



CHAPTER 12

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Food-Nutrient Delivery: Planning the Diet with Cultural Competency

KEY TERMS

adequate intake (AI)
daily reference intake (DRI)
daily reference values (DRVs)
daily value (DV)
Dietary Guidelines for Americans (DGA)
dietary reference intake (DRI)
estimated average requirement (EAR)
estimated safe and adequate daily dietary intake (ESADDI)
flexitarian
food insecurity

functional food
health claim
Healthy Eating Index (HEI)
locovore
MyPyramid Food Guidance System
nutrition facts label
phytochemicals
recommended dietary allowance (RDA)
reference daily intakes (RDIs)
tolerable upper intake level (UL)
vegan

An appropriate diet is adequate and balanced and considers the individual's characteristics such as age and stage of development, taste preferences, and food habits. It also reflects the availability of foods, socioeconomic conditions, cultural practices and family traditions, storage and preparation facilities, and cooking skills. An adequate and balanced diet meets all the nutritional needs of an individual for maintenance, repair, living processes, growth, and development. It includes energy and all nutrients in proper amounts and in proportion to each other. The presence or absence of one essential nutrient may affect the availability, absorption, metabolism, or dietary need for others. The recognition of nutrient interrelationships provides further support for the principle of maintaining food variety to provide the most complete diet.

Dietitians translate food, nutrition, and health information into food choices and diet patterns for groups and individuals. With increasing knowledge of how diet influences diseases that lead to premature disability and mortality among Americans, an appropriate diet helps reduce the risk

of developing chronic diseases and conditions. In this era of vastly expanding scientific knowledge, food intake messages for health promotion and disease prevention change rapidly. The public often hears references to functional food ingredients, which provide more benefits than just basic nutrition.

DETERMINING NUTRIENT NEEDS

According to the Food and Nutrition Board, choosing a variety of foods should provide adequate amounts of nutrients. A varied diet may also ensure that a person is consuming sufficient amounts of **functional food** constituents that, although not defined as nutrients, have biologic effects and may influence health and susceptibility to disease. Examples include foods containing dietary fiber and carotenoids, as well as lesser known **phytochemicals** (components of plants that have protective or disease-preventive properties) such as isothiocyanates in broccoli or other cruciferous vegetables and lycopene in tomato products (see Chapter 20).

WORLDWIDE GUIDELINES

Numerous standards serve as guides for planning and evaluating diets and food supplies for individuals and population groups. The Food and Agriculture Organization and the World Health Organization of the United Nations have established international standards in many areas of food quality and safety, as well as dietary and nutrient recommendations. In the United States the Food and Nutrition Board (FNB) of the Institute of Medicine (IOM) has led the development of nutrient recommendations since the 1940s. Since the mid-1990s, nutrient recommendations developed by the FNB have been used by the United States and Canada.

The U.S. Department of Agriculture (USDA) and U.S. Department Health and Human Services (USDHHS) have a shared responsibility for issuing dietary recommendations, collecting and analyzing food composition data, and formulating regulations for nutrition information on food products. Health Canada is the agency responsible for Canadian dietary recommendations; in Australia, the guidelines are available through the National Health and Medical Research Council. The Japan Dietetic Association updates their guidelines every four years, the latest designed as the “Spinning Top” from the Ministry of Health, Labor and Welfare. Indeed, many countries have issued guidelines appropriate for the circumstances and needs of their populations.

Dietary Reference Intakes

American standards for nutrient requirements have been the recommended dietary allowances (RDAs) established by the FNB of the IOM. They were first published in 1941 and most recently revised between 1997 and 2002. Each revision incorporates the most recent research findings. In 1993 the FNB developed a framework for the development of nutrient recommendations, called **dietary reference intakes (DRI)**. Nutrition and health professionals should always use updated food composition databases and tables and inquire whether data used in computerized nutrient analysis programs have been revised to include the most up-to-date information. An interactive DRI calculator is available at <http://fnic.nal.usda.gov/interactiveDRI/>.

Estimated Safe and Adequate Daily Dietary Intakes

Numerous nutrients are known to be essential for life and health, but data for some are insufficient to establish a recommended intake. Intakes for these nutrients are **estimated safe and adequate daily dietary intakes (ESADDIs)**. Most intakes are shown as ranges to indicate that not only are specific recommendations not known, but also at least the upper and lower limits of safety should be observed.

DRI Components

The DRI model expands the previous RDA, which focused only on levels of nutrients for healthy populations to prevent deficiency diseases. To respond to scientific advances in diet and health throughout the life cycle, the DRI model now includes four reference points: adequate intake (AI),

estimated average intake (EAR), RDA, and tolerable upper intake level (UL).

