

## chapter 2

# Tools for Designing a Healthy Diet



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**H**ow many times have you heard wild claims about how healthful certain foods are for you? As consumers focus more and more on diet and disease, food manufacturers are asserting that their products have all sorts of health benefits. Supermarket shelves have begun to look like an 1800s medicine show. “Take fish oil capsules to avoid a heart attack.” “Eat more olive oil and oat bran to lower blood cholesterol.” Hearing these claims, you would think that food manufacturers have solutions to all of our health problems.

Advertising aside, nutrient intakes out of balance with nutrient needs—such as excess energy, saturated fat, salt, and alcohol and sugar intake—are linked to many leading causes of death in North America, including obesity, hypertension, cardiovascular disease, cancer, liver disease, and type 2 diabetes. In Chapter 2, you will explore the components of a healthy diet—a diet that will minimize your risks of developing nutrition-related diseases. The goal is to provide you with a firm understanding of basic diet-planning concepts before you study the nutrients in detail.

Check out the **Contemporary Nutrition: Issues and Insights**

**online learning center** at [www.mhhe.com/wardlow](http://www.mhhe.com/wardlow) for quizzes, flash cards, other activities, and web links designed to further help you learn about various tools for diet planning.



## Chapter Objectives

*Chapter 2 is designed to allow you to:*

1. Develop an eating plan based on the concepts of variety, balance, moderation, nutrient density, and energy density.
2. Outline the ABCDEs of nutrition assessment: anthropometric, biochemical, clinical, dietary, and economic.
3. Describe what the Recommended Dietary Allowances (RDA) represent and how these relate to the other standards included in the new Dietary Reference Intakes.
4. Learn the food groupings used in the Food Guide Pyramid and list potentially inadequate nutrients in that diet plan.
5. List the Dietary Guidelines and the diseases these guidelines are designed to prevent or minimize.
6. Describe what a nutrition label currently consists of, and when and which health claims are allowed on a food package.
7. Describe various ethnic influences on the North American diet.



## Refresh Your Memory

*As you begin your study of diet planning in Chapter 2, you may want to review:*

- The terms in the margin in Chapter 1 and Table 1-1.
- The impact of the Dietary Supplement Health and Education Act (DSHEA) on certain label claims in Chapter 1.

## Real Life Scenario

**A**ndy is like many other college students. He grew up on a quick bowl of cereal and milk for breakfast and a hamburger, french fries, and cola for lunch, either in the school cafeteria or at a local fast-food restaurant. At dinner, he generally avoided eating any of his salad or vegetables, and by 9 o'clock he was deep into bags of chips and cookies. Andy has taken most of these habits to college. He prefers coffee for breakfast and possibly a chocolate bar. Lunch is still mainly a hamburger, French fries, and cola, but pizza and tacos now alternate more frequently than when he was in high school. One thing Andy really likes about the restaurants surrounding campus is that, for just about half a dollar more, he can *supersize* his meal. This helps him stretch his food dollar; searching out value meals for lunch and dinner now has become part of a typical day.

Provide some dietary advice for Andy. Start with his positive habits and then provide some constructive criticism, based on what you now know.



# N

## utrition Connection

**BEETLE BAILEY**

*On what do nutrition experts generally agree regarding a balanced diet? Why is a diet rich in dietary fiber that includes some fish and is low in fried foods and animal fat emphasized, along with at least 30 minutes of physical activity on most or all days of the week? Are North Americans generally following this plan? What are the potential consequences for those who do not. This chapter provides some answers.*

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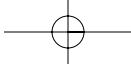
### A Food Philosophy That Works

You may be surprised to learn that what you should eat to minimize the risk of developing the common nutrition-related diseases seen in North America is exactly what you've heard many times before: *Consume a variety of foods balanced by a moderate intake of each food.* A variety of foods is best because no one food meets all your nutrient needs. Human milk comes close to meeting all of an infant's needs, except that it provides only limited amounts of iron, vitamin D, and fluoride. Cow's milk contains very little iron; neither form of milk provides dietary fiber. Meat provides protein but little calcium. Eggs have no vitamin C and provide little calcium because the calcium is mostly in the shell. Thus, you need variety in your diet because the required nutrients are scattered among many different foods.

Health professionals have recommended the same basic diet and health plan for the past 30 years: Watch how much you eat, focus on the major food groups, and stay physically active. Whole grains, fruits, and vegetables have always been among the foods emphasized for our diet for the past 30 years.

It is disappointing, however, that according to a recent survey conducted by The American Dietetic Association, two of five people in the United States believe that following a healthful diet means giving up foods they enjoy. To the contrary, a healthful diet requires only some simple planning and doesn't have to mean deprivation and misery. Besides, eliminating favorite foods typically doesn't work for "dieters" in the long run. The best plan consists of learning the basics of a healthful diet—a variety and balance of foods from all food groups and moderate consumption of all foods. Let's now fine-tune this advice by focusing on variety, balance, moderation, nutrient density, and energy density.

**S**ome people might like to live on pizza alone. What are pizza's nutrient strengths and inadequacies? Check the food composition table in Appendix A for the vitamin C content of cheese pizza. How many slices would you need to eat to yield the vitamin C RDA of 75–95 milligrams? (Answer: 30–40 slices)



## ■ Variety Contributes to Diet Adequacy

Variety in your diet means choosing a number of different foods within any given food group rather than eating the "same old thing" day after day. Variety makes meals more interesting and helps ensure that a diet contains sufficient nutrients. For example, carrots may be your favorite vegetable; however, if you choose carrots every day as your only vegetable source, you may miss out on the vitamin folate. Other vegetables, such as broccoli and asparagus, are rich sources of this nutrient. This concept is true of all classes of foods: fruits, vegetables, grains, and so on. Different foods within each class vary somewhat in the nutrients they contain, but they generally provide similar types of nutrients.

An added bonus of variety in the diet, especially within the fruit and vegetable groups, is the inclusion of a rich supply of what scientists call **phytochemicals**. These substances are not absolutely required elements of the diet. Still, many of these substances provide significant health benefits. Considerable research attention is focused on various phytochemicals in reducing the risk for certain diseases such as cancer. Because current multivitamin and mineral supplements contain few or none of these beneficial substances, they generally are available only from food.

Numerous population studies show reduced cancer among people who regularly consume fruits and vegetables. This is true for cancer of the gastrointestinal (GI) tract, breast, lung, and bladder. Researchers surmise that some phytochemicals present in the fruits and vegetables block the cancer process. The cancer process is described in the Nutrition Issue in Chapter 8. For now, realize that cancer develops over many years via a multistep process. If an agent such as a phytochemical can block any one of the steps in this process, the chances that cancer will ultimately appear in the body are reduced. Other phytochemicals have been linked to a reduced risk of cardiovascular disease. Could it be that, because humans evolved on a wide variety of plant-based foods, the body developed with a need for these phytochemicals, along with the various nutrients present, to maintain optimal health?

It will likely take many years for scientists to unravel the important effects of the myriad of phytochemicals in foods, and it is unlikely that all will ever be available in supplement form. For this reason, leading cardiovascular disease and cancer researchers suggest that a diet rich in fruits, vegetables, and whole grains is the most reliable way to obtain the potential benefits of phytochemicals. Table 2.1 lists some phytochemicals under study, with their common food sources. Table 2.2 provides a number of suggestions for including more phytochemicals in your diets—especially more fruits and vegetables—as does the website [www.5aday.com](http://www.5aday.com).

## ■ Balance Means Not Overconsuming Any One Food

One way to balance your diet as you consume a variety of foods is to select foods from the five major food groups every day:

- Milk, yogurt, and cheese
- Meat, poultry, fish, dry beans, eggs, and nuts
- Vegetables
- Fruit
- Bread, cereal, rice, and pasta

A lunch consisting of a bean burrito with tomatoes accompanied by a glass of milk and an apple covers all groups. Fats, oils, and sweets can also be added to your diet in moderation to increase its flavor and help deliver certain nutrients, such as vitamin E and essential fatty acids.

## ■ Moderation Refers Mostly to Portion Size

Although moderating portion size is a good practice, eating moderately also requires planning your entire day's diet so that you don't overconsume nutrient sources. For



Focus on nutrient-rich foods as you strive to meet your nutrient needs.

**Table 2.1** Some Phytochemical Compounds Under Study

Phytochemical	Food Sources
Allyl sulfides/organosulfurs	Garlic, onions, leeks
Saponins	Garlic, onions, licorice, legumes
Phenolic acids	All plants
Protease inhibitors	Soybeans and all other plants
Carotenoids	Orange, red, yellow fruits and vegetables (egg yolks are a source as well)
Monoterpenes	Oranges, lemons, grapefruit
Capsaicin	Chili peppers
Lignans	Flaxseed, berries, whole grains
Triterpenoids	Citrus fruit, mushrooms
Indoles	Cruciferous vegetables (broccoli, cabbage, kale)
Isothiocyanates	Cruciferous vegetables, especially broccoli
Phytosterols	Soybeans, other legumes, cucumbers, other fruits and vegetables
Flavonoids	Citrus fruit, onions, apples, grapes, red wine, tea, chocolate
Isoflavones	Soybeans, other legumes
Catechins	Tea
Ellagic acid	Strawberries, raspberries, grapes, apples, bananas
Anthocyanosides	Red, blue, and purple plants (eggplant, blueberries)
Curcumin	Turmeric
Dithiolthiones	Carrots
Fructooligosaccharides	Onions, bananas, oranges

Some related compounds under study are found in animal products, such as sphingolipids (meat and dairy products) and conjugated linoleic acid (meat and cheese). These are not phytochemicals per se because they are not from plant sources, but they have been shown to have health benefits.

example, if you eat something relatively high in fat, sugar, or energy, such as a bacon cheeseburger with a regular soft drink at a fast-food (quick-service) restaurant, you should eat other foods that are less concentrated sources of the same nutrients, such as fruits and salad greens that same day. This helps balance one's diet. If you prefer whole milk to low-fat or nonfat milk, reduce the fat elsewhere in your meals. Try low-fat salad dressings, or use jam rather than butter or margarine on toast. Overall, strive to simply moderate—rather than eliminate—intake of some foods.

Although there are no "good" or "bad" foods as such, many North Americans have diets overloaded with high-fat foods (e.g., whole milk, doughnuts, French fries, hot dogs), white bread and related refined wheat products, and sugared soft drinks. Such diets lack the foundations of a healthy food plan—variety, balance, and moderation—and pose substantial risks for nutrition-related diseases.

## ■ Nutrient Density Can Also Help Guide Food Choice

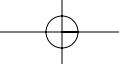
**Nutrient density** has gained acceptance in recent years for assessing the nutritional quality of an individual food. To determine the nutrient density of a food, simply compare its vitamin or mineral content with the amount of energy it provides. A food is said to be nutrient dense if it provides a large amount of a nutrient for a relatively small amount of calories (compared with other food sources). The higher a food's nutrient density, the better it is as a nutrient source. Comparing the nutrient density of different foods is an easy way to estimate their relative nutritional quality. Generally, nutrient density is assessed with respect to individual nutrients. For example, many

**A** term has been coined to refer to foods rich in phytochemicals—**functional foods**. This term indicates that the food provides health benefits beyond those supplied by the traditional nutrients it contains. Since a tomato contains the phytochemical lycopene, it can be called a functional food. The food industry especially has begun to use this term.



Fruits, vegetables, beans, and whole grains are typically rich in phytochemicals.

**nutrient density** The ratio derived by dividing a food's contribution to nutrient needs by its contribution to energy needs. When its contribution to nutrient needs exceeds its energy contribution, the food is considered to have a favorable nutrient density.



Choosing whole-grain cereals is an excellent way to increase the nutrient value of a diet. Ideally, the cereal should have at least 3 grams of dietary fiber per serving.

### Critical Thinking

Andy, described in the Case Scenario, would benefit from more variety in his diet. What are some practical tips he can use to increase his fruit and vegetable intake?

**energy density** A comparison of the energy (kcal) content of a food with the weight of the food. An energy-dense food is high in calories but weighs very little (e.g., many fried foods), whereas a food low in energy density has few calories but weighs a lot, such as an orange.

**Table 2.2** Tips for Including Foods Rich in Phytochemicals in a Diet

- Include vegetables in main and side dishes. Add these to rice, omelets, potato salad, tuna salad, and pastas. Try broccoli or cauliflower florets, mushrooms, peas, carrots, corn, or peppers.
- Look for quick-fixing grain side dishes in the supermarket. Pilafs, couscous, rice mixes, and tabbouleh are just a few that you'll find.
- Choose fruit-filled cookies, such as fig bars, instead of sugar-rich cookies. Use fresh or canned fruit as a topping for puddings, hot or cold cereal, pancakes, and frozen desserts.
- Put raisins, grapes, apple chunks, pineapples, grated carrots, zucchini, or cucumber into coleslaw, chicken salad, or tuna salad.
- Be creative at the salad bar: Try fresh spinach, leaf lettuce, red cabbage, zucchini, yellow squash, cauliflower, peas, mushrooms, or red or yellow peppers.
- Pack fresh or dried fruit for snacks away from home instead of grabbing a candy bar or going hungry.
- Add slices of cucumber, zucchini, spinach, or carrot slivers to the lettuce and tomato on your sandwiches.
- Try one or two vegetarian meals per week, such as beans and rice or pasta; Chinese vegetable stir fry; or spaghetti, squash, and tomato sauce.
- When daily protein intake more than meets recommended amounts, reduce the meat, fish, or poultry in casseroles, stews, and soups by one-third to one-half and add more vegetables and legumes.
- Keep a bowl of fresh vegetables in the refrigerator for snacks.
- Choose fruit or vegetable juices instead of soft drinks, and preferably 100% varieties.
- Substitute tea for coffee or soft drinks on a regular basis.
- Have a bowl of fruit on hand.
- Switch from crisphead lettuce to leaf lettuce, such as romaine.
- Use salsa as a dip for chips in place of creamy dips.
- Choose whole-grain breakfast cereals, breads, and crackers.
- Flavor food with plenty of herbs and spices, including ginger, rosemary, basil, thyme, garlic, parsley, and chives in place of salt.
- Experiment with soy products, such as tofu, soy milk, soy protein isolate, and roasted soybeans. (see chapter 6)

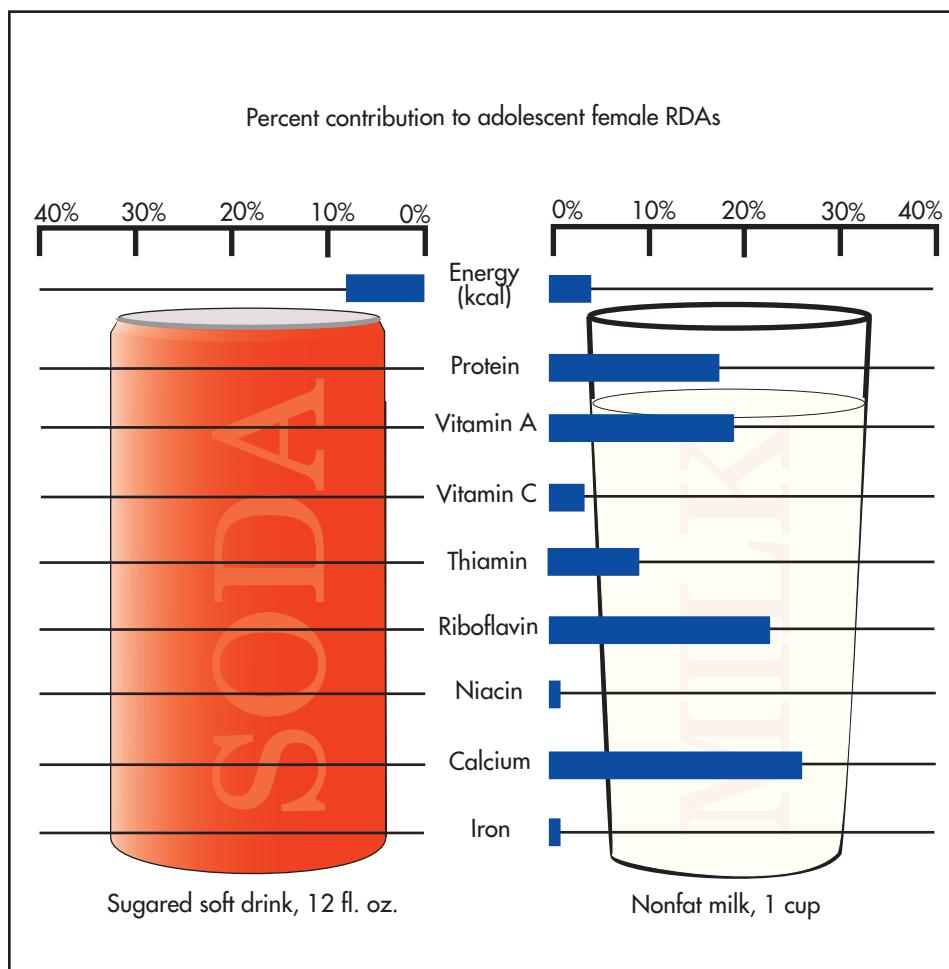
fruits and vegetables have a high content of vitamin C compared with their modest energy content: That is, they are nutrient-dense foods for vitamin C. Moreover, as Figure 2.1 shows, nonfat milk is much more nutrient dense than sugared soft drinks for many nutrients.

