

Dietary Guidelines for Americans 2005

U.S. Department of Health and Human Services
U.S. Department of Agriculture
www.healthierus.gov/dietaryguidelines



MESSAGE FROM THE SECRETARIES

We are pleased to present the 2005 *Dietary Guidelines for Americans*. This document is intended to be a primary source of dietary health information for policymakers, nutrition educators, and health providers. Based on the latest scientific evidence, the 2005 *Dietary Guidelines* provides information and advice for choosing a nutritious diet, maintaining a healthy weight, achieving adequate exercise, and "keeping foods safe" to avoid foodborne illness.

This document is based on the recommendations put forward by the Dietary Guidelines Advisory Committee. The Committee was composed of scientific experts who were responsible for reviewing and analyzing the most current dietary and nutritional information and incorporating this into a scientific evidence-based report. We want to thank them and the other public and private professionals who assisted in developing this document for their hard work and dedication.

The more we learn about nutrition and exercise, the more we recognize their importance in everyday life. Children need a healthy diet for normal growth and development, and Americans of all ages may reduce their risk of chronic disease by adopting a nutritious diet and engaging in regular physical activity.

However, putting this knowledge into practice is difficult. More than 90 million Americans are affected by chronic diseases and conditions that compromise their quality of life and well-being. Overweight and obesity, which are risk factors for diabetes and other chronic diseases, are more common than ever before. To correct this problem, many Americans must make significant changes in their eating habits and lifestyles.

We live in a time of widespread availability of food options and choices. More so than ever, consumers need good advice to make informed decisions about their diets. The 2005 *Dietary Guidelines* will help Americans choose a nutritious diet within their energy requirements. We believe that following the recommendations in the *Dietary Guidelines* will assist many Americans in living longer, healthier, and more active lives.

A handwritten signature in black ink that reads "Tommy G. Thompson".

Tommy G. Thompson
Secretary of Health and Human Services

A handwritten signature in black ink that reads "Ann M. Veneman".

Ann M. Veneman
Secretary of Agriculture

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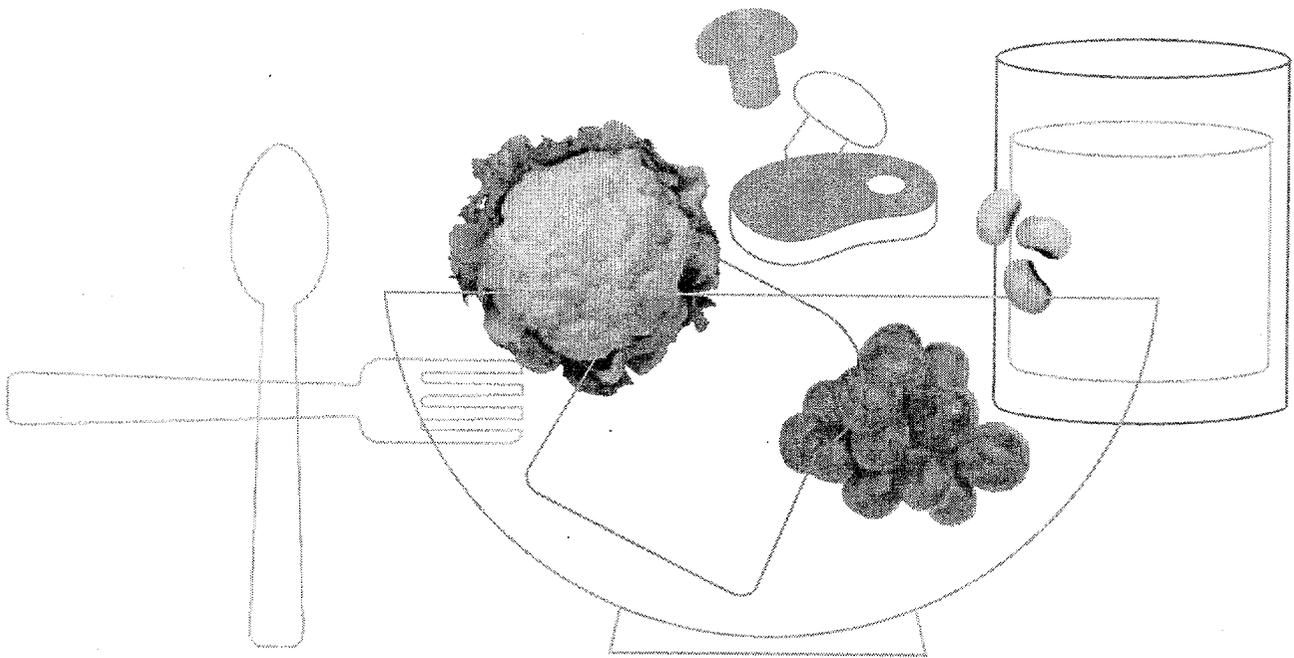
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Executive Summary

The *Dietary Guidelines for Americans* [*Dietary Guidelines*] provides science-based advice to promote health and to reduce risk for major chronic diseases through diet and physical activity. Major causes of morbidity and mortality in the United States are related to poor diet and a sedentary lifestyle. Some specific diseases linked to poor diet and physical inactivity include cardiovascular disease, type 2 diabetes, hypertension, osteoporosis, and certain cancers. Furthermore, poor diet and physical inactivity, resulting in an energy imbalance (more calories consumed than expended), are the most important factors contributing to the increase in overweight and obesity in this country. Combined with physical activity, following a diet that does not provide excess calories according to the recommendations in this document should enhance the health of most individuals.

An important component of each 5-year revision of the *Dietary Guidelines* is the analysis of new scientific information by the Dietary Guidelines Advisory Committee (DGAC) appointed by the Secretaries of the U.S. Department of Health and Human Services (HHS) and the U.S. Department of Agriculture (USDA). This analysis, published in the DGAC Report (<http://www.health.gov/dietaryguidelines/dga2005/report/>), is the primary resource for development of the report on the Guidelines by the Departments. The *Dietary Guidelines* and the report of the DGAC differ in scope and purpose compared to reports for previous versions of the *Guidelines*. The 2005 DGAC report is a detailed scientific analysis. The scientific report was used to develop the *Dietary Guidelines* jointly between the two Departments and forms the basis of recommendations that will be used by USDA and HHS for program and policy development.

Thus it is a publication oriented toward policymakers, nutrition educators, nutritionists, and healthcare providers rather than to the general public, as with previous versions of the *Dietary Guidelines*, and contains more technical information.

The intent of the *Dietary Guidelines* is to summarize and synthesize knowledge regarding individual nutrients and food components into recommendations for a pattern of eating that can be adopted by the public. In this publication, Key Recommendations are grouped under nine inter-related focus areas. The recommendations are based on the preponderance of scientific evidence for lowering risk of chronic disease and promoting health. It is important to remember that these are integrated messages that should be implemented as a whole. Taken together, they encourage most Americans to eat fewer calories, be more active, and make wiser food choices.

A basic premise of the *Dietary Guidelines* is that nutrient needs should be met primarily through consuming foods. Foods provide an array of nutrients and other compounds that may have beneficial effects on health. In certain cases, fortified foods and dietary supplements may be useful sources of one or more nutrients that otherwise might be consumed in less than recommended amounts. However, dietary supplements, while recommended in some cases, cannot replace a healthful diet.

Two examples of eating patterns that exemplify the *Dietary Guidelines* are the USDA Food Guide (<http://www.usda.gov/cnpp/pyramid.html>) and the DASH (Dietary Approaches to Stop Hypertension) Eating Plan.¹ Both of these eating patterns are designed to integrate dietary recommendations into a healthy way to eat for most individuals. These eating patterns are not weight loss diets, but rather illustrative examples of how to eat in accordance with the *Dietary Guidelines*. Both eating patterns are constructed across a range of calorie levels to meet the needs of various age and gender groups. For the USDA Food Guide, nutrient content estimates for each food group and subgroup are based on population-

Taken together, [the *Dietary Guidelines*] encourage most Americans to eat fewer calories, be more active, and make wiser food choices.

weighted food intakes. Nutrient content estimates for the DASH Eating Plan are based on selected foods chosen for a sample 7-day menu. While originally developed to study the effects of an eating pattern on the prevention and treatment of hypertension, DASH is one example of a balanced eating plan consistent with the 2005 *Dietary Guidelines*.

Throughout most of this publication, examples use a 2,000-calorie level as a reference for consistency with the Nutrition Facts Panel. Although this level is used as a reference, recommended calorie intake will differ for individuals based on age, gender, and activity level. At each calorie level, individuals who eat nutrient-dense foods may be able to meet their recommended nutrient intake without consuming their full calorie allotment. The remaining calories—the *discretionary calorie allowance*—allow individuals flexibility to consume some foods and beverages that may contain added fats, added sugars, and alcohol.

