The Healthy Eating Index: 1994-96

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Abstract

To assess and monitor the dietary status of Americans, the United States Department of Agriculture's (USDA) Center for Nutrition Policy and Promotion developed the Healthy Eating Index (HEI). The HEI is composed 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 USDA's Food Guide Pyramid serving recommendations for the five major food groups (grains, vegetables, fruits, milk, and meat); Components 6 and 7 measure total fat and saturated fat consumption 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 of age and over and subgroups of the population using data from the 1994-96 Continuing Survey of Food Intakes by Individuals. Most people have a diet that needs improvement. Approximately 12 percent of the population have a good diet, and 18 percent of people have a poor diet. Americans especially need to improve their fruit and milk products consumption. Males age 15 to 18, in particular, tend to have lower quality diets. African Americans, people with low income, and those with a high school diploma or less education also have lower quality diets. These findings provide an awareness and better understanding of the types of dietary changes needed to improve people's eating patterns.

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The Healthy Eating Index 1994-96

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Foreword

I am pleased to present the newly updated *Healthy Eating Index* for 1994-96. The *Healthy Eating Index* measures how well the diet of Americans conforms to the recommendations of the *Dietary Guidelines for Americans* and the Food Guide Pyramid. It may be considered as a report card on the overall quality of diet consumed by Americans. Originally designed and developed by the USDA Center for Nutrition Policy and Promotion, the *Healthy Eating Index* is a single summary measure to assess changes in food consumption patterns.

The first *Healthy Eating Index* reported the eating patterns of Americans for the 1989-90 period. With the current *Healthy Eating Index* and future updates, we can begin to examine food consumption trends that will permit researchers to analyze how well Americans eat and to help professionals devise effective nutrition promotion strategies.

The mission of the Center for Nutrition Policy and Promotion is to improve the nutritional status of Americans by serving as the focal point within the Department of Agriculture for linking scientific research to the dietary needs of the consumer. This mission is crucial. Poor diet is a significant contributing factor in 4 of the 10 leading causes of death in our country: Heart disease, cancer, stroke, and diabetes. These diseases account for 1.4 million deaths annually, nearly two-thirds of deaths in the United States. Diet also plays a critical role in other health concerns such as obesity, hypertension, and osteoporosis. Together, these diet-related diseases cost society an estimated $250 billion each year in medical costs and lost productivity.

The *Healthy Eating Index* is an excellent tool not only for assessing the quality of diet of Americans but also for possible use in better understanding the impact of food choices on Americans' health. *The Healthy Eating Index* will serve as a performance measure for the success of nutrition intervention efforts to improve dietary habits.

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Executive Summary

Introduction

To assess and monitor the dietary status of Americans, the United States Department of Agriculture's (USDA) Center for Nutrition Policy and Promotion (CNPP) developed the Healthy Eating Index (HEI) and first computed it using 1989 data *(13)*. The HEI is a summary measure of people's overall diet quality. This report presents the HEI for 1994-96—the most recent years for which national data are available to compute the HEI. Data used are from USDA's 1994-96 Continuing Survey of Food Intakes by Individuals, a nationally representative survey containing 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 the USDA's Food Guide Pyramid serving recommendations for the five major food groups: Grains group (bread, cereal, rice, and pasta), vegetables group, fruits group, milk group (milk, yogurt, and cheese), and meat group (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.

Findings

Overall HEI Score

The mean HEI score is 63.6 for 1994, 63.5 for 1995, and 63.8 for 1996 (table ES-1). 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. Between 1994 and 1996, the diets of most people (70 percent) were in the ‘‘needs improvement’’ range. Approximately 12 percent of the population had a good diet, and 18 percent had a poor diet.

Table ES-1. Healthy Eating Index: Overall and component mean scores, 1994-96

	Year			
	1994	1995	1996	1994-96
Overall	63.6	63.5	63.8	63.6
Components				
Grains	6.6	6.7	6.7	6.7
Vegetables	6.1	6.2	6.3	6.2
Fruits	3.9	3.9	3.8	3.9
Milk	5.4	5.4	5.4	5.4
Meat	6.6	6.5	6.4	6.5
Total fat	6.8	6.8	6.9	6.8
Saturated fat	6.4	6.3	6.4	6.4
Cholesterol	7.9	7.7	7.9	7.8
Sodium	6.3	6.3	6.3	6.3
Variety	7.7	7.6	7.6	7.6

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

HEI Component Scores

Over the 1994-96 period, mean HEI component scores for the U.S. population were highest for cholesterol. The cholesterol score averaged 7.8 on a scale of zero to 10. With an average score of 7.6, the variety score was the second highest. The fruits component of the HEI had the lowest mean score (3.9), and the milk component accounted for the second lowest score (5.4). For the other HEI components, average scores were generally between 6 and 7 for the population. Overall, 71 percent of people had a maximum score of 10 for cholesterol—that is, they met the dietary recommendation. Fifty-two percent had a maximum score for variety over the 3 years. For the other HEI components, only 17 to 40 percent of the population met the dietary recommendations on a given day

HEI Scores by Selected Characteristics

HEI scores varied by demographic and socioeconomic characteristics. Over the 1994-96 period, females had an average HEI score about one point higher than that of males (64 vs. 63). Children age 2 to 3 had the highest average HEI score (74) among all age/gender groups, and as children aged, their HEI scores declined.