The **adequate intake (AI)** is a nutrient recommendation based on observed or experimentally determined approximation of nutrient intake by a group (or groups) of healthy people when sufficient scientific evidence is not available to calculate an RDA or an EAR. Some key nutrients are expressed as an AI, including calcium (see Chapter 3). The **estimated average requirement (EAR)** is the average requirement of a nutrient for healthy individuals; a functional or clinical assessment has been conducted, and measures of adequacy have been determined. An EAR is the amount of a nutrient with which approximately one half of individuals would have their needs met and one half would not. The EAR should be used for assessing the nutrient adequacy of populations, but not for individuals.

The **recommended dietary allowance (RDA)** presents the amount of a nutrient needed to meet the requirements of almost all (97% to 98%) of the healthy population of individuals for whom it was developed. An RDA for a nutrient should serve as a goal for intake for individuals, not as a benchmark for adequacy of diets of populations. Finally the **tolerable upper intake level (UL)** was established for many nutrients to reduce the risk of adverse or toxic effects from consumption of nutrients in concentrated forms—either alone or combined with others (not in food)—or from enrichment and fortification. A UL is the highest level of daily nutrient intake that is unlikely to have any adverse health effects on almost all individuals in the general population. The DRIs for the macronutrients, vitamins and minerals, including the ULs are presented on the inside front cover and opening page of this text. The acceptable macronutrient distribution ranges are based on energy intake by age and sex. See Table 12-1 and the DRI tables on the inside front cover of this text.

Target Population

Each of the nutrient recommendation categories in the DRI system is used for specific purposes among individuals or populations. The EAR is used for evaluating the nutrient intake of populations. The AI and RDA can be used for individuals. Nutrient intakes between the RDA and the UL may further define intakes that may promote health or prevent disease in the individual.

Age and Gender Groups

Because nutrient needs are highly individualized depending on age, sexual development, and the reproductive status of females, the DRI framework has 10 age groupings, including age-group categories for children, men and women 51 to 70 years of age, and those older than 70 years of age. It separates three age-group categories each for pregnancy and lactation—younger than 18 years, 19 to 30 years, and 31 to 50 years of age.

Reference Men and Women

The requirement for many nutrients is based on body weight, according to reference men and women of

TABLE 12-1

Acceptable Macronutrient Distribution Ranges

Nutrient	AMDR (Percentage of Energy as kcal/day)			AMDR Sample Diet Adult, 2000-kcal/day Diet	
	1-3 Years	4-18 Years	>19 Years	% Reference*	g/Day
Protein [†]	5-20	10-30	10-30	10	50
Carbohydrate	45-65	45-65	45-65	60	300
Fat	30-40	25-35	20-35	30	67
α -Linolenic acid (<i>n</i> -3) [‡]	0.6-1.2	0.6-1.2	0.6-1.2	0.8	1.8
Linolenic acid (<i>n</i> -6)	5-10	5-10	5-10	7	16
Added sugars [§]	≤25% of total calories			500	125

Modified from Food and Nutrition Board, Institute of Medicine: Dietary reference intakes for energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein, and amino acids, Washington DC, 2002, National Academies Press.

AMDR, Acceptable macronutrient distribution range; DHA, docosahexaenoic acid; DRI, dietary reference intake; EPA, eicosapentaenoic acid.

*Suggested maximum.

[†]Higher number in protein AMDR is set to complement AMDRs for carbohydrate and fat, not because it is a recommended upper limit in the range of calories from protein.

[‡]Up to 10% of the AMDR for α -linolenic acid can be consumed as EPA, DHA, or both (0.06%-0.12% of calories).

[§]Reference percentages chosen based on average DRI for protein for adult men and women, then calculated back to percentage of calories. Carbohydrate and fat percentages chosen based on difference from protein and balanced with other federal dietary recommendations.

designated height and weight. These values for age-sex groups of individuals older than 19 years of age are based on actual medians obtained for the American population by the third National Health and Nutrition Examination Survey, 1988 to 1994. Although this does not necessarily imply that these weight-for-height values are ideal, at least they make it possible to define recommended allowances appropriate for the largest number of people.