The recommendations in the *Dietary Guidelines* are for Americans over 2 years of age. It is important to incorporate the food preferences of different racial/ethnic groups, vege-

¹ NIH Publication No. 03-4082, Facts about the DASH Eating Plan, United States Department of Health and Human Services, National Institutes of Health, National Heart, Lung, and Blood Institute, Karanja NM et al. *Journal of the American Dietetic Association (JADA)* 8:519-27, 1999. <http://www.nhlbi.nih.gov/healthy/public/heart/hbp/dash/>

tarians, and other groups when planning diets and developing educational programs and materials. The USDA Food Guide and the DASH Eating Plan are flexible enough to accommodate a range of food preferences and cuisines.

The *Dietary Guidelines* is intended primarily for use by policymakers, healthcare providers, nutritionists, and nutrition educators. The information in the *Dietary Guidelines* is useful for the development of educational materials and aids policymakers in designing and implementing nutrition-related programs, including federal food, nutrition education, and information programs. In addition, this publication has the potential to provide authoritative statements as provided for in the Food and Drug Administration Modernization Act (FDAMA). Because the *Dietary Guidelines* contains discussions where the science is emerging, only statements included in the Executive Summary and the sections titled "Key Recommendations," which reflect the preponderance of scientific evidence, can be used for identification of authoritative statements. The recommendations are inter-related and mutually dependent; thus the statements in this document should be used together in the context of planning an overall healthful diet. However, even following just some of the recommendations can have health benefits.

The following is a listing of the *Dietary Guidelines* by chapter.

ADEQUATE NUTRIENTS WITHIN CALORIE NEEDS

Key Recommendations

- Consume a variety of nutrient-dense foods and beverages within and among the basic food groups while choosing foods that limit the intake of saturated and *trans* fats, cholesterol, added sugars, salt, and alcohol.
- Meet recommended intakes within energy needs by adopting a balanced eating pattern, such as the USDA Food Guide or the DASH Eating Plan.

Key Recommendations for Specific Population Groups

- *People over age 50.* Consume vitamin B₁₂ in its crystalline form (i.e., fortified foods or supplements).
- *Women of childbearing age who may become pregnant.* Eat foods high in heme-iron and/or consume iron-rich plant foods or iron-fortified foods with an enhancer of iron absorption, such as vitamin C-rich foods.
- *Women of childbearing age who may become pregnant and those in the first trimester of pregnancy.* Consume adequate synthetic folic acid daily (from fortified foods or supplements) in addition to food forms of folate from a varied diet.
- *Older adults, people with dark skin, and people exposed to insufficient ultraviolet band radiation (i.e., sunlight).* Consume extra vitamin D from vitamin D-fortified foods and/or supplements.

WEIGHT MANAGEMENT

Key Recommendations

- To maintain body weight in a healthy range, balance calories from foods and beverages with calories expended.
- To prevent gradual weight gain over time, make small decreases in food and beverage calories and increase physical activity.

Key Recommendations for Specific Population Groups

- *Those who need to lose weight.* Aim for a slow, steady weight loss by decreasing calorie intake while maintaining an adequate nutrient intake and increasing physical activity.
- *Overweight children.* Reduce the rate of body weight gain while allowing growth and development. Consult a healthcare provider before placing a child on a weight-reduction diet.
- *Pregnant women.* Ensure appropriate weight gain as specified by a healthcare provider.
- *Breastfeeding women.* Moderate weight reduction is safe and does not compromise weight gain of the nursing infant.
- *Overweight adults and overweight children with chronic diseases and/or on medication.* Consult a healthcare provider about weight loss strategies prior to starting a weight-reduction program to ensure appropriate management of other health conditions.

PHYSICAL ACTIVITY

Key Recommendations

- Engage in regular physical activity and reduce sedentary activities to promote health, psychological well-being, and a healthy body weight.
 - To reduce the risk of chronic disease in adulthood: Engage in at least 30 minutes of moderate-intensity physical activity, above usual activity, at work or home on most days of the week.
 - For most people, greater health benefits can be obtained by engaging in physical activity of more vigorous intensity or longer duration.
 - To help manage body weight and prevent gradual, unhealthy body weight gain in adulthood: Engage in approximately 60 minutes of moderate- to vigorous-intensity activity on most days of the week while not exceeding caloric intake requirements.
 - To sustain weight loss in adulthood: Participate in at least 60 to 90 minutes of daily moderate-intensity physical activity while not exceeding caloric intake requirements. Some people may need to consult with a healthcare provider before participating in this level of activity.
- Achieve physical fitness by including cardiovascular conditioning, stretching exercises for flexibility, and resistance exercises or calisthenics for muscle strength and endurance.

Key Recommendations for Specific Population Groups

- *Children and adolescents.* Engage in at least 60 minutes of physical activity on most, preferably all, days of the week.
- *Pregnant women.* In the absence of medical or obstetric complications, incorporate 30 minutes or more of moderate-intensity physical activity on most, if not all, days of the week. Avoid activities with a high risk of falling or abdominal trauma.
- *Breastfeeding women.* Be aware that neither acute nor regular exercise adversely affects the mother's ability to successfully breastfeed.
- *Older adults.* Participate in regular physical activity to reduce functional declines associated with aging and to achieve the other benefits of physical activity identified for all adults.

FOOD GROUPS TO ENCOURAGE

Key Recommendations

- Consume a sufficient amount of fruits and vegetables while staying within energy needs. Two cups of fruit and 2½ cups of vegetables per day are recommended for a reference 2,000-calorie intake, with higher or lower amounts depending on the calorie level.
- Choose a variety of fruits and vegetables each day. In particular, select from all five vegetable subgroups (dark green, orange, legumes, starchy vegetables, and other vegetables) several times a week.
- Consume 3 or more ounce-equivalents of whole-grain products per day, with the rest of the recommended grains coming from enriched or whole-grain products. In general, at least half the grains should come from whole grains.
- Consume 3 cups per day of fat-free or low-fat milk or equivalent milk products.

Key Recommendations for Specific Population Groups

- *Children and adolescents.* Consume whole-grain products often; at least half the grains should be whole grains. Children 2 to 8 years should consume 2 cups per day of fat-free or low-fat milk or equivalent milk products. Children 9 years of age and older should consume 3 cups per day of fat-free or low-fat milk or equivalent milk products.

FATS

Key Recommendations

- Consume less than 10 percent of calories from saturated fatty acids and less than 300 mg/day of cholesterol, and keep *trans* fatty acid consumption as low as possible.
- Keep total fat intake between 20 to 35 percent of calories, with most fats coming from sources of polyunsaturated and monounsaturated fatty acids, such as fish, nuts, and vegetable oils.
- When selecting and preparing meat, poultry, dry beans, and milk or milk products, make choices that are lean, low-fat, or fat-free.
- Limit intake of fats and oils high in saturated and/or *trans* fatty acids, and choose products low in such fats and oils.

Key Recommendations for Specific Population Groups

- *Children and adolescents.* Keep total fat intake between 30 to 35 percent of calories for children 2 to 3 years of age and between 25 to 35 percent of calories for children and adolescents 4 to 18 years of age, with most fats coming from sources of polyunsaturated and monounsaturated fatty acids, such as fish, nuts, and vegetable oils.

CARBOHYDRATES

Key Recommendations

- Choose fiber-rich fruits, vegetables, and whole grains often.
- Choose and prepare foods and beverages with little added sugars or caloric sweeteners, such as amounts suggested by the USDA Food Guide and the DASH Eating Plan.
- Reduce the incidence of dental caries by practicing good oral hygiene and consuming sugar- and starch-containing foods and beverages less frequently.

SODIUM AND POTASSIUM

Key Recommendations

- Consume less than 2,300 mg (approximately 1 tsp of salt) of sodium per day.
- Choose and prepare foods with little salt. At the same time, consume potassium-rich foods, such as fruits and vegetables.

Key Recommendations for Specific Population Groups

- *Individuals with hypertension, blacks, and middle-aged and older adults.* Aim to consume no more than 1,500 mg of sodium per day, and meet the potassium recommendation (4,700 mg/day) with food.

ALCOHOLIC BEVERAGES

Key Recommendations

- Those who choose to drink alcoholic beverages should do so sensibly and in moderation—defined as the consumption of up to one drink per day for women and up to two drinks per day for men.
- Alcoholic beverages should not be consumed by some individuals, including those who cannot restrict their alcohol intake, women of childbearing age who may

become pregnant, pregnant and lactating women, children and adolescents, individuals taking medications that can interact with alcohol, and those with specific medical conditions.

- Alcoholic beverages should be avoided by individuals engaging in activities that require attention, skill, or coordination, such as driving or operating machinery.