As noted previously, menu planning focuses mainly on the total diet—not on the selection of one critical food as key to an adequate diet. Nonetheless, nutrient-dense foods—such as nonfat and low-fat milk, lean meats, beans, oranges, carrots, broccoli, whole-wheat bread, and whole-grain breakfast cereals—do help balance less nutrient-dense foods—such as cookies and potato chips—which many people like to eat. The latter are often called empty-calorie foods because they tend to supply much energy as sugar and/or fat but few other nutrients.

Searching for nutrient-dense foods is especially important in some cases. For example, this strategy can aid diet planning for people who tend to consume little food energy, including some older people and those following weight-loss diets.

### ■ Energy (kcal) Density Especially Influences Energy Intake

**Energy density** is a concept that has captured the attention of nutrition scientists in recent years. Energy density of a food is determined by comparing energy (kcal)

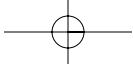


**Figure 2.1** Comparison of the nutrient density of a sugared soft drink with that of nonfat milk. Choosing a glass of nonfat milk makes a significantly greater contribution to nutrient intake in comparison with a sugared soft drink. An easy way to determine nutrient density is to see how many of the nutrient bars are longer than the kcal bar. The soft drink has no longer nutrient bars. Nonfat milk has longer nutrient bars for protein, vitamin A, thiamin, riboflavin, and calcium. Including many nutrient-dense foods in your diet aids in meeting nutrient needs.

content with the weight of food. A food that is rich in calories but weights relatively very little is considered energy dense. Examples include nuts, cookies, fried foods in general, and fat-free snacks, such as fat-free pretzels. Foods with low energy density include fruits, vegetables, and any food that incorporates lots of water during cooking, such as oatmeal (Table 2.3).

Researchers have shown that having low-energy-density foods in a meal contributes to satiety without contributing many calories. This is because we probably consume a constant weight of food at a meal, rather than a constant number of calories. How this constant weight of food is regulated is not known, but careful laboratory studies show that people consume fewer calories in a meal if the food choices tend to be low in energy density, compared with foods high in energy density. Following (or maintaining) such a diet low in energy density can aid in losing weight.

Overall, foods with lots of water and dietary fiber provide a low-energy-density contribution to a meal and help one feel full, whereas foods with high energy density—especially those high in fat—must be eaten in greater amounts in order to contribute to fullness. This is one more reason to support a diet rich in fruits, vegetables, and whole grains, a pattern that also is typical of many ethnic diets throughout the world (see the Nutrition Issue at the end of this chapter). Still, favorite foods, even if



Salads are low in energy density if we avoid adding additional calories from salad dressing, bacon bits, cheese crumbles or cubes, and croutons.

**Table 2.3** Energy Density of Common Foods (Listed in Relative Order)

Very Low Energy Density (<0.6 kcal per gram)	Low Energy Density (0.6 to 1.5 kcal per gram)
Lettuce	Whole milk
Tomatoes	Oatmeal
Strawberries	Cottage cheese
Broccoli	Beans
Salsa	Bananas
Grapefruit	Broiled fish
Nonfat milk	Fat-free yogurt
Carrots	Ready-to-eat breakfast cereals with 1% low-fat milk
Vegetable soup	Plain baked potato
	Cooked rice
	Spaghetti noodles
Medium Energy Density (1.5 to 4 kcal per gram)	High Energy Density (>4 kcal per gram)
Eggs	Graham crackers
Ham	Fat-free sandwich cookies
Pumpkin pie	Chocolate
Whole-wheat bread	Chocolate chip cookies
Bagels	Tortilla chips
White bread	Bacon
Raisins	Potato chips
Cream cheese	Peanuts
Cake with frosting	Peanut butter
Pretzels	Mayonnaise
Rice cakes	Butter or margarine
	Vegetable oils

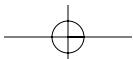
Data adapted from Rolls B, Barnett RA: *Volumetrics*. New York: HarperCollins, 2000.

they are high in energy density, can have a place in your dietary pattern, but you will have to plan for them. For example, chocolate is a very energy-dense food, but a small portion at the end of a meal can supply a satisfying finale. In addition, foods with high energy density can help people with poor appetites, such as older people, to maintain or gain weight.

The following sections of the chapter describe various states of nutritional health and provide tools and nutrient guidelines for planning healthy diets to support overall health.

### Concept Check

**B**asic diet-planning concepts include consuming a variety of foods, balancing a diet by consuming foods from each of the five food groups, and moderating portion size with each food choice, so that the diet is not excessive in energy. Choosing nutrient-dense foods, such as nonfat milk, fruits, vegetables, and whole grains, helps supply a diet with many nutrients but not excessive calories. Many of these foods are also rich sources of phytochemicals, supplying an even greater health benefit to the diet. Consuming foods of low energy density, such as fruits and vegetables, may also help in weight control, in that these provide satiety for a meal because of their large volume but few calories.



**Table 2.4** Categories of Nutritional States with Respect to Iron\*

General conditions	Condition with respect to iron
Overnutrition: nutrients consumed in excess of body needs (degree of toxicity varies for each nutrient)	Results in toxic damage to liver cells; may contribute to cardiovascular disease
Desirable nutrition: nutrients consumed to support body functions and stores of nutrients for times of increased need	Adequate liver stores of iron, adequate blood values for iron-related compounds
Undernutrition: nutrient intake does not meet nutrient needs; biochemical changes then take place	Many changes in body functions associated with a decline in iron status (e.g., iron-containing proteins and pigments in the blood drop below acceptable amounts and oxygen supply to body tissues is reduced)
Clinical symptoms; these effects eventually are seen	Pale complexion; greatly increased heart rate during activity; "spooning" of the nails in a severe deficiency; poor body temperature regulation

\*This general scheme can apply to all nutrients. Iron was chosen because you are likely to be familiar with this nutrient.

## States of Nutritional Health

The body's nutritional health is determined by the sum of its **nutritional state** with respect to each needed nutrient. Three general categories are recognized: desirable nutrition, undernutrition, and overnutrition. Maintaining a state of desirable nutrition is the basis for establishing human nutrient needs and the diet plans to meet those needs discussed later in the chapter. The common term **malnutrition** can refer to either **overnutrition** or **undernutrition**. Neither state is conducive to good health.

### ■ Desirable Nutrition

The nutritional state for a particular nutrient is desirable when body tissues have enough of the nutrient to support normal metabolic functions as well as surplus stores that can be used in times of increased need. A desirable nutritional state can be achieved by obtaining essential nutrients from a variety of foods.

### ■ Undernutrition

Undernutrition occurs when nutrient intake does not meet nutrient needs. Stores are then used up and health declines. Many nutrients are in high demand due to the constant state of cell loss and later regeneration in the body, such as in the gastrointestinal tract. For this reason, certain nutrient stores are exhausted rapidly, such as for many of the B vitamins. In turn, a regular intake is needed. In addition, some women in North America do not consume sufficient iron to meet monthly losses and eventually deplete their iron stores (Table 2.4).

Once availability of a nutrient falls sufficiently low, biochemical evidence, in which the body's metabolic processes slow or stop, appears. At this state of deficiency there are not outward symptoms, thus it is termed a **subclinical** deficiency (review Table 2.4). A subclinical deficiency can go on for some time before clinicians are able to detect its effects.

**nutritional state** The nutritional health of a person as determined by anthropometric measurements (height, weight, circumferences, and so on), biochemical measurements of nutrients or their by-products in blood and urine, a clinical (physical) examination, a dietary analysis, and economic evaluation; also called nutritional status.

**malnutrition** Failing health that results from long-standing dietary practices that do not coincide with nutritional needs.

**overnutrition** A state in which nutritional intake greatly exceeds the body's needs.

**undernutrition** Failing health that results from a long-standing dietary intake that does not meet nutritional needs.

**subclinical** Disease or disorder that is present but not severe enough to produce symptoms that can be detected or diagnosed.

**Table 2.5** Conducting an Evaluation of Nutritional Health

Component	Example
Background histories	Medical history, including current diseases and past surgeries Medications history Social history (marital status, cooking facilities) Family history Economic status Education attainment
Nutritional parameters	Anthropometric assessment: height, weight, skinfold thickness, arm muscle circumference, and other parameters Biochemical (laboratory) assessment of blood and urine: enzyme activities, concentrations of nutrients or their by-products Clinical assessment (physical examination): general appearance of skin, eyes, and tongue; rapid hair loss; sense of touch; ability to walk Diet history: usual intake or record or previous days' meals

Eventually clinical symptoms will develop, sometimes taking many years, and may result in clinical evidence of a deficiency; perhaps in the skin, hair, nails, tongue, or eyes. Often, clinicians do not detect a problem until a deficiency produces such results, such as in a vitamin C deficiency.

### ■ Overnutrition

Prolonged consumption of more nutrients than the body needs can lead to overnutrition. In the short run, for instance a week or two, overnutrition may cause only a few symptoms, such as stomach distress from excess dietary fiber or iron intake. But if kept up, some nutrients may increase to toxic amounts, which can lead to serious disease. For example, too much vitamin A can have negative effects, particularly in children and pregnant women.

The most common type of overnutrition in industrialized nations—excess intake of energy-yielding nutrients—often leads to obesity. In the long run, obesity can then lead to other serious diseases, such as certain forms of diabetes and cancer. Use the website [shapeup.org](http://shapeup.org) to learn more about this problem.

For most vitamins and minerals, the gap between desirable intake and overnutrition is wide. Therefore, even if people take a typical multivitamin and mineral supplement daily, they probably won't receive a harmful amount of any nutrient. The gap between optimal intake and overnutrition is narrowest for vitamin A, calcium, iron, copper, and other minerals. Thus, if you take nutrient supplements, keep a close eye on your total vitamin and mineral intake both from food and from supplements to avoid toxicity (see Chapter 8 for further advice on use of nutrient supplements).

## How Could Your Nutritional State Be Measured?

To find out how nutritionally fit *you* are, a nutritional assessment—either whole or in part—needs to be performed (Table 2.5). Generally, this is performed by a physician and often with the aid of a registered dietitian.

### ■ Evaluating the ABCDEs

Five components in combination further add to the complete nutritional picture. **Anthropometric** measurements of height, weight, body skinfolds, and body

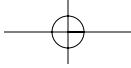
**anthropometric** Pertaining to the measurement of body weight and the lengths, circumferences, and thicknesses of parts of the body.



**Figure 2.2** (a) Anthropometric, (b) biochemical, (c) clinical, and (d) dietary information helps determine a person's nutritional state. (e) Economic status adds further information, rounding out the ABCDEs of nutritional assessment.

circumferences are an excellent first line of attack. They are easy to obtain and are generally reliable. However, an in-depth examination of nutritional health is impossible without the more expensive process of biochemical assessment. This involves the measurement of specific blood enzyme activities and of the concentrations of nutrients and nutrient by-products in the blood, urine, and feces.

A clinical examination would follow, during which a health professional would search for any physical evidence of diet-related diseases. Then, a diet history, documenting at least the previous few days' intake, would look into possible problem areas. Finally, current economic status is added to the picture, such as the ability to purchase and prepare appropriate foods needed to maintain health. Now the true nutritional state of a person emerges (Fig. 2.2). Together these activities form the ABCDEs of nutritional assessment: anthropometric measurement, biochemical assessment, clinical examination, diet history, and economic status.



### Another Bite

A practical example using the ABCDEs for evaluating nutritional state can be illustrated in a person who chronically abuses alcohol. Upon evaluation, the physician notes:

- (a) Low weight-for-height, muscle wasting in the upper body
- (b) Low amounts of the vitamins thiamin and folate in the blood
- (c) Psychological confusion, facial sores, and uncoordinated movement
- (d) Dietary intake of little more than alcohol-fortified wine and snack cakes for the last week
- (e) Currently residing in a homeless shelter; \$35.00 in wallet; unemployed

Evaluation: This person needs professional attention, including nutrient repletion.

### ■ Recognizing the Limitations of Nutritional Assessment

As mentioned, a long time may elapse between the initial development of poor nutritional health and the first clinical evidence of a problem. Recall that a diet high in saturated (typically solid) fat often increases blood cholesterol concentration, but without producing any clinical evidence for years. However, when the blood vessels become sufficiently blocked by cholesterol and other materials, chest pain during physical activity or a heart attack may occur. Much current nutrition research aims to develop better methods for early detection of nutrition-related problems such as this.

Another example in the delay of evidence that serious consequences are occurring is with a calcium deficiency, a particularly relevant issue for adolescent females. Many young women consume well below the needed amount of calcium but often suffer no ill effects in their younger years. However, women whose bone structures do not reach full potential during the years of growth are likely to face an increased risk for osteoporosis later in life.

Furthermore, clinical evidence of nutritional deficiencies is often not very specific, such as diarrhea, an irregular walk, and facial sores. These may have different causes. Long lag times and vague evidence often make it difficult to establish a link between an individual's current diet and nutritional state.

Table 1.5 in Chapter 1 showed the close relationship of nutrition and health. The good news is that this attention to maintaining nutritional health contributes to the goal of achieving a long-vigorous life.

### Concept Check

A desirable nutritional state results when the body has enough nutrients to function fully and contains stores to use in times of increased needs. When nutrient intake fails to meet body needs, undernutrition develops. Symptoms of such an inadequate nutrient intake can take months or years to develop. Overloading the body with nutrients, leading to overnutrition, is another potential problem to avoid. Nutritional state can be assessed by using anthropometric measurements, biochemical evidence, clinical evaluation, diet history, and economic status (ABCDEs).

## Recommendations For Food Choice

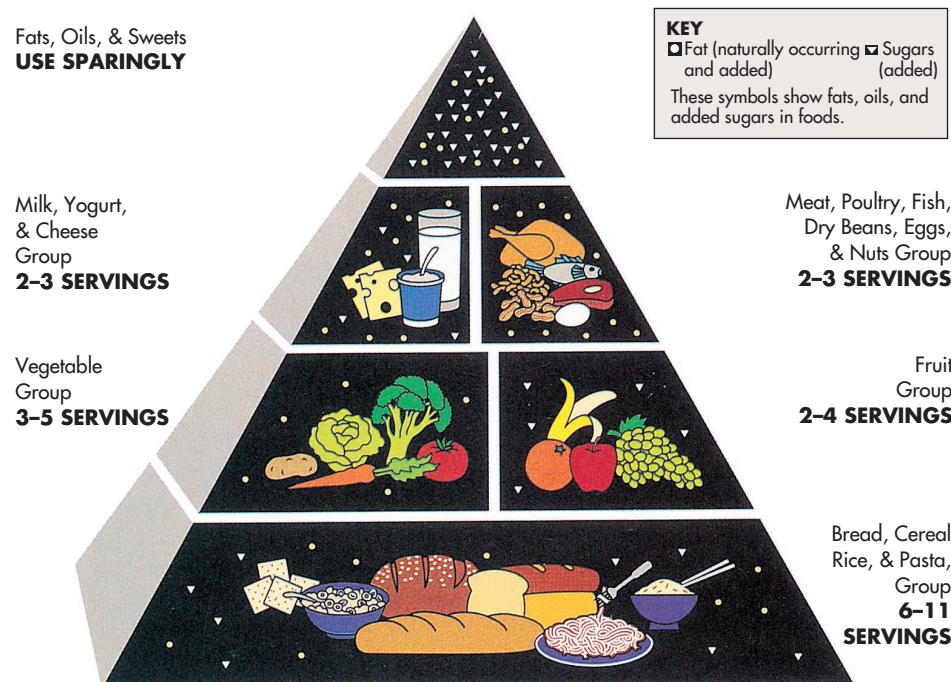
The following sections of the chapter will describe various guidelines for planning healthy diets.

