

Chapter 2

Nutrition Guidelines and Assessment

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THINK About It

- 1 Do you think that the food choices you make today will effect your future health?
- 2 Have you ever taken a very large dose of a vitamin or mineral? If so, why? How did you determine whether it was safe?
- 3 Do you eat the same foods most days, or do you select a variety of foods from day to day?

CHAPTER Menu

- Linking Nutrients, Foods, and Health
- Dietary Guidelines
- From Dietary Guidelines to Planning: What You Will Eat
- Exchange Lists
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LEARNING Objectives

- Describe and discuss the nutrition concepts of adequacy: balance, calorie control, nutrient density, moderation, and variety.
- List the key recommendations of the *Dietary Guidelines for Americans, 2015-2020*.
- Define the Dietary Reference Intake values: DRI, EAR, RDA, AI, and DV.
- Identify five mandatory components of a food label.
- List and describe four major factors in nutrition assessment of an individual.

So, you want to be healthier—maybe that’s why you are taking this course! You probably already know that a well-planned diet is one important element of being healthy. Although most of us know that the foods we choose to eat have a major impact on our health, we aren’t always certain about what choices to make. Choosing the right foods isn’t made any easier when we are bombarded by headlines and advertisements: Eat less fat! Get more fiber in your diet! Moderation is the key! Build strong bones with calcium!

For many Americans, nutrition is simply a lot of hearsay, or maybe the latest slogan coined from last week’s news headlines. Conversations about nutrition start with “*They* say you should...” or “Now *they* think that...”. Have you ever wondered who “they” are and why “they” are telling you what to eat or what not to eat?

It’s no secret that a healthy population is a more productive population, so many of our nutrition guidelines come from the federal government’s efforts to improve our overall health. Thus, the government is one “they.” Undernutrition and overnutrition are examples of two nutrition problems that government policy has addressed.

Many important elements of nutrition policy focus on relieving **undernutrition** in some population groups. Let’s look at some examples. To prevent widespread deficiencies, the government requires food manufacturers to add nutrients to certain foods: iodine to salt, vitamin D to milk, and thiamin, riboflavin, niacin, iron, and folic acid to enriched grains. Another example is the creation of dietary standards, such as the Dietary Reference Intakes, which make it easier to define adequate diets for large groups of people.

Overnutrition, or the excessive intake of food, especially in unbalanced proportions, has led to changes in public policy as well. Health researchers have discovered links between diet and obesity, high blood pressure, cancer, and heart disease. As a result, nutritionists suggest that we make informed food choices by reducing our intake of excess calories, sodium, saturated fats, added sugar, refined grains, and trans fats, and at the same time, be physically active. Another aspect of nutrition policy is shaped by the public’s desire to know what is in the food they eat. This need has led to increased nutrition information on food labels. Public education efforts have resulted in the development of teaching tools such as MyPlate.

New information about diet and health will continue to drive public policy. This chapter explores diet-planning tools, dietary guidelines, and current dietary standards and discusses how to evaluate nutritional health. How does your diet compare with these current guidelines and standards?

► **undernutrition** Poor health resulting from depletion of nutrients caused by inadequate nutrient intake over time. It is now most often associated with poverty, alcoholism, and some types of eating disorders.

► **overnutrition** The long-term consumption of an excess of nutrients. The most common type of overnutrition in the United States results from the regular consumption of excess calories, fats, saturated fats, and cholesterol.

Quick Bite

Early “Laws” of Health

Galen might be among the best-known physicians who ever lived. During the second century, Galen expounded his “laws of health”—eat proper foods, drink the right beverages, exercise, breathe fresh air, get enough sleep, have a daily bowel movement, and control your emotions. Isn’t it interesting that these core concepts are still recommended today?

Linking Nutrients, Foods, and Health

We all know that what we eat affects our health. Nutrition science has made many advances in identifying essential nutrients and the foods in which they are found. Eating foods with all the essential nutrients prevents nutritional deficiencies such as scurvy (vitamin C deficiency) or pellagra (deficiency of the B vitamin niacin). In the United States, few people suffer nutritional deficiencies as a result of dietary inadequacies. More often, Americans suffer from chronic diseases such as heart disease, cancer, hypertension, and diabetes—all linked to overconsumption and lifestyle choices. Your future health depends on today’s lifestyle choices, including your food choices.

Living in a high-tech world, we expect immediate solutions to long-term problems. Wouldn’t it be interesting if we could avoid the consequences of over-eating by taking a pill, drinking a beverage, or getting a shot? As you know, no magic food, nutrient, or drug exists. Instead, we have to rely on healthful foods, exercise, and lifestyle choices to reduce our risk of chronic disease—a task that challenges many Americans. Tools are available to help us select healthful foods to eat. The U.S. Department of Agriculture’s MyPlate food guidance system and the Exchange Lists are two common and comprehensive tools. Although different, these tools rely on the same core nutrition concepts: adequacy, balance, calorie (energy) control, nutrient density, moderation, and variety. These underlying concepts help to keep the focus of healthy eating on a total diet approach.¹ Let’s look at how each concept can shape our eating patterns.

Adequacy

Having an adequate diet means that the foods you choose to eat provide all the essential nutrients, fiber, and energy in amounts sufficient to support growth and maintain health.² Many Americans consume more calories than they need without getting 100 percent of the recommended intakes for a number of nutrients. Take, for example, a meal of soda pop, two hard-shell beef tacos, and cinnamon breadsticks. Although this meal provides foods from different food groups, it is high in sugar and fat and low in many of the vitamins and minerals found in fruits and vegetables. Occasionally skipping fruits and vegetables at a meal does not create a vitamin or mineral deficiency; however, dietary habits that skimp on fruits and vegetables most of the time provide an overall inadequate diet. Most people could improve the adequacy of their diet by choosing meals and snacks that are high in vitamins and minerals but low to moderate in energy (calorie) content. 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.³

Balance

A healthful diet requires a balance of a variety of foods (grains, vegetables, fruits, oil, milk, and meat and beans), energy sources (carbohydrate, protein, and fat), and other nutrients (vitamins and minerals). Your diet can also be balanced in a complementary way when the foods you choose to eat provide you with adequate nutrients. The trick is to consume enough, but not too much, from all the different food groups.

Calorie Control

It can be a challenge to identify the amount of calories you need to maintain or achieve a healthy weight. Although complicated by a number of factors, the formula for weight maintenance seems simple: If you eat the same amount of calories that you use each day, your weight will stay the same. If you eat



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Energy Balance Equation

Data from Centers for Disease Control and Prevention.

THINK
About It
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more calories than you use, you will gain weight, and if you eat less than you use, you will lose weight. In this chapter, we focus on how to choose foods by learning how to get the most nutrients without wasting calories. This is a lesson on budgeting: you should demand value for your expenditures. Just as each of us has a monetary budget—a limited amount of money to spend on things such as food, rent, books, and transportation—in a sense we all have a calorie budget as well. Once you determine how many calories your body uses each day and how to manipulate your calorie expenditure to reach certain health goals, you will be making food choices to match your calorie needs. Every time you eat, you are choosing to spend some of your calorie budget for that day. Those who spend their budget wisely tend to be healthier than those who do not. Let's put the concept of calorie control together with nutrient density to see how it works.

Nutrient Density

The concern that Americans' diets are becoming increasingly energy-rich but nutrient-poor has focused attention on the nutrient content of individual foods relative to the energy they provide.⁴ Understanding nutrient density can help explain how overeating can nevertheless result in undernutrition, and it also can help people make informed food choices.

The **nutrient density** of food provides a clue to how “healthy” a food is. It is a ratio of nutrient content to energy content. Nutrient-dense foods provide

► **nutrient density** A description of the healthfulness of foods. Foods high in nutrient density are those that provide substantial amounts of vitamins and minerals and relatively few calories; foods low in nutrient density are those that supply calories but relatively small amounts of vitamins and minerals (or none at all).



Going Green

Is the American Diet Contributing to a Warmer Planet?

Our food choices not only contribute to our state of health, both current and future, but also are a significant part of greenhouse gas emissions known as carbon footprint. The impact includes production, transport, processing, packaging, storage, and preparation of food that is delivered to our dinner plates. The food sector contributes 15–30 percent of all greenhouse gas emissions, the primary promoter of global warming. The average American diet creates 2.8 tons of carbon dioxide (CO₂) emissions per person per year, which far exceeds the 2.2 tons of CO₂ emissions generated by Americans driving cars and trucks.

Some foods can result in damage to both our health and the environment. For example, the highly processed foods that have become a big part of our diets are low sources of good nutrition and often require barrels of oil to create. How can we make eating healthier and also more environmentally friendly? Choose plant-based foods. Because they are healthy and protect natural resources, many nutritionists favor an emphasis on plant-based foods in our diets.

Although grains and sweets have less environmental impact, animal-derived foods such as meat and dairy with higher levels of greenhouse gas emissions have more nutritional value. Can we choose both and optimize the levels of nutrient density as well as lower greenhouse gas emissions? The answer is not as simple as reducing or excluding animal-based products and replacing them with plants or grains just because these food sources are more sustainable. When optimizing a diet with regard to sustainability, it is crucial to account for the nutritional value and not solely focus on impacts per kilogram of products, because any dietary recommendations to reduce greenhouse gas emissions must also meet dietary requirements. Current research has demonstrated that a sustainable diet that meets the dietary requirements for health combined with lower greenhouse gas emissions can be achieved without eliminating meat or dairy products, but rather through various food combinations that are associated with different environmental impacts.

Drewnowski A, Rehm CD, Martin, A, et al. Energy and nutrient density of foods in relation to their carbon footprint. *Am J Clin Nutr.* 2015;101(1):184–191; Werner LB, Flysjo A, Tholstrup T. Greenhouse gas emissions of realistic dietary choices in Denmark: the carbon footprint and nutritional value of dairy products. *Food Nutr Res.* 2014;58.

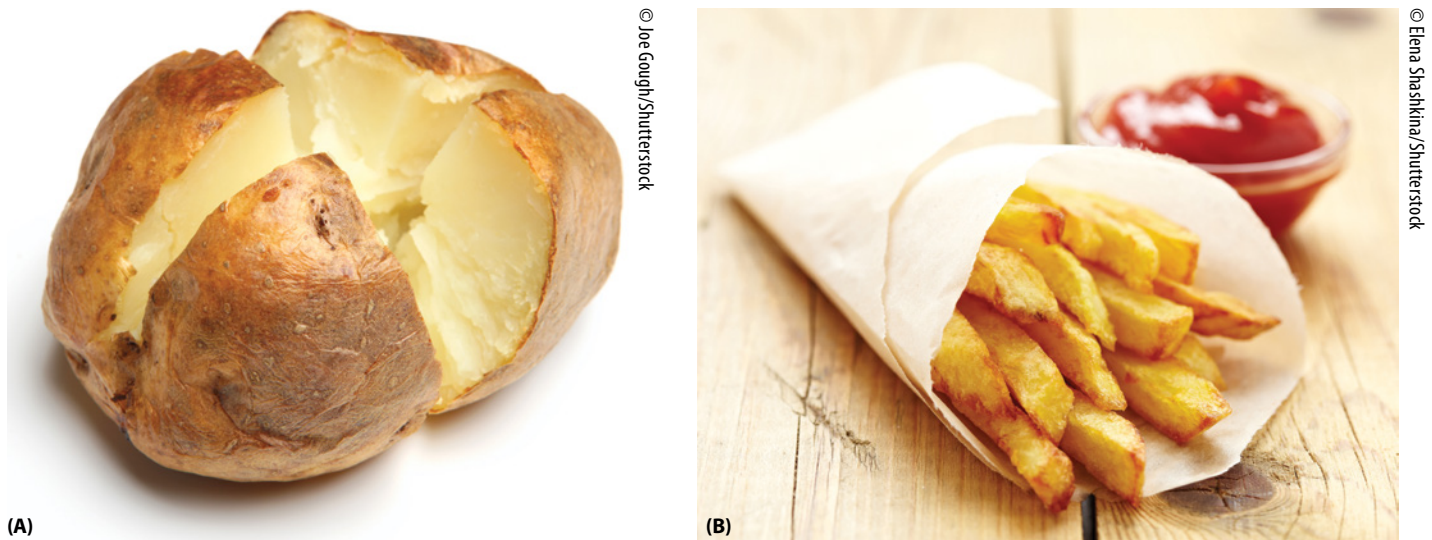


FIGURE 2.1 Nutrient density. Based on the amount of nutrients per total calories, the plain baked potato is more nutrient dense than the same amount of French fries.

substantial amounts of vitamins and minerals and relatively few calories.⁵ Foods that are low in nutrient density supply calories but relatively small amounts of vitamins and minerals, sometimes none at all.⁶ A food high in calories but low in vitamins and minerals is less nutrient dense than one that has a high vitamin and mineral content compared with its overall calories.

Consider a potato as an example. We can prepare a potato in many different ways. We can eat baked potatoes, mashed potatoes with toppings, or French fries. Depending on how it is cooked and what is added to it before we eat it, the nutrient density of a potato changes. The most nutrient-dense form of this potato would be a plain baked potato, which provides the most vitamins and minerals with relatively few calories. The least nutrient-dense version of this potato is French fries, because frying a food adds a lot more calories without adding more vitamins and minerals. In this case, the proportion of vitamins and minerals is low compared to the overall higher calorie content. French fries are not nutrient dense (See **FIGURE 2.1**).

Some foods with little or no added sugar or fat are high-nutrient-density food choices. For example, you might decide to eat a pear instead of a handful of caramel corn. Both provide about the same amount of calories. By choosing to eat the pear instead of the caramel corn, however, you are working toward meeting your daily nutrient needs while gaining more nutrients within the calories consumed, thereby selecting a more nutrient-dense and overall more healthy food choice.

Moderation

Not too much or too little—that's what moderation means. Moderation does not mean that you have to eliminate low-nutrient-density foods from your diet, such as soft drinks and candy, but rather that you can include them occasionally. Moderation entails not taking anything to extremes. You probably have heard that vitamin C has positive effects, but that doesn't mean huge doses of this essential nutrient are appropriate for you. It's also important to remember that substances that are healthful in small amounts can sometimes be dangerous in large quantities. For example, the body needs zinc for hundreds of chemical reactions, including those that support normal growth, development, and immune function. Too much zinc, however, can cause deficiency of copper, another essential mineral, which can lead to impaired immune function.

Being moderate in your diet means that you do not restrict or completely eliminate any one type of food, but rather that all types of food can fit into a healthful diet.

Food guides and their graphics convey the message of moderation by showing suggested amounts of different food groups. Appearing in diverse shapes, food guides from other countries reflect their cultural contexts. Japan, for example, uses the shape of a spinning top (see **FIGURE 2.2**).

Variety

How many different foods do you eat on a daily basis? Ten? Fifteen? Would it surprise you that one of Japan's dietary guidelines suggests eating 30 different foods each day?⁷ Now *that's* variety! Variety means including a lot of different foods in the diet: not just different food groups such as fruits, vegetables, and grains, but also different foods from each group. Eating two bananas and three carrots each and every day might give you the minimum number of recommended daily servings of fruits and vegetables, but it doesn't add much variety.

Variety is important for a number of reasons. Eating a variety of fruits, for example, provides a broader mix of vitamins, minerals, and phytochemicals than if you eat the same one or two fruits most of the time. Choosing a variety of protein sources gives you a different balance of fats and other nutrients. Variety can add interest and excitement to your meals while preventing boredom with your diet. Perhaps most important, variety in your diet helps ensure that you get all the nutrients you need. Studies have shown that people who have varied diets are more likely to meet their overall nutrient needs.⁸

There are no magic diets, foods, or supplements. Instead, your overall, long-term food choices can bring you the benefits of a nutritious diet. A healthful diet is something you create over time, not the way you eat on any given day. Using the principles of adequacy, balance, calorie (energy) control, nutrient density, moderation, and variety can help you attain and achieve healthy eating habits, which in turn will contribute to your overall healthy lifestyle. Let's take a look at some general guidance for making those food choices.

Key Concepts Food and nutrient intake play a major role in health and risk of disease. For most Americans, overnutrition is more of a problem than undernutrition. The diet-planning principles of adequacy, balance, calorie (energy) control, nutrient density, moderation, and variety are important concepts in choosing a healthful diet.

Dietary Guidelines

To help citizens improve their overall health, many countries have developed dietary guidelines—simple, easy-to-understand statements about food choices, food safety, and physical activity. This section examines dietary guidelines for the United States and Canada.

Dietary Guidelines for Americans

In 1980, the **U.S. Department of Agriculture (USDA)** and the **U.S. Department of Health and Human Services (DHHS)** jointly released the first edition of the *Dietary Guidelines for Americans*. Revised guidelines have been released every five years



FIGURE 2.2 Dietary guidelines around the world. Global differences in environment, culture, socioeconomic, and behavior create significant differences in the foods that make up our diets. Despite this, dietary guidelines from one country to the next show surprising similarities. Whether a country has only 3 guidelines or as many as 23, all share similar basic recommendations. For example, the Japanese dietary guidelines use a spinning top. The United States uses a plate, and Canada uses a rainbow. Mexico and most European countries use a circular form.

Courtesy of the Japanese Ministry of Health, Labor and Welfare/USDA.

Quick Bite

Variety Is Key

Mothers often say, "Eat your vegetables." Studies show that adding variety in the vegetables you eat is a good indicator of overall increased vegetable consumption. It may cost a little more today, but eating different types of vegetables is related to better overall diet quality and a larger quantity of vegetables consumed. The small increase in cost at the grocery store now likely will save you more than money in the future. So experiment a little, and try something other than your usual carrots and green beans at dinner.

► **U.S. Department of Agriculture (USDA)** The government agency that monitors the production of eggs, poultry, and meat for adherence to standards of quality and wholesomeness. The USDA also provides public nutrition education, performs nutrition research, and administers the WIC program.

► **U.S. Department of Health and Human Services (DHHS)** The principal federal agency responsible for protecting the health of all Americans and providing essential human services. The agency is especially concerned with those Americans who are least able to help themselves.

FIGURE 2.3 *Dietary Guidelines for Americans.* A revised *Dietary Guidelines for Americans* was released in 2015. Relationship between energy balance and body fat storage. The *Dietary Guidelines for Americans, 2015-2020* recommends reducing intake of sodium (salt), added sugars (e.g., cookies), and refined grains (e.g., white bread). Reducing alcohol intake (e.g., beer) is a strategy that adults can use to reduce calorie consumption.