NUTRITIONAL STATUS OF AMERICANS

Food and Nutrient Intake Data

Information about the diet and nutritional status of Americans and the relationship between diet and health is collected by 22 federal agencies. This effort is coordinated by the USDA and USDHHS through the National Nutrition Monitoring and Related Research Program, (See Chapter 10). Overall, analysis of the American diet shows that the population is slowly changing eating patterns and adopting more healthy diets. Intake of total fat, saturated fatty acids, and cholesterol has decreased in some segments of the population; servings of fruits and vegetables have risen to four per day. Hospitals have even taken on the challenge for healthier food intake (see *Focus On: The "Healthy Food In Health Care" Pledge*).

Unfortunately, gaps still exist between actual consumption and government recommendations in certain population subgroups. Nutrition-related health measurements indicate that overweight and obesity are increasing from lack of physical activity. Hypertension remains a major public health problem in middle-age and older adults and

in non-Hispanic blacks in whom it increases the risk of stroke and coronary heart disease. Osteoporosis develops more often among non-Hispanic whites than non-Hispanic blacks. Finally, in spite of available choices, many Americans experience **food insecurity**, meaning that they lack access to adequate and safe food for an active, healthy life. Table 12-2 provides a list of food components and public health concerns related to those components.

Healthy Eating Index

The Center for Nutrition Policy and Promotion of the USDA releases the **Healthy Eating Index (HEI)** to measure how well people's diets conform to recommended healthy eating patterns. The index provides a picture of foods people are eating, the amount of variety in their diets, and compliance with specific recommendations in the Dietary Guidelines for Americans (DGA). The HEI is designed to assess and monitor the dietary status of Americans by evaluating 10 components, each representing different aspects of a healthy diet. The dietary components used in the evaluation include grains, vegetables, fruits, milk, meat, total fat, saturated fat, cholesterol, sodium, and variety. Data from the HEI over time show that Americans are reducing total and saturated fat and eating a wider variety of foods. The 2005 report suggests that milk intake is still low (Guenther et al., 2008). The overall HEI score ranges from 0 to 100. Interestingly, women generally have scores higher than men, and toddlers have the highest scores.

Nutrition Monitoring Report

At the request of the USDHHS and USDA, the Expert Panel on Nutrition Monitoring was established by the Life Sciences Research Office of the Federation of American

FOCUS ON

The “Healthy Food in Health Care” Pledge

Health care facilities across the nation have recognized that their systems of purchasing, producing and distributing food are misaligned with the U.S. dietary guidelines and have joined a movement to change their practices. The organization promoting this plan is called “Health Care Without Harm.” In 2009, The American Medical Association (AMA) approved a new policy resolution in support of practices and policies within health care systems that promote and model a healthy and ecologically sustainable food system. The resolution also calls on the AMA to work with health care and public health organizations to educate the health care community and the public about the importance of healthy and ecologically sustainable food systems. Hospitals are using the online pledge form to commit to these eight steps:

1. Work to source locally (see *Focus On*: What is a Locovore?).
2. Encourage vendors to supply foods without harmful chemicals and antibiotics and to support the health of farmers and the environment.
3. Implement a program to adopt sustainable food procurement.
4. Communicate to group purchasing organizations a desire to source locally and to source foods that do not contain harmful chemicals.
5. Educate patients and the community about nutritious, socially just, and ecologically sustainable food practices and procedures.
6. Minimize or beneficially reuse food waste and support the use of food packaging that is ecologically protective.
7. Develop a program to promote and source from producers and processors that uphold the dignity of family, farmers, and their communities, and support humane and sustainable agriculture systems.
8. Report annually.

Health Care without Harm. Accessed 24 May 2010 from <http://www.noharm.org>.

Societies for Experimental Biology to review the dietary and nutritional status of the American population. In general, the committee concluded that the food supply in the United States is abundant, although some people may not receive enough nutrients for various reasons. Nutrient intakes are most likely to be low in persons living below the poverty level. Intakes of nutrients reported to be low in the general population are even lower in the poverty group. Chapter 10 describes this report more fully.

NATIONAL GUIDELINES FOR DIET PLANNING

Eating can be one of life’s greatest pleasures. People eat for enjoyment and to obtain energy and nutrients. Although many genetic, environmental, behavioral, and cultural factors affect health, diet is equally important for promoting health and preventing disease. Yet within the past 40 years, attention has been focused increasingly on the relationship of nutrition to chronic diseases and conditions. Although this interest derives somewhat from the rapid increase in number of older adults and their longevity, it is also prompted by the desire to prevent premature deaths from diseases such as coronary heart disease, diabetes mellitus, and cancer. Approximately two thirds of deaths in the United States are caused by chronic disease.

