and nuts).
- **Component 6** measures total fat consumption as a percentage of total food energy (calorie) intake.
- **Component 7** measures saturated fat consumption as a percentage of total food energy intake.
- **Component 8** measures total cholesterol intake.
- **Component 9** measures total sodium intake.
- **Component 10** examines variety in a person's diet.

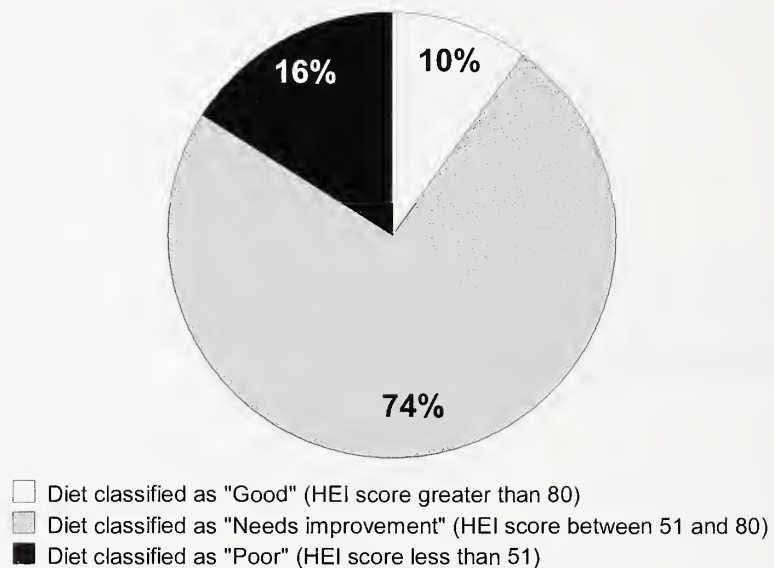
Each component of the Index has a maximum score of 10 and a minimum score of zero. Intermediate scores were computed proportionately. The maximum overall score for the 10 components combined is 100. High component scores indicate intakes close to recommended ranges or amounts; low component scores indicate less compliance with recommended ranges or amounts. An HEI score over 80 implies a "good" diet, an HEI score between 51 and 80 implies a diet that "needs improvement," and an HEI score less than 51 implies a "poor" diet.

## Findings

### Overall HEI Score

The mean HEI score for the U.S. population was 63.8 for 1999-2000. During 1999-2000, most people's (74 percent) diets "needed improvement" (fig. ES-1). Ten percent of the population had a good diet, and 16 percent had a poor diet.

Figure ES-1. Healthy Eating Index rating, U.S. population, 1999-2000



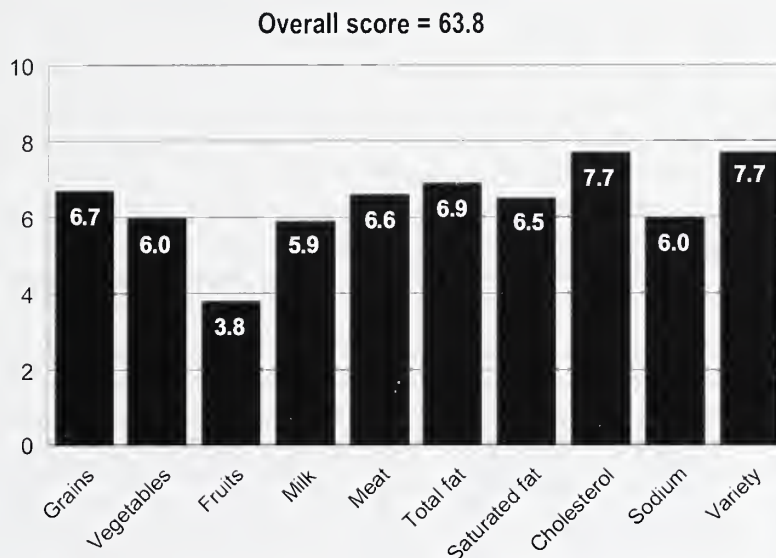
### HEI Component Scores

During 1999-2000, the U.S. population had the highest HEI component scores for cholesterol and variety, each averaging 7.7 on a scale of zero to 10 (fig. ES-2). With an average score of 6.9, the total fat score was the next highest. The fruits component of the HEI had the lowest mean score for the U.S. population (3.8); the milk component, the second lowest score (5.9). For the other HEI components, average scores were generally between 6 and 6.7. Overall, 69 percent of people had a maximum score of 10 for cholesterol—that is, they met the dietary recommendation, and 55 percent had a maximum score for variety. For the other HEI components, only 17 to 41 percent of the population met the dietary recommendations on a given day.

### HEI Scores of Selected Segments of the Population

HEI scores varied by demographic and socioeconomic characteristics of the U.S. population. (The results discussed here are statistically significant.) During 1999-2000, females had a slightly higher HEI score than did males (64.5 vs. 63.2). Children age 2 to 3 had the highest average HEI score (75.7) among all age/gender groups, and as children aged, their HEI scores declined.

Figure ES-2. Healthy Eating Index: Component mean scores, 1999-2000



Note: The overall HEI score ranges from 0 to 100. HEI component scores range from 0 to 10. High component scores indicate intakes close to recommended ranges or amounts; low component scores indicate less compliance with recommended ranges or amounts.

For 1999-2000, non-Hispanic Whites had a higher average HEI score than did non-Hispanic Blacks (64.2 vs. 61.1). Native-born Americans had a lower HEI score than did members of the U.S. population born in Mexico or other countries (63.5 vs. 66 and 65.7). HEI scores generally increased as the level of education and income increased. For example, people with household income below the poverty threshold had an average HEI score of 61.7. By comparison, people with household income over 184 percent of the poverty threshold had an average HEI score of 65. However, regardless of selected characteristics, the average HEI score indicated that people's diets needed improvement.

### Trends in the HEI

The diets of Americans have slightly improved from 1989 to 1999-2000 but have not changed since 1996. In 1989, the HEI score for all people 2 years old and over was 61.5, compared with 63.8 in 1996 and 1999-2000. Saturated fat and variety scores increased steadily while sodium scores decreased steadily over the three periods. These findings provide a better understanding of the types of dietary changes needed to improve people's eating patterns.