HEI scores generally increased as the level of income and education increased. People with household income 50 percent of the poverty threshold or below had an average HEI score of 60. By comparison, people with household income over three times the poverty threshold had an average HEI score of 65. Whites had a higher average HEI score than African Americans had for 1994-96 (64 vs. 59). By region, people who lived in the Northeast had the highest HEI score, an average of 65 for 1994-96, and those who lived in the South had the lowest score, an average of 62.

HEI: 1989 vs. 1996

The diets of Americans have slightly, but significantly, improved since 1989. However, people's diets need further improvement. In 1989, the HEI score for all people 2 years of age and over was 61.5 compared with 63.8 in 1996—a 4-percent increase. Between 1989 and 1996, the Federal Government introduced nutrition education initiatives, such as the Food Guide Pyramid, the Nutrition Labeling and Education Act, and the revised *Dietary Guidelines for Americans*, which may have contributed to this increase. Scores increased for all HEI components from 1989 to 1996, except for milk, meat, and sodium. Scores improved the most for the saturated fat and variety components of the Index.

The Healthy Eating Index: 1994-96

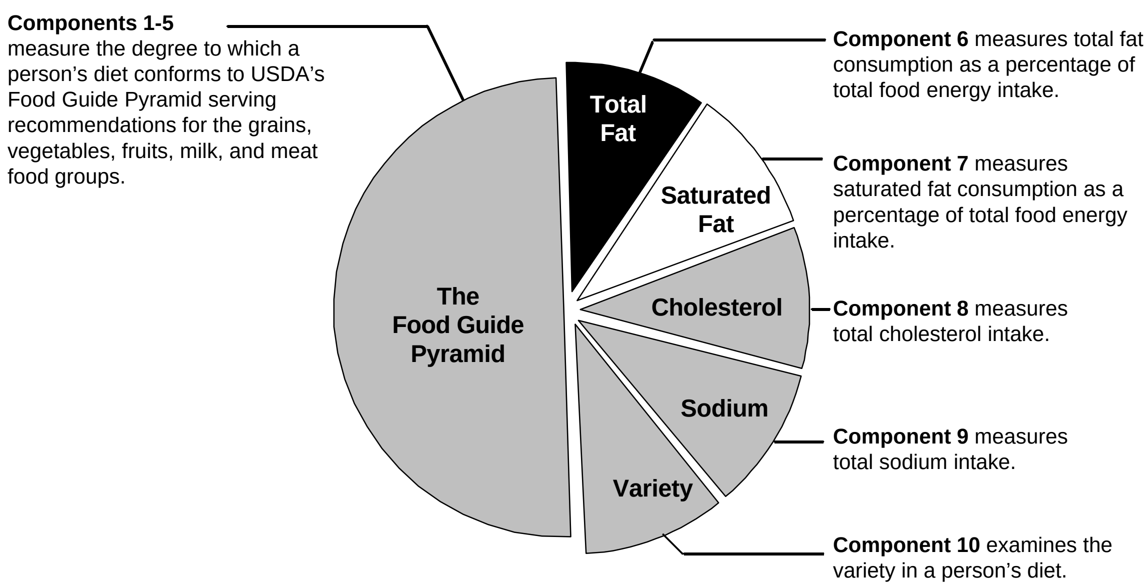
Introduction

Some recent reports have indicated that in 4 of the 10 leading causes of death in the United States (cardiovascular disease, certain types of cancer, stroke, and diabetes) diet and lack of physical activity are significant contributing factors *(4,11)*. It has been well documented that a healthful diet reduces the risk of chronic diseases such as cardiovascular disease and certain forms of cancer *(7,16)*. A study using a healthy diet indicator, based on the World Health Organization's dietary recommendations, found that mortality was lowest in people with the healthiest diets *(5)*. 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), based on the work of Kennedy *et al. (6)*, and first computed the Index using 1989 data. The HEI is a summary measure of people's overall diet quality (broadly defined in terms of adequacy, moderation, and variety). The Index consists of scores for consumption of the recommended number of servings of each of the five major Food Guide Pyramid food groups *(14)*; intake of total fat, saturated fat, cholesterol, and sodium; and a measure of dietary variety (fig. 1). The HEI is the only instrument that gauges overall diet quality of the population that is computed on a regular basis. According to the American Dietetic Association, the Index is ''The most accurate measurement to date on how Americans eat'' *(1)*.