### ■ The Food Guide Pyramid—A Menu-Planning Tool

Since the early twentieth century, researchers have worked to clarify the science of nutrition into practical terms, so that people with no special training could estimate whether their nutritional needs were being met. A seven-food-group plan, based on foods traditionally eaten by people in the United States, was one of the first formats. Daily food choices had to include items from each group. This plan had been simplified by the mid-1950s to a four-food-group plan: a milk group, a meat group, a fruit and vegetable group, and a bread and cereal group. The entire plan was designed to provide a minimum foundation for a diet, and represented about 1200 to 1400 kcal per day. Other food choices were to be added to meet daily energy needs.

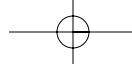
Today, the Food Guide Pyramid, which is designed to represent a total diet providing sufficient protein, vitamins, and minerals, is widely advocated for diet planning (Fig. 2.3). This pyramid goes beyond earlier food guides to suggest a pattern of food choices for the entire day, rather than simply a foundation diet.

**A**ppendix B contains the Canadian Food Guide to Healthy Eating.



**Figure 2.3** USDA's Food Guide Pyramid. The Food Guide Pyramid lists the food groups and the amount to consume from each group. Note that for children and teenagers, 3 servings should be chosen from the milk, yogurt, and cheese group. Once you have estimated your energy needs, recommended servings from the other groups with wider ranges are as follows:

Energy intake	1600 kcal	2200 kcal	2800 kcal
Grain group	6	9	11
Vegetable group	3	4	5
Fruit group	2	3	4
Meat group (ounces)	5	6	7
Total fat (grams)	53	73	93
Total added sugars (teaspoons)	6	12	18

**Table 2.6** The Food Guide Pyramid—a Summary

Food Category	Major Contributions	Foods and Individual Serving Sizes <sup>†</sup>
Milk, yogurt, and cheese	Calcium Phosphorus Carbohydrate Protein Riboflavin Vitamin D Magnesium Zinc	1 cup milk (includes low-lactose products) 1½ oz cheese 2 oz processed cheese 1 cup yogurt 2 cups cottage cheese 1 cup soy-based beverage with added calcium
Meat, poultry, fish, dry beans, eggs, and nuts	Protein Thiamin Riboflavin Niacin Vitamin B-6 Folate <sup>§</sup> Vitamin B-12 <sup>  </sup> Phosphorus Magnesium <sup>§</sup> Iron Zinc	2–3 oz cooked meat, poultry, or fish 1–1½ cups cooked dry beans 4 tbsp peanut butter 2 eggs ¾–1 cup nuts 5 oz. soyburger
Fruits	Carbohydrate Vitamin A (few varieties) Vitamin C Folate Magnesium Potassium Dietary fiber	¼ cup dried fruit ½ cup cooked or canned fruit ¾ cup juice 1 whole piece of fruit 1 melon wedge (about ¼) ½ cup berries
Vegetables	Carbohydrate Vitamin A Vitamin C Folate Magnesium Potassium Dietary fiber	½ cup raw or cooked vegetables 1 cup raw leafy vegetables ¾ cup vegetable juice
Bread, cereal, rice, and pasta	Carbohydrate Thiamin Riboflavin <sup>¶</sup> Niacin Folate <sup>#</sup> Magnesium <sup>#</sup> Iron <sup>¶#</sup> Zinc <sup>#</sup> Dietary fiber <sup>#</sup>	1 slice of bread 1 oz (about ¾ cup) ready-to-eat cereal ½ cup cooked cereal, rice, or pasta ½ hamburger roll, bagel, or English muffin 3–4 plain crackers 1 small roll, biscuit, or muffin 1 6" tortilla
Fats, oils, and sweets	Food from this category should not replace any from the other groups. Amounts consumed should be determined by individual energy needs.	

<sup>†</sup>May be reduced for child servings<sup>§</sup>Primarily in plant protein sources<sup>||</sup>Only in animal foods<sup>¶</sup>If enriched<sup>#</sup>Whole grains and some enriched/fortified products<sup>#</sup>Whole grains

To quickly estimate serving sizes, use the following equivalents:

Thumb = 1 oz of cheese

4 stacked dice = 1 oz cheese

Thumb tip to first joint = 1 tsp

Matchbox = 1 oz meat

Bar of soap or pack of cards = 3 oz meat

Palm of a hand = 3 oz

1 ice cream scoop = ½ cup

Fist or baseball = 1 cup

Handful = 1 or 2 oz of a snack food

Tennis ball = 1 medium fruit serving

Computer mouse = ½ to ¾ cups

Ping-pong or golf ball = 2 tbsp

Yo-yo or hockey puck = 1 bagel serving

### Components of the Food Guide Pyramid

The number of servings to consume from each food group in the current Food Guide Pyramid depends on a person's age and energy needs. Serving size is also adjusted downward for young children (see Chapter 14). Table 2.6 lists serving sizes and the recommended number of servings to consume per day for adults. The table also lists the major nutrients each food group supplies. Note the similarities and differences among the groups.

The plan for an adult over age 18 essentially consists of the following:

- 2 servings from the milk, yogurt, and cheese group
- 2 to 3 servings from the meat, poultry, fish, dry beans, eggs, and nuts group (5 to 7 ounces total)
- 3 to 5 servings from the vegetable group
- 2 to 4 servings from the fruit group
- 6 to 11 servings from the bread, cereals, rice, and pasta group

Note also that some food choices will contain servings of more than one food group (e.g., lasagna contains pasta, cheese, and tomatoes, and likely ingredients from other food groups as well).

For some population groups—children, and teenagers; and teenagers who are pregnant or breastfeeding—three servings of the milk, yogurt, and cheese group are recommended due to higher calcium needs. The same is also true for older adults ( $\geq 51$  years). Alternately, some of those servings also could be replaced with calcium-fortified foods or a calcium supplement (see chapter 9).

Foods in a final category at the tip of the pyramid, which is not a group per se, include fats, oils, and sweets. These can be eaten to help meet individual energy needs but should not replace foods from other groups.

### Menu Planning with the Food Guide Pyramid

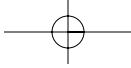
Table 2.7 illustrates a 1-day menu based on the Food Guide Pyramid. Remember the following points when using the Food Guide Pyramid to plan daily menus:

1. The guide does not apply to infants or children under 2 years of age.
2. No one food is absolutely essential to good nutrition. Each food is deficient in at least one essential nutrient.
3. No one food group provides all essential nutrients in adequate amounts. Each food group makes an important, distinctive contribution to nutritional intake.
4. Variety is the key to success of the guide and is first guaranteed by choosing foods from all the groups. Furthermore, one should consume a variety of foods within each group, except possibly in the milk, yogurt, and cheese group.
5. The foods within a group may vary widely with respect to nutrient and energy content. For example, the energy content of 3 ounces of baked potato is 98 kcal, whereas that of 3 ounces of potato chips is 470 kcal. Compare an orange and an apple with respect to vitamin C using the food composition table in Appendix A.

Overall, the Food Guide Pyramid incorporates the foundations of a healthy diet: variety, balance, and moderation. The nutritional adequacy of diets planned using this tool, however, depends on selection of a variety of foods. In addition, to ensure enough vitamin E, vitamin B-6, magnesium, and zinc—nutrients sometimes low in diets based on this plan—consider the following advice:

1. Choose primarily low-fat and nonfat items from the milk, yogurt, and cheese group. By reducing energy intake in this way, you can select more items from other food groups. If milk causes intestinal gas and bloating, emphasize yogurt and cheese (see Chapter 4 for details on the problem of lactose maldigestion and intolerance. Milk is rich in lactose).
2. Include plant foods that are good sources of proteins, such as beans and nuts, at least several times a week because many are rich in vitamins (such as vitamin E), minerals (such as magnesium), and dietary fiber.

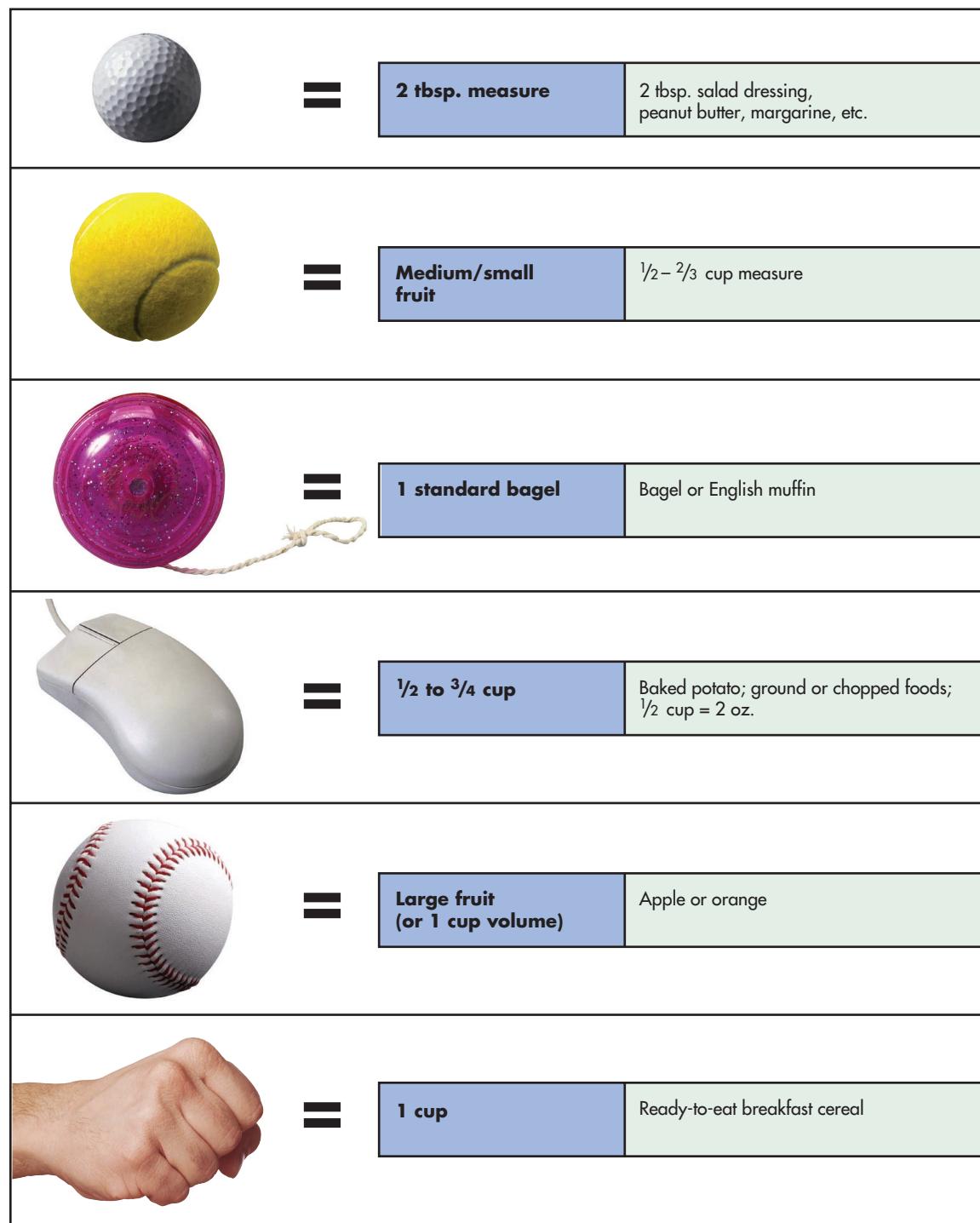
**E**xperts recommend that we pay close attention to the stated serving size for each choice when following the Food Guide Pyramid. This aids in controlling total energy intake. See Figure 2.4 for a convenient guide to estimating serving size. Note that serving sizes listed for one serving in a Food Guide Pyramid group are often less than typically served in restaurants today.

**Table 2.7** Putting the Food Guide Pyramid into Practice

Meal	Servings/Food Group*
<b>Breakfast</b>	
1 small, peeled orange	1 fruit
$\frac{3}{4}$ cup Healthy Choice Low-fat Granola with $\frac{1}{2}$ cup nonfat milk	1 bread $\frac{1}{2}$ milk
$\frac{1}{2}$ toasted, small raisin bagel with 1 tsp soft margarine	1 bread 1 fat/sweet
Optional: coffee or tea	
<b>Lunch</b>	
Ham sandwich	
2 slices whole-wheat bread	2 bread
2 oz ham	1 meat
2 tsp mustard	
1 small apple	1 fruit
2 oatmeal-raisin cookies (small)	2 fat/sweet
Optional: diet soft drink	
<b>3 PM Study Break</b>	
6 whole wheat crackers	2 bread
1 tbsp peanut butter	$\frac{1}{4}$ meat
$\frac{1}{2}$ cup nonfat milk	$\frac{1}{2}$ milk
<b>Dinner</b>	
Lettuce salad	
1 cup romaine lettuce	1 vegetable
$\frac{1}{2}$ cup sliced tomatoes	1 vegetable
1 tbsp Italian dressing	$1\frac{1}{2}$ fat/sweet
$\frac{1}{2}$ grated carrot	1 vegetable
3 oz broiled salmon	1 meat
$\frac{1}{2}$ cup rice	1 bread
$\frac{1}{2}$ cup green beans with 1 tsp margarine	1 vegetable 1 fat/sweet
Optional: coffee or tea	
<b>Late-night snack</b>	
1 cup "light" fruit yogurt	1 milk
<b>Nutrient breakdown</b>	
1800 kcal	
Carbohydrate	56% of kcal
Protein	18% of kcal
Fat	26% of kcal

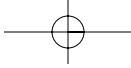
This menu meets nutrient needs for all vitamins and minerals for an average adult. For adolescents, teenagers, and older adults, add one additional serving from the milk, yogurt, and cheese group or seek other calcium rich sources.

\*Names of food groups abbreviated as follows: milk = milk, yogurt, and cheese group; meat = meat, poultry, fish, dry beans, eggs, and nuts group; bread = bread, cereal, rice, and pasta group; fat/sweet = fats, oils, and sweets category.



**Figure 2.4** A golf ball, tennis ball, yo-yo, computer mouse, baseball, and fist make convenient guides to judge Food Guide Pyramid serving sizes.

3. For vegetables and fruits, try to include a dark green vegetable for vitamin A and a vitamin C-rich fruit, such as an orange, every day. Don't focus primarily on potatoes for your vegetable choices. Surveys show that only 25% of adults eat a green vegetable on any given day. Increased consumption of these foods is important because they contribute vitamins, minerals, dietary fiber, and phytochemicals.



4. Choose whole-grain varieties of breads, cereals, rice, and pasta often because they contribute vitamin E and dietary fiber. A plate about two-thirds covered by grains, fruits, and vegetables and one-third or less covered by protein-rich foods promotes this diet advice. As well, a daily serving of a whole-grain, ready-to-eat breakfast cereal is an excellent choice because the vitamins (such as vitamin B-6) and minerals (such as zinc) typically added to it, along with dietary fiber, help fill in the potential gaps listed earlier.
5. Include some plant oils on a daily basis, such as those in salad dressing, and eat fish at least twice a week. This supplies you with health-promoting fatty acids.

Following the Food Guide Pyramid makes it possible to create daily diets containing as few as 1600 to 1800 kcal (review Table 2.7), sufficient for a sedentary adult or an older person. Not following this advice can leave a diet 1600 to 1800 kcal short on the nutrients just mentioned. Recall that excessive consumption of any one food—even those considered “healthy”—is also undesirable and possibly risky.

If 1600 to 1800 kcal represents too much food energy for you, you should first consider becoming more physically active rather than eating less. Obtaining enough nutrients from a diet that supplies fewer than 1600 kcal per day is very difficult. If you can't increase your energy output, you can make a special attempt to choose some nutrient-fortified foods regularly (e.g., ready-to-eat breakfast cereals) or take a

### Another Bite

**D**uring the last few years a number of organizations and experts have proposed alternate diet plans and pyramids to replace the Food Guide Pyramid.

The American Institute for Cancer Research is promoting a plate instead of a pyramid for menu planning. The plate should be covered two-thirds or more by vegetables, fruits, and whole grains and one-third or less by meat, fish, poultry, and low-fat dairy products ([www.aicr.org](http://www.aicr.org)).

The Mayo Clinic has developed a Healthy Weight Pyramid with physical activity at the center of the pyramid. The plan allows for unlimited amounts of fruits and vegetables in the diet, 4 to 8 servings of carbohydrates (grains), 3 to 7 servings of protein/dairy products, 3 to 5 servings of fats, and very limited amounts of sweets (75 kcal/day) ([www.mayo.edu/news/pyramid.jpg](http://www.mayo.edu/news/pyramid.jpg)).

The Dietary Approaches to Stop Hypertension (DASH) Pyramid helps treat elevated blood pressure. It contains more fruit and vegetable choices (total of 8 to 10) than the Food Guide Pyramid (see the Nutrition Insight in Chapter 9).