## **ARE YOU INTERESTED IN CALCULATING YOUR HEI?**

If so, try the Interactive Healthy Eating Index (IHEI), an on-line interactive self-assessment tool that provides a quick measure of the quality of your overall diet. You will also be able to calculate HEI component scores and nutrient intakes and get a personal Food Guide Pyramid Graphic as well as targeted nutrition education messages. Go to <http://www.cnpp.usda.gov>.

# The Healthy Eating Index: 1999-2000

## Introduction

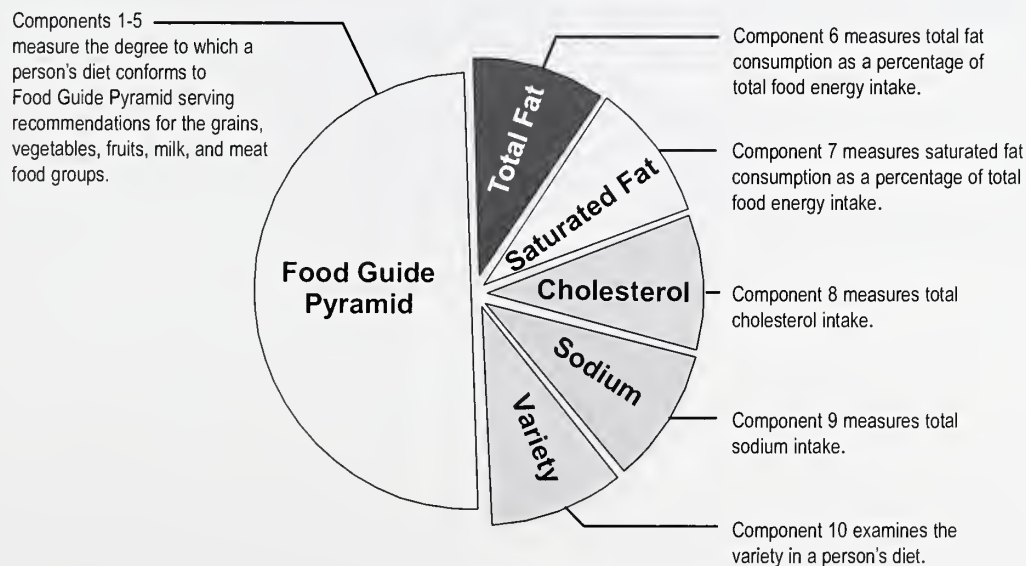
Healthful eating is essential for development and well-being. In the United States today, some dietary patterns are associated with 4 of the 10 leading causes of death (coronary heart disease, certain types of cancer, stroke, and type 2 diabetes) (U.S. Department of Health and Human Services [DHHS], 2000). A healthful diet, however, can reduce major risk factors for chronic diseases such as obesity, high blood pressure, and high blood cholesterol (USDA & DHHS, 2000). Studies have shown an increase in mortality associated with overweight<sup>1</sup> and obesity resulting from poor eating habits (DHHS, 2001). Major improvements in the health of the American public can, therefore, be made by improving people's dietary patterns.

To assess the dietary status of Americans and monitor changes in these patterns, the U.S. Department of Agriculture's (USDA) Center for Nutrition Policy and Promotion (CNPP) developed the Healthy Eating Index (HEI), (Kennedy, Ohls, Carlson, & Fleming, 1995). CNPP's HEI has been computed with 1989-90 and with 1994-96 data. The HEI is a summary measure of the overall quality of people's diets (broadly defined in terms of adequacy, moderation, and variety) (fig. 1).

This report presents the HEI for 1999-2000—the most recent period for which nationally representative data are available to compute the Index. The HEI is calculated for the general population and selected subgroups. A comparison of the 1999-2000 HEI with the HEI of earlier years examines possible trends in the diets of Americans.

<sup>1</sup>The Healthy Eating Index measures overall diet quality but does not necessarily reflect overconsumption.

Figure 1. Components of the Healthy Eating Index



## Components of the Healthy Eating Index

The Healthy Eating Index provides an overall picture of the type and quantity of foods people eat, their compliance with specific dietary recommendations, and the variety in their diets. The total Index score is the sum of 10 dietary components, weighted equally (table 1). Each component of the Index has a maximum score of 10 and a minimum score of zero. The maximum overall HEI score is 100. High component scores indicate intakes close to the recommended ranges or amounts; low component scores indicate less compliance with the recommended ranges or amounts. The 10 components represent various aspects of a healthful diet.

- **Components 1-5** measure the degree to which a person's diet conforms to serving recommendations for the five major food groups of the Food Guide Pyramid: grains (bread, cereal, rice, and pasta), vegetables, fruits, milk (milk, yogurt, and cheese), and meat (meat, poultry, fish, dry beans, eggs, and nuts).
- **Component 6** measures total fat consumption as a percentage of total food energy (calorie) intake.
- **Component 7** measures saturated fat consumption as a percentage of total food energy intake.
- **Component 8** measures total cholesterol intake.
- **Component 9** measures total sodium intake.
- **Component 10** examines variety in a person's diet.

### Food Group Components of the Food Guide Pyramid

The Food Guide Pyramid translates recommendations from the *Dietary Guidelines for Americans* (Dietary Guidelines Advisory Committee, 2000) into types and amounts of foods people can eat to have a healthful diet. The recommended number of Pyramid servings for the five food groups depends on a person's caloric requirement. Table 2 shows the recommended number of servings for the five groups for different age/gender groups and for caloric levels of 1,600, 2,200, and 2,800.

**Table 1. Components of the Healthy Eating Index and scoring system**

	Score ranges <sup>1</sup>	Criteria for maximum score of 10	Criteria for minimum score of 0
Grain consumption	0 to 10	6 - 11 servings <sup>2</sup>	0 servings
Vegetable consumption	0 to 10	3 - 5 servings <sup>2</sup>	0 servings
Fruit consumption	0 to 10	2 - 4 servings <sup>2</sup>	0 servings
Milk consumption	0 to 10	2 - 3 servings <sup>2</sup>	0 servings
Meat consumption	0 to 10	2 - 3 servings <sup>2</sup>	0 servings
Total fat intake	0 to 10	30% or less energy from fat	45% or more energy from fat
Saturated fat intake	0 to 10	Less than 10% energy from saturated fat	15% or more energy from saturated fat
Cholesterol intake	0 to 10	300 mg or less	450 mg or more
Sodium intake	0 to 10	2400 mg or less	4800 mg or more
Variety	0 to 10	8 or more different items in a day	3 or fewer different items in a day

<sup>1</sup>People with consumption or intakes between the maximum and minimum ranges or amounts were assigned scores proportionately.