This report presents the HEI for 1994-96—the most recent years 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 1996 HEI with the 1989 HEI is also made to examine possible trends in the diets of Americans.

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. Each component of the Index has a maximum score of 10 and a minimum score of zero (table 1). 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. These components are

- **Components 1-5** measure the degree to which a person's diet conforms to the USDA Food Guide Pyramid serving recommendations for the five major food groups: Grains group (bread, cereal, rice, and pasta), vegetables group, fruits group, milk group (milk, yogurt, and cheese), and meat group (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 the variety in a person's diet.

USDA Food Guide Pyramid Food Group Components

The USDA Food Guide Pyramid translates recommendations from the *Dietary Guidelines for Americans (15)* into types and amounts of foods people can eat to achieve a healthful diet. The HEI examines dietary intake in relation to servings of the five major groups in the Food Guide Pyramid: Grains, vegetables, fruits, milk, and meat. The recommended number of servings 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 1600, 2200, and 2800.

A maximum score of 10 was assigned to each of the five food group components of the Index if a person's diet met or exceeded the recommended number of servings for a food group, as indicated in table 2, p. 4. For example, if a person's diet met the fruits group serving recommendations, then 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 if a person did not consume any item from the food group. Intermediate scores were computed proportionately to the number of 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 1. Components of the Healthy Eating Index and scoring system

	Score Ranges[1]	Criteria for Maximum Score of 10	Criteria for Minimum Score of 0
Grain consumption	0 to 10	6 - 11 servings[2]	0 servings
Vegetable consumption	0 to 10	3 - 5 servings[2]	0 servings
Fruit consumption	0 to 10	2 - 4 servings[2]	0 servings
Milk consumption	0 to 10	2 - 3 servings[2]	0 servings
Meat consumption	0 to 10	2 - 3 servings[2]	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
Food variety	0 to 10	8 or more different items in a day	3 or fewer different items in a day

[1]People with consumption or intakes between the maximum and minimum ranges or amounts were assigned scores proportionately.
[2]Number of servings depends on Recommended Energy Allowance----see table 2. All amounts are on a per day basis.

In developing the Index, the researchers used serving recommendations from the Food Guide Pyramid for 1600, 2200, and 2800 kilocalories as the basis to interpolate serving recommendations for people with other food energy recommendations. The Recommended Energy Allowance (REA) *(8)* for children 2 to 3 years of age is less than 1600 kilocalories. The recommended number of servings was kept at the minimum serving level for these children, but the serving size was scaled downward to be proportionate with their food energy recommendations. This approach is consistent with Food Guide Pyramid guidance. In contrast, adult males 15 to 50 years old have an REA slightly greater than 2800 kilocalories *(8)*. Since the Food Guide Pyramid does not specify additional food group servings for caloric levels above 2800 kilocalories, researchers decided that food portions for these individuals would be truncated at the maximum levels recommended in the Food Guide Pyramid. The Appendix includes more details on determination of Food Guide Pyramid serving definitions, estimation of food group serving requirements by age and gender, and design alternatives.

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

Age/gender category	Energy (kilocalories)	Grains	Vegetables	Fruits	Milk	Meat[1]
Children 2-3[2]	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

[1]One serving of meat equals 2.5 ounces of lean meat.
[2]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 *(14).*

Fat and Saturated Fat Components

Index scores for fat and saturated fat intakes were examined in proportion to total food energy expressed as kilocalories. 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 is based on the 1995 recommendations of the *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. Intake of fat 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 is also based on the 1995 recommendations of the *Dietary Guidelines for Americans.* Saturated fat intake equal to or greater than 15 percent of total calories in a day, was assigned a score of zero. Intake of saturated fat between 10 and 15 percent was scored proportionately. The upper limit percentages for fat (45 percent) and saturated fat (15 percent) were based on consultation with nutrition researchers and exploration of the consumption distribution of these components.

Cholesterol Component

The score for cholesterol was based on the amount consumed in milligrams. A score of 10 points was assigned when daily cholesterol intake was 300 milligrams or less. This amount is based on recommendations of the Committee on Diet and Health of the National Research Council and represents a consensus of experts in foods and nutrition, medicine, epidemiology, public health, and related fields *(7)*. A score of zero was assigned when daily intake reached a level of 450 milligrams or more. Intake between 300 and 450 milligrams was scored proportionately. The upper limit amount for cholesterol intake was based on consultation with nutrition researchers and exploration of the consumption distribution of this component.

Sodium Component

The score for sodium was based on the amount consumed in milligrams per day. A score of 10 points was assigned when daily sodium intake was 2400 milligrams or less, the amount based on recommendations of the Committee on Diet and Health of the National Research Council *(7)*. A daily intake of 4800 milligrams or more received zero points. Intake between 2400 and 4800 milligrams was scored proportionately. The upper limit amount for sodium intake was based on consultation with nutrition researchers and exploration of the consumption distribution of this component.