FOOD SAFETY

Key Recommendations

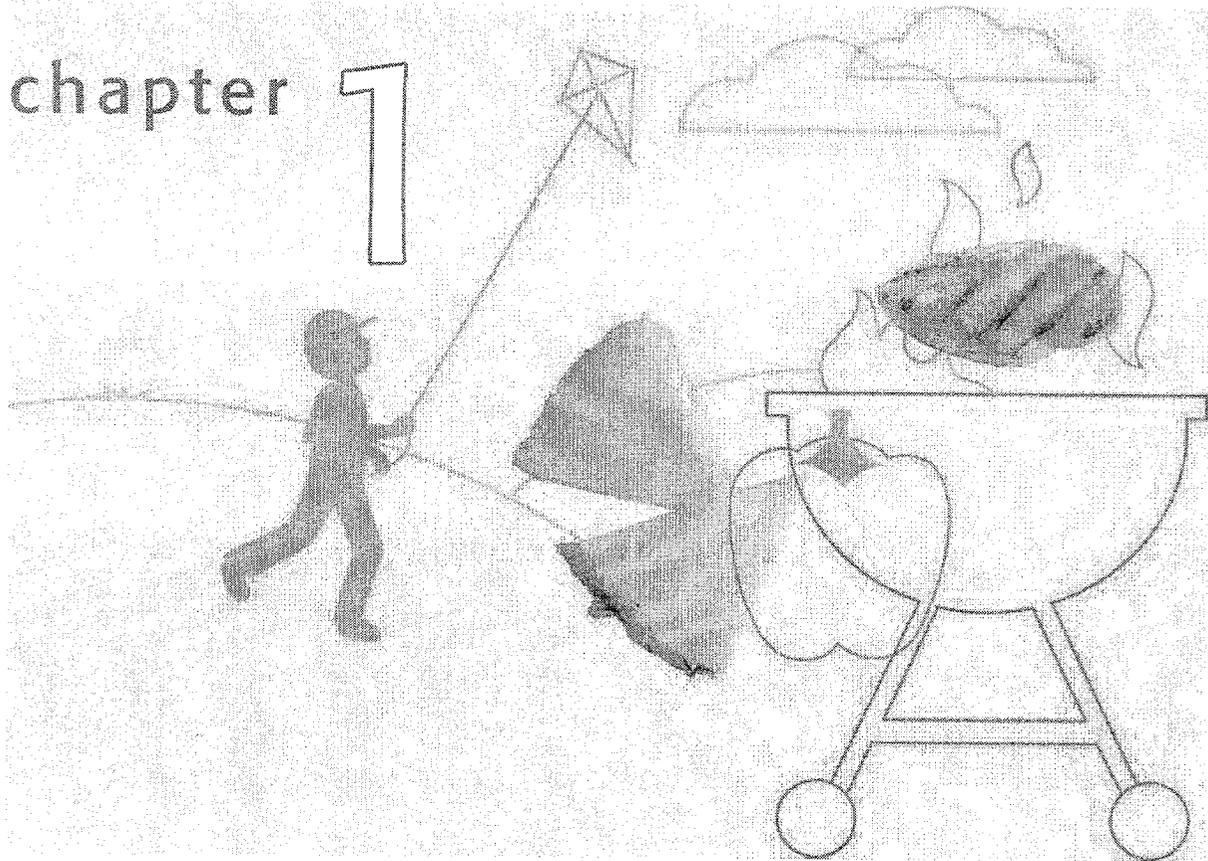
- To avoid microbial foodborne illness:
 - Clean hands, food contact surfaces, and fruits and vegetables. Meat and poultry should *not* be washed or rinsed.
 - Separate raw, cooked, and ready-to-eat foods while shopping, preparing, or storing foods.
 - Cook foods to a safe temperature to kill microorganisms.
 - Chill (refrigerate) perishable food promptly and defrost foods properly.
 - Avoid raw (unpasteurized) milk or any products made from unpasteurized milk, raw or partially cooked eggs or foods containing raw eggs, raw or undercooked meat and poultry, unpasteurized juices, and raw sprouts.

Key Recommendations for Specific Population Groups

- *Infants and young children, pregnant women, older adults, and those who are immunocompromised.* Do not eat or drink raw (unpasteurized) milk or any products made from unpasteurized milk, raw or partially cooked eggs or foods containing raw eggs, raw or undercooked meat and poultry, raw or undercooked fish or shellfish, unpasteurized juices, and raw sprouts.
- *Pregnant women, older adults, and those who are immunocompromised:* Only eat certain deli meats and frankfurters that have been reheated to steaming hot.



chapter 1



Background and Purpose of the *Dietary Guidelines for Americans*

The *Dietary Guidelines for Americans* [*Dietary Guidelines*], first published in 1980, provides science-based advice to promote health and to reduce risk for chronic diseases through diet and physical activity. The recommendations contained within the *Dietary Guidelines* are targeted to the general public over 2 years of age who are living in the United States. Because of its focus on health promotion and risk reduction, the *Dietary Guidelines* form the basis of federal food, nutrition education, and information programs.

By law (Public Law 101-445, Title III, 7 U.S.C. 5301 et seq.), the *Dietary Guidelines* is reviewed, updated if necessary, and published every 5 years. The process to create the *Dietary Guidelines* is a joint effort of the U.S. Department of Health and Human Services (HHS) and the U.S. Department of Agriculture (USDA) and has evolved to include three stages.

In the first stage, an external scientific Advisory Committee appointed by the two Departments conducted an analysis of new scientific information and prepared a report summarizing its findings.² The Advisory Committee's report was made available to the public and Government agencies for comment. The Committee's analysis was the primary resource for development of the *Dietary Guidelines* by the Departments. A significant amount of the new scientific information used by the Dietary Guidelines Advisory Committee (DGAC) was based on the Dietary Reference Intake (DRI) reports published since 2000 by the Institute of Medicine (IOM), in particular the macronutrient report and the fluid and electrolyte report.

During the second stage, the Departments jointly developed Key Recommendations based on the Advisory Committee's report and public and agency comments.

² For more information about the process, summary data, and the resources used by the Advisory Committee, see the 2005 Dietary Guidelines Advisory Committee Report (2005 DGAC Report) at <http://www.health.gov/dietaryguidelines>.



The *Dietary Guidelines* details these science-based policy recommendations. Finally, in the third stage, the two Departments developed messages communicating the *Dietary Guidelines* to the general public.

Because of the three-part process used to develop and communicate the 2005 *Dietary Guidelines*, this publication and the report of the DGAC differ in scope and purpose compared to reports for previous versions of the *Guidelines*. The 2005 DGAC report is a detailed scientific analysis that identifies key issues such as energy balance, the consequences of a sedentary lifestyle, and the need to emphasize certain food choices to address nutrition issues for the American public. The scientific report was used to develop the *Dietary Guidelines* jointly between the two Departments, and this publication forms the basis of recommendations that will be used by USDA and HHS for program and policy development. Thus it is a publication oriented toward policymakers, nutrition educators, nutritionists and healthcare providers rather than to the general public, as with previous versions of the *Dietary Guidelines*, and contains more technical information.

New sections in the *Dietary Guidelines*, consistent with its use for program development, are a glossary of terms and appendixes with detailed information about the USDA Food Guide and the Dietary Approaches to Stop Hypertension (DASH) Eating Plan as well as tables listing sources of some nutrients. Consumer messages have been developed to educate the public about the Key Recommendations in the *Dietary Guidelines* and will be used in materials targeted for consumers separate from this publication. In organizing the *Dietary Guidelines* for the Departments, chapters 2 to 10 were given titles that characterize the topic of each section, and the *Dietary Guidelines* itself is presented as an integrated set of Key Recommendations in each topic area.

These Key Recommendations are based on a preponderance of the scientific evidence of nutritional factors that are important for lowering risk of chronic disease and promoting health. To optimize the beneficial impact of these recommendations on health, the *Guidelines* should be implemented in their entirety.

IMPORTANCE OF THE *DIETARY GUIDELINES* FOR HEALTH PROMOTION AND DISEASE PREVENTION

Good nutrition is vital to good health and is absolutely essential for the healthy growth and development of children and adolescents. Major causes of morbidity and mortality in the United States are related to poor diet and a sedentary lifestyle. Specific diseases and conditions linked to poor diet include cardiovascular disease, hypertension, dyslipidemia, type 2 diabetes, overweight and obesity, osteoporosis, constipation, diverticular disease, iron deficiency anemia, oral disease, malnutrition, and some cancers. Lack of physical activity has been associated with cardiovascular disease, hypertension, overweight and obesity, osteoporosis, diabetes, and certain cancers. Furthermore, muscle strengthening and improving balance can reduce falls and increase functional status among older adults. Together with physical activity, a high-quality diet that does not provide excess calories should enhance the health of most individuals.