Oldways Preservation Trust has developed Latin American, Asian, and Mediterranean pyramids to reflect traditional diets in these ethnic groups (see the Nutrition Issue in this chapter).

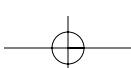
Oldways Preservation Trust has also developed a vegetarian pyramid (see the Nutrition Issue in Chapter 6).

Dr. Walter Willett, a well-respected nutrition scientist, has created a Healthy Eating Pyramid. The diet plan emphasizes a daily generous intake of whole grains, plant oils, and vegetables; fruits at least two to three times per day, nuts and legumes one to three times per day; fish, poultry, and eggs zero to two times per day; dairy products or calcium supplements one to two times per day; and little use of red meat, butter, white rice, white bread, potatoes, pasta, and sweets. Regular physical activity and weight control is also recommended, as is alcohol intake in moderation (if of legal age) and a multivitamin and mineral supplement for most people. Chapter 5 discusses the rationale and implications of this diet plan. To view the pyramid see [www.hsph.harvard.edu/now/aug24/](http://www.hsph.harvard.edu/now/aug24/).

All of these plans share a common pattern of including primarily fruits, vegetables, and grains—preferably, mostly whole grains—in a diet.



There is no shortage of pyramids to choose from when planning a diet. Which pyramid looks best to you?



balanced multivitamin and mineral supplement (see Chapter 8). In addition, for those whose diets do not include meat or other animal products, the Nutrition Issue on vegetarianism in Chapter 6 provides advice on adapting the Food Guide Pyramid to that dietary practice.

### Evaluation of the Current North American Diet Using the Food Guide Pyramid

The average North American diet, based on surveys, fails to meet the serving recommendations in the Food Guide Pyramid for many food groups. For example, the average diet included only 1 to 2 fruit servings (rather than the recommended 2 to 4 servings) and only 2 to 3 vegetable servings (rather than 3 to 5 servings), and much of that comes from potatoes, not a particularly nutrient-dense vegetable choice. Overall, fruits and vegetables are the most underrepresented groups. In contrast, the fats, oils, and sweets are well represented.

### How Does Your Current Diet Rate?

Regularly comparing your daily food intake with the Food Guide Pyramid recommendations is a relatively simple way to evaluate your overall diet. Strive to meet the recommendations. If that is not possible, identify the nutrients that are low in your diet based on the nutrients found in each food group (review Table 2.6). For example, if you do not consume enough servings from the milk, yogurt, and cheese group, your calcium intake is most likely too low. After completing the Rate Your Plate activity at the end of this chapter, you will be able to determine more accurately which nutrients are too low in your current diet and by how much. Armed with this knowledge, find foods that you enjoy that supply those nutrients, such as calcium-fortified orange juice. Customizing the Food Guide Pyramid to accommodate your own food habits may seem a daunting task now, but it is not difficult once you gain some additional nutrition knowledge. To learn more, see the web page sponsored by USDA ([www.usda.gov/cnpp](http://www.usda.gov/cnpp)). At this site, you can view the entire booklet describing the pyramid.

### Concept Check

**T**he Food Guide Pyramid translates the general needs for carbohydrate, protein, fat, vitamins, and minerals into the recommended number of daily servings from each of five major food groups. It is one of many convenient and valuable tools for planning daily menus.

### ■ Dietary Guidelines—Another Tool for Menu Planning

The Food Guide Pyramid was designed to help meet nutritional needs for carbohydrate, protein, fat, vitamins, and minerals. However, most of the major chronic “killer” diseases in North America, such as cardiovascular disease, cancer, and alcoholism, are not primarily associated with deficiencies of these nutrients. Deficiency diseases such as scurvy (vitamin C deficiency) and pellagra (niacin deficiency) are no longer common. For many North Americans, the primary dietary culprit is an overconsumption of one or more of the following: energy, saturated fat, cholesterol, alcohol, and sodium (salt). Underconsumption of calcium, iron, folate and other B-vitamins, vitamin D, vitamin E, zinc, or dietary fiber is also a problem for some people, but easy to fix as the major dietary problems are addressed.

In response to concerns regarding these killer disease patterns in the United States, since 1980 the USDA and Department of Health and Human Services (DHHS) have published **Dietary Guidelines** to aid diet planning. The latest Dietary Guidelines begin with three overarching messages and then list 10 specific guidelines:

**A** Appendix B contains nutrient guidelines for Canadians.

**Dietary Guidelines** General goals for nutrient intakes and diet composition set by the USDA and the Department of Health and Human Services (DHHS).



# The Alphabet Soup of specific Nutrient Needs

**B**efore designing a diet plan, such as the Food Guide Pyramid discussed in the previous section, we must determine what amount of each essential nutrient is needed to maintain health. The standards that have been developed for such nutrient needs, such as DRI, RDA, AI, and UL can often seem like an alphabet soup of abbreviations. However, you can more easily sift through these nutrient standards if you have a base of knowledge concerning their development and use (Table 2.8).

## DRI: RDAs and Related Standards

Most of the terms that describe nutrient standards fall under one umbrella term—**Dietary Reference Intakes (DRIs)**. These apply to both U.S. and Canadian residents.

You are probably most familiar with the nutrient standard **Recommended Dietary Allowance (RDA)**. An RDA represents the nutrient intake that is sufficient to meet the needs of nearly all individuals (about 97%) in an age and gender group (for specific numbers, see the inside cover of this book). The RDAs are generally set at about 20% over what is needed by an average person to balance intake with losses; this 20% increase is done in order to accommodate people who may have slightly higher nutrient needs than the average person. A person can compare his or her individual intake of specific nutrients to the RDA and evaluate whether one's diet is inadequate or ample in that nutrient. An intake slightly above or below the RDA is not of great concern since your needs do not likely fall directly on the RDA number. However, a significant deviation below (about 1/2) or above (about 3 times for some nutrients) the RDA for a

considerable length of time can eventually result in a deficiency or toxicity of nutrients, respectively.

An RDA for a nutrient can be set only if there is much information on the human needs for that particular nutrient. Today there is not enough information on nutrients such as calcium, vitamin D, fluoride, and biotin to set such a precise standard as an RDA. For these and other nutrients, the DRIs include a category called **Adequate Intake (AI)**. This standard is based on observing dietary intakes of people that appear to be maintaining nutritional health. That amount of intake is assumed to be adequate, as no evidence of a nutritional deficiency is apparent. Finally, minimum requirements to maintain health are set for sodium, chloride, and potassium, and **Tolerable Upper Intake Levels (Upper Levels; ULs)** have been set for some vitamins and minerals (see Chapters 8 and 9).

## How Should These Nutrient Standards Be Used?

RDAs and related standards are intended mainly for diet planning. Specifically, a diet plan should aim to meet the RDA, Adequate Intake, and minimum requirements, as appropriate, and not exceed the Upper Level on a long-term basis if one has been set. However, the Adequate Intake should not be used alone, as the RDA can be, to evaluate individual nutrient intake and needs. For these standards, individual characteristics from person to person should be more carefully considered. For example, it is recommended that the Adequate Intake be used in combination with the clinical, biochemical, and anthropometric measures of one's nutritional state, discussed earlier

in this chapter. To learn more about these nutrient standards use the web page [www4.nationalacademies.org/IOM/IOMHome.nsf/Pages/Food+and+Nutrition+Board](http://www4.nationalacademies.org/IOM/IOMHome.nsf/Pages/Food+and+Nutrition+Board).

## Daily Values: The Standards Used for Food Labeling

Though it is worthwhile to understand the intent behind the terms discussed in this Nutrition Insight, a nutrition standard more relevant to everyday life is **Daily Values**. These are generic standards used on food labels. The actual version used on food labels is applicable to ages 4 years old through adulthood (Table 2.9). No gender categories are used with the Daily Values, and age categories are wide, as just noted. This condensed system is essential for food labeling, since the RDAs and other nutrient standards are highly age and gender specific; there are too many categories for each nutrient for RDA and related standards to be used on food labels.

Daily Values exist for vitamins, minerals, and protein. These are mostly set at or close to the highest RDA value or related nutrient standard seen in the various age and gender categories for a specific nutrient. Daily Values are also set for dietary components that are not currently part of the DRIs, such as cholesterol, carbohydrate, fiber, and others. The values are based on dietary advice from U.S. federal agencies.

Overall, Daily Values are designed to allow consumers to compare their intake to desirable (or maximum) intakes. It is nevertheless important to understand that the nutrient standards expressed on food labels are not the same as the RDAs. Food labels will be discussed further in the following section.

**Table 2.8** Putting the Alphabet Soup of Specific Nutrient Needs to Use

**Recommended Dietary Allowance (RDA)**—use this to evaluate your current intake for a specific nutrient. The further you stray above or below this value, the greater the chance of developing nutritional problems.

**Adequate Intake (AI)**—use this to evaluate your current intake of nutrients, but realize that an AI designation means that much more research is needed before scientists can establish a more definitive number.

**Minimum Requirement for Health**—use this as a guide for the lowest intake of sodium, chloride, and potassium that allows for health. Note that our typical intakes greatly exceed the minimum requirements for sodium and chloride.

**Upper Level (UL)**—use this to evaluate the highest amount of daily nutrient intake that is unlikely to cause adverse health effects in the long run in almost all people (97% to 98%) in a population. This number applies to chronic use and is set to protect even very susceptible people in the healthy general population. As intake increases above the Upper Level, the potential for adverse effects increases.

**Daily Value (DV)**—use this as a rough guide for comparing the nutrient content of a food to approximate human needs. Typically the Daily Value used on food labels refers to ages 4 years through adulthood. It is based on a 2000 kcal diet; Daily Values for fat, saturated fat, protein, carbohydrate, and fiber increase slightly with higher energy intakes (see Fig. 2.5b in the later section of Food Labeling).

**Table 2.9** Comparison of Daily Values with the latest RDAs and Other Nutrient Standards\*

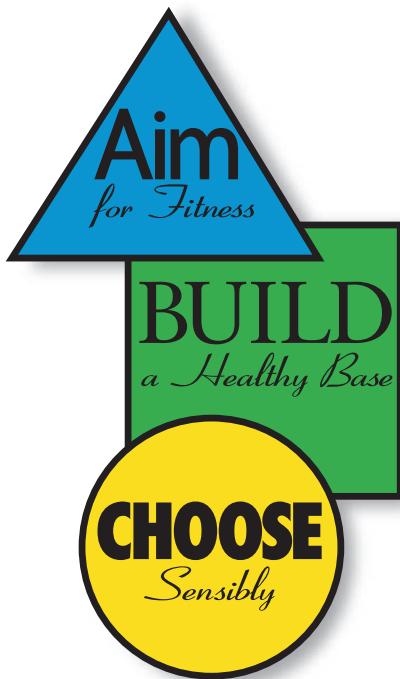
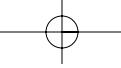
Dietary Constituent	Unit of Measure	Current Daily Values for People Over 4 Years of Age	RDA or other current dietary standard	
			Males 19 Years Old	Females 19 Years Old
Fat <sup>†</sup>	grams	<65	—	—
Saturated fatty acids <sup>‡</sup>	"	<20	—	—
Protein <sup>‡</sup>	"	50	58	46
Cholesterol <sup>§</sup>	milligrams	<300	—	—
Carbohydrate <sup>‡</sup>	grams	300	—	—
Fiber	"	25	—	—
Vitamin A	micrograms Retinol Activity Equivalents	1000	900	700
Vitamin D	International Units	400	200	200
Vitamin E	"	30	22–33	22–33
Vitamin K	micrograms	80	120	90
Vitamin C	milligrams	60	90	75
Folate	micrograms	400	400	400
Thiamin	milligrams	1.5	1.20	1.10
Riboflavin	"	1.7	1.30	1.10
Niacin	"	20	16	14
Vitamin B-6	"	2	1.30	1.30
Vitamin B-12	micrograms	6	2.40	2.40
Biotin	milligrams	0.3	0.03	0.03
Pantothenic acid	"	10	5	5
Calcium	"	1000	1000	1000
Phosphorus	"	1000	700	700
Iodide	micrograms	150	150	150
Iron	milligrams	18	8	18
Magnesium	"	400	400	310
Copper	"	2	0.9	0.9
Zinc	"	15	11	8
Sodium <sup>†</sup>	"	<2400	500	500
Potassium <sup>†</sup>	"	3500	2000	2000
Chloride <sup>†</sup>	"	3400	750	750
Manganese	"	2	2.3	1.8
Selenium	micrograms	70	55	55
Chromium	"	120	35	25
Molybdenum	"	75	45	45

\*Daily Values are generally set at the highest nutrient recommendation in a specific age and gender category. Many Daily Values exceed current nutrient standards. This is in part because aspects of the Daily Values were originally developed in the early 1970s using estimates of nutrient needs published in 1968. The Daily Values have yet to be updated to reflect the current state of knowledge.

<sup>†</sup>Sodium, potassium, and chloride values are based on the minimum requirement for health. The considerably higher Daily Values for sodium and chloride are there to allow for more diet flexibility, but the extra amounts are not needed to maintain health.

<sup>‡</sup>These values are based, instead, on a 2000 kcal diet, with a caloric distribution of 30% from fat (and one-third of this total from saturated fat), 60% from carbohydrate, and 10% from protein. A greater calorie intake allows more carbohydrate, fat, saturated fat, and fiber intake (see Fig. 2.5b).

<sup>§</sup>Based on recommendations of federal agencies.



Logo for the current Dietary Guidelines.

### Aim for Fitness

1. *Aim for a healthy weight*  
(body mass index of 18.5 to 24.9 and a waist circumference no more than 35 inches (88 centimeters) in women and 40 inches (102 centimeters) in men; see Chapter 10).
2. *Be physically active each day*  
(30 minutes on most or all days of the week [60 minutes per day is even better]; see Chapter 11).

### Build a Healthy Base

3. *Let the pyramid guide your food choices*  
(see the previous section on the Food Guide Pyramid).
4. *Choose a variety of grains daily, especially whole grains*  
(see the Food Guide Pyramid and Chapter 4).
5. *Choose a variety of fruits and vegetables daily*  
(see the Food Guide Pyramid)
6. *Keep foods safe to eat*  
(proper cooking and refrigeration of perishable foods is especially important; see Chapter 16).

### Choose Sensibly

7. *Choose a diet that is low in saturated fat and cholesterol and moderate in total fat*  
(animal fats and fast food are the chief sources; see Chapter 5).
8. *Choose beverages and foods to moderate your intake of sugars*  
(soft drinks, cookies, and candy are the chief sources; see Chapter 4).
9. *Choose and prepare foods with less salt*  
(it is easy to adjust to a lower salt intake; see Chapter 9).
10. *If you drink alcoholic beverages, do so in moderation*  
(no more than one to two drinks per day for men and one drink for women and for both men and women 65 years or older; see Chapter 7).

These guidelines are intended for healthy children (2 years and older) and adults of any age. You can view the entire Dietary Guidelines booklet at [www.usda.gov/cnpp](http://www.usda.gov/cnpp).

### Another Bite

The RDAs for energy are set at the average needs for various age groups (see the inside cover). These are not increased by 20% to reflect the higher needs of some people—as is done for most vitamins and minerals—because excess energy consumed is not excreted. Thus, to promote weight maintenance, a more conservative standard is used for energy needs compared to that used for nutrient needs. The energy RDA should be viewed as only a rough estimate, because energy needs depend on energy use. For most adults, the ability to obtain and maintain a healthy weight is the best yardstick for assessing one's current energy intake.

### Practical Use of the Dietary Guidelines

The Dietary Guidelines are designed to promote adequate vitamin and mineral intake. The guidelines also emphasize changes that will reduce the risk of obesity, hypertension, cardiovascular disease, type 2 diabetes, alcoholism, and food-borne illness.

**Table 2.10** Advice for Applying the Dietary Guidelines to Practical Situations

If You Usually Eat This:	Eat This More Often:
White bread	Whole-wheat bread (fewer nutrients lost in refinement/processing and more dietary fiber)
Sugared breakfast cereal	Low-sugar (and high-fiber) cereal (use the calories you save for a side dish of fruit)
Cheeseburger and French fries	Hamburger (hold the mayonnaise) and baked beans (for less fat and cholesterol, and the benefits of plant proteins)
Potato salad at the salad bar	Three-bean salad
Doughnut, chips, salty snack foods	Bran muffin or bagel (little or no cream cheese)
Soft drinks	Diet soft drinks (save the kcal for more nutritious foods)
Boiled vegetables	Steamed vegetables (for more nutrient retention)
Canned vegetables	Frozen vegetables (fewer nutrients lost in processing)
Fried meats	Broiled meats (watch the fat drain away)
Fatty meats, such as ribs	Lean meats, such as ground round (also, eat chicken and fish often)
Whole milk and ice cream	Low-fat or nonfat milk and sherbet or frozen yogurt (to reduce saturated fat intake)
Mayonnaise or sour cream salad dressing	Oil and vinegar dressings or diet varieties (to save calories)
Cookies for a snack	Popcorn (air popped with minimal margarine or butter)
Heavily salted foods	Foods flavored primarily with herbs, spices, lemon juice

The Dietary Guidelines are not difficult to implement (Table 2.10). In addition, this overall diet approach is not especially expensive, as some people suspect. Fruits, vegetables, and low-fat and nonfat milk are no more expensive than the chips, cookies, and sugared soft drinks they should in part replace.