<sup>2</sup>Number of servings depends on Recommended Energy Allowance—see table 2. All amounts are on a per-day basis.

A maximum score of 10 was assigned to each of the five food group components of the Index when a person's diet met or exceeded the recommended number of servings for a food group, as indicated in table 2. For example, when a person's diet met the serving recommendations of the fruits group, that person's diet was awarded 10 points. For each of the five major food groups, a score of zero was assigned to the respective components when a person did not consume any item from the food group. Intermediate scores were computed proportionately to the number of servings or partial servings consumed. For example, if the serving recommendation for a food group was eight and a person consumed four servings, the component score was 5 points. Similarly, if six servings were consumed, a score of 7.5 was assigned.



**Table 2. Recommended number of Food Guide Pyramid servings per day, by age/gender categories**

Age/gender category	Energy (kilocalories)	Grains	Vegetables	Fruits	Milk	Meat <sup>1</sup>
Children, 2-3 <sup>2</sup>	1300	6	3	2	2	2
†	1600	6	3	2	2	2
Children, 4-6	1800	7	3.3	2.3	2	2.1
Females, 51+	1900	7.4	3.5	2.5	2	2.2
Children, 7-10	2000	7.8	3.7	2.7	2	2.3
Females, 11-24	2200	9	4	3	3	2.4
†	2200	9	4	3	2	2.4
Females, 25-50	2200	9	4	3	2	2.4
Males, 51+	2300	9.1	4.2	3.2	2	2.5
Males, 11-14	2500	9.9	4.5	3.5	3	2.6
†	2800	11	5	4	2	2.8
Males, 19-24	2900	11	5	4	3	2.8
Males, 25-50	2900	11	5	4	2	2.8
Males, 15-18	3000	11	5	4	3	2.8

<sup>1</sup>One serving of meat equals 2.5 ounces of lean meat.

<sup>2</sup>Portion sizes were reduced to two-thirds of adult servings except for milk for children age 2-3.

†Recommended number of servings per day at food energy levels specified in the Food Guide Pyramid (USDA, 1996).

In developing the Index, CNPP used serving recommendations from the Food Guide Pyramid for 1,600, 2,200, and 2,800 kilocalories (kcal) as the basis to interpolate serving recommendations for people with other food energy recommendations (table 2). The Recommended Energy Allowance (REA) for children 2 to 3 years old is less than 1,600 kcal (National Research Council, 1989b). The recommended number of servings was kept at the minimum for these children, but the serving size was reduced to two-thirds of the adult serving, except for milk. This approach is consistent with Food Guide Pyramid guidance. In contrast, adult males 15 to 50 years old have an REA slightly greater than 2,800 kcal (National Research Council, 1989b). Because the Food Guide Pyramid does not specify additional food group servings for caloric levels above 2,800 kcal, CNPP researchers decided that food portions for these individuals would be truncated at the maximum levels recommended in the Food Guide Pyramid (see appendix for other details).

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## Fat and Saturated Fat Components

Total fat intake of less than or equal to 30 percent of total calories in a day was assigned a maximum score of 10 points. This percentage was based on the recommendations of the 2000 *Dietary Guidelines for Americans*. Fat intake equal to or greater than 45 percent of total calories in a day was assigned a score of zero, and fat intake between 30 and 45 percent was scored proportionately.

Saturated fat intake of less than 10 percent of total calories in a day was assigned a maximum score of 10 points. This percentage was also based on the recommendations of the 2000 *Dietary Guidelines for Americans*. Likewise, when saturated fat intake was equal to or greater than 15 percent of total calories in a day, a score of zero was assigned, and intake of saturated fat between 10 and 15 percent was scored proportionately. Percentages for the upper limits of fat and saturated fat intake (45 and 15 percent, respectively) were based on consultation with nutrition researchers and exploration of the consumption distribution of these components.

## Cholesterol Component

A score of 10 points was assigned when daily cholesterol intake was 300 milligrams (mg) or less, the amount based on recommendations of the Committee on Diet and Health of the National Research Council (1989a). When daily intake reached a level of 450 mg or more, a score of zero was assigned, and when intake was between 300 and 450 mg, a proportionate score was assigned. The upper limit for cholesterol intake was based on consultation with nutrition researchers and exploration of the consumption distribution of this component.

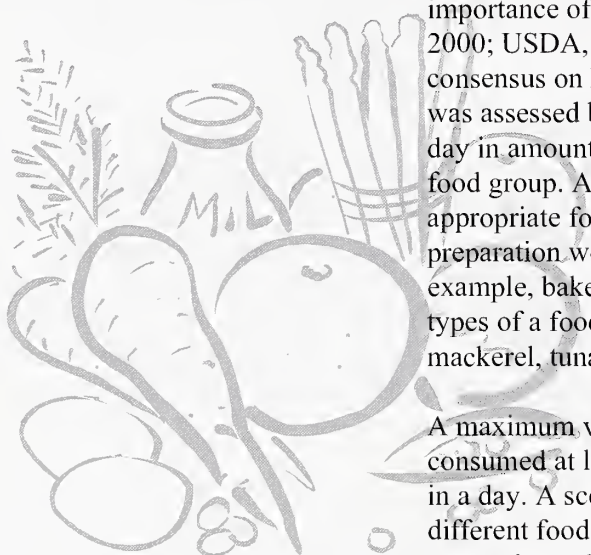
## Sodium Component

A score of 10 points was assigned when daily sodium intake was 2,400 mg or less, the amount based on recommendations of the Committee on Diet and Health of the National Research Council (1989a). A daily intake of 4,800 mg or more received a score of zero, and intake between 2,400 and 4,800 mg received a proportionate score. The upper limit for sodium intake was based on consultation with nutrition researchers and exploration of the consumption distribution of this component. Sodium scores reflect sodium content of foods reported consumed and do not include salt added at the table.

## Variety Component

While the *Dietary Guidelines for Americans*, the Food Guide Pyramid, and the National Research Council's diet and health report all stress the importance of variety in a diet (Dietary Guidelines Advisory Committee, 2000; USDA, 1996; National Research Council, 1989a), there is no consensus on how to quantify variety. Thus, dietary variety for the HEI was assessed by totaling the number of different foods a person ate in a day in amounts sufficient to contribute at least one-half of a serving in a food group. All food ingredients in food mixtures were assigned to their appropriate food category. Foods that differed only by method of preparation were grouped together and counted as one type of food. For example, baked, fried, or boiled potatoes were counted once. Different types of a food were grouped separately. For example: each type of fish—mackerel, tuna, and trout—was counted as a different food.