Reproduced from U.S. Department of Health and Human Services and U.S. Department of Agriculture. *Dietary Guidelines for Americans, 2015-2020*. 8th ed. Washington, DC: U.S. Government Printing Office; 2015.



as scientific information about links between diet and chronic disease is updated. The *Dietary Guidelines for Americans* provides science-based advice that suggests how nutrition and physical activity can help promote health across the lifespan and reduce the risk for major chronic diseases in the U.S. population ages 2 years and older.⁹ The food and physical activity choices you make every day affect your health—how you feel today, tomorrow, and in the future.

► ***Dietary Guidelines for Americans, 2015-2020*** The *Dietary Guidelines for Americans* are the foundation of federal nutrition policy and are developed by the U.S. Department of Agriculture (USDA) and the U.S. Department of Health and Human Services (DHHS). These science-based guidelines are intended to reduce the number of Americans who develop chronic diseases such as hypertension, diabetes, cardiovascular disease, obesity, and alcoholism.

The *Dietary Guidelines for Americans, 2015-2020* (see **FIGURE 2.3**) is designed as a tool for professionals to help individuals and their families consume a healthy, nutritionally adequate diet. The *Dietary Guidelines for Americans, 2015-2020* is based on research that looks at the relationship between overall eating patterns, health, and risk of chronic disease. Advances in research have provided a greater understanding of, and focus on, the importance of healthy eating patterns as a whole, and how foods and beverages act in combination to affect health. Recommendations within the *Guidelines* are what experts have determined to be the best advice for Americans to reduce the risk for chronic diseases such as heart disease, cancer, diabetes, stroke, osteoporosis, and obesity. These guidelines are the cornerstone of federal nutrition policy and education. They are used to develop educational materials and to aid in the design and implementation of nutrition-related programs, such as the National School Lunch Program and Meals on Wheels. The *Dietary Guidelines for Americans* serves as the basis for nutrition messages and consumer materials developed by nutrition educators and health professionals for the general public.¹⁰

Lifestyle choices, including a poor diet and lack of physical activity, are the most important factors that contribute to the overweight and obesity epidemic that is currently affecting men, women, and children throughout the United States. Even in individuals who are not overweight, a poor diet and

physical inactivity are well known to be associated with the major causes of morbidity and mortality. Currently, the number of Americans who are overweight or obese is at an all-time high; as a consequence, the risk for various chronic diseases is also on the rise. Furthermore, among the population of overweight and obese individuals, many are undernourished in several key nutrients. In an effort to address this growing problem, the *Dietary Guidelines for Americans, 2015-2020* focuses on the integration of government, agriculture, health care, business, educators, and communities working together to encourage individuals to make healthy lifestyle changes.¹¹ The main objective of these guidelines is to encourage eating patterns and regular physical activity for the American people. These *Guidelines* emphasize a total diet approach by encouraging us to think holistically about what we eat and drink. They also emphasize meeting nutritional needs by including nutrient-dense foods that contain essential vitamins and minerals, dietary fiber, and other naturally occurring substances that have positive health effects. The *Guidelines* offer practical tips for how people can make changes within their own diet as a way to integrate healthier choices. Examples of these practical tips include: consuming more vegetables, fruits, whole grains, fat-free and low-fat dairy products, and seafood; consumption of foods with less sodium, saturated and trans fats, added sugars, and refined grains; and an increase in daily physical activity.

The Dietary Guidelines, 2015-2020 provide five overarching guidelines that encourage healthy eating patterns, recognizing that individuals will need to make shifts in their food and beverage choices to achieve a healthy pattern, and acknowledge that all segments of our society—food producers, grocery stores, restaurants, families, and policymakers—have a role to play in supporting healthy choices. These guidelines also emphasize that a healthy eating pattern is not a rigid prescription, but rather an adaptable framework in which individuals can enjoy foods that meet their personal, cultural, and traditional preferences and fit within their budget and lifestyle.

Overarching Guidelines

1. **Follow a healthy eating pattern across the lifespan.** All food and beverage choices matter. Choose a healthy eating pattern at an appropriate calorie level to help achieve and maintain a healthy body weight, support nutrient adequacy, and reduce the risk of chronic disease.
2. **Focus on variety, nutrient density, and amount.** To meet nutrient needs within calorie limits, choose a variety of nutrient-dense foods across and within all food groups in recommended amounts.
3. **Limit calories from added sugars and saturated fats and reduce sodium intake.** Consume foods low in added sugars, saturated fats, and sodium. Cut back on foods and beverages higher in these components to amounts that fit within healthy eating patterns.
4. **Shift to healthier food and beverage choices.** Choose nutrient-dense foods and beverages across and within all food groups in place of less healthy choices. Consider cultural and personal preferences to make these shifts easier to accomplish and maintain.
5. **Support healthy eating patterns for all.** Everyone has a role in helping to create and support healthy eating patterns in multiple settings nationwide, from home to school to work to communities.



Key Recommendations from the *Dietary Guidelines for Americans 2015-2020*

Key recommendations provide further guidance on how individuals can follow the five guidelines. These should be applied in their entirety, given the interconnected relationship that each dietary component can have with others.

Dietary Guidelines for Americans, 2015-2020

Key Recommendations

- Follow a healthy eating pattern that accounts for all foods and beverages within an appropriate calorie level
- Consume less than 10 percent of calorie per day from added sugars
- Consume less than 10 percent of calories per day from saturated fats
- Consume less than 2,300 mg per day of sodium
- If alcohol is consumed, it should be consumed in moderation—up to one drink per day for women and up to two drinks per day for men—and only by adults of legal drinking age.
- Meet the Physical Activity Guidelines for Americans

Looking further into the *Dietary Guidelines* you can determine what foods to increase in our diets, as well as what foods to limit. For most Americans, foods to eat more of in our diet include:

- A variety of vegetables from all of the subgroups—dark green, red and orange, legumes (beans and peas), starchy, and other types
- Fruits, especially whole fruits
- Grains, at least half of which are whole grains
- Fat-free or low-fat dairy, including milk, yogurt, cheese, and/or fortified soy beverages
- A variety of protein foods, including seafood, lean meats and poultry, eggs, legumes, and nuts, seeds, and soy products
- Oils

In order to follow healthy eating patterns, individuals should limit the following foods:

- Saturated fats and *trans* fats
- Added sugars
- Sodium

In addition, individuals of all ages should meet *Physical Activity Guidelines for Americans* to help promote health and reduce the risk of chronic disease. Americans should aim to achieve and maintain a healthy body weight. The relationship between diet and physical activity contributes to calorie balance and managing body weight. The *Physical Activity Guidelines for Americans* suggests that adults should do the equivalent of 150 minutes of moderate-intensity aerobic activity each week—that's an average of only 30 minutes a day, five days a week. For children and adolescents age 6 years and older, the recommendation is 60 minutes or more of physical activity per day.¹²

The environment in which many Americans live, work, learn, and play can be a roadblock for many people trying to achieve or maintain a healthy body weight. Having been described as an obesogenic environment, this way of life is a significant contributor to America's obesity epidemic because it affects both sides of the calorie balance equation.¹³ In our modern lifestyle, the availability of high-calorie, palatable, inexpensive food is coupled with many mechanized labor-saving devices. The result is that we live in an environment that often promotes overeating while at the same time discourages physical activity.

A Roadmap to the 2015-2020 Edition of the Dietary Guidelines for Americans

Previous editions of the *Dietary Guidelines* have made suggestions that individuals follow particular dietary patterns. The current *Dietary Guidelines* are different in this way. In recognizing that people do not eat individual nutrients, but rather combinations of different foods that provide a variety of nutrients, which forms an overall eating pattern providing a cumulative effect on one's health. Because of this, eating patterns and their food and nutrient characteristics are a primary emphasis of recommendations in the 2015-2020 edition of the *Dietary Guidelines*. As of such, three chapters make up this edition.

Although the primary focus of the *Dietary Guidelines* is on nutrition, because of its critical and complementary role in promoting health and in preventing disease, the importance of meeting the *Physical Activity Guidelines for Americans* is discussed throughout these *Guidelines*. Examples of health benefits as well as tips for helping you to adopt the Dietary Guidelines' key recommendations can be found in [TABLE 2.1](#).

Chapter 1. Key Elements of Healthy Eating Patterns

This chapter focuses on the first three Guidelines as well as the Key Recommendations. The first three guidelines are: “*Follow a healthy eating pattern across the lifespan; Focus on variety, nutrient density, and amount; and limit calories from added sugars and saturated fats and reduce sodium intake*.” This chapter discusses the relationship of diet and physical activity to health and

TABLE 2.1
2015–2020 Dietary Guidelines for Americans: Benefits, Behaviors, and Tips

	Dietary Guideline Recommendation Benefits to Your Health	Goals or Behaviors That could Make You Healthier	How-to-Tips
Follow a healthy eating pattern across the lifespan	<ul style="list-style-type: none"> Individuals throughout all stages of the lifespan should have eating patterns that promote overall health and help prevent chronic disease Choose a healthy eating pattern at an appropriate calorie level to help achieve and maintain a healthy body weight, support nutrient adequacy, and reduce the risk of chronic disease 	<ul style="list-style-type: none"> Consume foods and drinks to meet, not exceed, calorie needs. Plan ahead to make healthy food choices Track food and calorie intake Reduce portion sizes, especially of high-calorie foods Choose healthy food options when eating away from home 	<ul style="list-style-type: none"> Know your calorie needs Prepare and pack healthy snacks at home to be eating at school or at work
Focus on variety, nutrient density, and amount	<ul style="list-style-type: none"> Choose a variety of nutrient-dense foods across and within all food groups in recommended amounts 	<ul style="list-style-type: none"> Eat five or more servings of vegetables and fruit daily, make up of a variety of choices Choose foods which contain nutrients and other beneficial substances that have not been “diluted” by the addition of calories from added solid fats, sugars, or refined starches, or by the solid fats naturally present in food 	<ul style="list-style-type: none"> Add dark-green, red, and orange vegetables to soups, stews, casseroles, and stir-fries and other main and side dishes Add beans or peas to salad, soups, and side dishes, or serve as a main dish Have raw, cut-up vegetables and fruit handy for a quick side dish snacks, salad, for desserts When eating out, choose a vegetable as a side dish
Limit calories from added sugars and saturated fats and reduce sodium intake	<ul style="list-style-type: none"> Cut back on foods and beverages high in added sugars, saturated fats and sodium to amounts that fit within healthy eating patterns Limit added sugars to less than 10 percent of calories per day Limit saturated fat intake to less than 10 percent of calories per day Limit sodium to less than 2,300 mg per day (adults) Eating a diet that includes saturated fat, trans fat, and dietary cholesterol raises low-density lipoprotein (LDL), or “bad” cholesterol levels, which increases the risk of coronary heart disease (CHD) 	<ul style="list-style-type: none"> Replace saturated fats with polyunsaturated fats Be aware of the most likely sources of trans fat in your diet, such as many pastry items and donuts, deep-fried foods, many types of snack chips, cookies, and crackers 	<ul style="list-style-type: none"> Eat less cake, cookies, ice cream, other desserts, and candy Include foods which provide monounsaturated and polyunsaturated fats, such as olive oil and nuts in your diet Limit intake of foods high in saturated and trans fats such as ground beef and full fat dairy products

(continues)

TABLE 2.1
2015–2020 Dietary Guidelines for Americans: Benefits, Behaviors, and Tips (Continued)

	Dietary Guideline Recommendation Benefits to Your Health	Goals or Behaviors That could Make You Healthier	How-to-Tips
Shift to healthier food and beverage choices	<ul style="list-style-type: none"> Choose nutrient-dense foods and beverages across and within all food groups Excessive alcohol consumption has no benefits, and the health and social hazards of heavy alcohol intake are numerous and well known 	<ul style="list-style-type: none"> Drink an adequate amount of water each day Choose foods and drinks with added sugars or caloric sweeteners (sugar-sweetened beverages) less frequently If you are of legal drinking age and you if alcohol is consumed, do so in moderation Mixing alcohol and caffeine is not recognized as safe by the FDA 	<ul style="list-style-type: none"> Drink few or no regular sodas, sports drinks, energy drinks, and fruit drinks Choose water, fat-free milk, 100 percent fruit juice, or unsweetened tea or coffee as drinks If alcohol is consumed limit to no more than one drink per day for women and two drinks per day for men Avoid excessive (heavy or binge) drinking Avoid alcohol if you are pregnant or may become pregnant
Support healthy eating patterns for all	<ul style="list-style-type: none"> Everyone has a role in helping to create and support healthy eating patterns in multiple settings* 	<ul style="list-style-type: none"> Systems, organizations, and businesses and industries, all have important role in helping individuals make healthy choices Professionals can work with individuals in a variety of settings to adapt their choices to develop a healthy eating pattern tailored to accommodate physical health, cultural, ethnic, traditional, and personal preferences, as well as personal food budgets and other issues of accessibility 	<ul style="list-style-type: none"> Make healthy food choices at home and away-from-home

Modified from U.S. Department of Health and Human Services and U.S. Department of Agriculture. 2015–2020 *Dietary Guidelines for Americans*. 8th Edition. December 2015. Available at <http://health.gov/dietaryguidelines/2015/guidelines/>.

TABLE 2.2
Healthy U.S.-Style Eating Pattern at the 2,000-Calorie Level

Food Group	Amount in the 2,000-Calorie-Level Pattern
Vegetables	2 ½ c-eq/day
• Dark green	1 ½ c-eq/wk
• Red and orange	5 ½ c-eq/wk
• Legumes (beans and peas)	1 ½ c-eq/wk
• Starchy	5 c-eq/wk
• Other	4 c-eq/wk
Fruits	2 c-eq/day
Grains	6 oz-eq/day
• Whole grains	≥ 3oz-eq/day
• Refined grains	≤ 3 oz-eq/day
Dairy	3 c-eq/day
Protein Foods	5 ½ oz-eq/day
• Seafood	8 oz-eq/wk
• Meats, poultry, eggs	26 oz-eq/wk
• Nuts, seeds, soy products	5 oz-eq/wk
Oils	27 g/day
Limit on Calories for Other Uses (% of calories)	270 kcal/day (14%)

Reproduced from U.S. Department of Health and Human Services and U.S. Department of Agriculture. 2015–2020 *Dietary Guidelines for Americans*. 8th Edition. December 2015. Available at <http://health.gov/dietaryguidelines/2015/guidelines/>

explains the principles of a healthy eating pattern. The dietary recommendation examples are based off of a 2,000-calorie level as shown in (TABLE 2.2).

To help determine if a 2,000-calorie diet is right for you, refer to the Estimated Daily Calorie Needs (TABLE 2.3).

Two additional USDA Food Patterns, the Healthy Mediterranean-Style Eating Pattern, and the Healthy Vegetarian Eating Pattern are found in the Appendix of the Guidelines. All of the eating plans emphasize fruits, vegetables, whole grains, beans and peas, fat-free and low-fat milk and milk products, and healthy oils as well as including less red meat and more seafood than the typical American diet. The Mediterranean diet, given its name as the eating pattern associated with those cultures bordering the Mediterranean Sea, has been associated with positive health outcomes such as lower rates of heart disease. The Mediterranean-Style eating pattern includes more fruits and seafood and less dairy compared to the Healthy U.S-Style Pattern. The Healthy Vegetarian Pattern modifies the Healthy U.S-Style Pattern by eliminating meat, poultry, and fish while adding more soy products, legumes, nuts, seeds, and whole grains. Dairy and eggs are included; however, the Vegetarian Pattern can be modified based on individual food restrictions.

The core elements of this chapter is the importance of consuming overall healthy eating patterns, including vegetables, fruits, grains, dairy, protein foods, and oils, eaten within an appropriate calorie level and in forms with limited amounts of saturated fats, added sugars, and sodium.

Chapter 2. Shifts Needed To Align with Healthy Eating Patterns

This chapter focuses on the fourth Dietary Guideline, “*Shift to healthier food and beverage choices.*” This chapter compares current food and nutrient intakes in the U.S. to recommendations and describes the shifts in dietary choices that are needed to align current intakes with current recommendations. Within this chapter, small shifts in food choices, both within and across food groups, encourage Americans that changes in food choices over the course of a week,

TABLE 2.3
Estimated Daily Calorie Needs

AGE (YEARS)	SEDENTARY ^a	MODERATELY ACTIVE ^b	ACTIVE ^c
Female			
2–3	1000	1000–1200	1000–1400
4–8	1200–1400	1400–1600	1400–1800
9–13	1400–1600	1600–2000	1800–2200
14–18	1800	2000	2400
19–30	1800–2000	2000–2200	2400
31–50	1800	2000	2200
51+	1600	1800	2000–2200
Male			
2–3	1000	1000–1400	1000–1400
4–8	1200–1400	1400–1600	1600–2000
9–13	1600–2000	1800–2200	2000–2600
14–18	2000–2400	2400–2800	2800–3200
19–30	2400–2600	2600–2800	3000
31–50	2200–2400	2400–2600	2800–3000
51+	2000–2200	2200–2400	2600–2800

^aA lifestyle that includes only the light physical activity associated with typical day-to-day life

^bA lifestyle that includes physical activity equivalent to walking about 1.5 to 3 miles per day at 3 to 4 miles per hour (30–60 minutes a day of moderate physical activity), in addition to the light physical activity associated with typical day-to-day life

^cA lifestyle that includes physical activity equivalent to walking more than 3 miles per day at 3 to 4 miles per hour (60 or more minutes a day of moderate physical activity), in addition to the light physical activity associated with typical day-to-day life

U.S. Department of Health and Human Services and U.S. Department of Agriculture. 2015–2020 Dietary Guidelines for Americans. 8th Edition. December 2015. Available at <http://health.gov/dietaryguidelines/2015/guidelines/>.

a day, or even a meal can make a big difference (see **FIGURES 2.4, 2.5, and 2.6**). The following provides small shift examples:

Instead of	Choose
High calorie snacks	Nutrient-dense snacks
Fruit products with added sugars	Fresh fruit
Refined grains	Whole grains
Snacks with added sugars (candy bar)	Unsalted snacks (unsalted peanuts)
Solid fats	Unsaturated oils
Beverages with added sugars (soda pop)	No-sugar added beverages (water)

Most Americans would agree that they need to shift intakes in order to meet the suggested eating patterns of the *Dietary Guidelines*; however, young children and older Americans generally are closer to the recommendations than are adolescents and young adults.