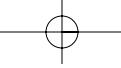
Note also that diet recommendations for adults have been issued by other scientific groups, such as the American Heart Association, U.S. Surgeon General, National Academy of Sciences, American Cancer Society, Canadian Ministries of Health (see Appendix B), and World Health Organization. All are consistent with the spirit of the Dietary Guidelines. These groups encourage people to modify their eating behavior in ways that are both healthful and pleasurable.

### The Dietary Guidelines and You

When using the Dietary Guidelines, you should consider your own state of health. Make specific changes and see whether they are effective. Note that results are sometimes disappointing, even when you are following a diet change very closely. Some people can eat a lot of saturated fat and still keep blood cholesterol under control. Other people, unfortunately, have high blood cholesterol even if they eat a diet low in saturated fat. Differences in genetic background are a key cause, as discussed in Chapter 3. Thus, we have individual nutritional needs and risks of developing certain diseases. One's diet should be planned with this in mind, responding to one's current health status and family history for specific diseases. However, tailoring a unique nutrition program for every North American citizen is unrealistic. The Food Guide Pyramid and the Dietary Guidelines provide typical adults with simple advice, which can be actively practiced by anyone willing to take a step toward good health.

There is no "optimal" diet. Instead, there are numerous healthful diets. The website [www.ificinfo.health.org](http://www.ificinfo.health.org) is a great source to lead you in that direction.

**A**dvice from The American Dietetic Association suggests five basic principles with regard to diet and health. Be realistic, making small changes over time. Be adventurous, trying new foods regularly. Be flexible, balancing some sweet and fatty foods with physical activity. Be sensible, including favorite foods in smaller portions. Finally, be active, including physical activity in daily life.



### Critical Thinking

Athe has grown up eating the typical American diet. Having recently read and heard many news items about the relationship between nutrition and health, she is beginning to look critically at her diet and is considering making changes. However, she doesn't know where to begin. What advice would you give her?



Nutrition recommendations are often made on a population-wide basis. However, in some cases, it would be more appropriate if these were made on an individual basis once a person's particular health status is known.

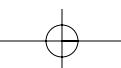
### Concept Check

**D**ietary Guidelines have been set by a variety of private and government organizations. These guidelines are designed to reduce the risk of developing obesity, hypertension, type 2 diabetes, cardiovascular disease, alcoholism, and food-borne illness. To do so, they recommend eating a variety of foods, which is fostered by following the Food Guide Pyramid. They also recommend performing regular physical activity, aiming for a healthy weight, and moderating total fat, saturated fat, salt, sugar, and alcohol intake, while focusing more on fruits, vegetables, and grain products in daily menu planning. Safe food preparation and storage are also highlighted.

## Scenario Follow-Up

The most positive aspect of Andy's diet is that it contains adequate protein, zinc, and iron because it is rich in animal protein. On the downside, his diet is low in calcium, some B-vitamins (such as folate), and vitamin C. This is because it is low in dairy products, fruits, and vegetables. It is also low in many of the phytochemical (plant-based) substances discussed at the beginning of this chapter. In addition, dietary fiber intake is low because fast-food restaurants primarily use refined grain products, rather than whole-grain products. And, since most super-sized options apply to foods rich in fat (French fries) and sugar (soft drinks), his diet is likely excessive in those two components.

He could alternate between tacos and bean burritos to gain the benefits of plant proteins in a diet. He could choose a low-fat granola bar instead of the candy bar for breakfast, or he could take the time to eat a bowl of whole-grain breakfast cereal with low-fat or nonfat milk to increase dietary fiber intake (and calcium intake in the latter case). He could also order milk at least half the time at his restaurant visits and substitute diet soft drinks for the regular variety. This would help moderate his sugar intake. Overall, his diet is most lacking in a variety of fruit and vegetable choices and dairy products in general because it lacks *variety* in food choice and *balance* among the five food groups.



## What Do Food Labels Have to Offer in Diet Planning?

Today, nearly all foods sold in the grocery store must be labeled with the product name, name and address of the manufacturer, amount of product in the package, and ingredients listed in descending order by weight. This food and beverage labeling is monitored in the United States by government agencies such as Food and Drug Administration (FDA). The listing of certain food constituents also is required—specifically, on a Nutrition Facts panel (Fig. 2.5). Use this information to learn more about what you eat. The following components must be listed: total kcal, kcal from fat, total fat, saturated fat, cholesterol, sodium, total carbohydrate, dietary fiber, sugars, protein, vitamin A, vitamin C, calcium, and iron. In addition to these required components, manufacturers can choose to list polyunsaturated and monounsaturated fat, potassium, dietary fiber, and others. Listing these components is *required*, however, if a claim is made about the health benefits of the specific nutrient (see the section in this chapter entitled “Health Claims on Food Labels”) or if the food is fortified with that nutrient.

The percentage of the Daily Value (% Daily Value) is usually given for each nutrient per serving. It is important to understand that these percentages are based on a 2000 kcal diet. In other words, they are not as applicable to people who require considerably more or less than 2000 kcal per day with respect to fat and carbohydrate intake.

Serving sizes on the Nutrition Facts panel must be consistent among similar foods. This means that all brands of ice cream, for example, must use the same serving size on their label. (These serving sizes may differ from those of the Food Guide Pyramid since those of food labels are based on typical serving sizes.) In addition, food claims made on packages must follow legal definitions (Table 2.11). For example, if a product claims to be “low sodium,” it must have 140 milligrams of sodium or less per serving.

Many manufacturers list the Daily Values set for dietary components such as fat, cholesterol, and carbohydrate on the Nutrition Facts panel. This can be useful as a reference point. As noted before, they are based on 2000 kcal; if the label is large enough, amounts based on 2500 kcal are listed as well for total fat, saturated fat, carbohydrate, and dietary fiber.

### Exceptions to Food Labeling

Foods such as fresh fruits and vegetables, fish, meats, and poultry currently are not required to have Nutrition Facts labels. However, many grocers and some meat packers have voluntarily chosen to provide their customers with information on these products. Nutrition Facts labels on meat products will also likely be required in the coming years. The next time you are at the grocery store, ask where you might find information on the fresh products that do not have a Nutrition Facts panel. You will likely find a poster or pamphlet near the product; often, these pamphlets contain recipes that use your favorite fruit, vegetable, or cut of meat. They may even assist you in your endeavor to improve your diet.

Because protein deficiency is not a public health concern in the United States, declaration of the % Daily Value for protein is not mandatory on foods for people over 4 years of age. If the % Daily Value is given on a label, FDA requires that the product be analyzed for protein quality. Because this procedure is expensive and time-consuming, many companies opt not to list a % Daily Value for protein rather than undergo the expense. However, labels on food for infants and children under 4 years of age must include the % Daily Value for protein, as must the labels on any food carrying a claim about protein content (see Chapter 14).

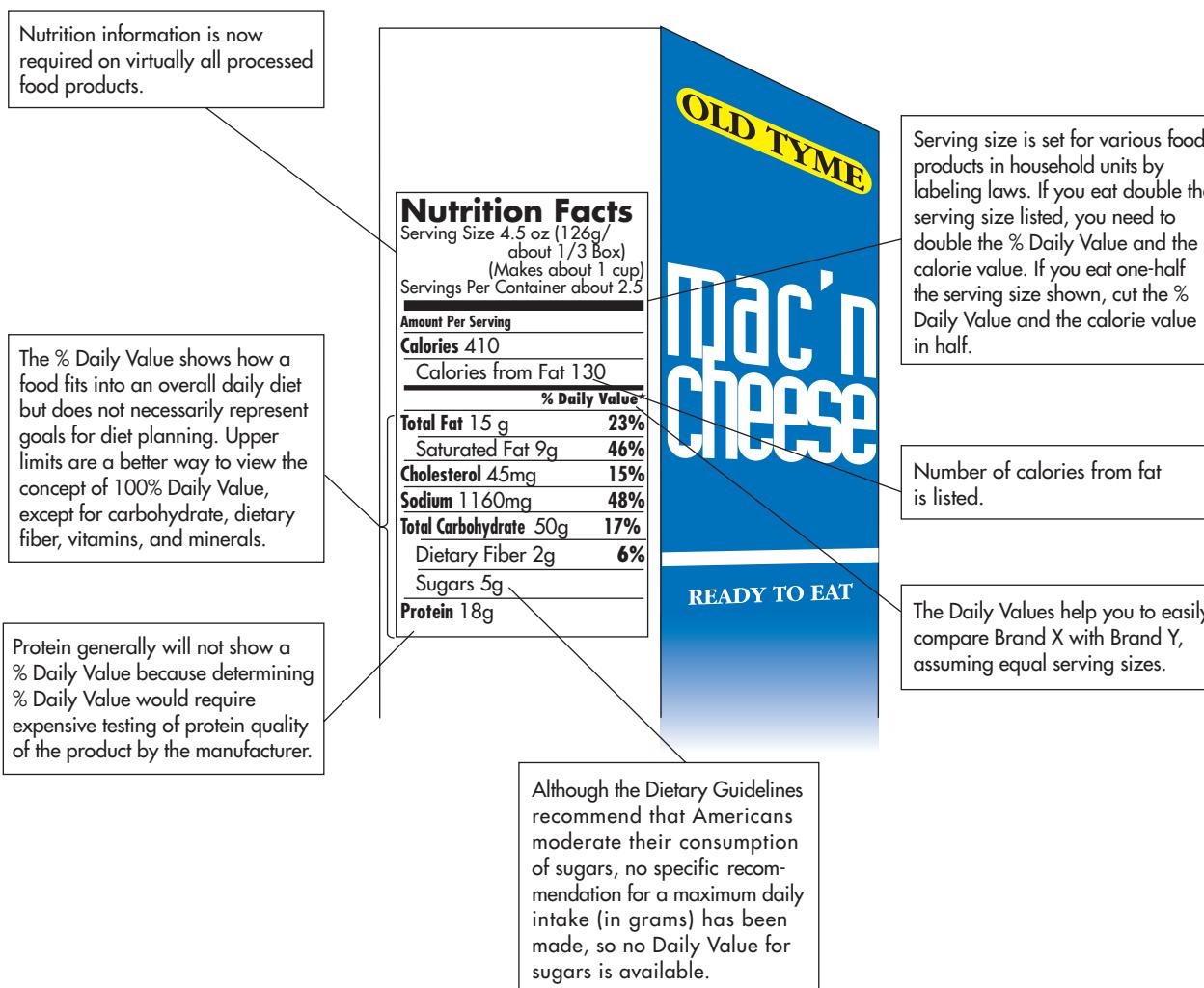


Use the Nutrition Facts label to learn more about the nutrient content of the foods you eat. Nutrient content is expressed as a percent of Daily Value. Canadian food labels have a slightly different format (review Appendix B).

**R**ecall from Chapter 1 that the nutrition label uses the term calorie for energy values, in some cases but kilocalorie (kcal) values are actually listed.



The food labels on these three products can be combined to indicate nutrient intake for a meal—a peanut butter and jelly sandwich.



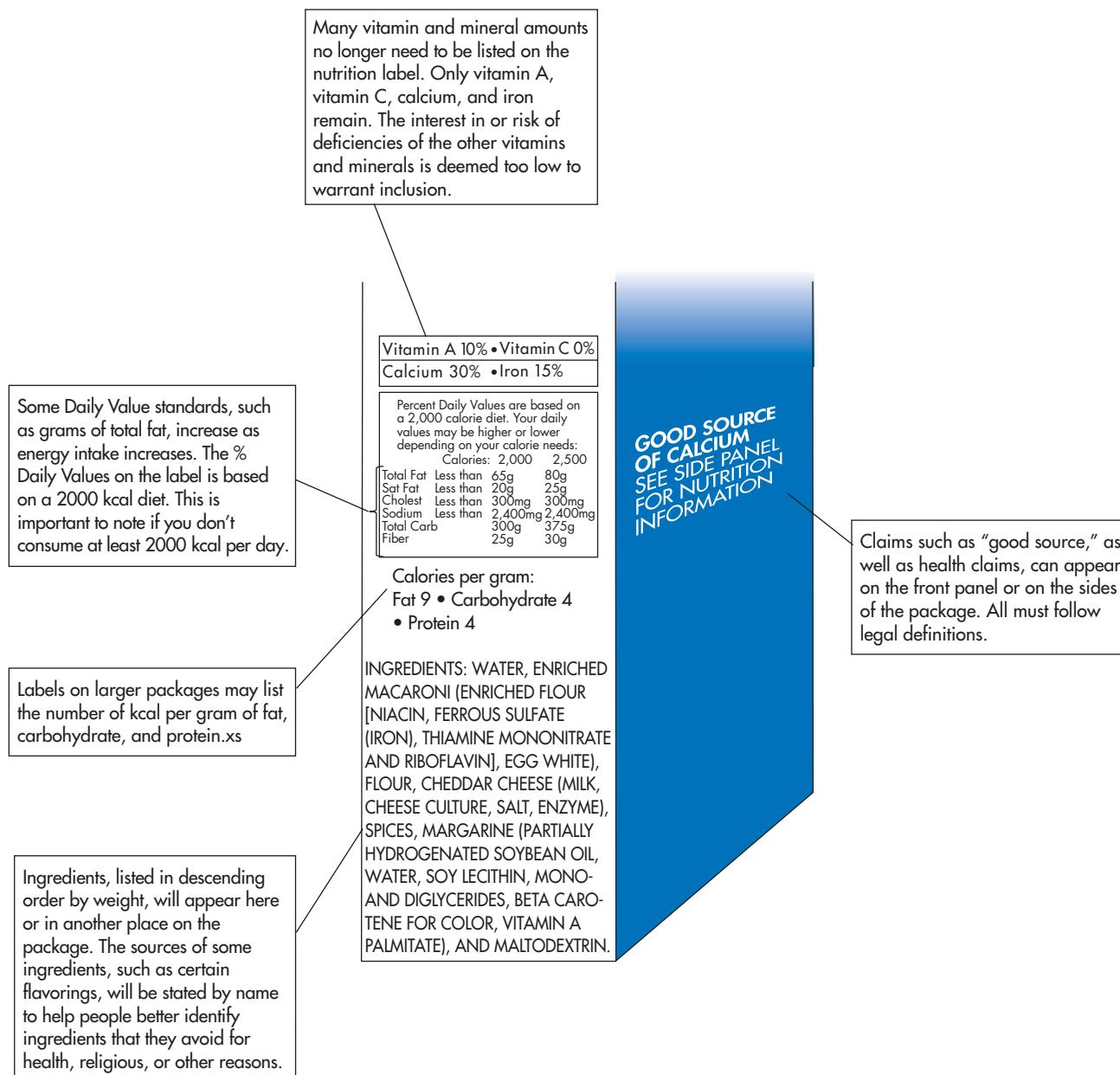
**Figure 2.5a** The Nutrition Facts panel on a current food label. The box is broken into two parts: (a) is the top and (b) is the bottom. The % Daily Value listed on the label is the percentage of the generally accepted amount of a nutrient needed daily that is present in 1 serving of the product. You can use the % Daily Values to compare your diet with current nutrition recommendations for certain diet components. Let's consider dietary fiber. Assume that you consume 2000 kcal per day, which is the energy intake corresponding to the % Daily Values listed on labels. If the total % Daily Value for dietary fiber in all the foods you eat in one day adds up to 100%, your diet meets the recommendations for dietary fiber. Food labels also contain the name and address of the food manufacturers. This allows consumers to contact the manufacturer if they desire.

**N**utrient and herbal supplements have a different layout with a "Supplement Facts" heading. Chapters 8 and 15 show examples of these labels.