A maximum variety score of 10 points was assigned when a person consumed at least half a serving each of 8 or more different types of foods in a day. A score of zero was assigned if at least half a serving of 3 or fewer different foods was consumed in a day. Intermediate scores were computed proportionately. These upper and lower limits to estimate food variety were based on consultation with nutrition researchers. The Appendix includes more detail on the coding structure used to compute the variety component of the HEI.



## ***Data Used to Calculate the Healthy Eating Index***

The Federal Government's National Health and Nutrition Examination Survey (NHANES) provides information on people's consumption of foods and nutrients, as well as extensive health-related data, and information about Americans' demographic and socioeconomic characteristics. NHANES data for 1999-2000—the most recent data available—were used to compute the HEI. Previous HEI reports were based on data from the Federal Government's Continuing Survey of Food Intakes by Individuals (CSFII).

For the 1999-2000 NHANES, individuals' dietary intakes were collected for 1 day. Prior research has indicated that food intake data based on 1-day dietary recall are reliable measures of usual intakes of population groups (Basiotis, Welsh, Cronin, Kelsay, & Mertz, 1987). Data were collected through an in-person interview by using the 24-hour dietary recall method. Typically, for children under 6 years old, information was provided by the parent (if the parent was not available, a proxy provided the information); the parent or proxy could also consult with others, such as a day care provider, regarding what the child ate. For children 6 to 11 years old, information was provided by the child with assistance typically from the parent (again, if the parent was not available, a proxy provided the information). Information about dietary intake for individuals 12 years and older was self-reported.

NHANES 1999-2000 is a complex, multistage probability sample of the civilian noninstitutionalized population of the United States. Individuals of all ages were sampled. The NHANES 1999-2000 sample includes expanded samples of Mexican Americans, African Americans, adolescents 12 to 19 years, and adults 60 years and older. In 2000, the sample individual selection probabilities were modified to increase the number of sampled persons in low-income, non-Hispanic White population domains. Additionally, screening and sampling rates were adjusted for women of childbearing age to increase the number of pregnant women included in the sample. Statistical weights were used to make the sample representative of the U.S. population. For more information on the NHANES data, see [www.cdc.gov/nchs/data/nhanes/guidelines1.pdf](http://www.cdc.gov/nchs/data/nhanes/guidelines1.pdf).

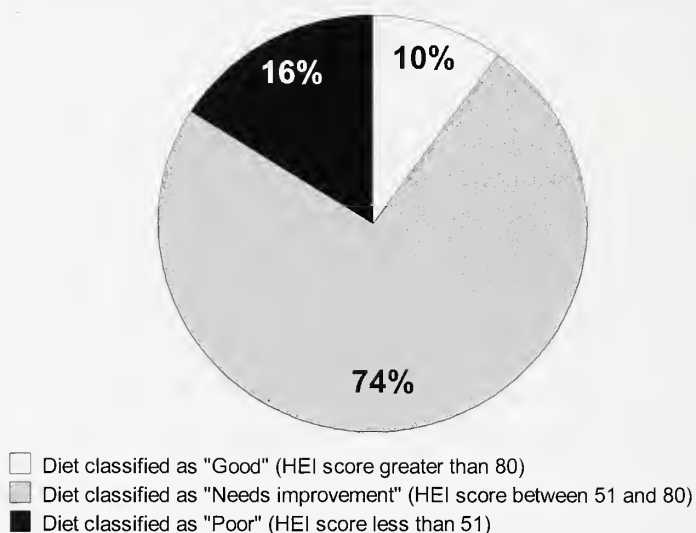
The HEI was computed for all individuals 2 years and older, because dietary guidelines are applicable to people of these ages only. Pregnant women were excluded from this analysis because of their special dietary needs. The final analytical sample size was 8,070 people.

## Results

### Healthy Eating Index Overall Scores

During 1999-2000, the mean HEI score for the U.S. population was 63.8. An HEI score over 80 implies a “good” diet; a score between 51 and 80, a diet that “needs improvement”; and a score less than 51, a “poor” diet.<sup>2</sup> The diets of most people (74 percent) needed improvement (fig. 2). Ten percent of the population had a good diet, and 16 percent had a poor diet.

Figure 2. Healthy Eating Index rating, U.S. population, 1999-2000



### Healthy Eating Index Component Scores

During 1999-2000, the highest mean HEI component scores for the U.S. population were for cholesterol and variety, both averaging 7.7 on a scale of 10 (fig. 3). With an average score of 6.9, total fat accounted for the next highest component score. People had the two lowest mean scores for the fruits and milk components of the HEI, averaging 3.8 and 5.9, respectively. Average scores for the other HEI components were between 6 and 6.7.

Overall, 69 percent of people had a maximum score of 10 for cholesterol—that is, they met the dietary recommendation, and 55 percent had a maximum score for variety during 1999-2000 (fig. 4). Less than 50 percent of the population met the dietary recommendations for the other 8 HEI components. Seventeen percent of people consumed the recommended number of servings of fruit per day; 24 to 30 percent met the dietary recommendation for the grains, vegetables, milk, and meat components of the HEI; and 32 to 41 percent met the dietary recommendations for total fat, saturated fat, and sodium. In general, most people could improve all aspects of their diets.

<sup>2</sup>This scoring system was developed in the initial HEI work by Kennedy et al. (1995) in consultation with nutrition experts.