In addition to shifting food choices, most individuals would benefit from making shifts to increase the amount of physical activity they engage in each week. This shift can come from limiting screen time and time spent on other sedentary activities.

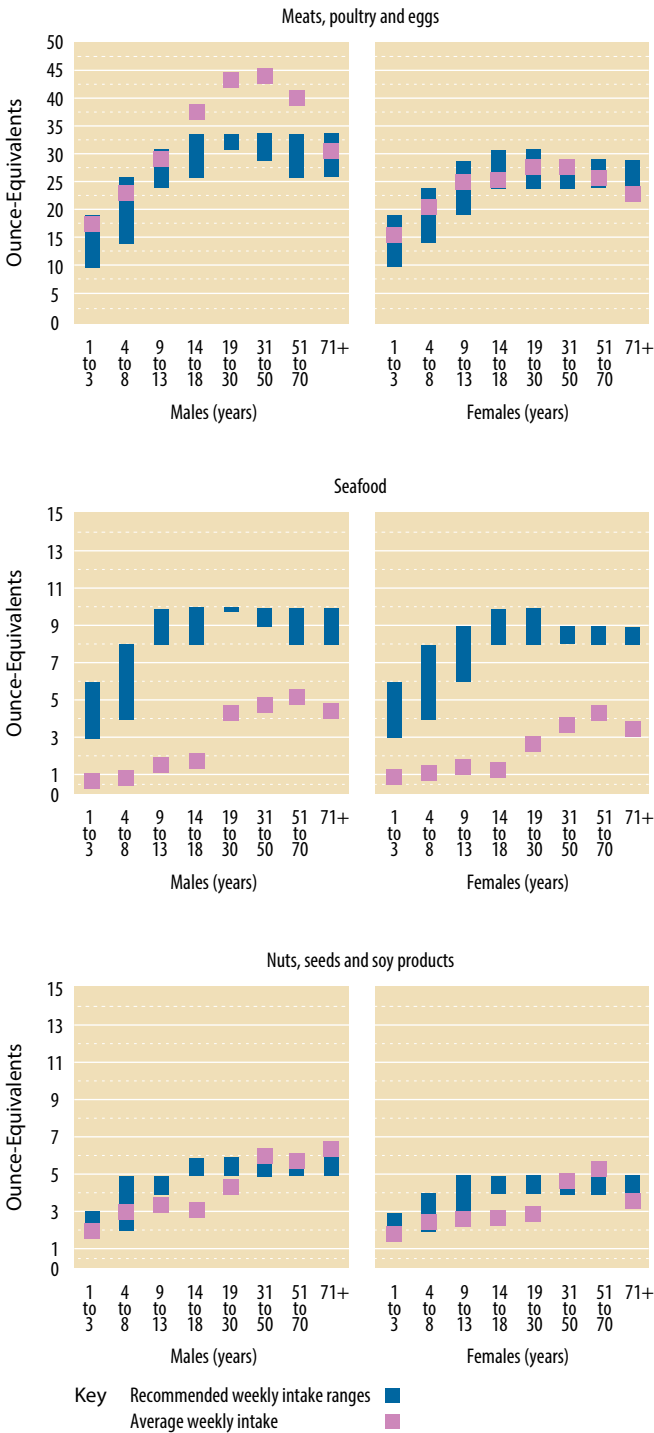


FIGURE 2.4 Average protein foods subgroup intake. Average Protein Foods Subgroup Intakes in ounce-Equivalents per Week by Age-Sex Groups, Compared to Ranges of Recommended Intake.

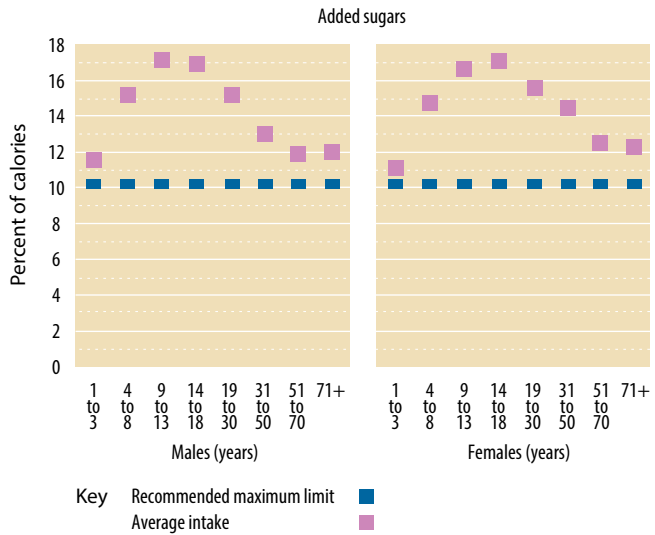


FIGURE 2.5 Intake of added sugars. Average intakes of added sugars as a percent of calories per day by age-sex group, in comparison to the *Dietary Guidelines*’ maximum limit of less than 10 percent of calories.

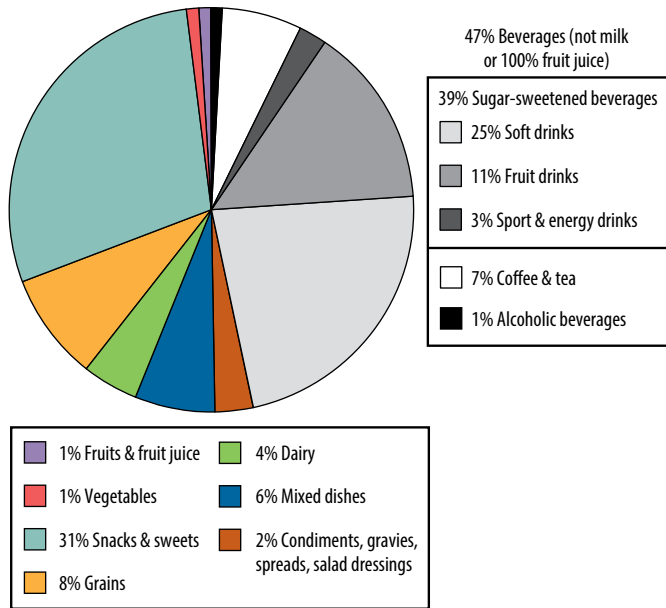


FIGURE 2.6 Sources of added sugars. Food category sources of added sugars in the U.S. population ages 2 years and older.

Chapter 3. Everyone Has a Role in Supporting Healthy Eating Patterns

This chapter focuses on the fifth guideline, “*Support healthy eating patterns for all.*” It explains how all individuals and segments of society have an important role to play in supporting healthy eating and physical activity choices. Coordination and collaboration between individuals and all aspects

of society is needed to create a new model in which healthy lifestyle choices at home, school, work, and in the community are easy, accessible, affordable, and normative. As suggested in the Social-Ecological Model used in these *Dietary Guidelines* (see **FIGURE 2.7**), various factors have a role in helping individuals shift their everyday food, beverage, and physical activity choices to align with the suggestions that make up the *Dietary Guidelines*.

Components of this chapter also encourages use of **MyPlate**, the USDA's current icon and primary food group symbol, as a guide to support healthy eating patterns. As part of the government's healthy eating initiative, MyPlate is an easy-to-understand visual image intended to empower people with the information they need to make healthy food choices and create eating habits consistent with the *Dietary Guidelines for Americans, 2015-2020*. Because we eat from plates, the design of the MyPlate icon identifies visually how much room on a plate each food group should occupy. It is the objective of this tool to remind people to think about, create, and make better, more balanced food choices. MyPlate uses the image of a dinner plate divided into four sections: fruits, vegetables, grains, and proteins, with a smaller plate (or glass) representing a serving of dairy. MyPlate is accompanied by a supporting website, www.ChooseMyPlate.gov, which provides tools, resources, and practical information on dietary assessment, nutrition education, and other user-friendly nutrition information.

Unlike the USDA's former food guide systems, MyPlate does not suggest particular foods or specific serving sizes and does not even mention desserts or sweets. It is not intended to tell people what to eat, but to empower them to make their own healthy choices and to use this visual icon as a sensible guide.¹⁶

The Appendices

The appendices of the *Dietary Guidelines for Americans, 2015-2020* are made up of 14 additional resources to support the content of the chapters. Included in the appendices are recommendations for the *Physical Activity Guidelines for Americans*; calorie needs by age, sex, and level of physical activity; a basic Healthy U.S.-Style Eating Pattern; two additional examples of healthy eating patterns; a glossary of terms; and nutritional goals for various age-sex groups. A list of select government resources on diet and physical activity, additional information on alcohol, lists of food sources of nutrients of public health concern, and food safety principles and guidance are also provided.

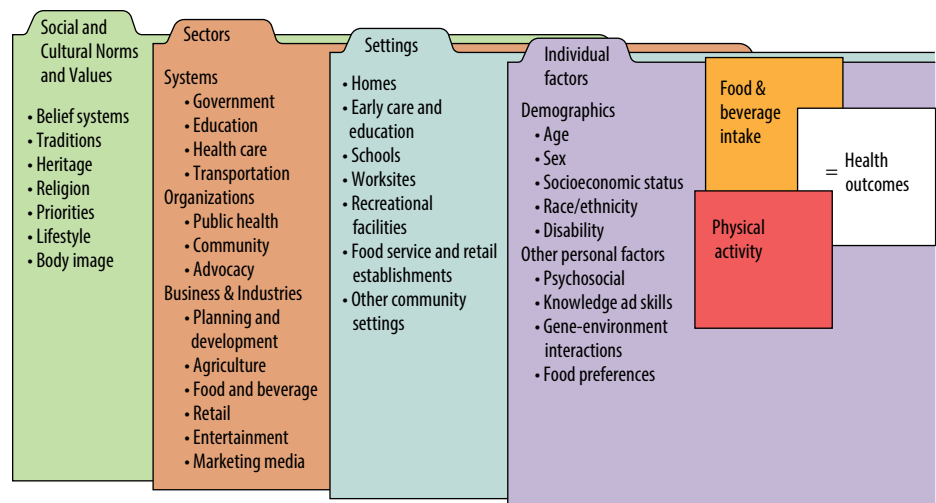


FIGURE 2.7 A social-ecological framework for nutrition and physical activity decisions.

Data from Health.gov. 2015. <http://health.gov/dietaryguidelines/2015/guidelines/chapter-3/social-ecological-model/>.

Quick Bite

Pass Up the Salt

We require only a few hundred milligrams of sodium each day, but this would be unpalatable. Given our current high-salt food environment, it would also be difficult to achieve. The average intake of sodium is about 3,400 mg per day, whereas the Dietary Guidelines recommend no more than 1,500 mg, or 3/4 teaspoon per day. The guideline is to eat less sodium, but not down to the level of actual requirements.



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TABLE 2.4
Daily Targets for Nutrients as Addressed in the *Dietary Guidelines for Americans, 2015-2020*

Nutrient or Food Group	Target Amount per Day for Adult Female Ages 19–30
Protein	46 gm (10–35% kcal)
Carbohydrate	130 gm (45–65% kcal)
Dietary fiber	28 gm
Added sugars	<10% kcal
Total fat	20–35% kcal
Saturated fat	<10% kcal
Linoleic acid	12 gm
Linolenic acid	1.1 gm
Calcium	1,000 mg
Iron	18 mg
Magnesium	310 mg
Phosphorus, mg	700 mg
Potassium	4,700 mg
Sodium	2,300 mg
Vitamin A	700 mg RAE
Vitamin E	15 mg AT
Vitamin D	600 IU
Vitamin C	75 mg

Data from U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans, 2015-2020*. 8th ed. Washington, DC: U.S. Government Printing Office; 2015.

Ways to Incorporate the Dietary Guidelines into Your Daily Life

Think about your diet and consider your overall food intake to determine whether it is consistent with the *Dietary Guidelines for Americans, 2015-2020*. Choose more fruits, vegetables, and whole grains to make sure you are getting all the nutrients you need while lowering your intake of saturated fat, trans fat, added sugar, and sodium. Eat fewer high-fat toppings and fried foods to help you balance energy intake and expenditure. Exercise regularly. Drink water more often than soft drinks, and if you choose to drink alcohol at all, use caution.

Using the *Dietary Guidelines* as your road map for finding a healthier way of eating, you might find it easier to meet your nutrition needs while also protecting your health and achieving or maintaining a healthy weight along the way. Table 2.1 suggests things you might be able to change in your own diet or lifestyle. Pick one or two suggestions or come up with some simple changes of your own to try that incorporate the *Dietary Guidelines for Americans, 2015-2020* into your daily life. **TABLE 2.4** summarizes daily limits or targets for a number of nutrients addressed in the *Dietary Guidelines*.

Key Concepts Dietary guidelines are recommendations based on current science that guide people toward more healthful choices. The *Dietary Guidelines for Americans, 2015-2020* provide five overarching guidelines that encourage healthy eating patterns, recognize that individuals will need to make shifts in their food and beverage choices to achieve a healthy pattern, and acknowledge that all segments of our society have a role to play in supporting healthy choices.

► **food groups** Categories of similar foods, such as fruits or vegetables.

Quick Bite

How Well Do School Cafeterias Follow Nutrition Guidelines?

About one in three kids and teenagers is obese, and high-fat school lunches might be part of the problem. Until recently, the USDA's nutritional standards for school meals had not been updated in more than 15 years. With the majority of school-age kids and teens getting 30 to 50 percent of their total calories from cafeteria meals each day, it's important that these meals be as healthy as possible. The Healthy, Hunger-Free Kids Act, which was passed in 2010, (1) boosts the nutrition quality of school lunches by requiring fewer calories, less sodium, and more fresh fruits, vegetables, and whole grains; (2) expands the number of students enrolled in free- and reduced-cost meals; and (3) puts into place a plan to eliminate things like vending machines from school cafeterias.

From Dietary Guidelines to Planning: What You Will Eat

By understanding the *Dietary Guidelines for Americans*, you will be able to identify characteristics that can make your diet and your lifestyle healthy. The next step is to translate your knowledge into healthful food choices. For many years, nutritionists and teachers have used **food groups** to illustrate the proper combination of foods in a healthful diet. Even young children can sort food into groups and fill a plate with foods from each group. The foods within each group are similar because of their origins—fruits, for example, all come from the same part of different plants. But from a nutritional perspective, what fruits have in common is the balance of macronutrients and the similarities in micronutrient composition. Even so, the foods in one group can differ significantly in their vitamin and mineral profiles; for example, some fruits (e.g., citrus, strawberries, and kiwi) are rich in vitamin C, whereas others (e.g., apples, bananas) have very little. Here again, we can see the importance of variety, of not simply including different food groups but also choosing a variety of foods *within* each group.

A Brief History of Food Group Plans

When the U.S. Department of Agriculture published its first dietary recommendations in 1894, specific vitamins and minerals had not even been discovered.¹⁵ The initial guide stressed the importance of consuming enough fat and sugar and energy-rich foods to support daily activity. Because people performed more manual labor in those days, many people were simply not



MyPlate: Foods, Serving Sizes, and Tips

Grains	Amount Equal to 1 Ounce	Common Portions and Ounce Equivalents
Bagels	1 "mini" bagel	1 large bagel = 4 ounce equivalents
Biscuits	1 small (2" diameter)	1 large (3") = 2 ounce equivalents
Breads	1 regular slice	2 regular slices = 2 ounce equivalents
Bulgur	½ cup cooked	
Cornbread	1 small piece (2½" × 1¼" × 1¼")	1 medium piece = 2 ounce equivalents
English muffin	½ muffin	1 muffin = 2 ounce equivalents
Muffins	1 small (2½" diameter)	1 large (3½" diameter) = 3 ounce equivalents
Oatmeal	½ cup cooked	
Pancakes	1 pancake (4½" diameter)	3 pancakes (4½" diameter) = 3 ounce equivalents
Popcorn	3 cups, popped	1 microwave bag, popped = 4 ounce equivalents
Ready-to-eat cereals	1 cup flakes; 1¼ cups puffed	
Rice	½ cup cooked (1 ounce dry)	1 cup cooked = 2 ounce equivalents
Pasta	½ cup cooked (1 ounce dry)	1 cup cooked = 2 ounce equivalents
Tortillas	1 small (6" diameter)	1 large (12" diameter) = 4 ounce equivalents

Tips: Make at least half your grains whole grains. Choose foods that name one of the following first on the label's ingredient list: brown rice, bulgur, graham flour, oatmeal, whole oats, whole rye, whole wheat, wild rice. Go easy on high-fat or sugary toppings.

Vegetables	Amount Equal to 1 Cup of Vegetables	Vegetables	Amount Equal to 1 Cup of Vegetables
Dark-Green Vegetables		Starchy Vegetables	
Spinach, romaine, collards, mustard greens, kale, other leafy greens	2 cups raw or 1 cup cooked	Corn	1 cup or 1 large ear (8" to 9" long)
Broccoli	1 cup chopped or florets	Green peas	1 cup
		White potatoes	1 cup diced or mashed 1 medium potato, boiled or baked
Orange Vegetables		Other Vegetables	
Carrots	1 cup raw or cooked 2 medium whole 1 cup baby chopped, sliced, or cooked	Bean sprouts	1 cup cooked
		Green beans	1 cup cooked
Pumpkin, sweet potato, winter squash	1 cup chopped, sliced, or cooked	Tomatoes	1 large raw whole (3")

Tips: Vary your veggies. Make half your plate fruits and vegetables. Eat more dark-green vegetables, more orange vegetables, and more dry beans. Buy fresh vegetables in season for best taste and lowest cost. Buy vegetables that are easy to prepare.