## ■ Health Claims on Food Labels

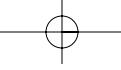
As a marketing tool directed toward the health-conscious consumer, food manufacturers are asserting that their products have all sorts of health benefits. This campaign began in earnest in 1984, when the Kellogg Company, in conjunction with The National Cancer Institute, printed a health claim on its "high-fiber" cereals, stating that dietary fiber may help prevent certain forms of cancer. This type of label message was not allowed at the time and caused a heated debate among nutrition scientists. After reviewing hundreds of comments on the proposed rule allowing health claims, FDA, which has legal oversight over most food products, decided to permit this and other health claims with certain restrictions.

Currently, FDA limits the use of health messages to specific diseases in which there is significant scientific agreement concerning the relationship between a nutrient, food, or food constituent and the disease. The claims allowed at this time may show a link between the following:



**Figure 2.5b** For legend see opposite page.

- A diet with enough calcium and a reduced risk of osteoporosis
- A diet low in total fat and a reduced risk of some cancers
- A diet low in saturated fat and cholesterol and a reduced risk of cardiovascular disease (typically referred to as heart disease on the label)
- A diet rich in dietary fiber—containing grain products, fruits, and vegetables and a reduced risk of some cancers
- A diet low in sodium and high in potassium and a reduced risk of hypertension and stroke
- A diet rich in fruits and vegetables and a reduced risk of some cancers
- A diet adequate in the synthetic form of the vitamin folate (called folic acid) and a reduced risk of neural tube defects (a type of birth defect)
- Use of sugarless gum and a reduced risk of tooth decay, especially when compared with foods high in sugars and starches



**S**ome products make so-called "structure/function" claims, such as "improves blood circulation." These do not fall under FDA jurisdiction because of laws passed by Congress in 1994 (see Chapter 1). View any of these non-FDA-approved claims skeptically.

- A diet rich in fruits, vegetables, and grain products that contain fiber and a reduced risk of cardiovascular disease. Oats (oatmeal, oat bran, and oat flour) and psyllium are two fiber-rich ingredients that can be singled out in reducing the risk of cardiovascular disease, as long as the statement also says the diet should also be low in saturated fat and cholesterol
- A diet rich in whole-grain foods and other plant foods, as well as low in total fat, saturated fat, and cholesterol, and a reduced risk of cardiovascular disease and certain cancers
- A diet low in saturated fat and cholesterol that also includes 25 g of soy protein and a reduced risk of cardiovascular disease. The statement "one serving of the (name food) provides \_\_\_\_\_ g of soy protein" must also appear as part of the health claim
- A diet rich in potassium and a reduced risk of stroke
- Omega-3 fatty acids from oils present in fish and a reduced risk of cardiovascular disease
- Margarines containing plant stanol and sterol esters and a reduced risk of cardiovascular disease (see Chapter 5 for more details on plant stanol and sterol esters)

A "may" or "might" qualifier must be used in the statement.

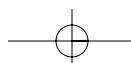
In addition, before a health claim can be made for a food product, it must meet two general requirements. First, the food must be a "good source" (before fortification) of dietary fiber, protein, vitamin A, vitamin C, calcium, or iron. The legal definition of "good source" appears in Table 2.11. Second, a single serving of the food product cannot contain more than 13 grams of fat, 4 grams of saturated fat, 60 milligrams of cholesterol, or 480 milligrams of sodium. If a food exceeds any one of these amounts, no health claim can be made for it, despite its other nutritional qualities. For example, even though whole milk is high in calcium, its label can't make the health claim about calcium and osteoporosis because whole milk contains 5 grams of saturated fat per serving.

In addition, the product must meet criteria specific to the health claim being made. For example, a health claim regarding fat and cancer can be made only if the product contains 3 grams or less of fat per serving, which is the standard for low-fat foods.

The bottom line for health claims is honesty. FDA is vigilant in controlling the claims made about foods on supermarket shelves.



Many products prominently feature health claims.



**Table 2.11** Definitions for Comparative and Absolute Nutrient Claims on Food Labels**Sugar**

- *Sugar free:* less than 0.5 grams (g) per serving.
- *No added sugar; without added sugar; no sugar added:*
  - No sugars were added during processing or packing, including ingredients that contain sugars (for example, fruit juices, applesauce, or jam).
  - Processing does not increase the sugar content above the amount naturally present in the ingredients. (A functionally insignificant increase in sugars is acceptable for processes used for purposes other than increasing sugar content.)
  - The food that it resembles and for which it substitutes normally contains added sugars.
  - If the food doesn't meet the requirements for a low- or reduced-calorie food, the product bears a statement that the food is not low calorie or calorie reduced and directs consumers' attention to the nutrition panel for further information on sugars and calorie content.
  - *Reduced sugar:* at least 25% less sugar per serving than reference food

**Calories**

- *Calorie free:* fewer than 5 kcal per serving.
- *Low calorie:* 40 kcal or less per serving and, if the serving is 30 g or less or 2 tablespoons or less, per 50 g of the food.
- *Reduced or fewer calories:* at least 25% fewer kcal per serving than reference food

**Fiber**

- *High fiber:* 5 g or more per serving. (Foods making high-fiber claims must meet the definition for low fat, or the level of total fat must appear next to the high-fiber claim)
- *Food source of fiber:* 2.5 to 4.9 g per serving
- *More or added fiber:* at least 2.5 g more per serving than reference food

**Fat**

- *Fat free:* less than 0.5 g of fat per serving
- *Saturated fat free:* less than 0.5 g per serving, and the level of trans fatty acids does not exceed 0.5 g per serving

- *Low fat:* 3 g or less per serving and, if the serving is 30 g or less or 2 tablespoons or less, per 50 g of the food. 2% milk can no longer be labeled low fat as it exceeds 3 g per serving. *Reduced fat* will be the term used instead.
- *Low saturated fat:* 1 g or less per serving and not more than 15% of kcal from saturated fatty acids
- *Reduced or less fat:* at least 25% less per serving than reference food
- *Reduced or less saturated fat:* at least 25% less per serving than reference food

**Cholesterol**

- *Cholesterol free:* less than 2 milligrams (mg) of cholesterol and 2 g or less of saturated fat per serving
- *Low cholesterol:* 20 mg or less cholesterol and 2 g or less of saturated fat per serving and, if the serving is 30 g or less or 2 tablespoons or less, per 50 g of the food
- *Reduced or less cholesterol:* at least 25% less cholesterol and 2 g or less of saturated fat per serving than reference food

**Sodium**

- *Sodium free:* less than 5 mg per serving
- *Very low sodium:* 35 mg or less per serving and, if the serving is 30 g or less or 2 tablespoons or less, per 50 g of the food
- *Low sodium:* 140 mg or less per serving and, if the serving is 30 g or less or 2 tablespoons or less, per 50 g of the food
- *Light in sodium:* at least 50% less per serving than reference food
- *Reduced or less sodium:* at least 25% less per serving than reference food

**Other terms:**

- *Fortified/enriched:* Vitamins and/or minerals have been added to the product in amounts in excess of at least 10% of that normally present in the usual product.
- *Healthy:* An individual food that is low fat and low saturated fat and has no more than 360 to 480 mg of sodium or 60 mg of cholesterol per serving can be labeled "healthy" if it provides at least 10% of vitamin A, vitamin C, protein, calcium, iron, or dietary fiber.
- *Light or lite:* The descriptor *light* or *lite* can mean two things: first, that a nutritionally

altered product contains one-third fewer kcal or half the fat of reference food (if the food derives 50% or more of its kcal from fat, the reduction must be 50% of the fat) and, second, that the sodium content of a low-calorie, low-fat food has been reduced by 50%. 2% milk can no longer be labeled low fat because it has more than 3 g of fat per serving. In addition, "light in sodium" may be used for foods in which the sodium content has been reduced by at least 50%. The term *light* may still be used to describe such properties as texture and color, as long as the label explains the intent—for example, "light brown sugar" and "light and fluffy."

- *Diet:* A food may be labeled with terms such as *diet*, *dietetic*, *artificially sweetened*, or *sweetened with nonnutritive sweetener* only if the claim is not false or misleading. The food can also be labeled *low calorie* or *reduced calorie*.
- *Good source:* *Good source* means that a food contains 10% to 19% of the Daily Value for a particular nutrient.
- *High:* *High* means that a food contains 20% or more of the Daily Value for a particular nutrient.
- *Organic:* Federal standards for organic foods allow claims when much of the ingredients do not use chemical fertilizers or pesticides, genetic engineering, sewage sludge, antibiotics, or irradiation in their production. At least 95% of ingredients must meet these guidelines to be labeled "organic" on the front of the package. For livestock, the animals need to be allowed to graze outdoors and as well be fed organic feed. They also cannot be exposed to antibiotics or growth hormones.
- *Natural:* The food must be free of food colors, synthetic flavors, or any other synthetic substance.

**The following terms apply only to meat and poultry products regulated by USDA.**

- *Extra lean:* less than 5 g of fat, 2 g of saturated fat, and 95 mg of cholesterol per serving (or 100 g of an individual food).
- *Lean:* less than 10 g of fat, 4.5 g of saturated fat, and 95 mg of cholesterol per serving (or 100 g of an individual food).

Many definitions are from FDA's *Dictionary of Terms*, as established in conjunction with the 1990 NLEA. g = grams; mg = milligrams

### Concept Check

The Nutrition Facts panel on a food label provides key information for helping track one's food intake. Nutrient quantities are compared with the Daily Values and expressed on a percentage basis (% Daily Value). This information can be used to either increase or reduce intake of specific nutrients. Health claims on food labels are closely regulated by FDA. Fruits, vegetables, whole grains, soy, and rich sources of calcium are prominent among the foods that can make specific health claims.

**T**he Exchange System is a final menu-planning tool. This tool organizes foods based on energy, protein, carbohydrate, and fat content. The result is a manageable framework for designing diets. For more information on the Exchange System see Appendices C and D.

### Epilogue

The tools discussed in this chapter greatly aid in menu planning. Menu planning can start with the Food Guide Pyramid. The totality of choices made within the groups can then be evaluated using the Dietary Guidelines. Individual foods that make up a diet can be examined more closely using the comparison with the Daily Values listed on the Nutrition Facts panel of the product. For the most part, these Daily Values are in line with the Recommended Dietary Allowances and related nutrient standards. The Nutrition Facts panel is especially useful in identifying nutrient-dense foods—foods that are high in a specific nutrient, such as the vitamin folate, but low in comparison with the relative amount of energy provided—as well as foods that fill you up without providing a lot of calories. The latter are described as foods with low energy density. Generally speaking, the more you learn about and use these tools, the more they will benefit your diet.

### Summary

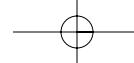
1. *Variety, balance, and moderation* are three watchwords of diet planning.
2. Nutrient density is a useful concept. It reflects the nutrient content of a food in relation to its energy (kcal) content. Nutrient-dense foods are relatively rich in nutrients, in comparison with energy content.
3. Energy density of a food is determined by comparing energy content with the weight of food. A food that is rich in calories but weighs relatively very little, such as nuts, cookies, fried foods in general, and fat-free snacks, is considered energy dense. Foods with low energy density include fruits, vegetables, and any food that incorporates lots of water during cooking, such as oatmeal.
4. A person's nutritional state can be categorized as *desirable nutrition*, in which the body has adequate stores for times of increased needs; *undernutrition*, which may be present with or without clinical symptoms; and *overnutrition*, which can lead to vitamin and mineral toxicities and various chronic diseases.
5. Evaluation of nutritional state involves analyzing background factors, anthropometric measurements, biochemical parameters, clinical evidence, diet history, and economic status. It is not always possible to detect nutritional inadequacies via nutrition assessment since such evidence often does not appear for many years.
6. The Food Guide Pyramid is designed to translate nutrient recommendations into a food plan that exhibits variety, balance, and moderation. The best results are obtained by using low-fat or non-fat dairy products; including some vegetable proteins in addition to animal-protein foods; including citrus fruits and dark green vegetables; and emphasizing whole-grain breads and cereals.
7. Dietary Guidelines have been issued to help reduce chronic diseases in our population. The guidelines emphasize eating a variety of foods; performing regular physical activity; maintaining or improving weight; moderating consumption of fats, cholesterol, sugar, salt, and alcohol; eating plenty of grain products, fruits, and vegetables; and safely preparing and storing foods, especially perishable foods.
8. Recommended Dietary Allowances (RDAs) are set for many nutrients. These amounts yield enough of each nutrient to meet the needs of healthy individuals within specific gender and age categories. Adequate Intake (AI) is the standard used when not enough information is available to set a revised RDA. Tolerable Upper Intake Levels (Upper Levels or ULs) for nutrient intake have been set for some vitamins and minerals. All of the many dietary standards fall under the term *Dietary Reference Intakes (DRIs)*. Daily Values are used as a basis for expressing the nutrient content of foods on the Nutrition Facts panel and are based for the most part on the RDAs published in 1988.
9. Food labels are a powerful tool to track your nutrient intake and learn more about the nutritional characteristics of the foods you eat. Any health claims listed must follow specific legal criteria set by FDA.

## Study Questions

- Describe the philosophy underlying the creation of the Food Guide Pyramid. What dietary changes would you need to make to meet the Pyramid guidelines on a regular basis?
- Trace the progression, in terms of physical results, of a person who went from an overnourished to an undernourished state.
- How could the nutritional state of the person at each state in question 2 be evaluated?
- Describe the intent of the Dietary Guidelines. Point out one criticism for its general application to all North American adults.
- Based on the discussion of the Dietary Guidelines, suggest two key dietary changes the typical North American adult should consider making.
- How do RDAs and Adequate Intakes differ from Daily Values in intention and application?
- How would you explain the concepts of nutrient density and energy density to a fourth-grade class?
- Nutritionists encourage all people to read labels on food packages to learn more about what they eat. What four nutrients could easily be tracked in your diet if you read the Nutrition Facts panels regularly on food products?
- Explain why consumers can have more confidence in FDA-approved health claims on food packages.
- Relate the importance of variety in a diet, especially with regard to fruit and vegetable choices, to the discovery of various phytochemicals in foods.

## Further Readings

- ADA Reports: Position of the American Dietetic Association: Functional foods. *Journal of the American Dietetic Association*, 99:1278, 1999.  
*The philosophy that food can be health promoting beyond its traditional nutritional value (i.e., phytochemical content) is gaining acceptance among scientists and health professionals. Never before have the health benefits of food had so much support.*
- American Heart Association Conference Proceedings: Unified dietary recommendations. *Circulation* 100:450, 1999.  
*A variety of health-related organizations, such as the American Heart Association and American Cancer Society, provide support for the dietary pattern recommended by the Dietary Guidelines.*
- Campbell TC, Chen J: Diet and health in rural China: Lessons learned and unlearned. *Nutrition Today* 34:116, 1999.  
*Studies of rural Asian subjects show that their traditional, primarily plant-based diet contributes to their low risk for chronic degenerative diseases. These findings are consistent with the observations of Asian migrants; they experience more of these diseases when they switch to a more westernized approach.*
- Clairmont MA: Nutraceuticals, phytochemicals and functional foods: A field of dreams for dietitians. *Today's Dietitian*, p. 36, April 2000.  
*Growing evidence supports the role of phytochemicals in disease prevention. Phytochemical-rich foods discussed include broccoli, cabbage, tomatoes, tea, soy, whole grains, oranges, grapes, and onions.*
- de Lorgeril and others: Mediterranean diet, traditional risk factors, and the rate of cardiovascular complications after myocardial infarction: Final report of the Lyon Diet Heart Study. *Circulation* 99:779, 1999.  
*People following a Mediterranean diet plan—in this case, based on canola oil products rather than the traditional source of fat, olive oil—showed a substantial reduction in heart attack risk. This study provides further evidence of the benefits of the Mediterranean diet.*
- Hasler C and others: How to evaluate the safety, efficacy, and quality of functional foods and their ingredients. *Journal of the American Dietetic Association* 101:733, 2001.  
*The term "functional food" is not yet legally defined. It is usually understood to mean any food or food ingredient that may provide a health benefit beyond the traditional nutrients it contains. The article goes on to review current health claims for foods.*
- Laudan R: Birth of the modern diet. *Scientific American*, p. 76, August 2000.  
*Advances in knowledge concerning diet and nutrition have had a great effect on our diets over the last 300 years. Recognizing the importance of fruits and vegetables scores high marks for our current diet, while the central rule of fat in our diets because of the importance given to meat and fat-based sauces is blamed for the high amounts of obesity in most developed nations.*
- Rolls BJ: The role of energy density in the overconsumption of fat. *Journal of Nutrition* 130:2685, 2000.  
*Eating foods that have a low energy density is one way to feel full without consuming a lot of calories. If the food is high in fat, even small portions may have a high energy content; energy-dense foods are generally consumed in larger quantities in order to feel full at the end of a meal.*
- Stampfer JM and others: Primary prevention of coronary heart disease in women through diet and lifestyle. *New England Journal of Medicine* 343:16, 2000.  
*Women who consume a varied diet (one rich in fiber, includes some fish, and is low in fried foods and animal fat), avoid overweight, drink small amounts of alcohol, exercise on a daily basis for about 30 minutes, and avoid smoking reduce their risk of heart attack by over 80%, compared with women without these habits.*
- Willett WC: Eat, drink, and be healthy, New York: Simon & Schuster, 2001.  
*The diet plan in the book emphasizes whole grains, plant oils, vegetables eaten daily; fruits at least 2–3 times per day, nuts and legumes 1–3 times per day; fish, poultry, and eggs eaten 0–2 times per day; dairy products or calcium supplements one to two times per day; and little use of red meat, butter, white rice, white bread, potatoes, pasta, and sweets. Regular physical activity and weight control is also recommended, as is alcohol intake in moderation (if of legal age) and a multi-vitamin and mineral supplement for most people.*



## Rate Your Plate



# I. Does Your Diet Meet Nutrient Needs, Food Guide Pyramid Recommendations, and the Dietary Guidelines?

Complete either Part I or Part II. Then complete Parts III, IV, and V. (For help in following the instructions for this activity, see the sample assessment in Appendix E.)