Figure 3. Healthy Eating Index: Component mean scores, 1999-2000

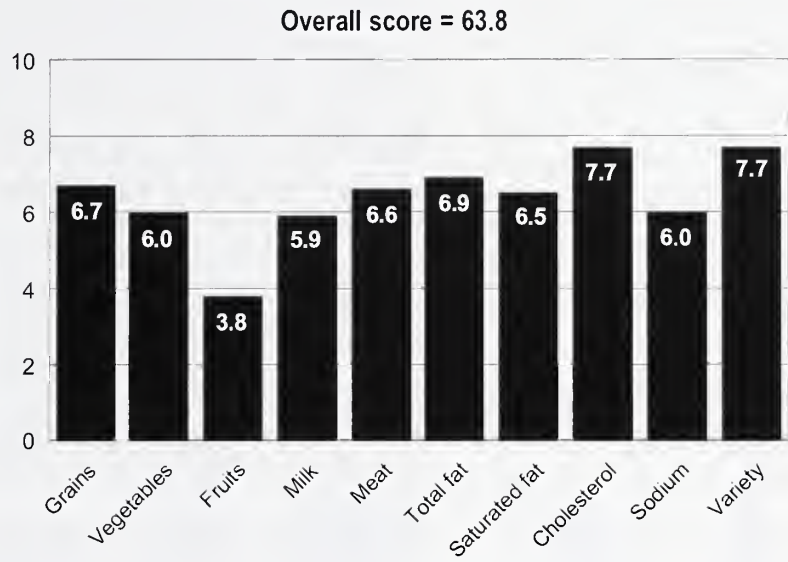
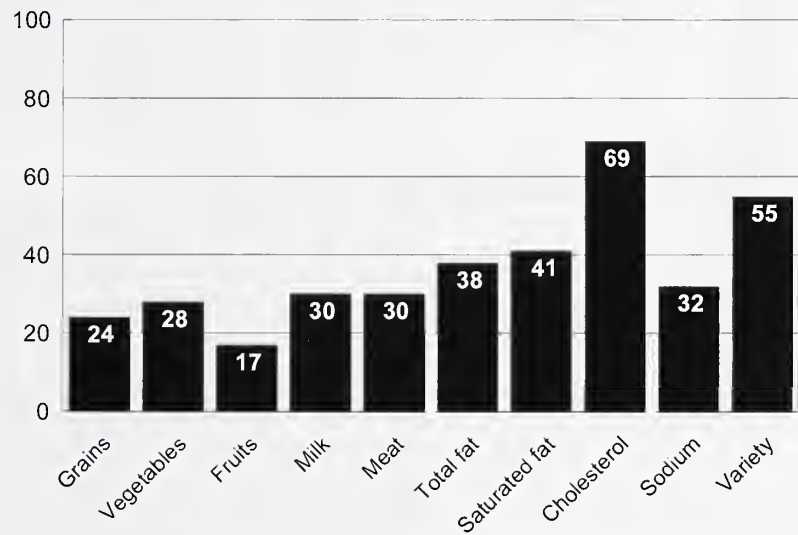


Figure 4. Percent of people meeting the dietary recommendations for the Healthy Eating Index components, 1999-2000



## Healthy Eating Index Scores by Characteristics

HEI scores varied significantly by Americans' demographic and socioeconomic characteristics (table 3).<sup>3</sup> All differences discussed in this section are statistically significant. Females had slightly higher overall scores than did males (64.5 vs. 63.2). Children age 2 to 3 had the highest mean HEI score (75.7) among all children, as well as among all age/gender groups, and older children had lower HEI scores than did younger children. Children age 2 to 3, compared with older children, also scored significantly higher on several components of the HEI: fruits, vegetables, and sodium. For example, children age 2 to 3 had a mean score of 7.3 for fruits, compared with 2.7 for males age 11 to 14. This youngest age group also had a mean score of 6.5 for vegetables, compared with 5.0 for children age 7 to 10. Most age/gender groups had HEI scores in the 61- to 67-point range. Both females and males age 51 and over had higher HEI scores (65.1 to 66.6) than did other adults (61.3 to 63.2).

Mexican Americans had the highest mean HEI score by race/ethnicity—64.5 for 1999-2000. They had significantly higher average scores on the fruits and sodium components of the HEI than was the case for other racial/ethnic groups. While non-Hispanic Whites and other Hispanics had slightly lower overall HEI scores than did Mexican Americans, non-Hispanic Whites had a higher mean overall HEI score than did non-Hispanic Blacks for 1999-2000 (64.2 vs. 61.1). Compared with Whites, Blacks scored significantly lower on the milk and vegetables components of the HEI: an average of 4.5 on the milk and 5.2 on the vegetables components, compared with 6.4 and 6.2 on these two components, respectively, for non-Hispanic Whites. Native-born Americans had a lower quality diet than did members of the U.S. population born in Mexico (63.5 vs. 66).

HEI scores generally increased with levels of education and income. Among adults (age 25 and over) during 1999-2000, those with more than a high school diploma had a higher mean HEI score, compared with those without a high school diploma (65.3 vs. 61.1).

People with household income over 184 percent of the poverty threshold had a higher mean HEI score than did people with household income below the poverty threshold (65 vs. 61.7).<sup>4</sup> People in higher income households had better scores on the grains, vegetables, fruits, milk, meat, and variety components of the HEI than did people in lower income households. People with household income over 184 percent of the poverty threshold had an average variety score of 8.2, while people with household income below the poverty threshold had an average variety score of 7.

<sup>3</sup>The demographic and socioeconomic characteristics of people used in this calculation of the HEI are different from those used in previous HEI reports, because the NHANES collected this information in a manner that differs from CSFII's method of collection; the CSFII was used to calculate the previous HEIs.

<sup>4</sup>In 2000, the poverty threshold was \$11,531 for a family of two, \$13,861 for a family of three, \$17,463 for a family of four, and \$20,550 for a family of five.