Variety Component

The Dietary Guidelines, the Food Guide Pyramid, and the National Research Council's diet and health report all stress the importance of variety in a diet *(3,7,14)*. There is no consensus, however, on how to quantify variety. Dietary variety was assessed by totaling the number of different foods that a person ate in a day in amounts sufficient to contribute at least one-half of a serving in a food group. Food mixtures were disaggregated into their food ingredients and assigned to the appropriate food category. Foods that differed only by preparation method 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 considered to be a different food.

A maximum variety score of 10 points was assigned if a person consumed at least half a serving each of 8 or more different kinds of foods in a day. A score of zero was assigned if 3 or fewer different foods were consumed by a person in a day. Intermediate scores were computed proportionately. These upper and lower limit amounts to gauge 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 and Methods Used To Calculate the Healthy Eating Index

USDA's Continuing Survey of Food Intakes by Individuals (CSFII) provides information on people's consumption of foods and nutrients. In addition to dietary intake information, the CSFII contains extensive information about Americans' demographic and socioeconomic characteristics. CSFII data for 1994-96—the most recent data available—were used to compute the HEI.

For the 1994-96 CSFII *(12)*, dietary intakes of individuals were collected on 2 nonconsecutive days. Data were collected through an in-person interview using the 24-hour dietary recall method. For individuals under age 12, information was provided by the parent or main meal provider. The survey was designed to be representative of the U.S. population living in households. Lower income households were oversampled to increase the precision level in analyses of this group. Weights were used to make the sample representative of the U.S. population.

The HEI was computed for people with complete food intake records for the first day of the survey. This allows for comparisons across the years. Prior research has indicated that food intake data based on 1-day dietary recall are reliable measures of usual intakes of groups of people *(2)*. The HEI was computed for all individuals 2 years and older, because dietary guidelines are applicable to people of these ages only. Pregnant and lactating women were excluded because of their special dietary needs. Final sample sizes were approximately 5,200 in 1994, 4,900 in 1995, and 4,800 in 1996.

Study Results

Overall Healthy Eating Index Scores

The mean HEI score is 63.6 for 1994, 63.5 for 1995, and 63.8 for 1996 (table 3, p. 8). 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.[1] Between 1994 and 1996, the diets of most people (70 percent) needed improvement (fig. 2). About 12 percent of the population had a good diet, and 18 percent had a poor diet.

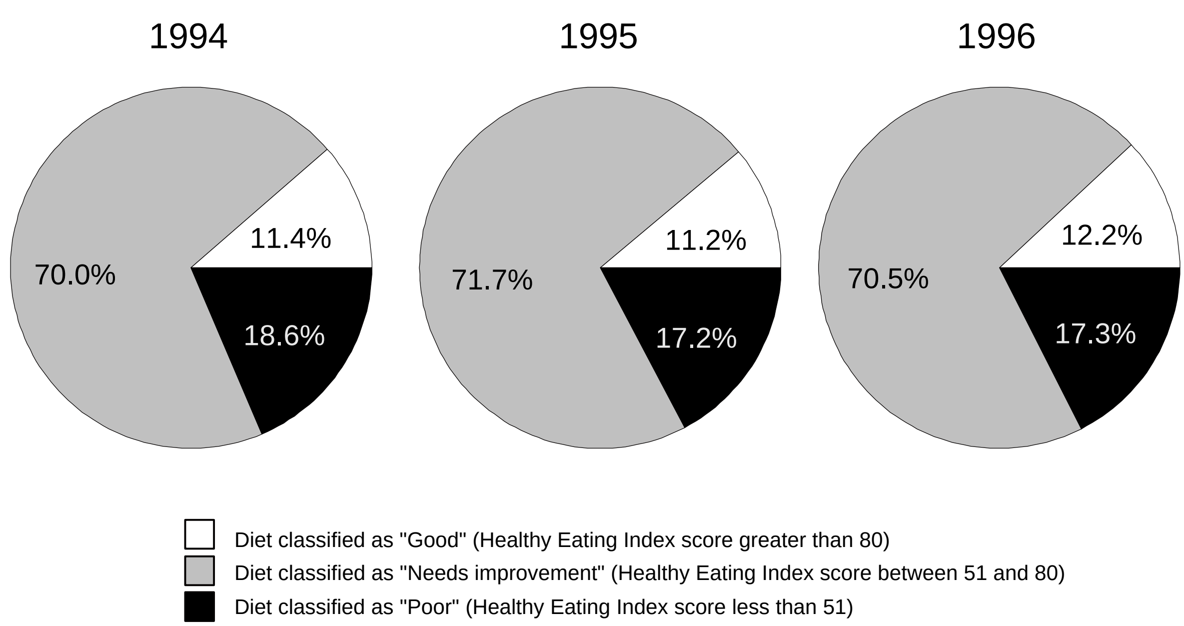
[1]This scoring system for a ‘‘good’’ diet, a diet that ‘‘needs improvement,’’ and a ‘‘poor’’ diet was developed in the initial HEI work by Kennedy *et al*. *(6)* in consultation with nutrition experts.