Poor diet and physical inactivity, resulting in an energy imbalance (more calories consumed than expended), are the most important factors contributing to the increase in overweight and obesity in this country. Moreover, overweight and obesity are major risk factors for certain chronic diseases such as diabetes. In 1999–2002, 65 percent of U.S. adults were overweight, an increase from 56 percent in 1988–1994. Data from 1999–2002 also showed that 30 percent of adults were obese, an increase from 23 percent in an earlier survey. Dramatic increases in the prevalence of overweight have occurred in children and adolescents of both sexes, with approximately 16 percent of children and adolescents aged 6 to 19 years considered to be overweight (1999–2002).³ In order to reverse this trend, many Americans need to consume fewer calories, be more active, and make wiser choices within and among food groups. The *Dietary Guidelines* provides a framework to promote healthier lifestyles (see ch. 3).

Given the importance of a balanced diet to health, the intent of the *Dietary Guidelines* is to summarize and synthesize knowledge regarding individual nutrients and

³ Hedley AA, Ogden CL, Johnson CL, Carroll MD, Curtin LR, Flegal KM. Prevalence of overweight and obesity among U.S. children, adolescents, and adults, 1999–2002. *Journal of the American Medical Association (JAMA)* 291(23):2847–2850, 2004.

food components into recommendations for an overall pattern of eating that can be adopted by the general public. These patterns are exemplified by the USDA Food Guide and the DASH Eating Plan (see ch. 2 and app. A). The *Dietary Guidelines* is applicable to the food preferences of different racial/ethnic groups, vegetarians, and other groups. This concept of balanced eating patterns should be utilized in planning diets for various population groups.

There is a growing body of evidence which demonstrates that following a diet that complies with the *Dietary Guidelines* may reduce the risk of chronic disease. Recently, it was reported that dietary patterns consistent with recommended dietary guidance were associated with a lower risk of mortality among individuals age 45 years and older in the United States.⁴ The authors of the study estimated that about 16 percent and 9 percent of mortality from any cause in men and women, respectively, could be eliminated by the adoption of desirable dietary behaviors. Currently, adherence to the *Dietary Guidelines* is low among the U.S. population. Data from USDA illustrate the degree of change in the overall dietary pattern of Americans needed to be consistent with a food pattern encouraged by the *Dietary Guidelines* (fig. 1).

A basic premise of the *Dietary Guidelines* is that nutrient needs should be met primarily through consuming foods. Foods provide an array of nutrients (as well as phytochemicals, antioxidants, etc.) and other compounds that may have beneficial effects on health. In some cases, fortified foods may be useful sources of one or more nutrients that otherwise might be consumed in less than recommended amounts. Supplements may be useful when they fill a specific identified nutrient gap that cannot or is not otherwise being met by the individual's intake of food. Nutrient supplements cannot replace a healthful diet. Individuals who are already consuming the recommended amount of a nutrient in food will not achieve any additional health benefit if they also take the nutrient as a supplement. In fact, in some cases, supplements and fortified foods may cause intakes to exceed the safe levels of nutrients. Another important premise of the *Dietary Guidelines* is that foods should be prepared and handled in such a way that reduces risk of foodborne illness.

USES OF THE *DIETARY GUIDELINES*

The *Dietary Guidelines* is intended primarily for use by policymakers, healthcare providers, nutritionists, and nutrition educators. While the *Dietary Guidelines* was developed for healthy Americans 2 years of age and older, where appropriate, the needs of specific population groups have been addressed. In addition, other individuals may find this report helpful in making healthful choices. As noted previously, the recommendations contained within the *Dietary Guidelines* will aid the public in reducing their risk for obesity and chronic disease. Specific uses of the *Dietary Guidelines* include:

Development of Educational Materials and Communications.

The information in the *Dietary Guidelines* is useful for the development of educational materials. For example, the federal dietary guidance-related publications are required by law to be based on the *Dietary Guidelines*. In addition, this publication will guide the development of messages to communicate the *Dietary Guidelines* to the public. Finally, the USDA Food Guide, the food label, and Nutrition Facts Panel provide information that is useful for implementing the key recommendations in the *Dietary Guidelines* and should be integrated into educational and communication messages.

Development of Nutrition-Related Programs.

The *Dietary Guidelines* aids policymakers in designing and implementing nutrition-related programs. The Federal Government bases its nutrition programs, such as the National Child Nutrition Programs or the Elderly Nutrition Program, on the *Dietary Guidelines*.

Development of Authoritative Statements.

The *Dietary Guidelines* has the potential to provide authoritative statements as provided for in the Food and Drug Administration Modernization Act (FDAMA). Because the recommendations are interrelated and mutually dependent, the statements in this publication should be used together in the context of an overall healthful diet. Likewise, because the *Dietary Guidelines* contains discussions about emerging science, only statements included in the Executive Summary and the highlighted boxes entitled "Key Recommendations," which reflect the preponderance of scientific evidence, can be used for identification of authoritative statements.

⁴ Kant AK, Graubard BI, Schatzkin A. Dietary patterns predict mortality in a national cohort: The national health interview surveys, 1987 and 1992. *Journal of Nutrition (J Nutr)* 134:1793-1799, 2004.
DIETARY GUIDELINES FOR AMERICANS, 2005

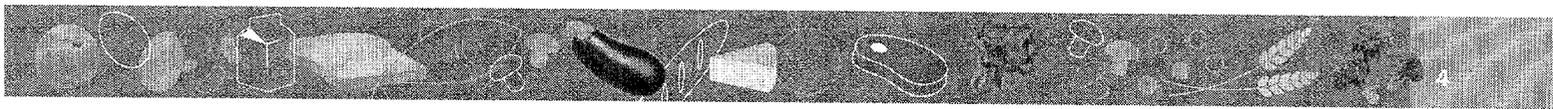
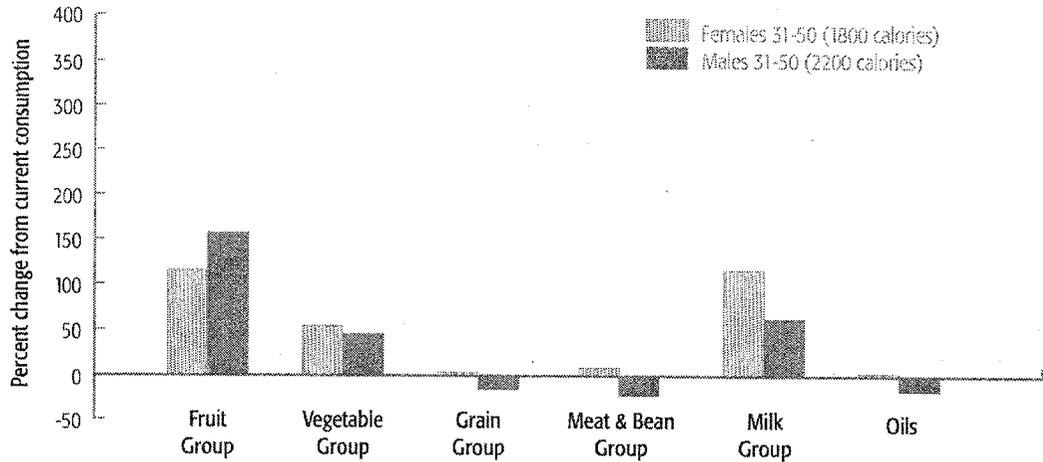


FIGURE 1. Percent Increase or Decrease From Current Consumption (Zero Line) to Recommended Intakes^{a,b}

A graphical depiction of the degree of change in average daily food consumption by Americans that would be needed to be consistent with the food patterns encouraged by the *Dietary Guidelines for Americans*. The zero line represents average consumption levels from each food group or subgroup by females 31 to 50 years of age and males 31 to 50 years of age. Bars above the zero line represent recommended increases in food group consumption, while bars below the line represent recommended decreases.

Food Groups and Oils



Actual change from consumption to recommended intakes:

Females	+0.8 cups	+0.9 cups	+0.1 oz	+0.4 oz	+1.6 cups	+0.4 g
Males	+1.2 cups	+0.9 cups	-1.0 oz	-1.4 oz	+1.2 cups	-4.2 g

Subgroups, Solid Fats, and Added Sugars



Actual change from consumption to recommended intakes:

Females	+0.3 cups	+0.2 cups	+0.3 cups	-0.1 cups	+0.1 cups	+2.2 oz	-2.1 oz	-18 g	-14 tsp
Males	+0.3 cups	+0.2 cups	+0.2 cups	+0.2 cups	+0.0 cups	+2.6 oz	-3.6 oz	-27 g	-18 tsp

^a USDA Food Guide in comparison to National Health and Nutrition Examination Survey 2001-2002 consumption data.

^b Increases in amounts of some food groups are offset by decreases in amounts of solid fats (i.e., saturated and *trans* fats) and added sugars so that total calorie intake is at the recommended level.

chapter

2



Adequate Nutrients Within Calorie Needs

OVERVIEW

Many Americans consume more calories than they need without meeting recommended intakes for a number of nutrients. This circumstance means that most people need to choose meals and snacks that are high in nutrients but low to moderate in energy content; that is, meeting nutrient recommendations must go hand in hand with keeping calories under control. Doing so offers important benefits—normal growth and development of children, health promotion for people of all ages, and reduction of risk for a number of chronic diseases that are major public health problems.