**Table 3. Healthy Eating Index, overall and component mean scores, by selected characteristics, 1999-2000**

Characteristic	Overall	Grains	Vegetables	Fruits	Milk	Meat <sup>1</sup>	Total fat	Saturated fat	Cholesterol	Sodium	Variety
<b>Gender</b>											
Male	63.2	6.9	5.9	3.5	6.3	7.2	6.9	6.5	7.1	5.0	8.0
Female	64.5	6.4	6.0	4.1	5.6	6.1	6.9	6.5	8.3	7.0	7.5
<b>Age/gender</b>											
Children, 2-3 <sup>2</sup>	75.7	8.9	6.5	7.3	7.4	6.3	7.8	5.9	8.9	8.3	8.6
Children, 4-6	66.9	7.4	5.0	4.9	7.2	4.9	7.1	5.7	9.1	7.8	7.8
Children, 7-10	66.0	8.0	5.0	3.9	7.7	5.6	7.1	6.0	8.6	6.2	8.0
Females, 11-14	61.4	6.5	5.0	3.6	5.3	5.3	7.0	6.0	8.8	7.0	7.0
Females, 15-18	61.7	6.4	5.6	3.6	4.6	5.3	7.2	6.6	9.0	6.7	6.8
Females, 19-50	63.2	6.1	6.2	3.3	5.5	6.5	6.9	6.6	8.1	6.5	7.5
Females, 51+	66.6	6.4	6.4	5.3	5.3	6.2	6.8	6.7	8.1	7.7	7.7
Males, 11-14	60.8	7.0	4.8	2.7	6.1	5.7	7.3	6.2	8.1	5.9	7.2
Males, 15-18	59.9	7.0	5.1	2.5	6.1	6.8	7.2	6.3	7.0	4.4	7.5
Males, 19-50	61.3	6.6	6.0	2.7	6.1	7.5	6.9	6.6	6.7	4.2	7.9
Males, 51+	65.2	6.7	6.7	4.5	5.9	7.7	6.6	6.7	6.8	5.3	8.4
<b>Race/ethnicity</b>											
Non-Hispanic White	64.2	6.8	6.2	3.7	6.4	6.5	6.7	6.3	7.8	5.8	7.9
Non-Hispanic Black	61.1	6.2	5.2	3.7	4.5	7.0	7.0	6.9	7.4	6.3	7.0
Mexican American	64.5	6.5	5.6	4.1	5.5	6.7	7.3	6.8	7.3	6.8	7.8
Other race <sup>3</sup>	63.4	6.6	5.9	3.8	4.0	6.7	7.5	7.3	8.1	6.3	7.2
Other Hispanic	64.2	6.6	5.4	3.8	5.7	6.6	7.7	7.1	7.8	6.0	7.6
<b>Place of birth</b>											
United States	63.5	6.7	6.0	3.6	6.1	6.6	6.8	6.3	7.7	5.9	7.7
Mexico	66.0	6.4	5.4	4.5	5.2	7.1	7.8	7.6	7.1	7.0	8.0
Other	65.7	6.3	5.8	4.6	5.1	6.6	7.9	7.7	7.8	6.1	7.8
<b>Education<sup>4</sup></b>											
No high school diploma	61.1	6.0	5.5	3.3	4.9	6.9	6.9	6.8	7.2	6.6	7.1
High school diploma	63.0	6.3	6.3	3.7	5.8	7.1	6.6	6.3	7.4	5.7	7.9
More than high school diploma	65.3	6.7	6.7	4.0	6.3	7.0	6.7	6.8	7.5	5.5	8.2
<b>Income as percent of poverty</b>											
<100%	61.7	6.2	5.4	3.5	5.3	6.4	7.1	6.5	7.5	6.8	7.0
100-184%	62.6	6.6	5.6	3.4	5.7	6.3	7.0	6.5	8.0	6.3	7.2
>184%	65.0	6.8	6.3	4.0	6.3	6.7	6.8	6.5	7.7	5.7	8.2

<sup>1</sup>One serving of meat equals 2.5 ounces of lean meat.

<sup>2</sup>Portion sizes were reduced to two-thirds of adult servings except for milk for children age 2-3.

<sup>3</sup>Consists of Asian, Pacific Islander, American Indian, and Alaskan Native.

<sup>4</sup>Consists of people age 25 and over only.

Note: The overall HEI score ranges from 0 to 100. HEI component scores range from 0 to 10. For each subgroup, component scores may not exactly equal the overall score because of rounding.



## **Trends in the Healthy Eating Index**

Based on the demographic and socioeconomic characteristics examined, no subgroup of the population had an average HEI score greater than 80—a score that implies a good diet. Certain segments of the American population had a diet of poorer quality than did other groups. This underscores the need to tailor nutrition policies and programs to meet the needs of different segments of the population, particularly those at a higher risk of having a poor diet.

How has the quality of the American diet changed over time? It has improved slightly since 1989 but has not changed since 1996 (table 4). People's diets were in the "needs improvement" range during all 3 years the HEI was computed. In 1989, the mean HEI score was 61.5. In 1996 and 1999-2000, it was 63.8—a 4-percent increase from 1989. Saturated fat and variety scores steadily increased over the three periods, and sodium scores steadily decreased. Grains, fruits, and total fat scores increased from 1989 to 1996 and then remained constant through 1999-2000. Whereas vegetables and cholesterol scores increased from 1989 to 1996 and decreased thereafter, milk and meat scores decreased from 1989 to 1996 and increased thereafter. The steady decrease in the sodium score (as a result of greater sodium intake) may be related to the increase in the grains score: grain products contribute large amounts of dietary sodium to the diet (Saltos & Bowman, 1997). Because of methodological changes since 1989 in serving calculations of the food groups (Appendix), food group scores in 1996 and 1999-2000 may be smaller than they would be if the same method for calculating the 1989 HEI had been used. Hence, the improvement in people's diets over time is likely greater than what is reported here.

The increase in the HEI from 1989 to 1999-2000 may be due to several factors: the Food Guide Pyramid was introduced, the *Dietary Guidelines for Americans* were revised, and the Nutrition Labeling and Education Act was enacted. These initiatives were aimed at improving the eating habits of Americans. Also, since 1989, many people have become more aware of the health benefits of a better diet that have been promoted through various campaigns. That the HEI has not improved from 1996 to 1999-2000 highlights the need for continual and new nutrition initiatives.

**Table 4. Trends in the Healthy Eating Index, overall and component mean scores**

	1989	1996	1999-2000
<b>Overall</b>	<b>61.5</b>	<b>63.8</b>	<b>63.8</b>
<b>Components</b>			
Grains	6.1	6.7	6.7
Vegetables	5.9	6.3	6.0
Fruits	3.7	3.8	3.8
Milk	6.2	5.4	5.9
Meat	7.1	6.4	6.6
Total fat	6.3	6.9	6.9
Saturated fat	5.4	6.4	6.5
Cholesterol	7.5	7.9	7.7
Sodium	6.7	6.3	6.0
Variety	6.6	7.6	7.7

## Conclusions

Americans' eating patterns, as measured by the HEI, have improved slightly since 1989 but have not changed from 1996 to 1999-2000. In all three periods, the average HEI score indicated that the diets of most Americans needed improvement. In 1999-2000, only 10 percent of Americans had a "good" diet. Of the 10 components of the HEI, cholesterol was the one where the highest percentage (69 percent) of people had a maximum score of 10—that is, they met the dietary recommendation. Fifty-five percent had a maximum score for variety. For the other 8 components of the HEI, only 17 to 41 percent of the population met the dietary recommendations on a given day.