Healthy Eating Index Component Scores

During the 1994-96 period, the highest mean HEI component score for the U.S. population was for cholesterol (table 3). The cholesterol score averaged 7.8 on a scale of 10. With an average score of 7.6, variety accounted for the second highest component score. The fruits and milk components of the HEI had the two lowest mean scores over 1994-96, with an average of 3.9 and 5.4, respectively. Average scores for the other HEI components were between 6 and 7.

Overall, 71 percent of people had a maximum score of 10 for cholesterol—that is, they met the dietary recommendation (table 4). Fifty-two percent had a maximum score for variety over the

Figure 2. Healthy Eating Index Rating, U.S. population, 1994-96



3 years. Fewer than 50 percent of the population met the dietary recommendations for the other 8 HEI components during 1994-96. Approximately 17 percent of people consumed the recommended number of servings of fruit per day. Twenty-two to 31 percent of people met the dietary recommendations for the grains, vegetables, milk, and meat components of the HEI. Thirty-five to 40 percent of people met the dietary recommendations for total fat, saturated fat, and sodium. In general, most people could improve in all aspects of their diets.

Healthy Eating Index Scores by Characteristics

HEI scores varied by Americans' demographic and socioeconomic characteristics (table 5, p. 10). Females had slightly higher scores than males. Children age 2 to 3 had the highest average HEI score (74 for 1994-96) among all children, as well as among all age/gender groups. Older children have lower HEI scores than younger children. Children age 2 to 3 scored particularly higher on the fruits and milk components of the HEI than older children. For example, the average fruit score for children age 2 to 3 was 7 for 1994-96 compared with 3.5 for males age 11 to 14; the average milk score for children age 2 to 3 was 7.3 compared with 5.2 for females age 11 to 14 (data not shown in tables). Most age/gender groups had HEI scores in the 60- to 69-point range. Both females and males age 51 and over had higher HEI scores than other adults.

Table 3. Healthy Eating Index: Overall and component mean scores, 1994-96

	Year			
	1994	1995	1996	1994-96
Overall	63.6	63.5	63.8	63.6
Components				
Grains	6.6	6.7	6.7	6.7
Vegetables	6.1	6.2	6.3	6.2
Fruits	3.9	3.9	3.8	3.9
Milk	5.4	5.4	5.4	5.4
Meat	6.6	6.5	6.4	6.5
Total fat	6.8	6.8	6.9	6.8
Saturated fat	6.4	6.3	6.4	6.4
Cholesterol	7.9	7.7	7.9	7.8
Sodium	6.3	6.3	6.3	6.3
Variety	7.7	7.6	7.6	7.6

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

Asian and Pacific Islander Americans had the highest HEI score by race—an average of 67 for 1994-96. Asian and Pacific Islander Americans had higher average scores on the grains and fat components of the HEI than other racial groups (data not shown in tables). Whites had a higher average HEI score than African Americans had for 1994-96 (64 vs. 59). Compared with Whites, African Americans scored particularly lower on the milk and fat components of the HEI. African Americans scored an average of 4.2 on the milk and 6.2 on the fat components during 1994-96, whereas Whites scored an average of 5.7 and 6.8 on these two components, respectively (data not shown in tables). There was almost no difference in diet quality between Hispanics and those not Hispanic (Hispanics may be of any race).

HEI scores generally increased with levels of income. People with household income 50 percent or below the poverty threshold had an average HEI score of 60 for 1994-96, and those with household income between 51 and 100 percent of the poverty threshold had an average HEI score of 61.[2] By comparison, people with a household income over three times the poverty threshold had an average HEI score of 65 for 1994-96.

Income is a good predictor of ability to purchase food. Higher income groups have the ability to buy relatively expensive foods, such as fresh fruits and lean meats, which result in a better diet quality. They also are able to have more variety in their diets. People in higher income households did better on the saturated fat and sodium components of the HEI than did people in lower income households. People with household income over three times the poverty threshold had an average score of 6.6 for saturated fat and 7.9 for sodium; those with household income 50 percent or below the poverty threshold had an average score of 5.7 for saturated fat and 6.6 for sodium (data not shown in tables).

Education level was positively associated with a better diet. People with a high school diploma or less had an average HEI score of 61 for 1994-96, whereas those with 4 years of college had an average HEI score of 66, and those with more than 4 years of college had an average HEI score of 68. Education may be a predictor of people's ability to translate nutrition guidance information into better dietary practices *(17)*. Higher education is also associated with higher earnings. The difference in HEI scores between the lowest and highest education categories was about 7 points.

[2]In 1995, the poverty threshold was $9,935 for a family of two, $12,156 for a family of three, $15,570 for a family of four, and $18,407 for a family of five.