Current Dietary Guidance

In 1969 President Nixon convened the White House Conference on Nutrition and Health (AJCN, 1969). Increased attention was being given to prevention of hunger and disease. The development of dietary guidelines in the United States is discussed in Chapter 10. Guidelines directed toward prevention of a particular disease, such as those from the National Cancer Institute; the American Diabetes Association; the American Heart Association; and the National Heart, Lung, and Blood Institute’s cholesterol education guidelines, contain recommendations unique to particular conditions. The American Dietetic Association supports a total diet approach, in which the overall pattern of food eaten, consumed in moderation with appropriate portion sizes and combined with regular physical activity, is key. Various guidelines that can be used by health counselors throughout the developed world are summarized in Box 12-1.

Implementing the Guidelines

The task of planning nutritious meals centers on including the essential nutrients in sufficient amounts as outlined in the newest DRIs, in addition to appropriate amounts of energy, protein, carbohydrate (including fiber and sugars), fat (especially saturated and *trans*-fats), cholesterol, and salt. Suggestions are included to help people meet the specifics of the recommendations. When specific numeric recommendations differ, they are presented as ranges.

To help people select an eating pattern that achieves specific health promotion or disease prevention objectives, nutritionists should assist individuals in making food choices (e.g., to reduce fat, to increase fiber). Although numerous federal agencies are involved in the issuance of dietary guidance, the USDA and USDHHS lead the effort. The **Dietary Guidelines for Americans (DGA)** were first published in 1980 and are revised every five years; the most recent guidelines were released in 2010 (Box 12-2). The DGA are designed to motivate consumers to change their eating and activity patterns by providing them with positive, simple messages. Using consumer research, the DGA develop messages that expand the influence of the dietary guidelines to encourage

TABLE 12-2

Food Components and Public Health Concerns

Food Component	Relevance to Public Health
Energy	The high prevalence of overweight indicates that an energy imbalance exists among Americans because of physical inactivity and underreporting of energy intake or food consumption in national surveys.
Total fat, saturated fat, and cholesterol	Intakes of fat, saturated fatty acids, and cholesterol among all age groups older than 2 years of age are above recommended levels. Cholesterol intakes are generally within the recommended range of 300 mg/dL or less.
Alcohol	Intake of alcohol is a public health concern because it displaces food sources of nutrients and has potential health consequences.
Iron and calcium	Low intakes of iron and calcium continue to be a public health concern, particularly among infants and females of childbearing age. Prevalence of iron deficiency anemia is higher among these groups than among other age and sex groups. Low calcium intake is a particular concern among adolescent girls and adult women in most racial and ethnic groups.
Sodium*	Sodium intake exceeds government recommendations of 2300 mg/day in most age and sex groups. Strategies to lower intake can be found at the Institute of Medicine website at http://www.iom.edu/Reports/2010/Strategies-to-Reduce-Sodium-Intake-in-the-United-States.aspx
Other nutrients at potential risk	Some population or age groups may consume insufficient amounts of total carbohydrate and carbohydrate constituents such as dietary fiber; protein; vitamin A; carotenoids; antioxidant vitamins C and E; folate, vitamins B ₆ and B ₁₂ ; magnesium, potassium, zinc, copper, selenium, phosphorus, and fluoride. Studies also suggest that vitamin D deficiency is very common.
Unbalanced Nutrients	Intakes of polyunsaturated and monounsaturated fatty acids, <i>trans</i> -fatty acids, and fat substitutes are often excessive.

*Recommended intake of 1500 mg or less in at-risk populations defined as African-Americans, people with hypertension, and anyone 40 years or older (IOM, 2004).

BOX 12-1

Universal Prescription for Health and Nutritional Fitness

- Adjust energy intake and exercise level to achieve and maintain appropriate body weight.
- Eat a wide variety of foods to ensure nutrient adequacy.
- Increase total carbohydrate intake, especially complex carbohydrates.
- Eat less total fat and less saturated fat.
- Eat more fiber-rich foods, including whole grains, fruits, and vegetables.
- Eat fewer high cholesterol foods.
- Limit or omit high-sodium foods.
- Reduce intake of concentrated sugars.
- Drink alcohol in moderation or not at all.
- Meet the recommendations for calcium, especially important for adolescents and women.
- Meet the recommendation for iron, especially for children, adolescents, and women of childbearing age.
- Limit protein to no more than twice the recommended dietary allowance.
- If using a daily multivitamin, choose dietary supplements that do not exceed the dietary reference intake.
- Drink fluoridated water.

consumers to adopt them and ultimately change their behaviors. The messages reach out to consumers' motivations, individual needs, and life goals, and can be used in education, counseling, and communications initiatives (USDA, 2005).