## Part I

### *Manual RDA analysis*

- A. Take the information from the 1-day food-intake record you completed in Chapter 1 and record it on the blank form provided in Appendix E or by your instructor. Be sure to record the food or drink ingested and the amount (e.g., weight) consumed. Note: Your instructor may require you to keep the food record for more than 1 day.
- B. Review the various nutrient standards on the inside cover of this book and choose the appropriate recommendations for your gender and age. Write the appropriate value for each nutrient on the line on the form labeled "Nutrient Need." The values for sodium and potassium from the table on the inside cover of the book are labeled "Estimated Sodium, Chloride, and Potassium Requirements of Healthy Persons."
- C. Look up the foods and drinks that you listed on the form in the food composition table, Appendix A. Record on the form the amounts of each nutrient and the kcal present in them, based on the serving size and the number of servings you ate. For example, if you drank 2 cups of milk and the serving size listed in Appendix A is 1 cup, double all nutrient values as you record them. If the food is not listed, choose a substitute, such as cola for root beer.
- D. For each food and drink, add the amounts in each column and record the results on the line labeled "Totals."
- E. Compare the totals to your nutrient needs. Divide the total for each nutrient by the specific amount and multiply that by 100. Record the result on the line labeled "% of Nutrient Needs."
- F. Keep this assessment for use in subsequent activities in other chapters.

## Part II

### *Computer diet analysis*

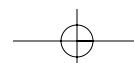
- A. Load the software (shrink-wrapped with this book) into the computer.
- B. Choose RDAs and related nutrient standards based on your age and gender.
- C. Enter the information from the 1-day food intake record you kept in Chapter 1. Be sure to enter each food and drink and the specific amount you ate.
- D. This software program will give you the following results:
  1. The appropriate RDA (or related standard) for each nutrient
  2. The total amount of each nutrient and the kcal consumed for the day
  3. The percentage intake compared with needs for each nutrient that you consumed
- E. Keep this assessment for use in subsequent activities in other chapters.

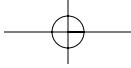
## Part III

### *Evaluation of Nutrient Intakes as a Percentage of Nutrient Needs*

Remember that you don't necessarily need to consume your estimated nutrient needs every day. A general standard is meeting needs averaged over 5 to 8 days. It is best not to exceed the Upper Level (if set) over the long term to avoid potential toxic effects for some nutrients.

- A. For which nutrients did your intakes fall below estimated nutrient needs?
- B. Did you exceed the minimum requirements for sodium? To what degree?
- C. For which nutrients did you exceed the Upper Level (if set)?
- D. What dietary changes could you make to correct or improve your dietary profile? If you're not sure, chapters 4 through 9 will help guide your decisions.





## Rate Your Plate



### Part IV

#### *Food Guide Pyramid*

Using the same food-intake record used in Part I or II, place each food item in the appropriate group of the Food Guide Pyramid chart in Appendix E. That is, for each food item, indicate how many servings it contributes to each group based on the amount you ate (see Table 2.6 for serving sizes). Note that many of your food choices may contribute to more than one group. For example, toast with margarine contributes to two categories: (1) the breads, cereals, rice, and pasta group; and (2) fats, oils, and sweets. After entering all the values, add the number of servings consumed in each group. Finally, compare your total in each food group with the recommended number of servings shown in Figure 2.3. Enter a minus sign (–) if your total falls below the recommendation or a plus sign (+) if it equals or exceeds the recommendation.

### Part V

#### *Further Diet Evaluation*

Do the weaknesses, if any, suggested in your nutrient analysis (see Part III) correspond to missing servings in the Food Guide Pyramid chart? If so, consider changing your food choices based on the Food Guide Pyramid to help improve your nutrient profile. Finally, indicate whether your day's diet did or did not conform to the following items in the Dietary Guidelines:

#### Aim for Fitness

- Aim for a healthy weight.
- Be physically active each day.

Yes	No
_____	_____
_____	_____
_____	_____
_____	_____

#### Build a Healthy Base

- Let the pyramid guide your food choices.
- Choose a variety of grains daily, especially whole grains.
- Choose a variety of fruits and vegetables daily.
- Keep foods safe to eat.

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

#### Choose Sensibly

- Choose a diet that is a low in saturated fat and cholesterol and moderate in total fat.
- Choose beverages and foods to moderate your intake of sugars.
- Choose and prepare foods with less salt.
- If you drink alcoholic beverages, do so in moderation.

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

If your diet comes up short on any of these evaluations, take appropriate action to improve your eating patterns.

## II. Applying the Nutrition Facts Label to Your Daily Food Choices

Imagine that you are at the grocer store looking for a quick meal before a busy evening. In the frozen food section, you find two brands of frozen cheese manicotti (see labels a and b). Which of the two brands would you choose? What information on the Nutrition Facts label in the figure contributed to this decision?

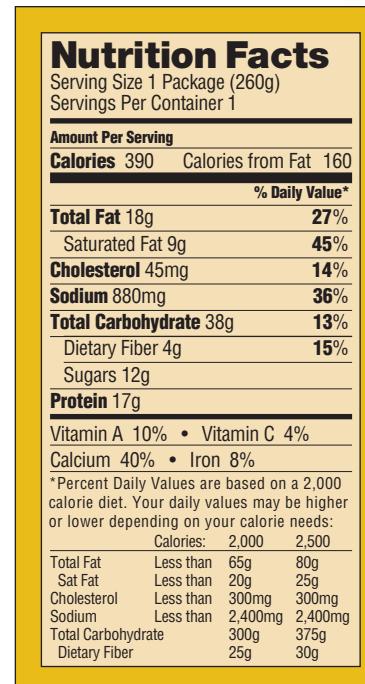
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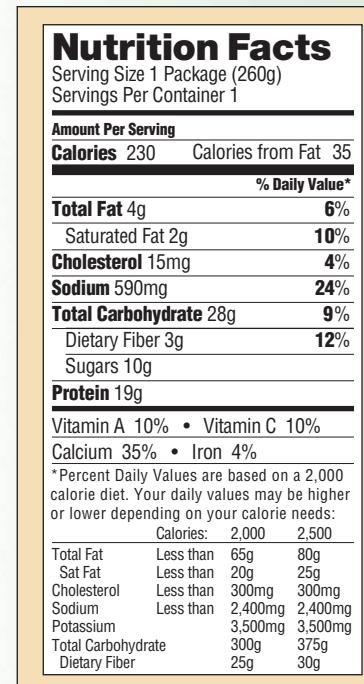
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(a)



(b)



# Nutrition Issue

## Ethnic Influences on the North American Diet

Human societies have developed under widely varying conditions. These conditions affected which foods were available (e.g., rice vs. wheat) and how long each food could be stored (e.g., tropical vs. temperate climates). This, in turn, influenced the dietary patterns of these various cultures. As these various cultures migrated to new locations, the migrants kept some traditional dietary habits, or *foodways*; changed some habits; and abandoned others. As people migrate and mingle with those of other cultures, their cuisines tend to mingle as well. Note that about 25% of all restaurants in the United States have an ethnic theme. Recent changes in affluence and technology also affect dietary habits, some for better and some for worse.

This Nutrition Issue examines how the cuisines of various cultures throughout the world have affected the North American diet. Examining the nutritional attributes of a number of ethnic diets will help you understand that no single cuisine is either completely healthful or unhealthful. The trick to finding healthful food is to evaluate individual dishes carefully. Let's look at six cuisines that contribute to food "North American style." Note that almost all North Americans sample at least one of these on a regular basis.

### Native Americans

The size and varied geography of the North American continent meant that different foods were available to people living in different locations. Some of these people were hunter-gatherers, depending on wild vegetation and wild game for subsistence. Others learned to grow vegetable crops. Depending on where they lived, Native North American groups cultivated early forms of such plant foods as tomatoes, sweet potatoes, squash, vanilla, and cocoa. Their diets tended to be low in sodium and fat and high in dietary fiber. In the far north, populations subsisted on fish, sea mammals, other game, and a few plants, such as seaweed, willow leaves, and berries.

Studies have shown that the diseases that affected these societies differed significantly from the diseases common in American society today. For example, Alaskan natives who still eat the traditional diet have cardiovascular disease rates lower than those in the general North American population. Younger generations of Alaskan natives, however, who usually do not eat the traditional diet, have developed cardiovascular disease at rates similar North Americans in general. This is also true of the Pima Indiana tribe in Arizona. These and other studies indicate that, as societies become more uniform, so, too, do disease patterns.

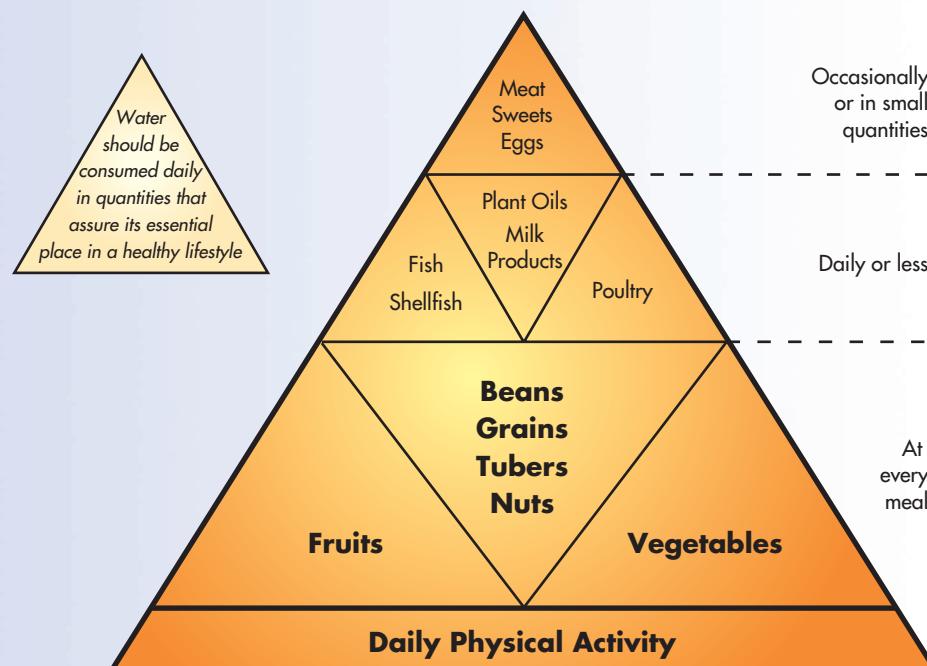
### Hispanic North Americans

When Spanish colonists arrived in what is now called Latin America, they brought foods, flavors, and cooking techniques, which they combined with locally available foods. Several cuisines developed from those combinations, influenced also by the arrival of other groups. Thus, the Cuban cuisine combined native foods with those of both Spanish and Chinese immigrants, whereas the Puerto Rican cuisine combined native foods with Spanish and African contributions. In Mexico, the Spanish influence mingled with that of local Native American cuisines.

The Mayans, Aztecs, and other populations in Mexico grew corn, beans, and chili peppers; these were the basis of Mexican cuisine. They also grew such fruits as avocados, papayas, and pineapples. By the end of the fifteenth century, wheat, chickpeas, melons, radishes, grapes, and sugar cane had been brought to the New World. Rice, citrus fruits, and some kinds of nuts came



Our cooking habits often reflect our ethnic heritage.



Alcohol may be consumed by adults in moderation and with meals, but consumption should be avoided during pregnancy and whenever it would put the individual or others at risk.

**Figure 2.6** The traditional healthy Latin American Diet Pyramid. A variety of diet pyramids have been developed by Oldways Preservation & Exchange Trust. These pyramids reflect the typical diets of rural peoples in the region—in this case Latin America. Text accompanying the Latin American Pyramid, as is true for the other Oldways ethnic pyramids, states that alcohol may be consumed with meals, but consumption should be avoided during pregnancy and whenever it would put the individual or others at risk. As you will notice throughout this Nutrition Issue, all pyramids developed by governmental or private organizations always have fruits, vegetables, and grains at the base. The Latin American Diet Pyramid then adds nuts and beans to this base; other pyramids also slightly alter the base.  
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soon afterward. The Spanish also introduced beef, lamb, and chicken. Native inhabitants had previously eaten mostly fish and wild game. Spices such as cinnamon, black pepper, cloves, thyme, marjoram, and bay leaves were introduced and became part of the cuisine.

Mexican cuisine today shows regional variety. In southern Mexico, savory sauces and stews and corn tortillas reflect the native heritage. The Gulf states are renowned for delicious seafood dishes prepared with tomatoes, herbs, and olives, whereas Yucatan cuisine follows Mayan tradition, with such specialties as wild turkey and fish flavored with lime juice. Fresh produce adds color, flavor, and nutrition to authentic Mexican dining. Markets in the United States are beginning to offer some of these plant foods, such as chayote, squash, jicama root, plantains, and cactus leaves and fruit. Traditional Mexican cooking is healthful in that it is high in complex carbohydrates, beans, fruits, and vegetables, particularly those rich in vitamins A and C. This pattern is reflected in the Latin American Diet Pyramid issued by Oldways Preservation & Exchange Trust in 1996 (Fig. 2.6). For more information on this and other ethnic diet pyramids, see the website [www.oldwayspf.org](http://www.oldwayspf.org). Today, true Mexican cooking bears little resemblance to the dishes usually found in "Mexican" restaurants in North America. Usually it is neither oily nor heavy and is based primarily on rice and beans. Restaurant Mexican food tends to use larger portions of meat, as well as adding portions of high-fat sour cream, guacamole, and cheese to many dishes.

*continued*

## Northern European North Americans

Immigrants from Western Europe are responsible for the “meat-and-potatoes” presentation of traditional North American home cooking. The first large group of settlers from Europe—the English, French, and Germans—brought their traditional foodways with them. As all cooks and cultures must do, these immigrants adapted to the foods available in the regions in which they settled. Native North Americans shared foods, which are now staples of the North American diet: corn and corn products, such as popcorn and hominy; some kinds of squash; and tomatoes.

However, because the immigrants often settled in regions of the “new land” that most closely resembled their homes in Europe, they were able to grow many familiar foods and retain many of their traditional foodways. One of these foodways involved the way food is presented.

A sizable portion of meat arranged with vegetables and potatoes in separate portions on a plate is the Northern European pattern, compared with other cuisines in which a mixture of starch, vegetables, and a much smaller portion of protein (such as a stir-fry) is more typical. The meat on the “North American” dinner plate may be, for example, sausage or roast beef, the potatoes may be boiled or mashed, and the vegetable may be sauerkraut or green peas. Whatever the choices, the Northern European pattern is still followed by many in North America.

This traditional pattern provides abundant protein and nutrients from dairy and meat products. However, the protein also contains saturated fat, and the large portions of protein and starch may mean that insufficient amounts of whole grains, vegetables, and fruits are eaten.

## African North Americans

Involuntary immigrants to the New World, people from West Africa struggled to survive under harsh conditions. Their ability to adapt familiar foodways to new conditions became a lasting influence on today’s North American cuisine.

The “soul food” of African North Americans is the basis of the regional cuisines of the southern United States. Many understand “soul food” to consist mainly of barbecued meat, fried chicken, sweet potatoes, and chitterlings. In fact, true soul food includes a wide range of dishes. African North Americans used traditional methods and foods brought from their homelands, such as yams, okra, and peanuts, as well as what was available in the New World. African North American women, cooking for their families, created dishes that they often adapted for the plantation owner’s table as well, creating the basis of Southern cuisine. The combination of these foodways with Native North American, Spanish, and French traditions produced the Cajun and Creole cuisines enjoyed today in Louisiana and throughout the nation.