Gender, age, race/ethnicity, place of birth, education, and income are factors that influence diet quality. In general, children less than age 11 had a better diet than did others. Possibly, parents are more attentive to children's diets. Adults over age 50, females, and those with more education and income had a better diet, compared with their counterparts. Non-Hispanic Blacks had a poorer quality diet than did other racial/ethnic groups. The average HEI score of people by selected characteristics, however, still indicated Americans had a diet that needed improvement.

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### Determination of Serving Definitions of the Food Guide Pyramid

For each of the five major food groups, serving definitions used to compute the Index scores were intended to be as consistent as possible with the concepts and definitions described in the Food Guide Pyramid (USDA, 1996). Serving definitions reflect consistency with the underlying rationale in terms of nutrient contributions from each of the five major food groups and the Pyramid concept of defining servings in common household measures and easily recognizable units. The servings calculated in this report were based on the Pyramid Servings database developed by USDA's Agricultural Research Service (USDA, 1998). A few newly reported food items were coded accordingly.

#### *Grains Group (Bread, Cereal, Rice, and Pasta)*

While the basic Pyramid serving definitions were used for most foods in this group, when needed, the grain or complex carbohydrate content of a food provided the basis for the serving definition for some grain-based foods. This was the case for snack-type grain products, grain-based desserts, certain quick breads, and miscellaneous grains, such as breading (i.e., crumbs, croutons, stuffing). For other grain products, such as some quick breads, pancakes, waffles, and taco shells, a combination of the two methods was used.

For yeast breads, some quick breads, rice, pasta, and breakfast cereals, the basic Pyramid definition was used. A serving was defined as 1 slice of bread, with the weight of 1 regular slice of commercial white bread (26 grams) used as a standard of comparison for decisions about serving weights for yeast breads. The Pyramid defines 1/2 a hamburger or submarine roll, English muffin, bagel, or croissant as one bread serving; a muffin or serving of quick bread was defined as 45 grams. For rice, pasta, or cooked breakfast cereals, one serving was defined as 1/2 cup cooked as specified by the Pyramid, and for ready-to-eat breakfast cereals, one serving was defined as 1 ounce, but only ingredients considered typical of grain products were counted toward the serving weight.

When standard serving sizes were not described in the Pyramid, CNPP based a serving on the grain content of the food. Because 1 slice of commercial white bread contains 16 grams of flour, one standard grain serving was defined as the grams of a grain product containing 16 grams of flour. For products containing grain ingredients other than flour and products containing more than one grain ingredient, servings were calculated by summing grain servings from each grain ingredient. Thus, grain servings for a given food were defined on a grain-equivalent basis.

## ***Vegetables Group***

Definitions of vegetable servings were based on those in the Food Guide Pyramid, which defines a serving as 1 cup of raw leafy vegetables; 1/2 cup of other vegetables, cooked or chopped raw; or 3/4 cup of vegetable juice. Often, the food coding database provided several different weights for the various forms in which a vegetable is available for consumption. For vegetables not specified in terms of preparation form, the following general order of priority was used to select a serving weight for a given vegetable: mashed, chopped, sliced, cubed, diced, pieces, and whole. In general, this had the effect of counting as a serving the most dense form of the vegetable for which a weight was available. For dehydrated vegetables (other than dried beans and peas), a serving size of 1/4 cup was assigned; for tomato puree or paste, 1/4 cup was used; and for dried beans and peas, the weight needed to yield 1/2 cup cooked was assigned. For potatoes—baked, boiled, roasted, mashed, and fried—one serving was defined as 1/2 cup; for potato chips, one serving was defined as 1 ounce; for dehydrated potatoes, one serving was the amount of dried potato flakes that yield 1/2 cup of prepared mashed potatoes.

All vegetables in multi-ingredient foods were disaggregated, and any fraction of a serving they contributed to a serving was accounted for in servings from the vegetable group on the Pyramid Servings intake files.

## ***Fruits Group***

Definitions of fruit servings were based on those in the Food Guide Pyramid, which defines a serving as a whole fruit such as a medium apple, banana, or orange; a grapefruit half; a melon wedge; 3/4 cup fruit juice; 1/2 cup berries; 1/2 cup chopped, cooked, or canned fruit; or 1/4 cup dried fruit. For raw fruits, one serving was defined as a whole fruit when the weight of one fruit was equal to or greater than the weight of 1/2 cup raw fruit. For fruits with pits, the serving weight was for 1/2 cup of pitted fruit. For large fruits, such as melons and pineapple, one serving was defined as 1/2 cup raw fruit.

For fruit juices, reconstituted juices, and juices containing less than 10 percent sugar by weight, a serving was defined as 3/4 cup. For juice concentrates, one serving was defined as 1.5 ounces, which is the amount needed to prepare 3/4 cup of reconstituted juice. Other sweetened fruit juices, juice drinks, and fruit ades were handled as mixtures, and servings were determined based on their fruit ingredients.

Servings from all fruits, whether eaten plain or consumed as an ingredient of any food, were counted toward servings of the fruits group. Fruit mixtures were separated into ingredients before serving weights were assigned only when a serving weight consistent with Pyramid guidance could not be determined for the food as consumed.

### ***Milk Group (Milk, Yogurt, and Cheese)***

For milk and yogurt, the serving definition used was taken directly from the Pyramid, which defines a serving as 1 cup of fluid milk or yogurt. For cheeses (includes cottage cheese and cream cheese), serving definitions were based on the Pyramid's underlying criterion for a milk serving, which is that it should provide about the same amount of calcium as 1 cup of skim milk (i.e., 302 mg).

The most frequently used serving definition for natural or processed cheese is 1.5 to 2 ounces, while that for dry cheeses and reduced-fat or nonfat cheeses is 1 ounce. For cottage and ricotta cheeses, servings sizes were defined in terms of the number of cups needed to provide 302 mg of calcium, and fat-free cream cheese was assigned a serving size based on its calcium content. Other types of cream cheese were counted toward the tip of the Pyramid.

Flavored milks, other than those made with whole, lowfat, or skim milk, were handled as mixtures, and serving definitions were based on their milk ingredients. For dry milk, dry whey, and evaporated milk, a serving was defined as the amount needed to yield 1 cup reconstituted or diluted. Frozen yogurt, ice cream, and other frozen dairy desserts were considered as mixtures, and servings were assigned based on their milk ingredients.