Based on dietary intake data or evidence of public health problems, intake levels of the following nutrients may be of concern for:

- Adults: calcium, potassium, fiber, magnesium, and vitamins A (as carotenoids), C, and E,
- Children and adolescents: calcium, potassium, fiber, magnesium, and vitamin E,
- Specific population groups (see below): vitamin B₁₂, iron, folic acid, and vitamins E and D.

At the same time, in general, Americans consume too many calories and too much saturated and *trans* fats, cholesterol, added sugars, and salt.

DISCUSSION

Meeting Recommended Intakes

Within Energy Needs

A basic premise of the *Dietary Guidelines* is that food guidance should recommend diets that will provide all the nutrients needed for growth and health. To this end, food guidance should encourage individuals to achieve the most recent nutrient intake recommendations of the Institute of Medicine, referred to collectively as the Dietary Reference Intakes (DRIs). Tables of the DRIs are provided at <http://www.iom.edu/Object.File/Master/21/372/0.pdf>.

An additional premise of the *Dietary Guidelines* is that the nutrients consumed should come primarily from foods. Foods contain not only the vitamins and minerals that are often found in supplements, but also hundreds of naturally occurring substances, including carotenoids, flavonoids and isoflavones, and protease inhibitors that may protect against chronic health conditions. There are instances when fortified foods may be advantageous, as identified in this chapter. These include providing additional sources of certain nutrients that might otherwise be present only in low amounts in some food sources, providing nutrients in highly bioavailable forms, and where the fortification addresses a documented public health need.

Two examples of eating patterns that exemplify the *Dietary Guidelines* are the DASH Eating Plan and the USDA Food Guide. These two similar eating patterns are designed to integrate dietary recommendations into a healthy way to eat and are used in the *Dietary Guidelines* to provide examples of how nutrient-focused recommendations can be expressed in terms of food choices. Both the USDA Food Guide and the DASH Eating Plan differ in important ways from common food consumption patterns in the United States. In general, they include:

- *More* dark green vegetables, orange vegetables, legumes, fruits, whole grains, and low-fat milk and milk products.
- *Less* refined grains, total fats (especially cholesterol), and saturated and *trans* fats, added sugars, and calories.

KEY RECOMMENDATIONS

- Consume a variety of nutrient-dense foods and beverages within and among the basic food groups while choosing foods that limit the intake of saturated and *trans* fats, cholesterol, added sugars, salt, and alcohol.
- Meet recommended intakes within energy needs by adopting a balanced eating pattern, such as the USDA Food Guide or the DASH Eating Plan.

Key Recommendations for Specific Population Groups

- *People over age 50.* Consume vitamin B₁₂ in its crystalline form (i.e., fortified foods or supplements).
- *Women of childbearing age who may become pregnant.* Eat foods high in heme-iron and/or consume iron-rich plant foods or iron-fortified foods with an enhancer of iron absorption, such as vitamin C-rich foods.
- *Women of childbearing age who may become pregnant and those in the first trimester of pregnancy.* Consume adequate synthetic folic acid daily (from fortified foods or supplements) in addition to food forms of folate from a varied diet.
- *Older adults, people with dark skin, and people exposed to insufficient ultraviolet band radiation (i.e., sunlight).* Consume extra vitamin D from vitamin D-fortified foods and/or supplements.

Both the USDA Food Guide and the DASH Eating Plan are constructed across a range of calorie levels to meet the nutrient needs of various age and gender groups. Table 1 provides food intake recommendations, and table 2 provides nutrient profiles for both the DASH Eating Plan and the USDA Food Guide at the 2,000-calorie level. These tables illustrate the many similarities between the two eating patterns. Additional calorie levels are shown in appendixes A-1 and A-2 for the USDA Food Guide and the DASH Eating Plan. The exact amounts of foods in these plans do not need to be achieved every day, but on average, over time. Table 3 can aid in identification of an individual's caloric requirement based on gender, age, and physical activity level.



Variety Among and Within Food Groups

Each basic food group⁵ is the major contributor of at least one nutrient while making substantial contributions of many other nutrients. Because each food group provides a wide array of nutrients in substantial amounts, it is important to include all food groups in the daily diet.

Both illustrative eating patterns include a variety of nutrient-dense foods within the major food groups. Selecting a variety of foods within the grain, vegetable, fruit, and meat groups may help to ensure that an adequate amount of nutrients and other potentially beneficial substances are consumed. For example, fish contains varying amounts of fatty acids that may be beneficial in reducing cardiovascular disease risk (see ch. 6).

Nutrient-Dense Foods

Nutrient-dense foods are those foods that provide substantial amounts of vitamins and minerals (micronutrients) and relatively few calories. Foods that are low in nutrient density are foods that supply calories but relatively small amounts of micronutrients, sometimes none at all. The greater the consumption of foods or beverages that are low in nutrient density, the more difficult it is to consume enough nutrients without gaining weight, especially for sedentary individuals. The consumption of added sugars, saturated and *trans* fats, and alcohol provides calories while providing little, if any, of the essential nutrients. (See ch. 7 for additional information on added sugars, ch. 6 for information on fats, and ch. 9 for information on alcohol.)

Selecting low-fat forms of foods in each group and forms free of added sugars—in other words nutrient-dense versions of foods—provides individuals a way to meet their nutrient needs while avoiding the overconsumption of calories and of food components such as saturated fats. However, Americans generally do not eat nutrient-dense forms of foods. Most people will exceed calorie recommendations if they consistently choose higher fat foods within the food groups—even if they do not have dessert, sweetened beverages, or alcoholic beverages.

If only nutrient-dense foods are selected from each food group in the amounts proposed, a small amount of calories

...meeting nutrient recommendations must go hand in hand with keeping calories under control.

can be consumed as added fats or sugars, alcohol, or other foods—the *discretionary calorie allowance*. Appendixes A-2 and A-3 show the maximum discretionary calorie allowance that can be accommodated at each calorie level in the USDA Food Guide. Eating in accordance with the USDA Food Guide or the DASH Eating Plan will also keep intakes of saturated fat, total fat, and cholesterol within the limits recommended in chapter 6.

Nutrients of Concern

The actual prevalence of inadequacy for a nutrient can be determined only if an Estimated Average Requirement (EAR) has been established and the distribution of usual dietary intake can be obtained. If such data are not available for a nutrient but there is evidence for a public health problem associated with low intakes, a nutrient might still be considered to be of concern.

Based on these considerations, dietary intakes of the following nutrients may be low enough to be of concern for:

- Adults: calcium, potassium, fiber, magnesium, and vitamins A (as carotenoids), C, and E,
- Children and adolescents: calcium, potassium, fiber, magnesium, and vitamin E,
- Specific population groups: vitamin B₁₂, iron, folic acid, and vitamins E and D.

⁵ The food groups in the USDA Food Guide are grains; vegetables; fruits; milk, yogurt, and cheese; and meat, poultry, fish, dry beans, eggs, and nuts. Food groups in the DASH Eating Plan are grains and grain products; vegetables; fruits; low-fat or fat-free dairy; meat, poultry, and fish; and nuts, seeds, and dry beans.



Efforts may be warranted to promote increased dietary intakes of potassium, fiber, and possibly vitamin E, regardless of age; increased intakes of calcium and possibly vitamins A (as carotenoids) and C and magnesium by adults; efforts are warranted to increase intakes of calcium and possibly magnesium by children age 9 years or older. Efforts may be especially warranted to improve the dietary intakes of adolescent females in general. Food sources of these nutrients are shown in appendix B.

Low intakes of fiber tend to reflect low intakes of whole grains, fruits, and vegetables. Low intakes of calcium tend to reflect low intakes of milk and milk products. Low intakes of vitamins A (as carotenoids) and C and magnesium tend to reflect low intakes of fruits and vegetables. Selecting fruits, vegetables, whole grains, and low-fat and fat-free milk and milk products in the amounts suggested by the USDA Food Guide and the DASH Eating Plan will provide adequate amounts of these nutrients.

Most Americans of all ages also need to increase their potassium intake. To meet the recommended potassium intake levels, potassium-rich foods from the fruit, vegetable, and dairy groups must be selected in both the USDA Food Guide and the DASH Eating Plan. Foods that can help increase potassium intake are listed in table 5 (ch. 5) and appendix B-1.

Most Americans may need to increase their consumption of foods rich in vitamin E (α -tocopherol) while decreasing their intake of foods high in energy but low in nutrients. The vitamin E content in both the USDA Food Guide and the DASH Eating Plan is greater than current consumption, and specific vitamin E-rich foods need to be included in the eating patterns to meet the recommended intake of vitamin E. Foods that can help increase vitamin E intake are listed in appendix B-2, along with their calorie content. Breakfast cereal that is fortified with vitamin E is an option for individuals seeking to increase their vitamin E intake while consuming a low-fat diet.