Table 4. Percent of people meeting the dietary recommendations for Healthy Eating Index components

Components	Year			
	1994	1995	1996	1994-96
Grains	21.9	23.0	22.2	22.4
Vegetables	29.4	30.8	31.8	30.7
Fruits	17.8	17.4	17.1	17.4
Milk	25.4	25.4	25.5	25.4
Meat	29.8	29.1	26.4	28.4
Total fat	36.8	36.5	37.5	36.9
Saturated fat	40.3	39.1	40.1	39.8
Cholesterol	71.2	68.8	71.9	70.6
Sodium	35.4	34.5	34.7	34.9
Variety	52.2	52.0	53.0	52.4

Note: For each component, a person received a maximum score of 10 for meeting the dietary recommendations.

There were regional differences in diet quality. People in the Northeast had the highest HEI score, an average of 65 for 1994-96, and those in the South had the lowest score, an average of 62. People in the South scored lower on the total fat component of the HEI than people in other regions (data not shown in tables). People who lived in an urban area (a Metropolitan Statistical Area in or outside a central city) also had a slightly higher HEI score than did people who lived in a nonurban area. This could be because average income, which is an indicator of one's ability to purchase food, is lower in nonurban than in urban areas.

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 have a diet of poorer quality than 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.

Table 5. Healthy Eating Index, overall mean scores by selected characteristics, 1994-96

Characteristic	Index score 1994	1995	1996	1994-96
Gender				
Male	63.0	63.0	62.6	62.9
Female	64.2	64.0	65.0	64.4
Age/gender				
Children 2-3	74.4	74.0	73.2	73.9
Children 4-6	66.4	68.8	68.0	67.7
Children 7-10	66.9	67.1	65.9	66.6
Females 11-14	63.1	63.5	64.0	63.5
Females 15-18	61.4	58.4	62.5	60.8
Females 19-50	61.8	61.2	62.7	61.9
Females 51+	67.1	67.6	67.5	67.4
Males 11-14	62.4	63.2	61.2	62.3
Males 15-18	60.4	61.4	60.2	60.7
Males 19-50	61.2	60.6	60.6	60.8
Males 51+	64.0	64.0	65.2	64.4
Race				
White	64.2	63.9	64.4	64.2
African American	58.9	59.5	59.4	59.3
Asian/Pacific Islander American	65.8	66.7	68.0	66.8
Other[1]	64.8	64.5	64.0	64.4
Ethnicity				
Not Hispanic	63.6	63.4	63.9	63.6
Hispanic	63.8	64.5	63.2	63.8
Income as % of poverty				
0-50	58.8	61.2	60.7	60.2
51-100	60.5	61.4	60.5	60.8
101-130	61.5	61.6	61.6	61.6
131-200	62.8	61.4	63.7	62.6
201-299	63.8	63.6	63.6	63.7
300 plus	65.0	64.9	65.0	65.0
Education				
4 years high school or less	60.8	60.6	61.0	60.8
Some college	63.5	63.0	63.2	63.2
4 years college	66.6	65.4	67.1	66.4
More than 4 years college	67.6	68.1	68.4	68.0
Region				
Northeast	65.3	65.0	65.8	65.4
Midwest	64.1	64.0	65.2	64.4
South	61.7	61.7	61.3	61.6
West	64.5	64.6	64.7	64.6
Urbanization				
MSA,[2] central city	64.0	63.2	64.3	63.8
MSA, outside central city	64.5	64.6	64.7	64.6
Non-MSA	61.0	61.6	61.6	61.4

[1]Includes American Indians and Alaskan Natives.
[2]Metropolitan Statistical Area.
Note: The overall HEI score ranges from 0-100. 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.

Healthy Eating Index and Body Mass Index

Obesity is a significant health problem in the United States. Physical measures of appropriate body weight, such as Body Mass Index (BMI),[3] are influenced by eating patterns and physical activity. For adults, a BMI of 25 is defined as the upper boundary of healthy weight for both men and women *(3)*. Mean BMI values, based on self-reported height and weight, for females and males age 19 and over by their overall HEI rating (diet quality is good, needs improvement, or is poor) for the 1994-96 period are shown in table 6.

For both females and males, those with a better diet had a lower BMI. This finding implies a connection between people's diet quality and their BMI. People with a poor diet are more likely to have a higher BMI, while people with a good diet are more likely to have a lower BMI. Although people with a diet rated as good had a lower BMI than others, the BMI for many of these people was slightly over 25. This is because other factors, such as physical activity, also influence BMI in addition to eating patterns.

[3]BMI = weight (in kilograms)/height (in meters)^2.

Table 6. Mean Body Mass Index by Healthy Eating Index rating for adults, 1994-96

Age/gender group	Diet quality		
	Good	Needs improvement	Poor
1994			
Females 19+	25.1	25.6	26.0
Males 19+	25.4	26.4	26.6
1995			
Females 19+	25.3	25.6	26.3
Males 19+	25.6	26.5	26.5
1996			
Females 19+	24.8	25.7	26.4
Males 19+	25.7	26.4	26.8
1994-96			
Females 19+	25.1	25.6	26.2
Males 19+	25.6	26.4	26.6

Note: The overall HEI score ranges from 0-100. 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.