(continues)

Fruit	Amount Equal to 1 Cup of Fruit	Milk	Amount Equal to 1 Cup of Milk
Apple	1 small	Milk	1 cup
Applesauce	1 cup	Yogurt	1 regular container (8 ounces) or 1 cup yogurt
Banana	1 large (8" to 9" long)	Cheese	1½ ounces hard cheese
Melon	1 cup diced or melon balls		⅓ cup shredded cheese
Grapes	1 cup whole; 32 seedless grapes		2 ounces processed cheese
Canned fruit or diced raw fruit	1 cup		2 cups cottage cheese
Orange or peach	1 large	Milk-based desserts	1 cup pudding made with milk
Strawberries	About 8 large berries		1 cup frozen yogurt
100% fruit juice	1 cup	Soymilk	1 cup calcium-fortified soymilk

Tips: Focus on fruit. Make half your plate fruits and vegetables. Eat a variety of fruit. Choose fresh, frozen, canned, or dried fruit. Go easy on juices. When choosing a juice, look for "100% juice" on the label.

Tips: Get your calcium-rich foods. Switch to fat-free or low-fat milk. If you don't or can't consume milk, get your calcium-rich foods by choosing lactose-free or other calcium sources such as calcium-fortified juices, cereals, breads, soy beverages, or rice beverages.

Meat and Beans	Amount Equal to 1 Ounce	Common Portions and Ounce Equivalents
Cooked lean beef, pork, ham	1 ounce	1 small steak = 3½ to 4 ounce equivalents
Cooked chicken or turkey without skin	1 ounce	1 small lean hamburger = 2 to 3 ounce equivalents 1 small chicken breast half = 3 ounce equivalents
Cooked fish or shellfish	1 ounce	1 can tuna, drained = 3 to 4 ounce equivalents 1 salmon steak = 4 to 6 ounce equivalents 1 small trout = 3 ounce equivalents
Eggs	1 egg	
Nuts and seeds	½ ounce of nuts (12 almonds, 24 pistachios, 7 walnut halves) ½ ounce of seeds, roasted 1 tablespoon of peanut butter	
Dry beans and peas	¼ cup cooked beans or peas ¼ cup baked beans, refried beans ¼ cup tofu 1 ounce tempeh 2 tablespoons hummus	

Tips: Go lean with protein. Choose low-fat or lean meats and poultry. Bake it, broil it, or grill it. Vary your choices, with more fish, beans, peas, nuts, and seeds.

Oils Common oils: Vegetable oils (canola, corn, cottonseed, olive, safflower, soybean, sunflower)

Foods naturally high in oils:

Nuts

Olives

Some fish

Avocados

Tips: Know your oils. Oils are not a food group, but they provide essential nutrients. Make most of your fat sources from fish, nuts, and vegetable oils. Limit solid fats such as butter, stick margarine, shortening, and lard.

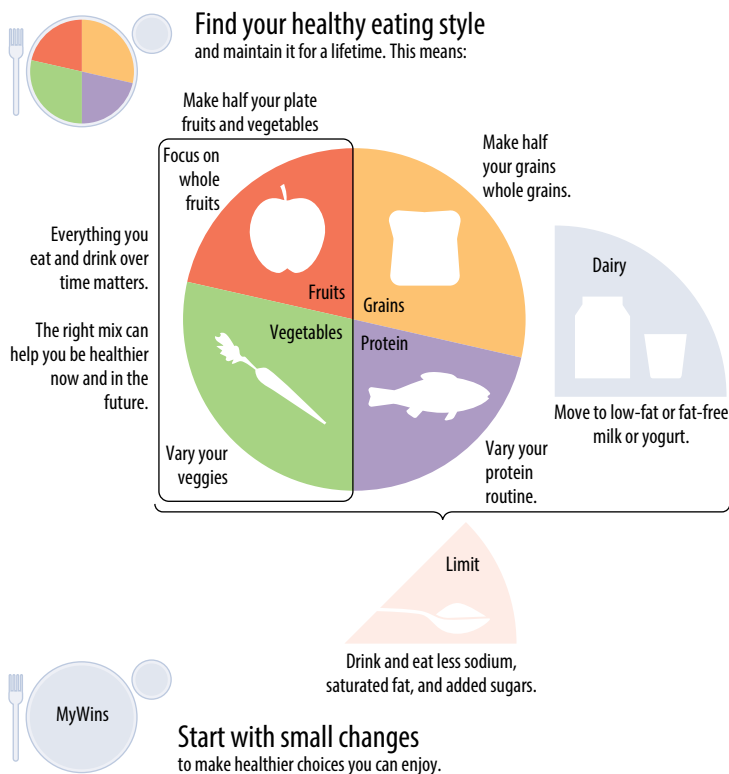
Modified from U.S. Department of Agriculture Center for Nutrition Policy and Promotion. Food Groups, MyPlate. <http://www.choosemyplate.gov/myplate/>.

getting enough calories. Canada's Official Food Rules (1942) recommended a weekly serving of liver, heart, or kidney and regular doses of fish liver oils—good sources of vitamins A and D. Later food group plans, including the Basic Four that was popular from the 1950s through the 1970s, focused on fruits, vegetables, grains, dairy products, and meats and their substitutes. After the development of the *Dietary Guidelines for Americans* in 1980, the USDA developed a new food guide that would promote overall health and be consistent with the *Dietary Guidelines*; thus, the Food Guide Pyramid was developed. Updated again and renamed in 2005, the USDA MyPyramid food guidance system was intended to be a visual reminder for individuals to make healthy food choices and be physically active every day. By law, the *Dietary Guidelines for Americans* is reviewed, updated if necessary, and published every five years, bringing us to the most current version, the *Dietary Guidelines for Americans, 2015-2020* (see **FIGURE 2.8**).

Canada's Guidelines for Healthy Eating

Promoting healthy eating habits among Canadians has been a priority of Health Canada for many years. Health Canada is the federal department responsible for helping the people of Canada maintain and improve their health. In the 1980s, a high priority was given to developing a single set of dietary guidelines. The result of this effort was the 1990 *Nutrition Recommendations for Canadians* and *Canada's Guidelines for Healthy Eating*. This report updated the existing dietary standards and provided a scientific description of the characteristics of a healthy dietary pattern.

MyPlate, MyWins



Position Statement: Academy of Nutrition and Dietetics

Total Diet Approach to Communicating Food and Nutrition Information

It is the position of the Academy of Nutrition and Dietetics that the total diet or overall pattern of food eaten is the most important focus of a healthful eating style. All foods can fit within this pattern, if consumed in moderation with appropriate portion size and combined with regular physical activity. The Academy of Nutrition and Dietetics strives to communicate healthful eating messages to the public that emphasize a balance of food and beverages, rather than any one food or meal.

Reproduced from Position of the American Dietetic Association: total diet approach to healthy eating. *J Am Diet Assoc.* 2013;113(2):307–317. Reprinted with permission from the American Academy of Nutrition and Dietetics.

- **Nutrition Recommendations for Canadians** A set of scientific statements that provide guidance to Canadians for a dietary pattern that will supply recommended amounts of all essential nutrients while reducing the risk of chronic disease.
- **Canada's Guidelines for Healthy Eating** Key messages that are based on the 1990 *Nutrition Recommendations for Canadians* and that provide positive, action-oriented, scientifically accurate eating advice to Canadians.

Quick Bite

SuperTracker: My Foods, My Fitness, My Health

The MyPlate website includes an interactive diet and physical activity tool called SuperTracker. You can use it to get your own personalized nutrition and physical activity plan. Track your foods and physical activities to see how they stack up to recommendations. Get tips and support to help you make healthier choices and plan ahead. Visit www.supertracker.usda.gov.

FIGURE 2.8 MyPlate. Released in 2011, MyPlate is an Internet-based educational tool that helps consumers implement the principles of the *Dietary Guidelines for Americans 2015-2020* and other nutritional standards. Courtesy of the USDA.

10 tips

Nutrition
Education Series

liven up your meals with vegetables and fruits



10 tips to improve your meals with vegetables and fruits

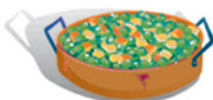
Discover the many benefits of adding vegetables and fruits to your meals. They are low in fat and calories, while providing fiber and other key nutrients. Most Americans should eat more than 3 cups—and for some, up to 6 cups—of vegetables and fruits each day. Vegetables and fruits don't just add nutrition to meals. They can also add color, flavor, and texture. Explore these creative ways to bring healthy foods to your table.

1 fire up the grill

Use the grill to cook vegetables and fruits. Try grilling mushrooms, carrots, peppers, or potatoes on a kabob skewer. Brush with oil to keep them from drying out. Grilled fruits like peaches, pineapple, or mangos add great flavor to a cookout.

2 expand the flavor of your casseroles

Mix vegetables such as sautéed onions, peas, pinto beans, or tomatoes into your favorite dish for that extra flavor.



3 planning something Italian?

Add extra vegetables to your pasta dish. Slip some peppers, spinach, red beans, onions, or cherry tomatoes into your traditional tomato sauce. Vegetables provide texture and low-calorie bulk that satisfies.

4 get creative with your salad

Toss in shredded carrots, strawberries, spinach, watercress, orange segments, or sweet peas for a flavorful, fun salad.

5 salad bars aren't just for salads

Try eating sliced fruit from the salad bar as your dessert when dining out. This will help you avoid any baked desserts that are high in calories.

6 get in on the stir-frying fun

Try something new! Stir-fry your veggies—like broccoli, carrots, sugar snap peas, mushrooms, or green beans—for a quick-and-easy addition to any meal.

7 add them to your sandwiches

Whether it is a sandwich or wrap, vegetables make great additions to both. Try sliced tomatoes, romaine lettuce, or avocado on your everyday sandwich or wrap for extra flavor.



8 be creative with your baked goods

Add apples, bananas, blueberries, or pears to your favorite muffin recipe for a treat.

9 make a tasty fruit smoothie

For dessert, blend strawberries, blueberries, or raspberries with frozen bananas and 100% fruit juice for a delicious frozen fruit smoothie.



10 liven up an omelet

Boost the color and flavor of your morning omelet with vegetables. Simply chop, sauté, and add them to the egg as it cooks. Try combining different vegetables, such as mushrooms, spinach, onions, or bell peppers.

Go to www.ChooseMyPlate.gov for more information.

As science advanced and nutritional concerns changed, Canada's official food rules evolved into *Eating Well with Canada's Food Guide*. (See **FIGURE 2.9**.) The amounts and types of foods recommended in the *Food Guide* are based on the nutrient reference values of the Dietary Reference Intakes (DRIs). The foods pictured in the *Food Guide* reflect the diversity of foods available in Canada. The "rainbow" used by the *Food Guide* places foods into four groups: Vegetables and Fruit, Grain Products, Milk and Alternatives, and Meat and Alternatives. The *Food Guide* describes the kinds of foods to choose from each group. For example, under the Milk and Alternatives group, the *Food Guide* suggests, "Drink fortified soy beverages if you do not drink milk." *Eating Well with Canada's Food Guide* illustrates that vegetables, fruits, and grains should be the major part of the diet, with milk products and meats consumed in smaller amounts.

The *Food Guide* also provides a "bar" that shows how many daily servings are recommended for each age group and gives examples of serving sizes. The *Food Guide* provides specific advice for different ages and stages. Limiting foods and beverages high in calories, fat, sugar, or salt is recommended, as is label-reading.

The current edition of *Eating Well with Canada's Food Guide* recommends that Canadians do the following¹⁴:

- Eat at least one dark-green and one orange vegetable each day.
- Enjoy vegetables and fruit prepared with little or no added fat, sugar, or salt.
- Eat vegetables and fruits more often than juice.
- Select whole grains for at least half of one's grain products.
- Choose grain products that are low in fat, sugar, or salt.
- Drink skim, 1 percent, or 2 percent milk each day.
- Consume meat alternatives, such as beans, lentils, and tofu, often.
- Eat at least two *Food Guide* servings of fish each week.
- Select lean meat and alternatives prepared with little or no added fat or salt.
- Include a small amount of unsaturated fat each day.
- Satisfy thirst with water.
- Limit foods and beverages high in calories, fat, sugar, or salt.
- Be active every day.

Following the eating pattern of *Canada's Food Guide* will help people to get enough vitamins, minerals, and other nutrients; reduce the risk of obesity, type 2 diabetes, heart disease, certain types of cancer, and osteoporosis; and achieve overall health and vitality. The Health Canada website (www.healthcanada.gc.ca/foodguide) includes a link to My Food Guide, which is an interactive tool for personalizing the information in *Canada's Food Guide*.

Canada's Physical Activity Guide, released in January 2011 by the Canadian Society for Exercise Physiology, recommends that children ages 5 to 11 and youth ages 12 to 17 should get at least 60 minutes of moderate-to-vigorous-intensity physical activity daily. Adults ages 18 to 64 and older adults age 65 and older should get at least 150 minutes of moderate- to vigorous-intensity aerobic physical activity per week, in bouts of 10 minutes or more.

Using MyPlate or Canada's Food Guide in Diet Planning

The first step in using MyPlate or *Canada's Food Guide* for diet planning is to determine the amount of calories you should eat each day. **TABLE 2.5** shows the recommended amounts of food for three calorie-intake levels. It also gives

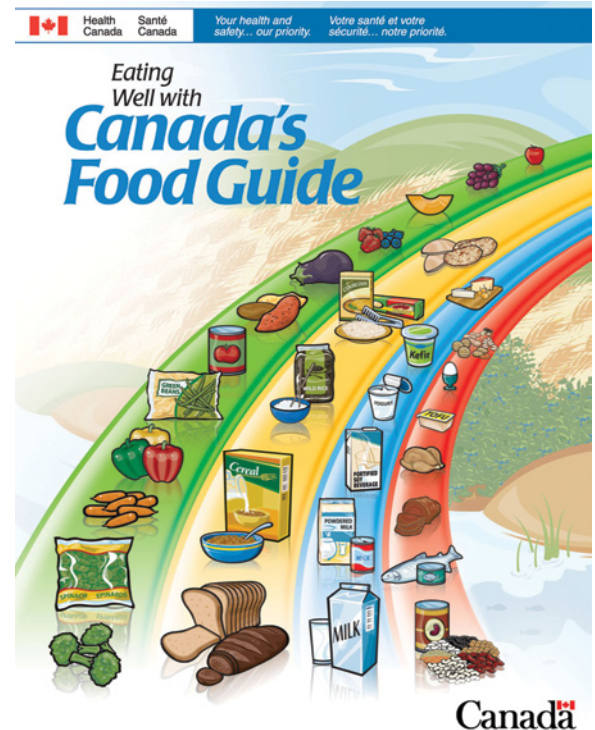


FIGURE 2.9 *Eating Well with Canada's Food Guide*. The rainbow portion of *Canada's Food Guide* sorts food into groups from which people can make wise food choices.

© All rights reserved. *Eating Well with Canada's Food Guide*. Health Canada, 2011. Adapted and reproduced with permission from the Minister of Health, 2016.

► **Eating Well with Canada's Food Guide** Recommendations to help Canadians select foods to meet energy and nutrient needs while reducing the risk of chronic disease. The *Food Guide* is based on the *Nutrition Recommendations for Canadians* and *Canada's Guidelines for Healthy Eating* and is a key nutrition education tool for Canadians aged 4 years and older.



2–4 servings of fruit per day.



6–11 servings of bread, rice, and cereal per day.

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TABLE 2.5
MyPlate Suggested Daily Amounts for Three Levels of Energy Intake

Food Group	Energy Intake Level		
	Low (1,400 kcal) ^a	Moderate (2,000 kcal) ^b	High (2,800 kcal) ^c
Grains	5 oz eq	6 oz eq	10 oz eq
Vegetables	1½ cups	2½ cups	3½ cups
Fruits	1½ cups	2 cups	2½ cups
Milk	2 cups	3 cups	3 cups
Meat and beans	4 oz eq	5½ oz eq	7 oz eq
Oils	4 teaspoons	6 teaspoons	8 teaspoons
Empty calories allowed ^d	117 kilocalories	270 kilocalories	426 kilocalories

^a 1,400 kilocalories is about right for many young children.

^b 2,000 kilocalories is about right for teenage girls, active women, and many sedentary men.

^c 2,800 kilocalories is about right for teenage boys and many active men.

^d Empty calorie allowance is the remaining amount of calories needed for all food groups, assuming that those choices are fat-free or low-fat and with no added sugars.

Note: Your calorie needs may be higher or lower than those shown. Women may need more calories when they are pregnant or breastfeeding.

Modified from U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans, 2010*. 7th ed. U.S. Government Printing Office; 2010. Courtesy of U.S. Department of Agriculture and U.S. Department of Health and Human Services.

you an idea of how MyPlate varies with different energy needs. Next, become familiar with the types of food in each group, the number of recommended servings, and the appropriate serving sizes. For an intuitive guide to serving sizes, see **TABLE 2.6**, and plan your meals and snacks using the suggested serving sizes for your appropriate calorie level.

Let's start to plan a 2,000-calorie diet. Beginning with breakfast, you could plan to have the following: 1 cup (1 oz) of ready-to-eat cereal, ½ cup of skim milk, 1 slice of whole wheat toast with 1 teaspoon of butter, and 1 cup of orange juice.

Continue to plan your meals and snacks for the rest of the day with the amount of servings you have remaining for each food group. In this case, it would be as shown in **TABLE 2.7**. Keep in mind that what you consider a serving might differ from the sizes defined in MyPlate. Research shows that Americans' serving sizes for common foods such as pasta, cookies, cereal, soft drinks, and French fries have increased significantly.¹⁷ Do large portions promote overeating and obesity? See the FYI feature "Portion Distortion" for a scientific exploration related to this question.

Sometimes it's difficult to figure out how to account for foods that are mixtures of different groups—lasagna, casseroles, or pizza, for example. Try separating such foods into their ingredients (e.g., pizza contains crust, tomato sauce, cheese, and toppings, which might be meats or vegetables) to estimate the amounts. You should be able to come up with a reasonable approximation. All in all, MyPlate and *Canada's Food Guide* are easy-to-use guidelines that can help you select a variety of foods.

Be aware of foods that contain many calories but have little or no nutrients, such as cookies, pastries, and donuts. Note in Table 2.7 that for a 2,000-calorie food plan, 270 calories are remaining and allowed to be used even when all the other food groups are accounted for. However, this accounting with leftover calories assumes that all food choices are fat-free or low-fat and do not have added sugars. What does this mean? If you are already in the habit of choosing low-fat and low-sugar options, you have a few calories to play with each day. These calories can be used for a higher-fat choice or for some sugar in your iced tea. But watch out! Those calories get used up quickly.