Most foods containing milk products were separated into ingredients, and the number of servings from the milk group was determined based on the amount of milk or cheese the servings contained. Exceptions were servings of the grains group and processed meats and meat analogs (i.e., soy-based meat products) that counted toward servings of the meat group.

### ***Meat Group (Meat, Poultry, Fish, Dry Beans, Eggs, and Nuts)***

For the meat group, the Pyramid recommends eating two to three servings each day of meat or meat alternates; this is equivalent to 5 to 7 ounces of cooked lean meat, poultry, or fish. To compute the HEI, CNPP used 2.5 ounces of lean meat as the definition for a serving of the meat, poultry, or fish group. Cooked lean meat is defined as meat, poultry, or fish that contains 9.35 grams or less fat per 100 grams or at least 90.65 grams that is not fat per 100 grams.

For meat alternates, the Pyramid specifies amounts equivalent to 1 ounce of cooked lean meat as follows: 1/2 cup of cooked dry beans or peas, 1 egg, 2 tablespoons of peanut butter, 1/3 cup of nuts, 1/4 cup of seeds, and 1/2 cup of tofu. The same serving unit, ounces of cooked lean meat equivalents, was used for all foods that count toward the meat group. This measure standardizes the definition of a serving unit across the different types of foods that count toward the meat group and presents the data in the unit of

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measure in which the recommendation for the meat group is specified. Dry beans and peas were first assigned to the meat group when the meat serving recommendations for meat were not met, after which they were added to the vegetables group.

### ***Allocation of Mixtures to Individual Food Groups***

In calculating the HEI, CNPP found it necessary to assign the foods in mixtures, in the appropriate amounts, to their constituent food groups. Pizza, for example, can make significant contributions to several food groups, including grains, vegetables, milk, and meat. The approach used was a straightforward extension of the one used to estimate serving sizes. Commodity compositions of foods were identified and then assigned to appropriate food groups based on calculated gram-per-serving-size factors.

## **Estimation of Food Group Serving Requirements by Age and Gender**

To score food group consumption, CNPP determined the recommended number of servings by food group for each person who participated in the 1999-2000 NHANES. The Food Guide Pyramid contains recommended number of servings of food groups for many age/gender categories, and these recommendations were used. Most age/gender groups had Recommended Energy Allowances (REAs) that were different from the three levels of energy intakes presented in the Food Guide Pyramid. Interpolations were used to estimate the required number of food group servings for each of these age/gender groups. Food servings specified in the Food Guide Pyramid for three food energy levels were used as a basis for interpolating comparable food servings at other energy levels for each food group.

Children 2 to 3 years old have an REA less than the lowest calorie level in the Food Guide Pyramid. Extrapolation of the Food Guide Pyramid's recommended number of servings to a lower calorie level would result in a lower number of servings than the minimums. However, the Food Guide Pyramid suggests that these children eat smaller servings except for milk. The number of servings for children 2 to 3 years old was, therefore, held constant at the minimum, but the serving sizes were reduced to two-thirds of the adult serving, except for milk, where the serving size was kept at the original level.

Similarly, males 15 to 50 years old have REAs slightly higher than the highest calorie level in the Food Guide Pyramid. Simple extrapolation would result in a greater number of servings than the maximums. Because the Food Guide Pyramid does not specify food group servings for diets beyond 2,800 kilocalories, CNPP truncated the food group servings at the maximum numbers indicated by the Food Guide Pyramid.

## Design Alternatives: What to Count

Foods often fall predominately within one food group but may contain small amounts of other food groups. For example, salad dressings may contain small amounts of milk or cheese. To capture their nutrient contributions, CNPP included even relatively small amounts of such incidental foods, for the most part, in serving calculations of the relevant Pyramid food group. For a few foods, milk (but not cheese) that was an ingredient was not counted toward milk group servings. These foods (e.g., rolls) included grain products that counted toward servings of the grains group and processed meats and meat analogs (e.g., bologna) that counted toward servings of the meat group.

With these exceptions, CNPP counted ingredient contributions to various food groups in computing the HEI, without imposing minimum-size cutoff values. The following examples illustrate some of the implications of this approach:

- The nutrition value from condiments, such as mayonnaise, was counted in computing the HEI.
- The nutrition value of milk used in some sweets, such as a milk chocolate bar, was counted in the milk group. If allocated to a single food group, the chocolate bar would have been assigned to the “sweets” group and not counted in the HEI.
- Fruit juice in a soft drink that is at least 10 percent fruit juice was counted in computing the HEI. Water and sugar in the soft drink were not counted.
- The potato content of potato chips was counted in computing the HEI. Fat content was not counted in computing the vegetables and variety components of the HEI but was counted in computing the fat component.

## Coding Structure Used to Compute the Variety Component of the HEI

The food coding structure used to compute the HEI was based on USDA’s coding structure for the 1994-96 CSFII; a few food items that were newly reported were coded similarly. Food items that were similar but coded separately in the CSFII were grouped together to compute the variety score. The following principles were used to make food variety coding decisions:

- Foods that were nutritionally similar were grouped together.
- Foods made with separate commodities were generally grouped separately.



- Foods differing only in fat content were generally grouped together.
- Vegetables were each given separate codes, but different forms of the same vegetable were coded together.
- Different forms of the same meat were generally coded the same; organ meats and ham were two exceptions.
- Each type of fish was given a separate code, but different cooked or processed forms of the same fish received the same code.
- Most forms of fluid milk had the same code.
- Most cheeses had the same code; the exception was cottage cheese.
- All white breads were given the same code. Sweet rolls and pasta received different codes.
- Whole wheat products were coded differently than were products made with refined wheat flour.
- Ready-to-eat cereals were assigned codes based on the main grain in the cereal. Those made from different grains received different codes.

Food mixtures were broken down into their constituent components; this helped with coding. A person had to consume at least one-half a serving of a variety code in order for the variety code to count. For example, a person might consume a serving of raisins (1/2 cup) in one sitting, or a person might consume a raisin muffin in the morning and have a cookie containing raisins later in the day. As long as the person ate at least one-half serving (1/4 cup) of raisins during the day, he or she would get credit for eating raisins.

A second conversion assumption used was that food mixtures containing two or more components from the same food group, such as mixed vegetables, could be reasonably and equally allocated to the two or more variety codes of the components that were present. Thus, a mixture containing carrots, corn, peas, and beans would count towards all four variety areas. However, the person must consume at least half a serving of each one for it to count in the day's total.



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