Trends in the Healthy Eating Index: 1989 vs. 1996

How has the quality of the American diet changed from 1989 to 1996? Table 7 compares HEI scores for the population in 1989 and 1996 (the first and latest years the Index was calculated). This comparison examines overall HEI scores and Index component scores based on 1-day intake data.

The diets of Americans have slightly, but significantly, improved since 1989. However, people's diets still need further improvement. In 1989, the HEI score for all people was 61.5.[4] By 1996 it was 63.8—a 4-percent increase.[5] Scores increased for all HEI components from 1989 to 1996 with the exception of milk, meat, and sodium. The decrease in the sodium score may be related to the increase in the grain score; grain products contribute large amounts of dietary sodium *(10)*. Noticeable gains in HEI component scores were made in saturated fat and variety.

The increase in the HEI since 1989 may be due to several factors. Since then the Federal Government began various nutrition initiatives—the Food Guide Pyramid, revised *Dietary Guidelines for Americans*, and the Nutrition Labeling and Education Act. 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 through various nutrition campaigns.

[4]Based on 1-day intake data *(13, p. 16)*.

[5]Because of methodological changes from 1989 to 1996 in food group serving calculations as described in the Appendix, food group scores in 1994-96 may be smaller than they would be using the 1989 methodology. Hence, the improvement in people's diets between 1989 and 1996 is likely greater than reported here.

Table 7. Healthy Eating Index, overall and component mean scores, 1989 versus 1996

	1989	1996
Overall	61.5	63.8
Components		
Grains	6.1	6.7
Vegetables	5.9	6.3
Fruits	3.7	3.8
Milk	6.2	5.4
Meat	7.1	6.4
Total fat	6.3	6.9
Saturated fat	5.4	6.4
Cholesterol	7.5	7.9
Sodium	6.7	6.3
Variety	6.6	7.6

Note: The overall HEI score ranges from 0-100. 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. HEI component scores range from 0-10. High component scores indicate intakes close to recommended ranges or amounts; low component scores indicate less compliance with recommended ranges or amounts. For 1989, scores are based on 1-day intake data.

Conclusions

Americans' eating patterns, as measured by the HEI, have slightly, but significantly improved since 1989. Although this trend is in the desired direction, the diets of most Americans still need improvement. In 1994-96, only 12 percent of Americans had a diet that could be considered good.

Of the 10 components of the HEI, the average scores of 7 of these components (grains, vegetables, fruits, total fat, saturated fat, cholesterol, and variety) increased from 1989 to 1996. Grains, vegetables, and fruits are generally high in fiber and low in total fat, saturated fat, and cholesterol, thereby influencing these latter three components. Although fruit scores increased, in 1996 only 17 percent of people ate the recommended number of servings of fruit on a given day.

The average score for the milk, meat, and sodium components declined from 1989 to 1996. In 1996, only 26 percent of people ate the recommended number of servings of milk products on a given day. In the past several years, there has been a decline in milk consumption and simultaneous increase in carbonated soft drink consumption *(9)*. The decrease in the sodium score is likely related to the increase in the grains score as many grain products, such as breads, are high in sodium.

One of the factors that influences dietary quality is income. People with a higher income are able to afford more variety—more types of fruits and vegetables—in their diets and HEI scores tend to increase. The impact of income on the ability to purchase a variety of foods is evident in the variety scores for different income groups. People with a household income 50 percent of the poverty threshold or below had an average variety score of 6.9 for 1994-96, whereas those with a household income of 300 percent of the poverty threshold or more had an average variety score of 7.9 (data not shown in tables). Education also influences diet quality. People with 4 years of college have a better diet than those with less education. People with more education may acquire more nutrition information, which improves the quality of their diets *(17)*.

Age, gender, race, ethnicity, and area of residence are other factors that influence diet quality. In general, children less than 11 years of age have a better diet than others. It could be that parents are more attentive to children's diets. Adults over 50 years of age have better diets than other adults. Females tend to have a slightly more healthful diet than males. African Americans have a poorer quality diet than other racial groups. People living in the South and nonurban areas are more likely to have a poorer diet.

These findings provide an awareness and better understanding of the types of dietary changes needed to improve people's eating patterns. USDA and other Federal Departments have various nutrition education and promotion activities designed to improve people's diets. USDA also has a number of partnerships with the private sector to achieve this goal. The HEI is an important tool that can be used to assess the effect of these activities and provide guidance to better target and design nutrition education and public health interventions.

Appendix

Determination of Food Guide Pyramid Serving Definitions

For each of the five major food groups, servings 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 *(14)*. 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 the USDA's Agricultural Research Service *(12)*.