TABLE 2.6

Playing with MyPlate Portions Your Favorite Sports and Games Can Help You Visualize MyPlate Portion Sizes

Grains	1 cup dry cereal  4 golf balls	2-ounce bagel  1 hockey puck	½ cup cooked cereal, rice, or pasta  tennis ball
Vegetables	1 cup of vegetables 		
Fruits	1 medium fruit (equivalent of 1 cup of fruit) 		
Oils	1 teaspoon vegetable oil  1 die (11/16" size)	1 tablespoon salad dressing  1 jacks ball	
Milk	1 ½ ounces of hard cheese  6 dice (11/16" size)	1/3 cup of shredded cheese  1 billiard ball or raquetball	
Meat and beans	3 ounces cooked meat  1 deck of playing cards	2 tablespoons hummus  1 ping pong ball	

One regular 12-ounce soft drink would take up 150 discretionary calories; an extra tablespoon of dressing on your salad is 100 calories.

Using the ChooseMyPlate.gov website is easy and informative. Getting a personalized plan, learning healthy eating tips, getting weight loss information, planning a healthy menu, and analyzing your diet are examples of what ChooseMyPlate.gov offers. The website is an excellent way to help guide you through the necessary steps of putting the *Dietary Guidelines* into practice, while at the same time teaching good nutrition and providing appropriate physical activity information.

Key Concepts MyPlate is a complete food guidance system based on the *Dietary Guidelines for Americans* and Dietary Reference Intakes to help Americans make healthy food choices and remind them to be active every day. The interactive tools on the ChooseMyPlate.gov website can help you monitor your food choices. *Eating Well with Canada's Food Guide* illustrates the dietary guidelines for Canadians and the Dietary Reference Intakes. These graphic tools show the appropriate balance of food groups in a healthful diet: more whole grains, low-fat dairy, vegetables, and fruits and less meat, and added fats and sugars.

TABLE 2.7

Sample 2,000 calorie diet showing Empty Calories Allowed

Food Group	Total Recommended for 2,000-Calorie Diet	Amount Used at Breakfast	Amount Left for Remainder of the Day
Grains	6 oz eq	2 oz eq	4 oz eq
Vegetables	2½ cups	0	2½ cups
Fruits	2 cups	1 cup	1 cup
Dairy	3 cups	½ cup	2½ cups
Protein	5½ oz eq	0	5½ oz
Oils	6 tsp	1 tsp	5 tsp
Empty calories allowed	267 calories	0	267 calories

Data from U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans*, 2010. 7th ed. Washington, DC: U.S. Government Printing Office; December 2010.



Portion Distortion

How do portions and serving sizes differ? According to the National Institutes of Health, a *portion* of food is defined as the amount of food that you choose to eat at one time, whereas a *serving* is a specific amount of food or drink.^a Many foods that are packaged as a single portion actually contain multiple servings. Sometimes the portion size and serving size are the same, but not always. Check the food label to see how much of a portion of the foods you like to eat counts as one serving.

Over the past few years, portions have grown significantly in supermarkets, restaurants, and even in our own homes.^b The prevalence of obesity continues to be of great concern to both adults and children in the United States, and increasing portion sizes can have a lot to do with this increasing weight.

Many factors contribute to Americans' growing waistlines, but one observation in particular cannot be overlooked: The incidence of obesity has increased in parallel with increasing portion sizes.^c Consider this: Adults today consume an average of 300 more calories per day than they did in the year 1985.^d Is this just a coincidence, or do larger portion sizes have something to do with it? In almost every eating situation, we are now confronted by huge portions, which are perceived as "normal" or "a great value." Americans have created the perception that large portion sizes are appropriate, creating an environment of *portion distortion*.^e We find portion distortions in restaurants, where the jumbo-sized portions are consistently 250 percent larger than the regular portions.^f We even find portion distortions in our homes, where the sizes of our bowls and glasses have steadily increased and where the surface area of the average dinner plate has increased 36 percent since 1960.^g Research shows that people unintentionally consume more calories when offered larger portions.^h Consuming larger portion sizes can contribute to positive energy balance, which, over time, leads to weight gain and ultimately can result in obesity.

The phenomenon of portion distortion has the potential to hinder weight loss, weight maintenance, and health improvement efforts. Consider right-sizing the portions of food that you choose to eat. This just might bring super-size benefits to your health.

To see whether you know how today's portions compare to the portions available 20 years ago, take the interactive portion distortion quizzes on the

National Heart, Lung, and Blood Institute's Portion Distortion webpage (www.nhlbi.nih.gov/health/educational/wecan/eat-right/portion-distortion.htm). You can also learn about the amount of physical activity required to burn off the extra calories provided by today's portions.



8 oz with milk and sugar

© hofbox/Shutterstock, Inc.



16-oz mocha coffee

© iStockphoto/Thinkstock

^a American Heart Association, Robert Wood Johnson Foundation. A nation at risk: obesity in the United States. <http://www.rwjf.org/en/library/research/2006/11/a-nation-at-risk--statistical-sourcebook--presents-facts-about-o.html>

^b Ibid.

^c Schwartz J, Byrd-Bredbenner C. Portion distortion: typical portion sizes selected by young adults. *J Am Diet Assoc.* 2006;106(9):1412–1418.

^d American Heart Association, Robert Wood Johnson Foundation. Op cit.

^e Wansink B, van Ittersum K. Portion size me: downsizing our consumption norms. *J Am Diet Assoc.* 2007;7(7):1103–1106.

^f Ibid.

^g Ibid.

^h Herman P, Polivy J, Pliner P, Vartanian L. Mechanisms underlying the portion-size effect. *Physiol Behav.* 2015 15;144:129–136. Epub March 20, 2015.

► **Exchange Lists** Lists of foods that in specified portions provide equivalent amounts of carbohydrate, fat, protein, and energy. Any food in an Exchange List can be substituted for any other without markedly affecting macronutrient intake.

Exchange Lists

Another food label tool for diet planning that uses food groups is called the **Exchange Lists**. Like MyPlate, the Exchange Lists divide foods into groups. Diets can be planned by choosing a certain number of servings, or exchanges, from each group each day. The original purpose of the Exchange Lists was to help people with diabetes plan diets that would provide consistent levels of energy and carbohydrates—both of which are essential for dietary management of diabetes. For this reason, foods are organized into groups or lists not only by the type of food (e.g., fruits or vegetables), but also by the amount of macronutrients (carbohydrate, protein, and fat) in each portion. The portions are defined so that each exchange has a similar composition. For example, 1 fruit exchange is $\frac{1}{2}$ cup of orange juice or 17 small grapes or 1 medium apple or $\frac{1}{2}$ cup of applesauce. All these exchanges have approximately 60 kilocalories,

15 grams of carbohydrate, 0 grams of protein, and 0 grams of fat. In the Exchange Lists, starchy vegetables such as potatoes, corn, and peas are grouped with breads and cereals instead of with other vegetables because their balance of macronutrients is more like bread or pasta than carrots or tomatoes.

FIGURE 2.10 shows the amounts of carbohydrate, protein, fat, and kilocalories in one exchange from each group, along with a sample serving size. For a complete set of the Exchange Lists, go to NIH Food Exchange Lists (https://www.nhlbi.nih.gov/health/educational/lose_wt/eat/fd_exch.htm).

Using the Exchange Lists in Diet Planning

In addition to their use by people with diabetes, Exchange Lists are used in many weight-control programs. Planning a diet using the Exchange Lists is done in much the same manner as using MyPlate. The first step is to become very familiar with the components of each group, the variations in fat content for dairy and meat lists, and ways that other foods may be included. Then, an individual diet plan can be used to select meals and snacks throughout the day. An exchange-based diet plan specifies the number of exchanges to be consumed from each group at each meal. For example, a 1,500-kilocalorie weight reduction diet plan might have the following meal pattern:

Breakfast:	2 starch, 1 fruit, 1 milk, 1 fat
Lunch:	3 meat, 2 starch, 1 fruit, 1 vegetable, 1 fat
Snack:	1 milk, 1 starch, 1 fat
Dinner:	2 meat, 1 starch, 2 vegetable, 2 fat
Snack:	2 starch, 1 fruit

Using this pattern and a complete set of the Exchange Lists, you could then plan out a day or week of menus. Here's one sample:

Breakfast:	½ cup orange juice, ¾ cup corn flakes, 1 cup 2% milk, 1 slice toast, 1 tsp margarine
Lunch:	3 oz cooked hamburger on bun, 1 tsp mayonnaise, ½ cup baby carrots, 1 medium apple
Snack:	¾ cup low-fat yogurt, ½ bagel with 1 tbsp cream cheese
Dinner:	2 oz cooked pork chop, ½ cup rice with 1 tsp margarine, ½ cup yellow squash and ½ cup zucchini stir-fried in 1 tsp vegetable oil
Snack:	1 toasted English muffin, 1 medium pear

Key Concepts The Exchange Lists are a diet-planning tool that use the idea of food groups, but define groups specifically in terms of macronutrient (carbohydrate, fat, and protein) content. Individual diet plans can be developed for people who need to control energy or carbohydrate intake, such as for weight control or management of diabetes mellitus.












































Key						
	Energy kilocalories					
	Carbohydrate grams					
	Protein grams					
	Fat grams					
CARBOHYDRATES & MILK	Starch	 80	 15	 3	 <1	
	Fruits	 60	 15	0	0	
	Fat-free and low-fat milk	 90	 12	 8	 0-3	1 cup fat-free or 1% milk = $\frac{2}{3}$ cup plain fat-free yogurt
	Reduced fat milk	 120	 12	 8	 5	1 cup 2% milk = $\frac{3}{4}$ cup plain low-fat yogurt
	Whole milk	 150	 12	 8	 8	1 cup whole milk
	Other	 Varies	 15	 Varies	 Varies	3 small sugar-free cookies = 2Tbsp light syrup = $\frac{1}{2}$ cup gelatin
	Vegetables	 25	 5	 2	0	1 cup raw salad greens = $\frac{1}{2}$ cup cooked carrots = 1 large tomato
MEAT & SUBSTITUTES	Very lean	 35	0	 7	 0-1	1 oz chicken = 1 oz canned (water packed) tuna = $\frac{1}{2}$ cup cooked beans = $\frac{1}{4}$ cup low-fat cottage cheese
	Lean	 55	0	 7	 3	1 oz beef tenderloin = 1 oz salmon = 1 oz roast pork
	Medium fat	 75	0	 7	 5	1 oz ground beef = 4 oz tofu = 1 egg
	High fat	 100	0	 7	 8	1 oz sausage = 1 oz cheese = 1 turkey hot dog
FAT	Fats	 45	0	0	 5	1 tsp butter = 8 large black olives = 1 slice bacon = 10 peanuts

FIGURE 2.10 Exchange Lists. The Exchange Lists are a widely used system for meal planning for people with diabetes. They are also helpful for people interested in healthy eating and weight control. Data from *Exchange Lists for Meal Planning*. Alexandria, VA: Academy of Nutrition and Dietetics; 2003.

► **dietary standards** A set of values for the recommended intake of nutrients.

► **Dietary Reference Intakes (DRIs)** A framework of dietary standards that includes Estimated Average Requirement (EAR), Recommended Dietary Allowance (RDA), Adequate Intake (AI), and Tolerable Upper Intake Level (UL).

► **Recommended Dietary Allowances (RDAs)** The nutrient intake levels that meet the nutrient needs of almost all (97 to 98 percent) individuals in a life-stage and gender group.

► **Recommended Nutrient Intakes (RNIs)** Canadian dietary standards that have been replaced by Dietary Reference Intakes.

► **Food and Nutrition Board** A board within the Institute of Medicine of the National Academy of Sciences. It is responsible for assembling the group of nutrition scientists who review available scientific data to determine appropriate intake levels of the known essential nutrients.

► **requirement** The lowest continuing intake level of a nutrient that prevents deficiency in an individual.

Recommendations for Nutrient Intake: The DRIs

So far, the tools described (*Dietary Guidelines for Americans*, MyPlate, *Eating Well with Canada's Food Guide*, and Exchange Lists) deal with whole foods and food groups rather than individual nutrient values; after all, foods are what we think about in planning our daily meals and shopping lists. Sometimes, though, we need more specific information about our nutritional needs—a healthful diet is healthful because of the balance of *nutrients* it contains. Before we can choose foods that meet our needs for specific nutrients, we need to know how much of each nutrient we require daily. This is what **dietary standards** do—they define healthful diets in terms of specific amounts of the nutrients.

Understanding Dietary Standards

Dietary standards are sets of recommended intake values for nutrients. These standards tell us how much of each nutrient we should have in our diets. In the United States and Canada, the **Dietary Reference Intakes (DRIs)** are the current dietary standards.

Consider the following scenario. You are running a research center located in Antarctica that is staffed by 60 people. Because staff will not be able to leave the site to get meals, you must provide all their food. You must keep the group adequately nourished; you certainly don't want anyone to become ill as a result of a nutrient deficiency. How would you (or the nutritionist you hire) start planning? How can you be sure to provide adequate amounts of the essential nutrients? The most important tool would be a set of dietary standards! Essentially the same scenario faces those who plan and provide food for groups of people in more routine circumstances—the military, prisons, and even schools. To assess nutritional adequacy, diet planners can compare the nutrient composition of their food plans to recommended intake values.

A Brief History of Dietary Standards

Beginning in 1938, Health Canada published dietary standards called **Recommended Nutrient Intakes (RNIs)**. In the United States, the **Recommended Dietary Allowances (RDAs)** were first published in 1941. By the 1940s, nutrition scientists had been able to isolate and identify many of the nutrients in food. They were able to measure the amounts of these nutrients in foods and to recommend daily intake levels. These levels became the first RNI and RDA values. Committees of scientists regularly reviewed the standards and published revised editions; for example, the tenth (and final) edition of RDAs was published in 1989.

In the mid-1990s, the **Food and Nutrition Board** of the National Academy of Sciences began a partnership with Health Canada to make fundamental changes in the approach to setting dietary standards and to replace the RDAs and RNIs. In 1997, the first set of DRIs was published.

Dietary Reference Intakes

Since the inception of the RDAs and RNIs, we have learned more about the relationships between diet and chronic disease, and nutrient-deficiency diseases have become rare in the United States and Canada. The new DRIs reflect intake levels not just for dietary adequacy, but also for optimal nutrition.

The DRIs are reference values for nutrient intakes to be used in assessing and planning diets for healthy people (see **FIGURE 2.11**). The DRIs include four basic elements: Estimated Average Requirement (EAR), Recommended Dietary Allowance (RDA), Adequate Intake (AI), and Tolerable Upper Intake Level (UL). Underlying each of these values is the definition of a **requirement** as the “lowest continuing intake level of a nutrient that, for a specific indicator of

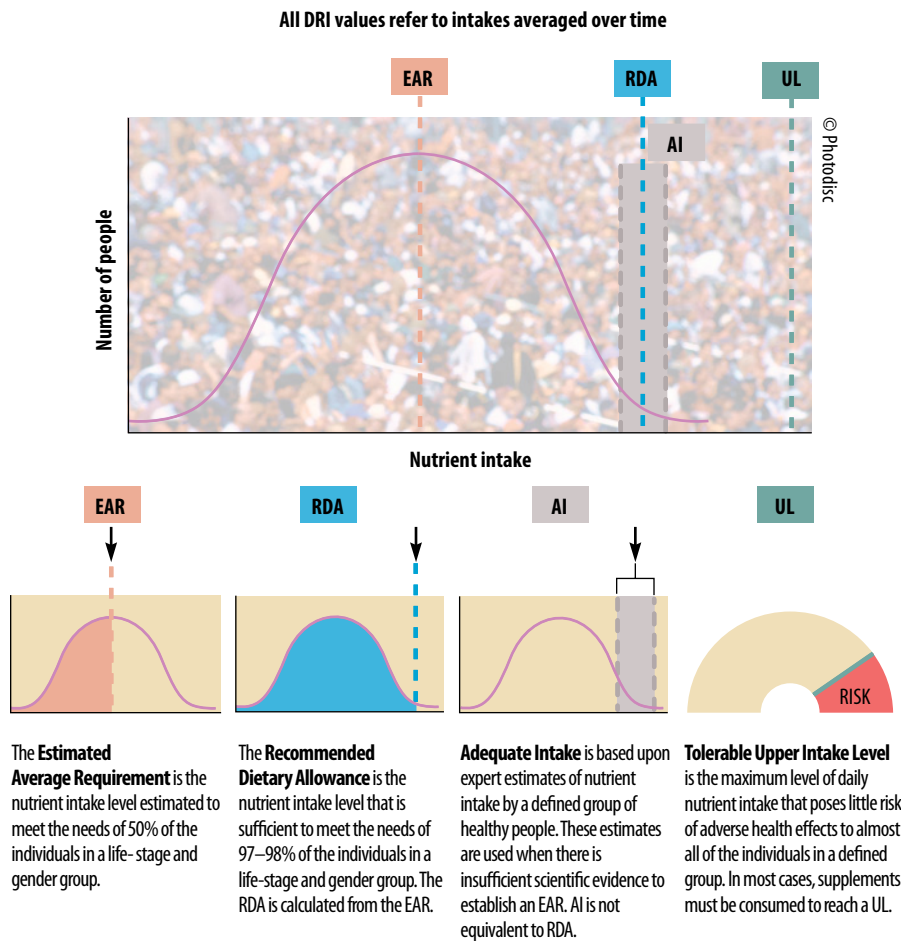


FIGURE 2.11 Dietary Reference Intakes. The Dietary Reference Intakes are a set of dietary standards that include Estimated Average Requirement (EAR), Recommended Dietary Allowance (RDA), Adequate Intake (AI), and Tolerable Upper Intake Level (UL).

adequacy, will maintain a defined level of nutriture in an individual.”¹⁸⁻²¹ In other words, a requirement is the smallest amount of a nutrient you should take in on a regular basis to remain healthy. In the DRI report on macronutrients, two other concepts were introduced: the Estimated Energy Requirement (EER) and the Acceptable Macronutrient Distribution Ranges (AMDRs).²²

Estimated Average Requirement

The **Estimated Average Requirement (EAR)** reflects the amount of a nutrient that would meet the needs of 50 percent of the people in a particular life-stage (age) and gender group. For each nutrient, this requirement is defined using a specific indicator of dietary adequacy. This indicator could be the level of the nutrient or one of its breakdown products in the blood, or the amount of an enzyme associated with that nutrient.²³ The EAR is used to set the RDA; EAR values also can be used to assess dietary adequacy or plan diets for groups of people.