In addition, most Americans need to decrease sodium intake. The DASH Eating Plan provides guidance on how to keep sodium intakes within recommendations. When

using the USDA Food Guide, selecting foods that are lower in sodium than others is especially necessary to meet the recommended intake level at calorie levels of 2,600/day and above. Food choices that are lower in sodium are identified in chapter 8.

Considerations for Specific Population Groups

People Over 50 and Vitamin B₁₂

Although a substantial proportion of individuals over age 50 have reduced ability to absorb naturally occurring vitamin B₁₂, they are able to absorb the crystalline form. Thus, all individuals over the age of 50 should be encouraged to meet their Recommended Dietary Allowance (RDA) (2.4 μ g/day) for vitamin B₁₂ by eating foods fortified with vitamin B₁₂ such as fortified cereals, or by taking the crystalline form of vitamin B₁₂ supplements.

Women and Iron

Based on blood values, substantial numbers of adolescent females and women of childbearing age are iron deficient. Thus, these groups should eat foods high in heme-iron (e.g., meats) and/or consume iron-rich plant foods (e.g., spinach) or iron-fortified foods with an enhancer of iron absorption, such as foods rich in vitamin C (e.g., orange juice). Appendix B-3 lists foods that can help increase iron intake and gives their iron and calorie content.

Women and Folic Acid

Since folic acid reduces the risk of the neural tube defects, spina bifida, and anencephaly, a daily intake of 400 μ g/day of synthetic folic acid (from fortified foods or supplements in addition to food forms of folate from a varied diet) is recommended for women of childbearing age who may become pregnant. Pregnant women should consume 600 μ g/day of synthetic folic acid (from fortified foods or supplements) in addition to food forms of folate from a varied diet. It is not known whether the same level of protection could be achieved by using food that is naturally rich in folate.

Special Groups and Vitamin D

Adequate vitamin D status, which depends on dietary intake and cutaneous synthesis, is important for optimal calcium absorption, and it can reduce the risk for bone

loss. Two functionally relevant measures indicate that optimal serum 25-hydroxyvitamin D may be as high as 80 nmol/L. The elderly and individuals with dark skin (because the ability to synthesize vitamin D from exposure to sunlight varies with degree of skin pigmentation) are at a greater risk of low serum 25-hydroxyvitamin D concentrations. Also at risk are those exposed to insufficient ultraviolet radiation (i.e., sunlight) for the cutaneous production of vitamin D (e.g., housebound individuals). For individuals within the high-risk groups, substantially higher daily intakes of vitamin D (i.e., 25 µg or 1,000 International Units (IU) of vitamin D per day) have been recommended to reach and maintain serum 25-hydroxyvitamin D values at 80 nmol/L. Three cups of vitamin D-fortified milk (7.5 µg or 300 IU), 1 cup of vitamin D-fortified orange juice (2.5 µg or 100 IU), and 15 µg (600 IU) of supplemental vitamin D would provide 25 µg (1,000 IU) of vitamin D daily.

Fluid

The combination of thirst and normal drinking behavior, especially the consumption of fluids with meals, is usually sufficient to maintain normal hydration. Healthy individuals who have routine access to fluids and who are not exposed to heat stress consume adequate water to meet their needs. Purposeful drinking is warranted for individuals who are exposed to heat stress or perform sustained vigorous activity (see ch. 4).

Flexibility of Food Patterns for Varied Food Preferences

The USDA Food Guide and the DASH Eating Plan are flexible to permit food choices based on individual and cultural food preferences, cost, and availability. Both can also accommodate varied types of cuisines and special needs due to common food allergies. Two adaptations of the USDA Food Guide and the DASH Eating Plan are:

Vegetarian Choices

Vegetarians of all types can achieve recommended nutrient intakes through careful selection of foods. These individuals should give special attention to their intakes of protein, iron, and vitamin B12, as well as calcium and vitamin D if avoiding milk products. In addition, vegetarians could select only nuts, seeds, and legumes from the meat and beans group, or they could include eggs if so desired. At the 2,000-calorie level, they could choose about 1.5 ounces of nuts and $\frac{2}{3}$ cup legumes instead of 5.5 ounces of meat, poultry, and/or fish. One egg, $\frac{1}{2}$ ounce of nuts, or $\frac{1}{4}$ cup of legumes is considered equivalent to 1 ounce of meat, poultry, or fish in the USDA Food Guide.

Substitutions for Milk and Milk Products

Since milk and milk products provide more than 70 percent of the calcium consumed by Americans, guidance on other choices of dietary calcium is needed for those who do not consume the recommended amount of milk products. Milk product consumption has been associated with overall diet quality and adequacy of intake of many nutrients, including calcium, potassium, magnesium, zinc, iron, riboflavin, vitamin A, folate, and vitamin D. People may avoid milk products because of allergies, cultural practices, taste, or other reasons. Those who avoid all milk products need to choose rich sources of the nutrients provided by milk, including potassium, vitamin A, and magnesium in addition to calcium and vitamin D (see app. B). Some non-dairy sources of calcium are shown in appendix B-4. The bioavailability of the calcium in these foods varies.

Those who avoid milk because of its lactose content may obtain all the nutrients provided by the milk group by using lactose-reduced or low-lactose milk products, taking small servings of milk several times a day, taking the enzyme lactase before consuming milk products, or eating other calcium-rich foods. For additional information, see appendixes B-4 and B-5 and NIH Publication No. 03-2751.⁶

⁶ NIH Publication No. 03-2751, U.S. Department of Health and Human Services, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, March 2003. <http://digestive.niddk.nih.gov/ddiseases/pubs/lactoseintolerance/index.htm>.



TABLE 1. Sample USDA Food Guide and the DASH Eating Plan at the 2,000-Calorie Level^a

Amounts of various food groups that are recommended each day or each week in the USDA Food Guide and in the DASH Eating Plan (amounts are daily unless otherwise specified) at the 2,000-calorie level. Also identified are equivalent amounts for different food choices in each group. To follow either eating pattern, food choices over time should provide these amounts of food from each group on average.

Food Groups and Subgroups	USDA Food Guide Amount ^b	DASH Eating Plan Amount	Equivalent Amounts
Fruit Group	2 cups (4 servings)	2 to 2.5 cups (4 to 5 servings)	<ul style="list-style-type: none"> ½ cup equivalent is: • ½ cup fresh, frozen, or canned fruit • 1 med fruit • ¼ cup dried fruit • USDA: ½ cup fruit juice • DASH: ¾ cup fruit juice
Vegetable Group	2.5 cups (5 servings)	2 to 2.5 cups (4 to 5 servings)	<ul style="list-style-type: none"> ½ cup equivalent is: • ½ cup of cut-up raw or cooked vegetable • 1 cup raw leafy vegetable • USDA: ½ cup vegetable juice • DASH: ¾ cup vegetable juice
Grain Group	6 ounce-equivalents	7 to 8 ounce-equivalents (7 to 8 servings)	<ul style="list-style-type: none"> 1 ounce-equivalent is: • 1 slice bread • 1 cup dry cereal • ½ cup cooked rice, pasta, cereal • DASH: 1 oz dry cereal (½–1 ¼ cup depending on cereal type—check label)
Meat and Beans Group	5.5 ounce-equivalents	6 ounces or less meat, poultry, fish	<ul style="list-style-type: none"> 1 ounce-equivalent is: • 1 ounce of cooked lean meats, poultry, fish • 1 egg • USDA: ¼ cup cooked dry beans or tofu, 1 Tbsp peanut butter, ½ oz nuts or seeds • DASH: 1 ½ oz nuts, ½ oz seeds, ½ cup cooked dry beans
		4 to 5 servings per week nuts, seeds, and dry beans ^c	
Milk Group	3 cups	2 to 3 cups	<ul style="list-style-type: none"> 1 cup equivalent is: • 1 cup low-fat/fat-free milk, yogurt • 1 ½ oz of low-fat or fat-free natural cheese • 2 oz of low-fat or fat-free processed cheese
Oils	24 grams (6 tsp)	8 to 12 grams (2 to 3 tsp)	<ul style="list-style-type: none"> 1 tsp equivalent is: • DASH: 1 tsp soft margarine • 1 Tbsp low-fat mayo • 2 Tbsp light salad dressing • 1 tsp vegetable oil
Discretionary Calorie Allowance	267 calories		<ul style="list-style-type: none"> 1 Tbsp added sugar equivalent is: • DASH: 1 Tbsp jelly or jam • ½ oz jelly beans • 8 oz lemonade
• Example of distribution:			
Solid fat ^d	18 grams		
Added sugars	8 tsp	~2 tsp (5 Tbsp per week)	

^a All servings are per day unless otherwise noted. USDA vegetable subgroup amounts and amounts of DASH nuts, seeds, and dry beans are per week.