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. For other grain products, such as some quick breads, pancakes, waffles, and taco shells, a combination of the two methods was used.

For yeast bread, 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 ½ 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 ½ 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, a serving was based on the grain content of the food. Since 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

Vegetable serving definitions were based on those in the Food Guide Pyramid, which defines a serving as 1 cup of raw leafy vegetables; ½ cup of other vegetables, cooked or chopped raw; or ¾ 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 ¼ cup was assigned, for tomato puree or paste a serving size of ¼ cup was used, and for dried beans and peas the serving was defined as the weight needed to yield ½ cup cooked. For potatoes—baked, boiled, roasted, mashed, and fried—one serving was defined as ½ cup, while for potato chips one serving was defined as 1 ounce and for dehydrated potatoes as the amount of dried potato flakes that yield ½ cup of prepared mashed potatoes.

All vegetables that were ingredients in multi-ingredient foods were disaggregated and any fraction of a serving they contributed, no matter how small, was accounted for in servings from the vegetable group on the Pyramid Servings intake files.

Fruits Group

Fruit serving definitions 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; ¾ cup fruit juice; ½ cup berries; ½ cup chopped, cooked, or canned fruit; or ¼ cup dried fruit. For raw fruits, one serving was defined as a whole fruit if the weight of one fruit was equal to or greater than the weight of ½ cup raw fruit. For fruits with pits, the serving weight was for ½ cup of pitted fruit. For large fruits, such as melons and pineapple, one serving was defined as ½ cup raw fruit.

For fruit juices, single-strength juices, and juices containing less than 10 percent sugar by weight, a serving was defined as ¾ cup. For juice concentrates, one serving was defined as 1.5 ounces, which is the amount needed to prepare ¾ 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 fruit group servings. Fruit mixtures were separated into ingredients before serving weights were assigned only if 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 milligrams).

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, serving sizes were defined in terms of the number of cups needed to provide 302 milligrams 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 Pyramid tip.

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 they contained. Exceptions were grain products that counted toward grain group servings and processed meats and meat analogs that counted toward meat group servings.

***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. In the HEI computation, 2.5 ounces of lean meat was used as the serving definition for 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 and 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: ½ cup of cooked dry beans or peas, 1 egg, 2 tablespoons of peanut butter, ⅓ cup of nuts, ¼ cup of seeds, and ½ 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 measure in which the meat group recommendation is specified. Dry beans and peas were first assigned to the meat group if the meat serving recommendations were not met, after which they were added to the vegetables group.

Allocation of Mixtures to Individual Food Groups

In calculating the HEI, it was 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. Commodities were then assigned to appropriate food groups based on the gram/serving size factors that were calculated.

Methodology Change for Serving Definitions

The methodology used to determine serving definitions for each of the five major food groups in this report is based on that developed by USDA's Agricultural Research Service *(12)*. This methodology differs somewhat from that used to calculate the 1989-90 HEI *(13)*. In particular, milk serving definitions previously used 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.

For the 1994-96 HEI, milk 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, or 302 milligrams. This approach, while more in line with the advice of nutrition researchers, has implications for lower milk group component scores. This is due to the omission of some foods, previously counted (e.g., butter and cream cheese), based on nonfat milk solids, but no longer given credit towards a milk serving because they do no meet the calcium criterion of the Pyramid. For a complete description and documentation of the Food Guide Pyramid servings, see reference 12.

Estimation of Food Group Serving Requirements by Age and Gender

In order to score food group consumption, it was necessary to determine the recommended numbers of servings by food group for each person in the 1994-96 CSFII. The Food Guide Pyramid contains recommended numbers of servings of food groups for many age/gender categories, and these recommendations were used. Some age/gender groups had Recommended Energy Allowances (REAs) that were different from the three levels of energy intakes presented in the Food Guide Pyramid. Interpolation techniques 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 lower numbers of servings than the minimums. However, the Food Guide Pyramid suggests 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 proportionately, 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 greater numbers of servings than the maximum numbers. Since the Food Guide Pyramid does not specify food group servings for diets beyond 2800 kilocalories, the food group servings were truncated 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 as ingredients. To capture their nutrient contributions, even relatively small amounts of such incidental foods, for the most part, were included 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 included grain products that counted toward grain group servings and processed meats and meat analogs that counted toward meat group servings.

With these exceptions, ingredient contributions to various food groups were counted in computing the HEI with no minimum size cutoff values imposed. 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 Index 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. 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 from 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. Only component foods present in substantial quantities were included in the variety calculations. A threshold of one-half a Food Pyramid serving was used. Food components contributing less than this amount were not included in the computation of the variety score. It is possible that variety scores for some people were slightly underestimated by this approach. Several servings in a food group consumed in less than one-half serving amounts throughout a day, when combined, could exceed the one-half serving limit. The potential effects of this underestimation on the final results are thought to be small.

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 food codes of the components that were present in the highest proportions.

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