Recommended Dietary Allowance

The Recommended Dietary Allowance (RDA) is the daily intake level that meets the needs of most people (97 to 98 percent) in a life-stage and gender group. The RDA is set at two standard deviations above the EAR. A nutrient will not have an RDA value if there are not enough scientific data available to set an EAR value.

People can use the RDA value as a target or goal for dietary intake and make comparisons between actual intake and RDA values. It is important to remember, however, that the RDAs do not define an *individual's* nutrient

► **Estimated Average Requirement (EAR)** The intake value that meets the estimated nutrient needs of 50 percent of individuals in a specific life-stage and gender group.

- **Adequate Intake (AI)** The nutrient intake that appears to sustain a defined nutritional state or some other indicator of health (e.g., growth rate or normal circulating nutrient values) in a specific population or subgroup. AI is used when there is insufficient scientific evidence to establish an EAR.
- **Tolerable Upper Intake Levels (ULs)** The maximum levels of daily nutrient intakes that are unlikely to pose health risks to almost all of the individuals in the group for whom they are designed.
- **Estimated Energy Requirement (EER)** Dietary energy intake that is predicted to maintain energy balance in a healthy adult of a defined age, gender, weight, height, and level of physical activity consistent with good health.
- **Acceptable Macronutrient Distribution Ranges (AMDRs)** Range of intakes for a particular energy source that are associated with reduced risk of chronic disease while providing adequate intakes of essential nutrients.

TABLE 2.8
Acceptable Macronutrient Distribution Ranges for Adults

Fat	20–35%
Carbohydrate	45–65%
Protein	10–35%
Omega-6 polyunsaturated fatty acids	5–10%
Alpha-linolenic acid	0.6–1.2%

Note: All values are percentage of energy intake.
Reproduced from Institute of Medicine, Food and Nutrition Board. *Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids*. Copyright © 2005 by the National Academy of Sciences, courtesy of the National Academies Press, Washington, DC.

requirements. Your actual nutrient needs might be much lower than average, and therefore the RDA would be more than you need. An analysis of your diet might show, for example, that you consume 45 percent of the RDA for a certain vitamin, but that might be adequate for your needs. Only specific laboratory or other tests can determine a person’s true nutrient requirements and actual nutritional status. An intake that is consistently at or near the RDA level is likely to be meeting your needs.

Adequate Intake

If not enough scientific data are available to set an EAR level, a value called an **Adequate Intake (AI)** is determined instead. AI values are determined in part by observing healthy groups of people and estimating their dietary intake. All the current DRI values for infants are AI levels because there have been too few scientific studies to determine specific requirements in infants. Instead, AI values for infants are usually based on nutrient levels in human milk, a complete food for newborns and young infants. Values for older infants and children are extrapolated from human milk and from data on adults. For nutrients (e.g., vitamin K, biotin, and chromium) with AI instead of RDA values for all life-stage groups, more scientific research is needed to better define the nutrient requirements of population groups. AI values can be considered target intake levels for individuals.

Tolerable Upper Intake Level

Tolerable Upper Intake Levels (ULs) have been defined for many nutrients. Consumption of a nutrient in amounts higher than the UL could be harmful. The ULs have been developed partly in response to the growing interest in dietary supplements that contain large amounts of essential nutrients. The UL is *not* to be used as a target for intake but rather should be a cautionary level for people who regularly take nutrient supplements.

Estimated Energy Requirement

The **Estimated Energy Requirement (EER)** is defined as the energy intake that is estimated to maintain energy balance in healthy, normal-weight individuals. It is determined using an equation that considers weight, height, age, and physical activity. Different equations are used for males and females and for different age groups.

Acceptable Macronutrient Distribution Ranges

Acceptable Macronutrient Distribution Ranges (AMDRs) indicate the recommended balance of energy sources in a healthful diet. These values consider the amounts of macronutrients needed to provide adequate intake of essential nutrients while reducing the risk for chronic disease. The AMDRs are shown in **TABLE 2.8**.

Use of Dietary Standards

The most appropriate use of DRIs is to plan and evaluate diets for large groups of people. Remember the Antarctica scenario at the beginning of this section? If you had planned menus and evaluated the nutrient composition of the foods that would be included and if the average nutrient levels of those daily menus met or exceeded the RDA/AI levels, you could be confident that your group would be adequately nourished. If you had a very large group—thousands of soldiers, for instance—the EAR would be a more appropriate guide.

Dietary standards are also used to make decisions about nutrition policy. The Special Supplemental Food Program for Women, Infants, and Children (WIC), for example, takes into account the DRIs as it provides food or vouchers for food. The goal of this federally funded supplemental feeding program

is to improve the nutrient intake of low-income pregnant and breastfeeding women, their infants, and young children. The guidelines for school lunch and breakfast programs are also based on DRI values.

Often, we use dietary standards as comparison values for individual diets. It can be interesting to see how your daily intake of a nutrient compares with the RDA or AI. However, an intake that is less than the RDA/AI doesn't necessarily mean deficiency; your individual requirement for a nutrient can be less than the RDA/AI value. You can use the RDA/AI values as targets for dietary intake, while avoiding nutrient intake that exceeds the UL.

Key Concepts Dietary standards are levels of nutrient intake recommended for healthy people. These standards help the government set nutrition policy and also can be used to guide the planning and evaluation of diets for groups and individuals. The Dietary Reference Intakes are the dietary standards for the United States and Canada. These standards focus on maintaining optimal health and lowering the risks of chronic disease, rather than simply on dietary adequacy.

Food Labels

Now that you understand diet-planning tools and dietary standards, let's focus on your use of these tools—for example, when making decisions at the grocery store. One of the most useful tools in planning a healthful diet is the **food label**.

Specific federal regulations control what may and may not appear on a food label and what *must* appear on it. The **Food and Drug Administration (FDA)** is responsible for ensuring that foods sold in the United States are safe, wholesome, and properly labeled. The Health Products and Food Branch of Health Canada has similar responsibilities. Only a small category of foods, such as spices and flavorings, is not required by the FDA to have a particular food label. Such foods are exempted because they do not provide a significant amount of nutrients. Deli items and ready-to-eat foods that are prepared and sold in retail establishments also do not require a food label.²⁴ Raw fruits and vegetables and fresh fish generally do not carry food labels either; however, these foods fall under the FDA's voluntary, point-of-purchase nutrition information program, which establishes that the nutrition information for grocery stores' most commonly purchased items must be posted somewhere near where that food is sold.²⁵ The FDA's jurisdiction applies to packaged foods except for certain meat, poultry and processed egg products, because these foods are regulated by the U.S. Department of Agriculture Food Safety and Inspection Service.

In May of 2016 the FDA introduced updates to the Nutrition Facts Panel. Until then, and aside from adding trans fat to the list of required nutrients in 2006, the Nutrition Facts Label has not changed since 1994. Food manufacturers have until the year 2018 to implement the required label changes, therefore consumers can still see both the old and the new version of the Nutrition Facts Panel. Let's take a closer look at Food Labels.

Ingredients and Other Basic Information

The label on a food you buy today has been shaped by many sets of regulations. As **FIGURE 2.12** shows, food labels have five mandatory components:

1. A statement of identity/name of the food
2. The net weight of the food contained inside of the package, not including the weight of the package
3. The name and address of the manufacturer, packer, or distributor
4. A list of ingredients in descending order by weight
5. Nutrition information

► **food label** Labels required by law on virtually all packaged foods and having five requirements: (1) a statement of identity; (2) the net contents (by weight, volume, or measure) of the package; (3) the name and address of the manufacturer, packer, or distributor; (4) a list of ingredients; and (5) nutrition information.

► **Food and Drug Administration (FDA)** The federal agency responsible for ensuring that foods sold in the United States (except for eggs, poultry, and meat, which are monitored by the USDA) are safe, wholesome, and labeled properly. The FDA sets standards for the composition of some foods, inspects food plants, and monitors imported foods. The FDA is an agency of the U.S. Department of Health and Human Services (DHHS).



FIGURE 2.12 The five mandatory requirements for food labels. Federal regulations determine what may and may not appear on food labels.

► **statement of identity** A mandate that commercial food products prominently display the common or usual name of the product or identify the food with an “appropriately descriptive term.”

The **statement of identity** requirement means that the product must prominently display the common or usual name of the product or identify the food with an “appropriately descriptive term.” For example, it would be misleading to label a fruit beverage containing only 10 percent fruit juice as a “juice.” The statement of net package contents must accurately reflect the quantity in terms of weight, volume, measure, or numerical count. Information about the manufacturer, packer, or distributor gives consumers a way to contact someone in case they have questions about the product.

Ingredients must be listed by common or usual name, in descending order by weight; thus, the first ingredient listed is the primary ingredient in that food product. Let’s compare the ingredient list of two cereals:

Cereal A ingredients: Milled corn, sugar, salt, malt flavoring, high-fructose corn syrup

Cereal B ingredients: Sugar, yellow corn flour, rice flour, wheat flour, whole oat flour, partially hydrogenated vegetable oil (contains one or more of the following oils: canola, soybean, cottonseed), salt, cocoa, artificial flavor, corn syrup

In Cereal B, the first ingredient listed is sugar, which means this cereal contains more sugar by weight than any other ingredient. Cereal A’s primary ingredient is milled corn. That can make quite a difference in the amount (grams) of sugar a cereal contains!

As you probably have noticed, when the ingredient list includes the artificial sweetener aspartame, it also displays a warning statement. Also, preservatives and other additives in foods must be listed, along with an explanation of their function. Accurate and complete ingredient information is vital for people with food allergies who must avoid certain food components. The

labels of foods that contain any of the eight major food allergens (egg, wheat, peanuts, milk, tree nuts, soy, fish, and crustaceans) are required to include common names when listing these ingredients.

Nutrition Facts Panel

The **Nutrition Facts Panel** informs the consumer about the nutritional value of a food product, enabling an informed shopper to compare similar products.

Using both the new and the older version of the Nutrition Facts Panel, (see **FIGURE 2.13**) let's take a closer look at its elements. The heading "Nutrition Facts" stands out clearly. Just under the heading is information about the number of servings and serving size per container. It is important to note the serving size because all the nutrient information that follows is based on that amount of food, and the listed serving size might be different from what you usually eat. One change to the new Label is that the serving sizes described on the package are required to more closely reflect the amounts of that food in which people typically eat, something that has certainly changed since the last serving size requirements were published in 1993. People should recognize that the serving size does not necessarily reflect the recommended portion size, but rather the amount of that food that is generally eaten in one sitting. In addition, calories and nutrition information must be declared for the entire package.

► **Nutrition Facts Panel** A portion of the food label that states the content of selected nutrients in a food in a standard way prescribed by the Food and Drug Administration. By law, Nutrition Facts must appear on nearly all processed food products in the United States and the new Nutrition Fact Label is intended to make it easier for consumers to make informed decisions about the foods that they are eating. For example, the new Label includes the addition of nutrients which better reflect people's adequate, over- or under-consumption of nutrients and vitamins such as added sugar, Vitamin D and potassium.

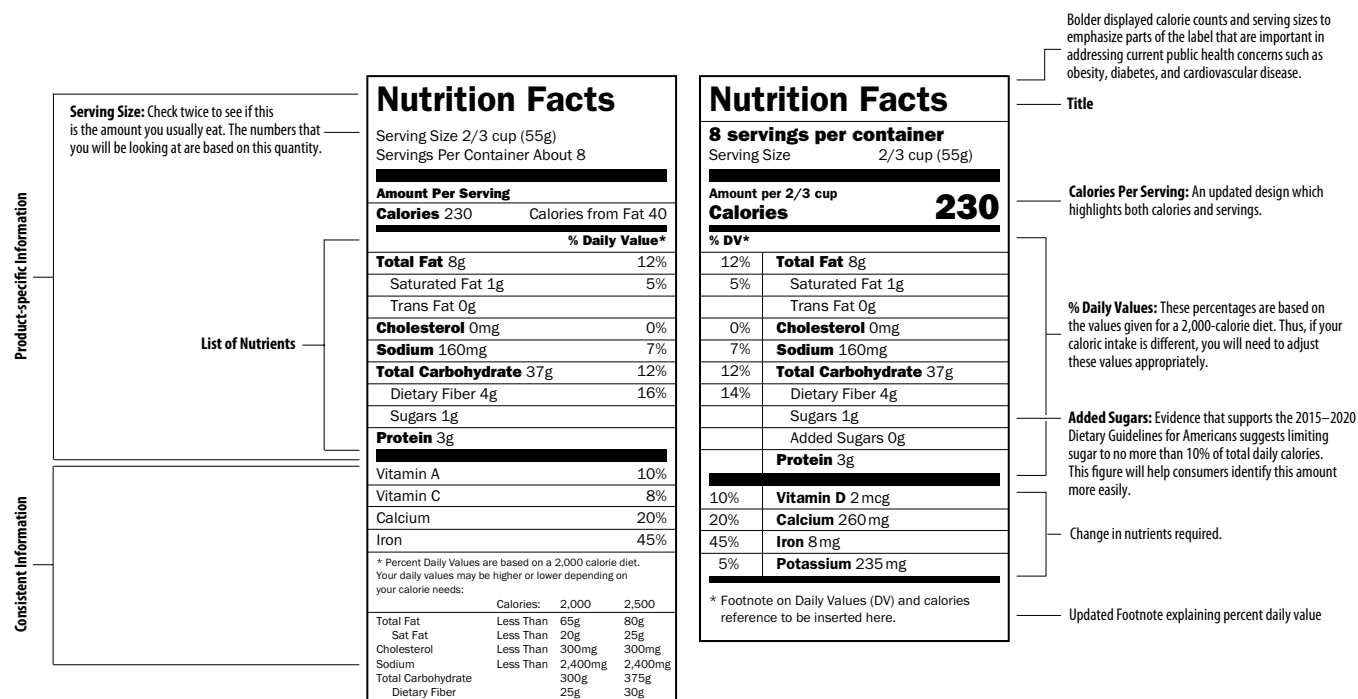


FIGURE 2.13 The Nutrition Facts panel. Comparison of the previous and new Nutrition Facts Panel.

The next part of the label shows a list of nutrients with % Daily Values. “Calories from Fat” will be removed from the old label because research shows that the type of fat is more important than the total amount. “Total Fat,” “Saturated Fat,” “Trans Fat” and “Cholesterol” will continue to be required on the label. In addition, Sodium, Total Carbohydrates, Dietary Fiber, Total Sugars, Added Sugars, and Protein are also included on this part of the Label. This information is given both in quantity (grams or milligrams per serving) and as a percentage of the Daily Value—a comparison standard specifically for food labels. (This standard is described in the following section.) Updated daily values for the nutrients sodium, dietary fiber, vitamin D, and potassium on the new label will now be consistent with the Institute of Medicine recommendations and the 2015-2020 Dietary Guidelines for Americans. Vitamin D and potassium tend to be nutrients that people are not getting enough of, therefore these nutrients will be included on the Label. The % DV for calcium and iron will continue to be required, along with the actual gram amounts. Vitamin A and C will no longer be required because deficiencies of these vitamins are rare. These nutrients can be included on a voluntary basis. Listed next are percentages of Daily Values for vitamin D, Calcium, Iron and Potassium, which are the only micronutrients that must appear on all standard labels. Manufacturers can choose to include information about other nutrients, such as potassium, polyunsaturated fat, additional vitamins, or other minerals, in the Nutrition Facts panel. However, if they make a claim about an optional component (e.g., “good source of vitamin E”) or **enrich** or **fortify** the food, the manufacturers must include specific nutrition information for these added nutrients. This information must be included even when government regulations require enrichment or fortification, such as the fortification of milk with vitamin D to prevent rickets (a bone disease in children that results from vitamin D deficiency) and the fortification of grain products with folic acid to reduce the risk of birth defects. Food products that come in small packages (e.g., gum, candy, tuna) or that have little nutritional value (e.g., diet soft drinks) can have abbreviated versions of the Nutrition Facts on the label, as **FIGURE 2.14** shows. **FIGURE 2.15** summarizes the New Nutrition Facts Label.

- **enrich** To add vitamins and minerals lost or diminished during food processing, particularly the addition of thiamin, riboflavin, niacin, folic acid, and iron to grain products.
- **fortify** Refers to the addition of vitamins or minerals that were not originally present in a food.

- **Daily Values (DVs)** A single set of nutrient intake standards developed by the Food and Drug Administration to represent the needs of the “typical” consumer; used as standards for expressing nutrient content on food labels.



FIGURE 2.14 Nutrition Facts on small packages. When a product package has insufficient space to display a full Nutrition Facts panel, manufacturers may use an abbreviated version.

Daily Values

Let's come back to the Daily Values part of the label. The **Daily Values (DVs)** are a set of dietary standards used to compare the amount of a nutrient (or other component) in a serving of food to the amount recommended for daily consumption. Nutrients are listed as a percentage of the food's Daily Value on the Nutrition Facts panel, and the Percent Daily Values (%DV) are based on a 2,000-calorie diet. Your estimated needs may be more or less than 2,000 calories per day, but you can still use the %DV as a guide. The %DV helps you determine if a serving of a food is high or low in a nutrient. In other words, you can see if this food contributes a lot or a little to your daily recommended allowance. Let's say you rely on your breakfast cereal as a major source of dietary fiber intake. Comparing two packages, you find that a serving of cornflakes cereal has 4 percent of the DV for dietary fiber, but choosing bran-flakes cereal gives you 20 percent. By eating one serving of the cornflakes, you will get 4 percent of an estimated 100 percent of your fiber needs for the day. If you choose to eat the bran flakes, you will get 20 percent of the 100 percent estimated needs of fiber for the day. You don't have to know anything about grams to see which food is higher in fiber.