^b The 2,000-calorie USDA Food Guide is appropriate for many sedentary males 51 to 70 years of age, sedentary females 19 to 30 years of age, and for some other gender/age groups who are more physically active. See table 3 for information about gender/age/activity levels and appropriate calorie intakes. See appendixes A-2 and A-3 for more information on the food groups, amounts, and food intake patterns at other calorie levels.

^c In the DASH Eating Plan, nuts, seeds, and dry beans are a separate food group from meat, poultry, and fish.

^d The oils listed in this table are not considered to be part of discretionary calories because they are a major source of the vitamin E and polyunsaturated fatty acids, including the essential fatty acids, in the food pattern. In contrast, solid fats (i.e., saturated and *trans* fats) are listed separately as a source of discretionary calories.

TABLE 2. Comparison of Selected Nutrients in the Dietary Approaches to Stop Hypertension (DASH) Eating Plan^a, the USDA Food Guide^b, and Nutrient Intakes Recommended Per Day by the Institute of Medicine (IOM)^c

Estimated nutrient levels in the DASH Eating Plan and the USDA Food Guide at the 2,000-calorie level, as well as the nutrient intake levels recommended by the Institute of Medicine for females 19–30 years of age.

Nutrient	DASH Eating Plan (2,000 kcals)	USDA Food Guide (2,000 kcals)	IOM Recommendations for Females 19 to 30
Protein, g	108	91	RDA: 46
Protein, % kcal	21	18	AMDR: 10–35
Carbohydrate, g	288	271	RDA: 130
Carbohydrate, % kcal	57	55	AMDR: 45–65
Total fat, g	48	65	—
Total fat, % kcal	22	29	AMDR: 20–35
Saturated fat, g	10	17	—
Saturated fat, % kcal	5	7.8	ALAP ^d
Monounsaturated fat, g	21	24	—
Monounsaturated fat, % kcal	10	11	—
Polyunsaturated fat, g	12	20	—
Polyunsaturated fat, % kcal	5.5	9.0	—
Linoleic acid, g	11	18	AI: 12
Alpha-linolenic acid, g	1	1.7	AI: 1.1
Cholesterol, mg	136	230	ALAP ^d
Total dietary fiber, g	30	31	AI: 28 ^e
Potassium, mg	4,706	4,044	AI: 4,700
Sodium, mg	2,329 ^f	1,779	AI: 1,500, UL: <2,300
Calcium, mg	1,619	1,316	AI: 1,000
Magnesium, mg	500	380	RDA: 310
Copper, mg	2	1.5	RDA: 0.9
Iron, mg	21	18	RDA: 18
Phosphorus, mg	2,066	1,740	RDA: 700
Zinc, mg	14	14	RDA: 8
Thiamin, mg	2.0	2.0	RDA: 1.1
Riboflavin, mg	2.8	2.8	RDA: 1.1
Niacin equivalents, mg	31	22	RDA: 14
Vitamin B ₆ , mg	3.4	2.4	RDA: 1.3
Vitamin B ₁₂ , µg	7.1	8.3	RDA: 2.4
Vitamin C, mg	181	155	RDA: 75
Vitamin E (AT) ^g	16.5	9.5	RDA: 15.0
Vitamin A, µg (RAE) ^h	851	1,052	RDA: 700

^a DASH nutrient values are based on a 1-week menu of the DASH Eating Plan. NIH publication No. 03-4062. www.nhlbi.nih.gov.

^b USDA nutrient values are based on population-weighted averages of typical food choices within each food group or subgroup.

^c Recommended intakes for adult females 19–30; RDA = Recommended Dietary Allowance; AI = Adequate Intake; AMDR = Acceptable Macronutrient Distribution Range; UL = Upper Limit.

^d As Low As Possible while consuming a nutritionally adequate diet.

^e Amount listed is based on 14 g dietary fiber/1,000 kcal.

^f The DASH Eating Plan also can be used to follow at 1,500 mg sodium per day.

^g AT = mg d-α-tocopherol

^h RAE = Retinol Activity Equivalents

TABLE 3. Estimated Calorie Requirements (in Kilocalories) for Each Gender and Age Group at Three Levels of Physical Activity^a

Estimated amounts of calories needed to maintain energy balance for various gender and age groups at three different levels of physical activity. The estimates are rounded to the nearest 200 calories and were determined using the Institute of Medicine equation.

Gender	Age (years)	Activity Level ^{b,c,d}		
		Sedentary ^b	Moderately Active ^c	Active ^d
Child	2-3	1,000	1,000-1,400 ^e	1,000-1,400 ^e
Female	4-8	1,200	1,400-1,600	1,400-1,800
	9-13	1,600	1,600-2,000	1,800-2,200
	14-18	1,800	2,000	2,400
	19-30	2,000	2,000-2,200	2,400
	31-50	1,800	2,000	2,200
	51+	1,600	1,800	2,000-2,200
Male	4-8	1,400	1,400-1,600	1,600-2,000
	9-13	1,800	1,800-2,200	2,000-2,600
	14-18	2,200	2,400-2,800	2,800-3,200
	19-30	2,400	2,600-2,800	3,000
	31-50	2,200	2,400-2,600	2,800-3,000
	51+	2,000	2,200-2,400	2,400-2,800

^a These levels are based on Estimated Energy Requirements (EER) from the Institute of Medicine Dietary Reference Intakes macronutrients report, 2002, calculated by gender, age, and activity level for reference-sized individuals. "Reference size," as determined by IOM, is based on median height and weight for ages up to age 18 years of age and median height and weight for that height to give a BMI of 21.5 for adult females and 22.5 for adult males.

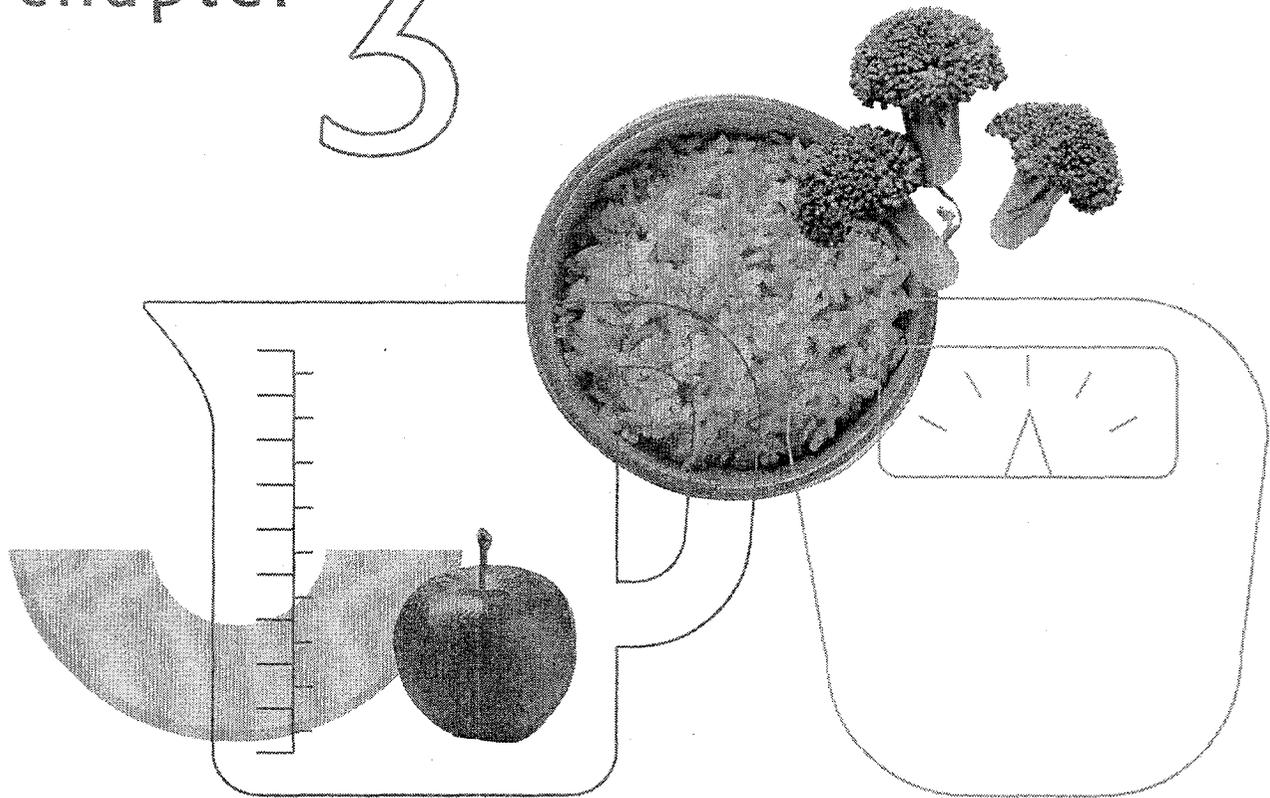
^b Sedentary means a lifestyle that includes only the light physical activity associated with typical day-to-day life.