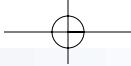
Pork and corn products were the basis of soul food. The plantation owner ate the better parts of the pig. As with other foods, slaves learned to make the less desirable parts of the pig, such as entrails, feet, ears, and head, palatable. Corn was ground for corn bread. Unrefined yellow cornmeal was mixed with water and lard to make “hoecake,” baked on a hoe blade by cooks who had neither ovens nor cooking utensils for their own use. The plantation owner probably ate white cornbread made from refined cornmeal.

Among other dishes still considered soul food staples are greens, usually cooked with a small portion of smoked pork. The greens used include collards, mustard, turnip, or dandelion greens, and kale. Black-eyed peas, first brought to the New World by slaves, are also cooked with pork. Sweet potatoes and yams were and remain basic soul foods; sweet potato pie is the soul food equivalent of pumpkin pie.

Today’s traditional African North American cuisine has both nutritional benefits and deficits. The variety of fruits, vegetables, and grain products used provides ample vitamins, minerals, and dietary fiber. For instance, African North Americans in general consume more cruciferous vegetables, and fruits and vegetables containing vitamins A and C than do other ethnic groups in North America. However, cured pork products contribute undesirable levels of salt as well as saturated fat. Traditional reliance on frying, especially with lard, also adds saturated fat to the diet. Boiling vegetables for long periods depletes water-soluble vitamins. Dairy products may not be used enough, especially by older people who follow traditional dietary customs. This avoidance



Black-eyed peas are one African contribution to the North American diet.



is based in part on the difficulty many African North American adults experience in digesting lactose; see Chapter 4 for details.

To help guide African North Americans toward a health food plan, Hebni Nutrition Consultants has developed a Soul Food Pyramid. It differs from the Food Guide Pyramid primarily by emphasizing lactose-reduced dairy products in the milk, yogurt, and cheese group and placing very-high-fat meats, such as bacon and sausage, in the fats, oils, and sweets category. To obtain a copy of the Soul Food Pyramid, call/fax 407-345-7999.

## Asian North Americans

Okinawa, an island southwest of Japan, boasts some of the oldest, healthiest people in the world. Their diet of fresh vegetables, minimal amounts of meat (mainly pork and fish), and moderate fat (lower than North American diets but higher than traditional Japanese fare) has influenced the eating habits of Japan and North America alike. Studies show that the Okinawan diet of more fresh versus pickled vegetables, more fish and fiber, less salt, and a little more fat than traditional Japanese cuisine has protected them from premature death from problems such as cardiovascular disease. Since this discovery, the Japanese diet has become more like that of the Okinawans.

This idea of large portions of vegetables and grains, and small portions of meat, is becoming known in North America, but people are having difficulty complying with this more disciplined way of eating. Also influenced by Japanese cuisine is the growing popularity of soy products, such as tofu, soy milk, and miso, as well as use of flavors such as soy sauce, cilantro, and ginger.

More than 200 different vegetables are used in Chinese cuisine; bok choy and other forms of Chinese cabbage are perhaps the most widely eaten vegetables in the world. In the southeastern coastal region of China, home of the Cantonese cuisine, the number of dishes may be as high as 50,000. Rice is the core of the diet in southern China, whereas, in the temperate North, wheat is used to make noodles (China is the original home of pasta), bread, and dumplings. Popular dishes include hot pots (stews containing many ingredients) and stir-fried mixtures of vegetables and small amounts of meat or fish cooked in a lightly oiled, very hot pan.

An Asian Diet Pyramid has been proposed to reflect the Asian dietary pattern (Fig. 2.7). Like the Latin American Diet Pyramid, the bulk of the diet consists of grains, fruits, vegetables, and plant sources of protein, such as legumes, nuts, and seeds.

The Asian Pyramid does fall short in calcium but otherwise can form the basis of a healthy diet. Overall, most attention should be paid to the bottom portion of whichever pyramid you choose, and if dairy products are not included on a daily basis, other rich sources of calcium should be sought (see Chapter 9 for options).

Chinese immigration to North America began with the California gold rush in the middle of the nineteenth century. Chinese workers brought with them food-preparation methods that tend to preserve nutrients, as well as a variety of sauces and seasonings, such as gingerroot, garlic, rice wine, scallions, and sesame seeds and oil. Although many of the traditional foodways have been preserved, North American restaurant versions of Chinese cuisine, whether Cantonese, Szechwan, or Mandarin, are usually not authentic. Chinese North American restaurant food is often prepared with far more fat than in true Chinese cooking, which tends to use flavorful but fat-free sauces and seasoning. The restaurant versions of Chinese dishes also contain much larger portions of protein.

## Italian North Americans

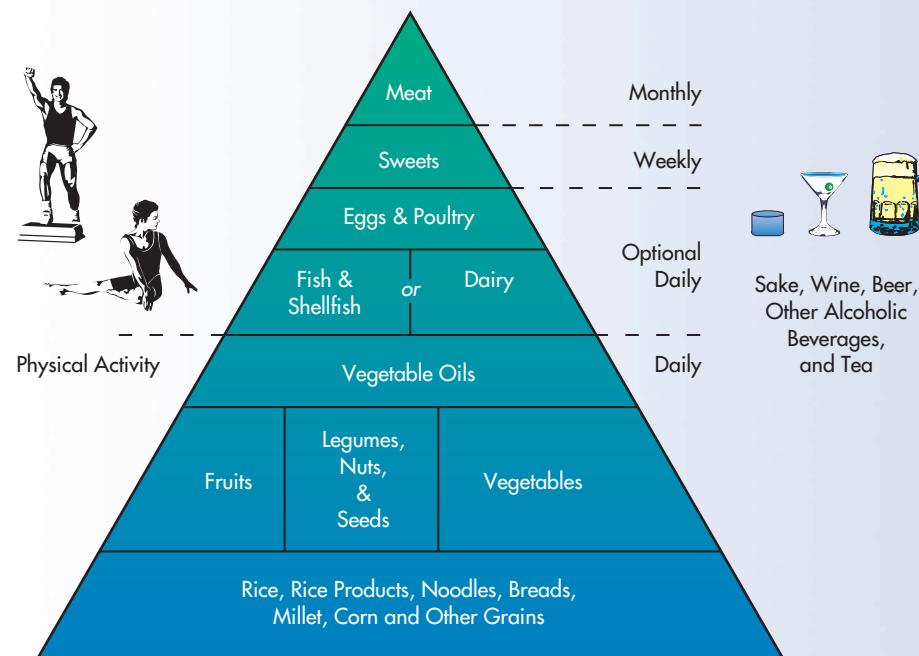
Authentic Italian cuisine, like Asian cuisine, is more diverse than most North American realize. Foods of different regions reflect Italy's varied geography and climate. Northern Italy, the more affluent part of the country, is the principal producer of meat and dairy products, such as butter and cheese. Rice dishes, such as risotto, are popular there. Fish is more important in regions near the sea, and lighter foods, such as fresh vegetables prepared with herbs, garlic, and olive oil, are characteristic. The poorer regions south of Rome, as well as the island of Sicily, have a diet rich in



Stir-fry is commonly used in Chinese cooking.

**T**wo issues addressed by various ethnic diet pyramids developed by Oldways Preservation & Exchange Trust but not specifically included as part of the Food Guide Pyramid diagram are physical activity and alcohol intake. The ethnic diet pyramids recommend daily physical activity. Alcohol may be consumed by adults in moderation with meals, but consumption should be avoided during pregnancy and whenever it would put the individual or others at risk. The booklet accompanying the Food Guide Pyramid does address alcohol intake, suggesting that adults have no more than one drink (women and all adults age 65 years and older) to two drinks (men) per day.

*continued*



**Figure 2.7** The Asian Diet Pyramid. This pyramid was inspired by the cuisines of South and East Asia, including such countries as China, Japan, South Korea, India, Thailand, Vietnam, Cambodia, Indonesia, Malaysia, Philippines, and other related Pacific Rim areas. If meat is consumed more often than monthly, it should be in small amounts. If dairy foods are consumed on a daily basis, they should be used in low to moderate amounts, and preferably low in fat. Grain products chosen should be minimally refined whenever possible.

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grains, vegetables, dried beans, and fish, with little meat or oil. Compared with northern Italians of the same class, southern Italians eat less beef, veal, chicken, and butter and more bread, pasta, vegetables, fruit, and fish.

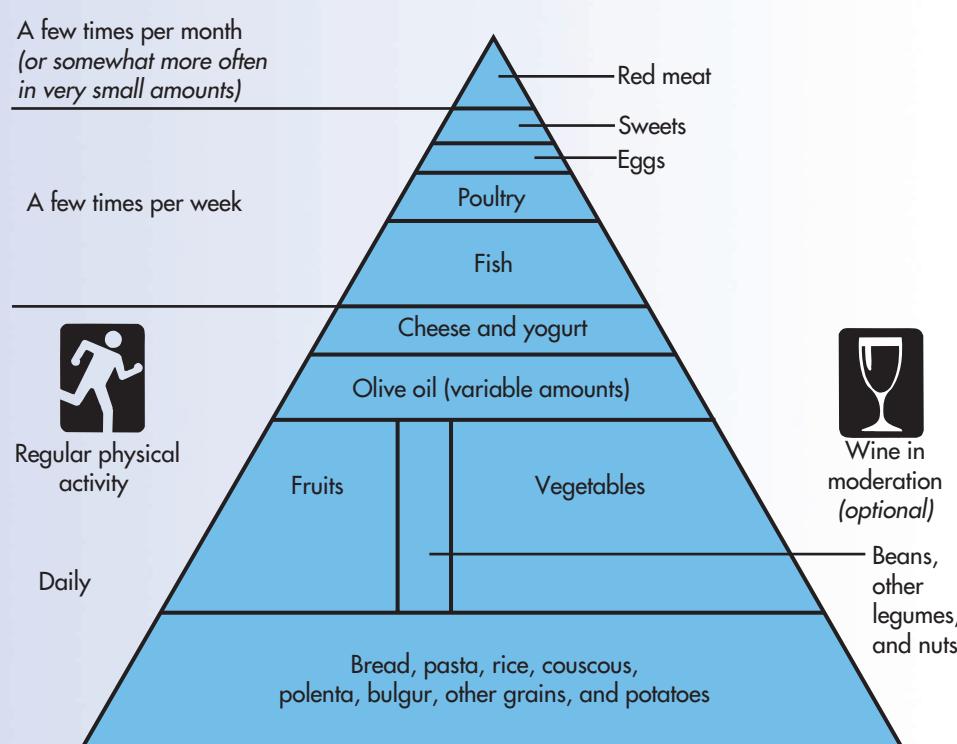
Pasta is the heart of the Italian diet. Italians eat six times more of this simple wheat and water product than do North Americans, although we have also learned to enjoy this nutritious dish. Pasta in North America, however, often means spaghetti, with a tomato-based sauce that includes meatballs or sausage. In contrast, Italians eat pasta in a variety of shapes and with a variety of sauces, often excluding meat.

Most of the Italian cuisine found in restaurants offers foods more common to the north of Italy, including veal, cheese, and cream and pesto sauces for pasta. Pizza, a southern Italian dish, is the exception, and it is fast becoming the most frequently consumed food in the United States. Pizza in this country is served on a variety of flour crusts topped with anything from high-fat meats, such as pepperoni, to vegetables or even fruit, combined with a variety of cheeses, tomatoes, and oregano for seasoning. Purists in Naples, however, insist that classic pizza consists only of a thin crust, tomato, basil, and mozzarella cheese.

Although some components of the Italian diet contain substantial amounts of saturated fat, nutritionists now know that other components, such as pasta, olive oil, and vegetables, contribute to healthy diets. One approach to Italian-American cuisine could be the Mediterranean Diet Pyramid (Fig. 2.8). This is a plan based on food choices like those traditionally found in the simple cuisines of Greece and southern Italy. The Mediterranean Diet Pyramid allows up to 35% of total calories as fat in the diet. However, it recommends consuming the type of fat consumed in the Mediterranean region: olive oil. A cheaper version, which has a similar fat profile and health benefit, is canola oil (see Chapter 5 for details).



Olive oil is a principal fat source in the Mediterranean diet. Canola oil offers a similar monounsaturated fat composition at a lower price.



**Figure 2.8** The traditional healthy Mediterranean Diet Pyramid. This plan is based on long-standing eating habits in southern Italy, Crete, and Greece. The base of the diet is bread and grains, fruits and vegetables, and beans and potatoes. Red meat is consumed sparingly—moderate amounts of fish and poultry are preferred. Most of the fat in this plan comes from olive oil. Cheese and yogurt supply some calcium. Other low-fat and nonfat milk products also can be included, if desired.

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## Jewish North Americans

Although Jewish immigrants arrive from all over the world, the two predominant groups are the Ashkenazic Jews, from Eastern European countries such as Russia, Germany, Poland, and Romania and from South Africa; and the Sephardic Jews from Spain, Portugal, and North Africa. Religious laws influence the dietary practices of some Jews. These Jewish laws dictate the separation of meat and milk products in a meal as well as in pots and pans used for cooking. In addition, it is important for meat to be completely drained of blood. To be sure that food laws are followed in processing, foods are labeled "kosher," meaning that a rabbi has approved food handling. Today, however, many discontinue such practices, especially as they become more integrated into the United States.

Common foods for Ashkenazic Jews include dark rye bread, borscht, and herring. The Sephardic Jews eat foods that are also common in the Middle East, such as eggplant, humus, tahini, and couscous. Many of these foods have become popular in North American cuisine, including rye bread, bagels with cream cheese, corned beef, and pastrami. In Israel the food practices are similar to that of the Sephardic Jews, who traditionally ate only small amounts of meat due to economic constraints. The Ashkenazic diet is traditionally higher in fat and salt due to the consumption of foods such as high-fat meats, chicken fat, chopped liver, cream cheese, corned beef, smoked fish, sauerkraut, and pickles. Clearly, foodways of each group of Jewish immigrants have been preserved. Some are beneficial to health, while others should be practiced only occasionally.

*continued*

**Table 2.12** The World's Fare Has Influenced the North American Diet

Diet	Advantages	Shortcomings
Native North American	Variety of seafood, lean wild game; early Native Americans ate many types of vegetables, berries, leaves	High fat content of some meat/seafood; low in calcium
Hispanic North American	Excellent variety of vegetables, legumes, fruits; high in dietary fiber	Traditional Hispanic diet may fall short in calcium; Mexican-American restaurants serve much high-fat fare, rich in sour cream, cheese, and guacamole
Northern European North American	Abundant sources of protein, iron, calcium from meat and dairy groups	Less variety from vegetables, fruits, legumes; high in fat
African North American	Good variety of vegetables; high dietary fiber; many variations, including Cajun and Creole dishes	Traditional meals high in fat; may fall short in calcium
Asian North American	Excellent variety of vegetables, grains; cooking methods retain nutrients in foods	Some sauces high in salt and fat; may fall short in calcium
Italian North American	Varies regionally—some regions provide excellent variety of seafood; overall high grain intake, good vegetable and fruity variety.	Italian-American restaurants often serve many foods made with high-fat cheese, sauces, and meats, likely low in calcium
Jewish North American	Good variety of whole-grain products, legumes, and some types of seafood. Many traditions regarding food as an important part of Jewish culture have been retained.	Traditional Jewish foods are often high in saturated fat and salt. Limited variety from vegetables and fruits; may fall short on calcium.

This is a brief summary of healthful attributes and shortcomings of the ethnic influences covered in this Nutrition Issue.

## Ethnic Diets and Present Trends

Only seven ethnic diets have been described here; see Table 2.12 for a summary of their advantages and disadvantages. Many other cuisines have also influenced the North American diet, and new arrivals continue to bring their traditions and foodways to this country. For example, social upheavals have increased the immigration of Russians and other Eastern European peoples to North America. On the other side of the world, continuing unrest in Southeast Asia has brought peoples from that area here. Restaurants serving traditional Russian or Thai fare, for instance, are offering new foodways to those willing to experiment.

Based on research also begun many years ago, still other scientists suggest that a healthful diet consists of the inexpensive traditional dishes based on grains, fruits, and vegetables that form the backbone of a number of ethnic cuisines. These are precisely the dishes that people abandon as they become affluent and seek convenience. Simple foods prepared in simple ways have fed most of humanity for virtually its entire existence. As we begin a new century, some North Americans are rediscovering the simple foods of their respective pasts, learning to enjoy a variety of cuisines and finding out how each cuisine can contribute to a healthier North American diet.