Nutrient Content Claims

The Nutrition Labeling and Education Act (NLEA) and the associated FDA regulations allow food manufacturers to make **nutrient content claims** using a variety of descriptive terms on labels, such as *low fat* and *high fiber*. The FYI feature “Definitions for Nutrient Content Claims on Food Labels” contains a list of terms that may be used. The FDA has made an effort to make the terms meaningful, and the regulations have reduced the number of potentially misleading label statements. It would be misleading, for example, to print “cholesterol free” on a can of vegetable shortening—a food that is 100 percent fat and high in saturated and trans-fatty acids (types of fat that raise blood cholesterol levels). Although true, this type of statement misleads consumers who associate “cholesterol free” with “heart healthy.” Under the NLEA regulations, statements about low cholesterol content can be used only when the product is also low in saturated fat (less than 2 grams per serving).

The FDA recently made a ruling on food labels for the term *gluten-free*. The rule will be helpful for people who have celiac disease, a digestive and autoimmune disorder that results in damage to the lining of the small intestine when foods with gluten are eaten. Gluten is a protein that occurs naturally in wheat, rye, barley, and cross-bred hybrids of these grains. The rule requires that to be labeled ‘gluten free’ each kilogram of the product must contain less than 20 milligrams of the protein, and the food cannot contain any of the following: an ingredient that is any type of wheat, rye, barley, or crossbreeds of these grains; an ingredient derived from these grains that has not been processed to remove gluten; and an ingredient derived from these grains that has been processed to remove gluten, if it results in the food containing 20 or more parts per million of gluten.²⁷ Most people with a gluten allergy can tolerate gluten in small amounts, and this amount is consistent with the threshold established by other countries and international bodies that set food safety standards.²⁶

In addition to the content claims defined in the regulations, companies may submit to the FDA a notification of a new nutrient content claim based on “an authoritative statement from an appropriate scientific body of the United States Government or the National Academy of Sciences.”²⁹

Health Claims

With the passage of the NLEA, manufacturers also were allowed to add health claims to food labels. A **health claim** is a statement that links one or more dietary components to reduced risk of disease—such as a claim that calcium helps reduce the risk of osteoporosis. Before the NLEA was passed, products making such claims were considered drugs, not foods.

A health claim must be supported by scientifically valid evidence for it to be approved for use on a food label. Regulations require a finding of “significant scientific agreement” before the FDA may authorize a new health claim. In addition, there are specific criteria for the use of claims. For example, a high-fiber food that is also high in fat is not eligible for a health claim. So far, the FDA has approved the following health claims:

- *Calcium, vitamin D, and osteoporosis:* Adequate calcium and vitamin D along with regular exercise may reduce the risk of osteoporosis.
- *Dietary fat and cancer:* Low-fat diets may reduce the risk for some types of cancer.

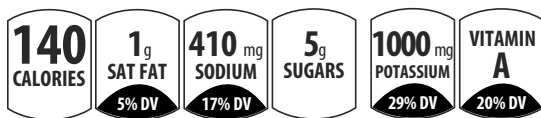
► **nutrient content claims** These claims describe the level of a nutrient or dietary substance in the product, using terms such as *good source*, *high*, or *free*.



© smartstock/istockphoto.com

► **health claim** Any statement that associates a food or a substance in a food with a disease or health-related condition. The FDA authorizes health claims.

PER 1 CUP SERVING



Facts Up Front is a voluntary food and beverage industry nutrient-based labeling initiative that summarizes important nutrition information on the front of food packages with the intention of helping busy consumers make healthier food choices.

Courtesy of Grocery Manufacturers Association, available at <http://www.factsupfront.org>.

- *Dietary fiber, such as that found in whole oats, barley, and psyllium seed husk, and coronary heart disease (CHD):* Diets low in fat and rich in these types of fiber can help reduce the risk of heart disease.
- *Dietary noncarcinogenic carbohydrate sweeteners and dental caries (tooth decay):* Foods sweetened with sugar alcohols do not promote tooth decay.
- *Dietary saturated fat and cholesterol and coronary heart disease (CHD):* Diets high in saturated fat and cholesterol increase risk for heart disease.
- *Dietary saturated fat, cholesterol, and trans fat and heart disease:* Diets low in saturated fat and cholesterol and as low as possible in trans fat may reduce the risk of heart disease.
- *Fiber-containing grain products, fruits, and vegetables and cancer:* Diets low in fat and rich in high-fiber foods may reduce the risk of certain cancers.
- *Fluoridated water and dental caries:* Drinking fluoridated water may reduce the risk of dental caries.
- *Folate and neural tube defects:* Adequate folate intake prior to and early in pregnancy may reduce the risk of neural tube defects (a birth defect).
- *Fruits and vegetables and cancer:* Diets low in fat and rich in fruits and vegetables may reduce the risk of certain cancers.
- *Fruits, vegetables, and grain products that contain fiber, particularly pectins, gums, and mucilages, and CHD:* Diets low in fat and rich in these types of fiber may reduce the risk of heart disease.
- *Plant sterol/stanol esters and CHD:* Diets low in saturated fat and cholesterol that contain significant amounts of these additives may reduce the risk of heart disease.
- *Potassium and high blood pressure/stroke:* Diets that contain good sources of potassium may reduce the risk of high blood pressure and stroke.
- *Sodium and hypertension (high blood pressure):* Low-sodium diets may help lower blood pressure.
- *Soy protein and CHD:* Foods rich in soy protein as part of a low-fat diet may help reduce the risk of heart disease.
- *Substitution of saturated fat with unsaturated fat and heart disease:* Replacing saturated fat with similar amounts of unsaturated fats may reduce the risk of heart disease.
- *Whole-grain foods and CHD or cancer:* Diets high in whole-grain foods and other plant foods and low in total fat, saturated fat, and cholesterol may help reduce the risk of heart disease and certain cancers.

A new health claim may be proposed at any time, so this list might expand in the future. The most current information on label statements and claims can be found on the Food tab of the FDA website at www.fda.gov.²⁸

Structure/Function Claims

► **structure/function claims** These statements may claim a benefit related to a nutrient-deficiency disease (e.g., *vitamin C prevents scurvy*) or describe the role of a nutrient or dietary ingredient intended to affect a structure or function in humans (e.g., *calcium helps build strong bones*).

Food labels also may contain **structure/function claims** that describe potential effects of a food, food component, or dietary supplement component on body structures or functions, such as bone health, muscle strength, and digestion. As long as the label does not claim to diagnose, cure, mitigate, treat, or prevent a disease, a manufacturer can claim that a product “helps promote immune health” or is an “energizer” if *some* evidence can be provided to support the claim. Currently, structure/function claims on foods must be related to the food’s nutritive value. Many scientists are concerned



Definitions for Nutrient Content Claims on Food Labels

Free: Food contains no amount (or trivial or “physiologically inconsequential” amounts). May be used with one or more of the following: fat, saturated fat, cholesterol, sodium, sugar, and calories. Synonyms include *without*, *no*, and *zero*.

Fat-free: Less than 0.5 gram of fat per serving.

Saturated fat-free: Less than 0.5 gram of saturated fat per serving, and less than 0.5 gram of trans fatty acids per serving.

Cholesterol-free: Less than 2 milligrams of cholesterol and 2 grams or less of saturated fat per serving.

Sodium-free: Less than 5 milligrams of sodium per serving.

Sugar-free: Less than 0.5 gram of sugar per serving.

Calorie-free: Fewer than 5 calories per serving.

Low: Food can be eaten frequently without exceeding dietary guidelines for one or more of these components: fat, saturated fat, cholesterol, sodium, and calories. Synonyms include *little*, *few*, and *low source of*.

Low-fat: 3 grams or less per serving.

Low-saturated-fat: 1 gram or less of saturated fat per serving; no more than 15 percent of calories from saturated fat.

Low-cholesterol: 20 milligrams or less and 2 grams or less of saturated fat per serving.

Low-sodium: 140 milligrams or less per serving.

Very-low-sodium: 35 milligrams or less per serving.

Low-calorie: 40 calories or less per serving.

Lean and extra lean: Describe the fat content of meal and main dish products, seafood, and game meat products.

Lean: Less than 10 grams of fat, 4.5 grams or less saturated of fat, and less than 95 milligrams of cholesterol per serving and per 100 grams.

Extra lean: Less than 5 grams of fat, less than 2 grams of saturated fat, and less than 95 milligrams of cholesterol per serving and per 100 grams.

High: Food contains 20 percent or more of the Daily Value for a particular nutrient in a serving.

Good source: Food contains 10 to 19 percent of the Daily Value for a particular nutrient in one serving.

Reduced: Nutritionally altered product containing at least 25 percent less of a nutrient or of calories than the regular or reference product. *Note:* A “reduced” claim cannot be used if the reference product already meets the requirement for “low.”

Less: Food, whether altered or not, contains 25 percent less of a nutrient or of calories than the reference food. *Fewer* is an acceptable synonym.

Light: This descriptor can have two meanings:

1. A nutritionally altered product contains one-third fewer calories or half the fat of the reference food. If the reference food derives 50 percent or more of its calories from fat, the “light” version must contain 25 percent or less calories (which is 50 percent of the reference food fat content) from fat.
2. The sodium content of a low-calorie, low-fat food has been reduced by 50 percent. Also, *light in sodium* may be used on a food in which the sodium content has been reduced by at least 50 percent.

Note: The term *light* can still be used to describe such properties as texture and color as long as the label clearly explains its meaning (e.g., *light brown sugar*, *light and fluffy*).

More: A serving of food, whether altered or not, contains more of a nutrient that is at least 10 percent of the Daily Value more than the reference food. This also applies to *fortified*, *enriched*, and *added* claims, but in those cases, the food must be altered.

Healthy: A *healthy* food must be low in fat and saturated fat and contain limited amounts of cholesterol (less than 60 milligrams) and sodium (less than 360 milligrams for individual foods and less than 480 milligrams for meal-type products). In addition, a single-item food must provide at least 10 percent or more of one of the following: vitamin A or C, iron, calcium, protein, or fiber. A meal-type product, such as a frozen entrée or dinner, must provide 10 percent of two or more of these vitamins or minerals, or protein or fiber, in addition to meeting the other criteria. Additional regulations allow the term *healthy* to be applied to raw, canned, or frozen fruits and vegetables and enriched grains even if the 10 percent nutrient content rule is not met. However, frozen or canned fruits or vegetables cannot contain ingredients that would change the nutrient profile.

Fresh: Food is raw, has never been frozen or heated, and contains no preservatives. *Fresh frozen*, *frozen fresh*, and *freshly frozen* can be used for foods that are quickly frozen while still fresh. Blanched foods also can be called fresh.

Percent fat-free: Food must be a low-fat or a fat-free product. In addition, the claim must reflect accurately the amount of nonfat ingredients in 100 grams of food.

Implied claims: These are prohibited when they wrongfully imply that a food contains or does not contain a meaningful level of a nutrient. For example, a product cannot claim to be made with an ingredient known to be a source of fiber (such as “made with oat bran”) unless the product contains enough of that ingredient (e.g., oat bran) to meet the definition for “good source” of fiber. As another example, a claim that a product contains “no tropical oils” is allowed, but only on foods that are “low” in saturated fat, because consumers have come to equate tropical oils with high levels of saturated fat.

Data from Food and Drug Administration. Guidance for industry: a food labeling guide (9. Appendix A: definitions of nutrient content claims). October 2009. <http://www.fda.gov/food/guidanceregulation/guidancedocumentsregulatoryinformation/labelingnutrition/ucm064911.htm>. Accessed January 25, 2016.

Nutrition Facts	
8 servings per container	
Serving size 2/3 cup (55g)	
Amount per serving	
Calories	230
% Daily Value*	
Total Fat 8g	10%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 160mg	7%
Total Carbohydrate 37g	13%
Dietary Fiber 4g	14%
Total Sugars 12g	
Includes 10g Added Sugars	20%
Protein 3g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 8mg	45%
Potassium 235mg	6%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Nutrition Facts	
8 servings per container	
Serving size 2/3 cup (55g)	
Amount per serving	
Calories	250
% Daily Value*	
Total Fat 10g	13%
Saturated Fat 3g	15%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 220mg	9%
Total Carbohydrate 37g	13%
Dietary Fiber 4g	14%
Total Sugars 12g	
Includes 10g Added Sugars	20%
Protein 4g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 8mg	45%
Potassium 235mg	6%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

FIGURE 2.15 Comparing product labels. Labels might look similar, but appearances can be deceptive. Compare the amounts of saturated fat and sodium in these two products.

► **nutrition assessment** Measurement of the nutritional health of the body. It can include anthropometric measurements, biochemical tests, clinical observations, and dietary intake, as well as medical histories and socioeconomic factors.

about the lack of a consistent scientific standard for both health claims and structure/function claims.

Using Labels to Make Healthful Food Choices

What's the best way to start using information on food labels to make food choices? Let's look at a couple examples. Perhaps one of your goals is to add more iron to your diet. Compare the cereal labels in **FIGURE 2.15**. Which cereal contains a higher percentage of the Daily Value for iron? How do they compare in terms of sugar content? What about vitamins and other minerals?

Maybe it's a frozen entrée you're after. Look at the two examples in Figure 2.17. Which is the best choice nutritionally? Are you sure? Sometimes the answer is not clear-cut. Product A is higher in sodium, whereas Product B has more saturated and trans fat. It would be important to know about the rest of your dietary intake before deciding. Do you already have quite a bit of sodium in your diet, or are you likely to add salt at the table? Maybe you never salt your food, so a bit extra in your entrée is okay. If you know that your saturated fat intake is already a bit high, however, Product A might be a better choice. To make the best choice, you should know which substances are most important in terms of your own health risks. The label is there to help you make these types of food decisions.

Key Concepts Making food choices at the grocery store is your opportunity to implement the *Dietary Guidelines for Americans* and your MyPlate-planned diet. The Nutrition Facts panel on most packaged foods contains not only specific amounts of nutrients shown in grams or milligrams, but also comparisons between amounts of nutrients in a food and recommended intake values. These comparisons are reported as %DV (Daily Values). The %DV information can be used to compare two products or to see how individual foods contribute to the total diet.

Nutrition Assessment: Determining Nutritional Health

In a nutritional sense, what does it mean to be healthy? Nutritional health is quite simply obtaining all nutrients in amounts needed to support body processes. We can measure nutritional health in a number of ways. Taken together, such measurements can give you insight into your current and long-term well-being. The process of measuring nutritional health is usually termed **nutrition assessment**.

Nutrition assessment serves a variety of purposes. It can help evaluate nutrition-related risks that can jeopardize a person's current or future health. Generally, nutrition assessment is a routine part of the nutritional care of hospitalized patients because it includes anthropometric measurements, biochemical values, and clinical observations. In this setting, nutrition assessment not only identifies risks, but also measures the effectiveness of treatment. In public health, nutrition assessment helps to identify people in need of nutrition-related interventions and to monitor the effectiveness of intervention programs. Sometimes assessments determine the nutritional health of an entire population—identifying health risks common in a population group so that specific policy measures can be developed to combat them.

The Continuum of Nutritional Status

Your nutritional status can be seen as a point along a continuum, with undernutrition and overnutrition at the extremes. Chronic undernutrition results in the development of nutritional deficiency diseases, as well as conditions of energy and protein malnutrition, and can lead to death. Unlike starvation, undernutrition is a condition in which *some* food is being consumed, but the

intake is not nutritionally adequate. Although chronic undernutrition and associated deficiency diseases were common in the United States in the 1800s and early 1900s, today they are rare. Undernutrition now is most often associated with extreme poverty, alcoholism, illness, or some types of eating disorders.

Overnutrition is the chronic consumption of more than is necessary for good health. Specifically, overnutrition is the regular consumption of excess calories, fats, saturated fats, or cholesterol—all of which increase risk for chronic disease. Today, nutrition-related chronic diseases such as heart disease, cancer, stroke, and diabetes are among the 10 leading causes of death in the United States. All these problems have been linked to dietary excess. (Remember that epidemiological [population] studies can show associations between various factors and diseases, but these correlations do not necessarily indicate cause and effect.) Between these two extremes lies a region of good health. Good food and lifestyle choices, a balanced diet, and regular exercise help to reduce the risk of chronic disease and delay its onset, keeping us in a region of good health for more of our lifetime.

Nutrition Assessment of Individuals

In health care settings, a registered dietitian or physician can do an individual nutrition assessment of a patient or client. Depending on the purpose of the nutrition assessment, the measures can be very comprehensive and detailed. A dietitian can then use this information to plan individualized nutrition counseling. Nutrition assessment measures are often repeated to assess the effectiveness of nutrition counseling.

Nutrition Assessment of Populations

Population-based nutrition assessment is done in conjunction with programs to monitor the status of nutrition in the United States or Canada or as part of large-scale epidemiological studies. Typically, nutrition assessment of populations is not as comprehensive as an assessment of an individual. One of the largest ongoing nationwide surveys of dietary intake and health status is the National Health and Nutrition Examination Survey (NHANES). The survey is unique in that it combines interviews and physical examinations. Data from NHANES have told us a great deal about the nutritional status and dietary intake of our population. This information is released periodically as the *What We Eat in America* report. Another tool for monitoring the dietary intake of Americans is the Continuing Survey of Food Intake by Individuals (CSFII).

Nutrition Assessment Methods

Just as there is not only one measure of physical fitness, there is not just one indicator of nutritional health. Nutrients play many roles in the body, so measures of nutritional status must look at many factors. Often these factors are called the **ABCDs of nutrition assessment**: anthropometric measurements, biochemical tests, clinical observations, and dietary intake. (See **TABLE 2.9**.)

► **ABCDs of nutrition assessment** Nutrition assessment components: anthropometric measurements, biochemical tests, clinical observations, and dietary intake.

Anthropometric Measurements

Anthropometric measurements are physical measurements of the body, such as height and weight, head circumference, girth measurement, or skin-fold measurements.

Height and Weight

To provide useful information, height and weight must be accurately measured. For infants and very young children, measurement of height is really

► **anthropometric measurements** Measurements of the physical characteristics of the body, such as height, weight, head circumference, girth, and skinfold measurements. Anthropometric measurements are particularly useful in evaluating the growth of infants, children, and adolescents and in determining body composition.