^c Moderately active means a lifestyle that includes physical activity equivalent to walking about 1.5 to 3 miles per day at 3 to 4 miles per hour, in addition to the light physical activity associated with typical day-to-day life.

^d Active means a lifestyle that includes physical activity equivalent to walking more than 3 miles per day at 3 to 4 miles per hour, in addition to the light physical activity associated with typical day-to-day life.

^e The calorie ranges shown are to accommodate needs of different ages within the group. For children and adolescents, more calories are needed at older ages. For adults, fewer calories are needed at older ages.

chapter 3



Weight Management

OVERVIEW

The prevalence of obesity in the United States has doubled in the past two decades. Nearly one-third of adults are obese, that is, they have a body mass index (BMI) of 30 or greater. One of the fastest growing segments of the population is that with a BMI ≥ 30 with accompanying comorbidities. Over the last two decades, the prevalence of overweight among children and adolescents has increased substantially; it is estimated that as many as 16 percent of children and adolescents are overweight, representing a doubling of the rate among children and tripling of the rate among adolescents. A high prevalence of overweight and obesity is of great public health concern because excess body fat leads to a higher risk for premature death, type 2

diabetes, hypertension, dyslipidemia, cardiovascular disease, stroke, gall bladder disease, respiratory dysfunction, gout, osteoarthritis, and certain kinds of cancers.

Ideally, the goal for adults is to achieve and maintain a body weight that optimizes their health. However, for obese adults, even modest weight loss (e.g., 10 pounds) has health benefits, and the prevention of further weight gain is very important. For overweight children and adolescents, the goal is to slow the rate of weight gain while achieving normal growth and development. Maintaining a healthy weight throughout childhood may reduce the risk of becoming an overweight or obese adult. Eating fewer calories while increasing physical activity are the keys to controlling body weight.

While overweight and obesity are currently significant public health issues, not all Americans need to lose weight. People at a healthy weight should strive to maintain their weight, and underweight individuals may need to increase their weight.

DISCUSSION

Overweight and obesity in the United States among adults and children has increased significantly over the last two decades. Those following typical American eating and activity patterns are likely to be consuming diets in excess of their energy requirements. However, caloric intake is only one side of the energy balance equation. Caloric expenditure needs to be in balance with caloric intake to maintain body weight and must exceed caloric intake to achieve weight loss (see tables 3 and 4). To reverse the trend toward obesity, most Americans need to eat fewer calories, be more active, and make wiser food choices.

Prevention of weight gain is critical because while the behaviors required are the same, the extent of the behaviors required to lose weight makes weight loss more challenging than prevention of weight gain. Since many adults gain weight slowly over time, even small decreases in calorie intake can help avoid weight gain, especially if accompanied by increased physical activity. For example, for most adults a reduction of 50 to 100 calories per day may prevent gradual weight gain, whereas a reduction of 500 calories or more per day is a common initial goal in weight-loss programs. Similarly, up to 60 minutes of moderate- to vigorous-intensity physical activity per day may be needed to prevent weight gain, but as much as 60 to 90 minutes of moderate-intensity physical activity per day is recommended to sustain weight loss for previously overweight people. It is advisable for men over age 40, women over age 50, and those with a history of chronic diseases such as heart disease or diabetes to consult with a healthcare provider before starting a vigorous exercise program. However, many people can safely increase their physical activity without consulting a healthcare provider.⁷

KEY RECOMMENDATIONS

- To maintain body weight in a healthy range, balance calories from foods and beverages with calories expended.
- To prevent gradual weight gain over time, make small decreases in food and beverage calories and increase physical activity.

Key Recommendations for Specific Population Groups

- *Those who need to lose weight.* Aim for a slow, steady weight loss by decreasing calorie intake while maintaining an adequate nutrient intake and increasing physical activity.
- *Overweight children.* Reduce the rate of body weight gain while allowing growth and development. Consult a healthcare provider before placing a child on a weight-reduction diet.
- *Pregnant women.* Ensure appropriate weight gain as specified by a healthcare provider.
- *Breastfeeding women.* Moderate weight reduction is safe and does not compromise weight gain of the nursing infant.
- *Overweight adults and overweight children with chronic diseases and/or on medication.* Consult a healthcare provider about weight loss strategies prior to starting a weight-reduction program to ensure appropriate management of other health conditions.

Monitoring body fat regularly can be a useful strategy for assessing the need to adjust caloric intake and energy expenditure. Two surrogate measures used to approximate body fat are BMI (adults and children) and waist circumference (adults).⁸ BMI is defined as weight in kilograms divided by height, in meters, squared. For adults, weight status is based on the absolute BMI level (fig. 2). For children and adolescents, weight status is determined by the comparison of the individual's BMI with age- and gender-specific percentile values (see fig. 3 for a sample boys' growth curve). Additional growth curves can be

⁷ For more information on recommendations to consult a healthcare provider, see Physical Activity and Public Health—A Recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine, *JAMA* 273:402-407, 1995. <http://wonder.cdc.gov/wonder/prevguid/p0000391/P0000391.asp>.

⁸ NIH Publication Number 00-4084, The Practical Guide: Identification, Evaluation and Treatment of Overweight and Obesity in Adults, U.S. Department of Health and Human Services, National Institutes of Health, National Heart, Lung, and Blood Institute, October 2000. http://www.nhlbi.nih.gov/guidelines/obesity/prctgd_c.pdf

found at <http://www.cdc.gov/growthcharts>. BMI is more accurate at approximating body fat than is measuring body weight alone. However, BMI has some limitations. BMI overestimates body fat in people who are very muscular and underestimates body fat in people who have lost muscle mass. The relationship between BMI and body fat varies somewhat with age, gender, and ethnicity. In addition, for adults, BMI is a better predictor of a population's disease risk than an individual's risk of chronic disease.⁸ For children gaining excess weight, small decreases in energy intake reduce the rate at which they gain weight (body fat), thus improving their BMI percentile over time. As another surrogate measure, waist circumference can approximate abdominal fat but should be measured very carefully. Fat located in the abdominal region is associated with a greater health risk than peripheral fat.⁸

Some proposed calorie-lowering strategies include eating foods that are low in calories for a given measure of food (e.g., many kinds of vegetables and fruits and some soups). However, when making changes to improve nutrient intake, one needs to make substitutions to avoid excessive calorie intake. The healthiest way to reduce calorie intake is to reduce one's intake of added sugars, fats, and alcohol, which all provide calories but few or no essential nutrients (for more information, see chs. 6, 7, and 9).

Special attention should be given to portion sizes, which have increased significantly over the past two decades (<http://hin.nhlbi.nih.gov/portion/index.htm>). Though there are no empirical studies to show a causal relationship between increased portion sizes and obesity, there are studies showing that controlling portion sizes helps limit calorie intake, particularly when eating calorie-dense foods (foods that are high in calories for a given measure of food). Therefore, it is essential that the public understand how portion sizes compare to a recommended amount of food (i.e., serving) from each food group at a specific caloric level. The understanding of serving size and portion size is important in following either the DASH Eating Plan or the USDA Food Guide (see app. A). When using packaged foods with nutrient labels, people should pay attention

Eating fewer calories while increasing physical activity are the keys to controlling body weight.

to the units for serving sizes and how they compare to the serving sizes in the USDA Food Guide and the DASH Eating Plan.

Lifestyle change in diet and physical activity is the best first choice for weight loss. A reduction in 500 calories or more per day is commonly needed. When it comes to body weight control, it is calories that count—not the proportions of fat, carbohydrates, and protein in the diet. However, when individuals are losing weight, they should follow a diet that is within the Acceptable Macronutrient Distribution Ranges (AMDR) for fat, carbohydrates, and protein, which are 20 to 35 percent of total calories, 45 to 65 percent of total calories, and 10 to 35 percent of total calories, respectively. Diets that provide very low or very high amounts of protein, carbohydrates, or fat are likely to provide low amounts of some nutrients and are not advisable for long-term use. Although these kinds of weight-loss diets have been shown to result in weight reduction, the maintenance of a reduced weight ultimately will depend on a change in lifestyle. Successful and sustainable weight loss and weight maintenance strategies require attention to both sides of the energy balance equation (i.e., caloric intake and energy expenditure).

⁸ NIH Publication Number 00-4084, *The Practical Guide: Identification, Evaluation and Treatment of Overweight and Obesity in Adults*, U.S. Department of Health and Human Services, National Institutes of Health, National Heart, Lung, and Blood Institute, October 2000. http://www.nhlbi.nih.gov/guidelines/obesity/prtgdl_c.pdf