TABLE 2.9 The ABCDs of Nutrition Assessment	
Assessment Method	Why It's Done
Anthropometric measures	Measure growth in children; show changes in weight that can reflect diseases (e.g., cancer, thyroid problems); monitor progress in fat loss
Biochemical tests	Measure blood, urine, and feces for nutrients or metabolites that indicate infection or disease
Clinical observations	Assess change in skin color and health, hair texture, fingernail shape, etc.
Dietary intake	Evaluate diet for nutrient (e.g., fat, calcium, protein) or food (e.g., number of fruits and vegetables) intake

measurement of recumbent length (that is, length when they are lying down). Careful measurement of length at each checkup gives a clear indication of a child’s growth rate. Standard growth charts show how the child’s growth compares with that of others of the same age and sex. For children 2 to 20 years old, charts illustrating growth are based on standing height, or stature.

The standing height of older children and adults can be determined with a tape measure fixed to a wall and a sliding right-angle headboard for reading the measurement. Aging adults lose some height as a result of bone loss and curvature, so it is important to *measure* height and not simply rely on remembered values.

Weight is a critical measure in nutrition assessment. It is used to assess children’s growth, predict energy expenditure and protein needs, and determine body mass index. Weight should be measured using a calibrated scale. For assessments that need a high degree of accuracy, subtract the weight of the clothing. Because many calculations and standards use metric measures of height and weight, it’s important to be familiar with standard conversion factors.

For the anthropometric assessment of infants and young children, a third measurement is common: head circumference. This is measured using a flexible tape measure placed snugly around the head. Head circumference measures are compared with standard growth charts and are another useful indicator of normal growth and development, especially during rapid growth from birth to age 3 years.

Body Mass Index

Body mass index (BMI) is a useful tool to screen an individual for the weight categories of underweight, healthy weight, overweight, or obese. BMI is determined using a numerical formula of a person’s weight in kilograms divided by the square of height in meters. BMI can be a reasonably accurate measure of the health risks associated with body weight. Although BMI is a useful measurement across populations, this measurement has limitations in the assessment of individuals because it does not take into account the distribution of body fat, or overall percent body fat of an individual.

Waist Circumference

One of the simplest means of determining body fat distribution uses waist circumference. Waist circumference can be accurately determined using a flexible tape measure placed just above the upper hip bone, snug to the body, and parallel to the floor. The total distance around the waist is the waist circumference measurement. Waist circumference is a good indicator of abdominal fat and risk for chronic diseases in adults.²⁹

To convert inches to centimeters, multiply the number of inches by 2.54

$\text{inches} \times 2.54 = \text{centimeters}$

To convert pounds to kilograms, divide the number of pounds by 2.2

$\text{pounds} \div 2.2 = \text{kilograms}$



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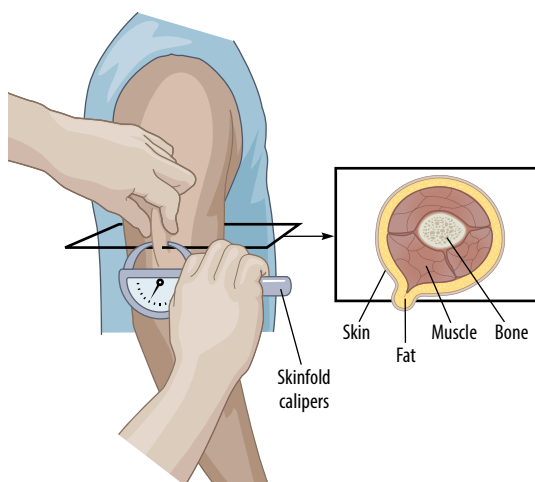


FIGURE 2.16 Skinfold measurements. A significant amount of the body's fat stores lies just beneath the skin, so when done correctly, skinfold measurements can provide an indication of body fatness. An inexperienced or careless measurer, however, can easily make large errors. Skinfold measurements can also be an effective tool for monitoring malnutrition.

Skinfolds

Skinfold measurements serve a variety of purposes. Because a significant amount of the body's fat stores is located right beneath the skin (subcutaneous fat), skinfold measurements at various sites around the body can give a good indication of body fatness. This information can be used to evaluate the physical fitness of an athlete or predict the risk of obesity-related disorders. Skinfold measurements also are useful in cases of illness; the maintenance of fat stores in a patient's body is a valuable indicator of dietary adequacy. Skinfold measurements are made with special calipers (see **FIGURE 2.16**). For reliable measurements, training in the use of calipers is essential. Skinfold measurements can be used to estimate the percentage of body fat or can be compared with percentile tables for specific sex and age categories.

► **skinfold measurements** A method to estimate body fat by measuring with calipers the thickness of a fold of skin and subcutaneous fat.

Biochemical Tests

Because of their relation to growth and body composition, anthropometric measurements give a broad picture of nutritional health—whether the diet contains enough calories and protein to maintain normal patterns of growth, normal body composition, and normal levels of lean body mass. However, anthropometric measures do not give specific information about *nutrients*. For that information, a variety of biochemical tests is useful.

Biochemical assessment measures a nutrient or metabolite (a related compound) in one or more body fluids, such as blood or urine, or in feces. For example, the concentration of albumin (an important transport protein) in the blood can be an indicator of the body's protein status. If little protein is eaten, the body produces smaller amounts of body proteins such as albumin.

Biochemical assessments can include measurements of a nutrient metabolite, a storage or transport compound, an enzyme that depends on a vitamin or mineral, or another indicator of the body's functioning in relation to a particular nutrient. These measures usually are a better indicator of nutritional status than directly measuring blood levels of nutrients such as

► **biochemical assessment** Assessment by measuring a nutrient or its metabolite in one or more body fluids, such as blood and urine, or in feces. Also called laboratory assessment.

vitamin A or calcium. The levels of nutrients excreted in the urine or feces also provide valuable information.

Clinical Observations

- **clinical observations** Assessment by evaluating the characteristics of well-being that can be seen in a physical exam. Nonspecific, clinical observations can provide clues to nutrient deficiency or excess that can be confirmed or ruled out by biochemical testing.

Clinical observations—the characteristics of health that can be seen during a physical exam—help to complete the picture of nutritional health. Although often nonspecific, clinical signs are clues to nutrient deficiency or excess that can be confirmed or ruled out by further testing. In a clinical nutrition examination, a clinician observes the hair, nails, skin, eyes, lips, mouth, bones, muscles, and joints. Specific findings, such as cracking at the corners of the mouth (suggestive of riboflavin, vitamin B₆, or niacin deficiency) or petechiae (small, pinpoint hemorrhages on the skin indicative of vitamin C deficiency), need to be followed by other assessments. Clinical assessment should also include an evaluation of personal, social, environmental, and lifestyle factors that could impact access to healthy food and nutritional well-being.

Dietary Intake

A picture of nutritional health would not be complete without information about dietary intake. Dietary information can confirm the lack or excess of a dietary component suggested by anthropometric, biochemical, or clinical evaluations.

There are a number of ways to collect dietary intake data. Each has strengths and weaknesses. It is important to match the method to the type and quantity of data needed. Remember, too, that the quality of information obtained about people's diets often relies heavily on people's memories, as well as their honesty in sharing those recollections. How well do you remember *everything* you ate yesterday?

Quick Bite

Nutrition and Nails

Do your nails have white marks or ridges? Contrary to popular belief, that does not necessarily mean you have a vitamin deficiency. Usually a slight injury to the nail causes white marks or ridges.

Diet History

The most comprehensive form of dietary intake data collection is **diet history**. In this method, a skilled interviewer finds out not only what the client has been eating in the recent past, but also the client's long-term food consumption habits. The interviewer's questions also address other risk factors for nutrition-related problems, such as economic issues.

Food Record

Food records, or diaries, provide detailed information about day-to-day eating habits. Typically, a person records all foods and beverages consumed during a defined period, usually three to seven consecutive days. Because food records are recorded concurrently with intake, they are less prone to inaccuracy from lapses in memory. The data are completely self-reported; therefore, food records are not accurate if the person fails to record all items or changes their usual food intake while completing the record. To make food records more precise, the items in a meal can be weighed before consumption. Remaining portions are weighed at the end of the meal to determine exactly how much was eaten. **Weighed food records** are much more time consuming to complete.

Food Frequency Questionnaire

A **food frequency questionnaire (FFQ)** asks how often the subject consumes specific foods or groups of foods, rather than what specific foods the subject consumes daily. A food frequency questionnaire might ask, for example, "How often do you

- **diet history** Record of food intake and eating behaviors that includes recent and long-term habits of food consumption. Conducted by a skilled interviewer, the diet history is the most comprehensive form of dietary intake data collection.
- **food records** Detailed information about day-to-day eating habits; typically includes all foods and beverages consumed for a defined period, usually three to seven consecutive days.
- **weighed food records** Detailed food records obtained by weighing foods before eating and then weighing leftovers to determine the exact amount consumed.
- **food frequency questionnaire (FFQ)** A questionnaire for nutrition assessment that asks how often the subject consumes specific foods or groups of foods, rather than what specific foods the subject consumes daily. Also called food frequency checklist.

drink a cup of milk?” with the response options of daily, weekly, monthly, and so on. This information is used to estimate that person’s average daily intake.

Although food frequency questionnaires do not require a trained interviewer and can be relatively quick to complete, there are disadvantages to this method of data collection. One problem is that it is often difficult to translate people’s response to how often they drink milk, or how many cups of milk they drink per week, into specific nutrient values without more detailed information. More important, food frequency questionnaires require a person to average, over a long period, foods consumed erratically in portions that are sometimes large and sometimes small.

24-Hour Dietary Recall

The **24-hour dietary recall** is the simplest form of dietary intake data collection. In a 24-hour recall, the interviewer takes the client through a recent 24-hour period (usually midnight to midnight) to determine what foods and beverages the client consumed. To get a complete, accurate picture of the subject’s diet, the interviewer must ask probing questions such as “Did you put anything on your toast?” but not leading questions such as “Did you put butter and jelly on your toast?” Comprehensive population surveys frequently use 24-hour recalls as the main method of data collection. Although a single 24-hour recall is not very useful for describing the nutrient content of an individual’s overall diet (there’s too much day-to-day variation), in large-scale studies it gives a reasonably accurate picture of the average nutrient intake of a population. Multiple dietary recalls also are useful for estimating the nutrient intake of individuals.

► **24-hour dietary recall** A form of dietary intake data collection. The interviewer takes the client through a recent 24-hour period (usually midnight to midnight) to determine what foods and beverages the client consumed.

Methods of Evaluating Dietary Intake Data

Once the data are collected, the next step is to determine the nutrient content of the diet and evaluate that information in terms of dietary standards or other reference points. This is commonly done using nutrient analysis software. Computer programs remove the tedium of looking up foods in tables of nutrient composition; large databases allow for simple access to food composition, and the computer does the math automatically.

Comparison to Dietary Standards

It is possible to compare a person’s nutrient intake to dietary standards such as the RDA or AI values. Although this will give a quantitative idea of dietary adequacy, it cannot be considered a definitive evaluation of a person’s diet because we don’t know that individual’s specific nutrient requirements. The bottom line is that comparisons of individual diets to RDA or AI values should be interpreted with caution.

Comparison to MyPlate and the Dietary Guidelines for Americans

The MyPlate system has several online tools for assessment of dietary intake. Individuals (or evaluators) can use the SuperTracker feature on the ChooseMyPlate.com website to compare a typical day’s intake to the MyPlate groups and *Dietary Guidelines*. Although these evaluations usually are not specific, they give a general idea of whether the subject’s diet is high or low in saturated fat, or whether the subject is eating enough fruits, vegetables, and whole grains.

Outcomes of Nutrition Assessment

When taken together, anthropometric measures, biochemical tests, clinical exams, and dietary evaluation, along with the individual’s family history, socioeconomic situation, and other factors, give a complete picture of

nutritional health. A client's assessment can lead to a recommendation for a diet change to reduce weight or blood cholesterol, the addition of a vitamin or mineral supplement to treat a deficiency, the identification of abnormal growth resulting from inadequate infant feeding, or simply the affirmation that dietary intake is adequate for current nutrition needs.

Key Concepts Nutrition assessment involves the collection of various types of data—anthropometric measurements, biochemical tests, clinical observations, and dietary intake—for a complete picture of one's nutritional health. Such data are compared to established standards to diagnose nutritional deficiencies, identify dietary inadequacies, or evaluate progress as a result of dietary changes.

Learning Portfolio



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Study Points

- The diet-planning principles of adequacy, balance, calorie (energy) control, nutrient density, moderation, and variety are important concepts in choosing a healthful diet.
- The *Dietary Guidelines for Americans* gives consumers advice regarding general components of the diet.
- MyPlate is a graphic representation of a food guidance system that supports the principles of the *Dietary Guidelines for Americans*.
- Each food group in MyPlate has a recommended daily amount based on calorie needs. A variety of foods from each group can supply all the nutrients.
- The Exchange Lists are a diet-planning tool most often used for diabetic or weight-control diets.
- Servings for each food in the Exchange Lists are grouped so that equal amounts of carbohydrate, fat, and protein are provided by each choice.
- Dietary standards are values for individual nutrients that reflect recommended intake levels. These values are used for planning and evaluating diets for groups and individuals.
- The Dietary Reference Intakes are the current dietary standards in the United States and Canada. The DRIs consist of several types of values: EAR, RDA, AI, UL, EER, and AMDR.
- Nutrition information on food labels can be used to determine a more healthful diet.
- Label information not only provides the gram or milligram amounts of the nutrients present, but also gives a percentage of Daily Values so that the consumer can compare the amount in the food to the amount recommended for consumption each day.
- Nutrition assessment is a process of determining the overall health of a person as related to nutrition.
- Nutrition assessment involves four major evaluations: anthropometric measurements, biochemical tests, clinical observations, and dietary intake.

Study Questions

1. Define undernutrition and overnutrition.
2. What is the purpose of the *Dietary Guidelines for Americans*?
3. What are the recommended amounts for each food group of MyPlate for a 2,000-calorie diet?
4. Describe how the exchange system works and why people with diabetes might use it.
5. List and define four main Dietary Reference Intake categories.

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Learning Portfolio (continued)

- List five mandatory components found on all food labels.
- The standard Nutrition Facts panel shows information on which nutrients?
- What is the purpose of the “% Daily Value” listed next to most nutrients on food labels?
- Define three types of claims that might be found on food labels.

Try This

Are You a MyPlate Pleaser?

Keep a detailed food diary for three days. Make sure to include things you drink, along with the amounts (e.g., cups, ounces, tablespoons) of each food or beverage. How well do you think your intake matches the *Dietary Guidelines* and MyPlate recommendations? To find out, go to ChooseMyPlate.gov and click on SuperTracker, and then on Food Tracker. This feature allows you to do an online assessment of your food intake. Follow the instructions to Create Your Profile. Then, click on Proceed to Food Intake and enter each food you ate for one day. When you are done, you can click on Analyze Your Food Intake and see the comparisons to the *Dietary Guidelines* and MyPlate. How did you do? From which groups did you tend to eat more than is recommended? Were there any groups for which you did not meet the recommendations? Was there a day-to-day variation in the number of servings you ate of each group? Use the results of this activity to plan

ways you can improve your diet. You might want to visit this site frequently to monitor changes you are making in your food intake.

Grocery Store Scavenger Hunt

On your next trip to the grocery store, find a food item that has any number other than a “0” listed for the two vitamins and minerals required to be listed on the food label %DV. It doesn’t matter whether you choose a cereal, soup, cracker, or snack item, as long as it has numbers other than “0” for all four items. Once you’re home, calculate the number of milligrams of calcium, iron, and vitamin C found in each serving of your food. Next, take a look at vitamin A: How many International Units (IUs) does each serving of your product have? If you can calculate these, you should have a better understanding of % Daily Values.

Getting Personal

How well are You Following the *Dietary Guidelines*?

Advice provided by the *Dietary Guidelines for Americans* can help you determine the healthfulness of your diet. Using these guidelines as an evaluation tool, they can also help identify shifts you can make on the road to a more healthy lifestyle. Using the checklist below, consider your own eating habits and evaluate them against the recommendations. An example 2,000 Calorie Level is provided. Table A3-1 of the *Dietary Guidelines 2015-2020* provide recommendations for a variety of calorie levels.

Food Group	Suggested Amount/Day Based on 2,000 Calorie Level	Other Calorie Level Suggestions	My Intake Each Day	Did I Meet the Recommendations?	
				Yes	No
Dark-green vegetables	2 ½ cup				
Red and orange vegetables	5 ½ cup				
Legumes (beans and peas)	1 ½ cup				
Starchy vegetables	5 cups				

Food Group	Suggested Amount/Day Based on 2,000 Calorie Level	Other Calorie Level Suggestions	My Intake Each Day	Did I Meet the Recommendations?	
				Yes	No
Other vegetables	4 cups				
Fruits	2 cup				
Grains	6 oz				
Dairy	3 cup				
Protein foods	5 ½ oz				
• Seafood	8 oz/wk				
• Meats, poultry, eggs	26 oz/wk				
• Nuts, seeds, soy products	5 oz/wk				
Oil	27 gm				
Limit on calories for other uses	270 Cal or 14% of calorie intake				
Physical Activity Guidelines	equivalent of 150 minutes of moderate-intensity aerobic activity each week				

Serving Sizes and Equivalents

Food Group	Serving Sizes and Equivalents
Grains	1 ounce-equivalent = 1 slice of bread; 1 small muffin; 1 cup ready-to-eat cereal flakes; or ½ cup cooked cereal, rice, grains, or pasta
Vegetables	1 cup or equivalent (1 serving) = 1 cup raw or cooked vegetables; 2 cup raw leafy salad greens; or 1 cup vegetable juice
Fruits	1 cup or equivalent (1 serving) = 1 cup fresh, canned, or frozen fruit; 1 cup fruit juice; 1 small whole fruit; or ½ cup dried fruit
Dairy	1 cup or equivalent = 1 cup milk or yogurt; 1½ oz natural cheese; or 2 oz processed cheese
Protein Foods	1 ounce-equivalent = 1 oz lean meat, poultry, or fish; ¼ cup cooked dry beans or tofu; 1 egg; 1 tablespoon peanut butter; or ½ oz nuts or seeds
Oils	1 teaspoon or equivalent = 1 teaspoon vegetable oil or 1 tablespoon mayonnaise-type salad dressing

For each of the food groups that you did not meet the recommended intake amounts each day consider shifts you can make in your eating habits that will improve your intake. List three measurable goals to help achieve these changes:

To make my diet and lifestyle more healthy, I can:

- 1) _____
- 2) _____
- 3) _____



Learning Portfolio (continued)

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