The **MyPyramid Food Guidance System**, shown in Figure 12-1, offers a method for determining appropriate patterns for daily food choices based on servings from the five major food groups. For comparison, see the Eating Well with Canada's Food Guide as shown in *Clinical Insight: Nutrition Recommendations for Canadians* and Figure 12-2.

FOOD AND NUTRIENT LABELING

To help consumers make choices between similar types of food products that can be incorporated into a healthy diet, the Food and Drug Administration (FDA) established a voluntary system of providing selected nutrient information on food labels. The regulatory framework for nutrition information on food labels was revised and updated by the USDA (which regulates meat and poultry products and eggs) and the FDA (which regulates all other foods) with enactment of the Nutrition Labeling and Education Act (NLEA) in 1990. The labels became mandatory in 1994.

Mandatory Nutrition Labeling

As a result of the NLEA, nutrition labels must appear on most foods except products that provide few nutrients (such as coffee and spices), restaurant foods, and ready-to-eat foods prepared on site, such as supermarket bakery and deli

BOX 12-2

The 2010 Dietary Guidelines for Americans—Focal Points

Unlike previous Dietary Guidelines, reduction of calories in general, and reduction of dietary components that most contribute these excess calories, such as solid fats, added sugars, and refined grains, is the underlying message.

The emphasis is placed more on dietary patterns instead of individual nutrients and food groups to enable diverse approaches to complying with the Dietary Guidelines.

Whenever possible, the goal should be to encourage consumption of whole, minimally processed foods as the source of nutrients. The following concepts form the basis of the 2010 Dietary Guidelines for Americans Committee report:

- Reduce calorie consumption.
- Shift food intake patterns to a more plant-based diet that emphasizes vegetables, cooked dry beans and peas, fruits, whole grains, and nuts and seeds.
- Reduce intake of foods containing added sugars, solid fats, refined grains, and sodium.
- Meet the Physical Activity Guidelines for Americans by reducing sedentary behavior and screen time, and increasing physical activity at school, work, and community.
- Prevent excessive maternal weight gain and obesity in young children through attention to breastfeeding, early advice to parents, changes in school food offerings and physical activity, and preventive measures from the White House Task Force on Obesity.

Accessed 24 May 2010 from <http://www.healthierus.gov/dietaryguidelines>.

items. Providing nutrition information on many raw foods is voluntary. However, the FDA and USDA have called for a voluntary point-of-purchase program in which nutrition information is available in most supermarkets. Nutrition information is provided through brochures or point-of-purchase posters for the 20 most popular fruits, vegetables, and fresh fish and the 45 major cuts of fresh meat and poultry.

Nutrition information for foods purchased in restaurants is widely available at the point of purchase or from Internet sites or toll-free numbers. New legislation may require chains with 20 or more locations to disclose on their menus or menu board the number of calories per menu item, with additional nutrition information including total calories and calories from fat, and amounts of fat, saturated fat, cholesterol, sodium, total carbohydrates, complex carbohydrates, sugars, dietary fiber, and protein available upon request.

Ready-to-eat unpackaged foods in delicatessens or supermarkets may provide nutrition information voluntarily. However, if nutrition claims are made, nutrition labeling is

 CLINICAL INSIGHT

Nutrition Recommendations for Canadians

The revision to Canada's Food Guide to Healthy Eating was released in 2007 and developed age- and gender-specific food intake patterns. These age- and gender-specific suggestions include 4 to 7 servings of vegetables and fruits, 3 to 7 servings of grain products, 2 to 3 servings of milk or milk alternatives, and 1 to 3 servings of meat or meat alternatives. Unlike MyPyramid in the United States, Canada's Eating Well with Canada's Food Guide contains four food groupings presented in a rainbow shape (Health Canada, 2007).

Tips include:

- Consume no more than 400–450 mg of caffeine per day.
- Eat at least one dark green and one orange vegetable each day.
- Make at least half of grain products consumed each day whole grain.
- Compare the Nutrition Facts table on food labels to choose products that contain less fat, saturated fat, *trans* fat, sugar, and sodium.
- Drink skim, 1% or 2% milk, or fortified soy beverages each day. Check the food label to see if the soy beverage is fortified with calcium and vitamin D.
- Include a small amount (30–45 mL [2–3 Tbsp]) of unsaturated fat each day to get the fat needed.
- Limit the intake of soft drinks, sports drinks, energy drinks, fruit drinks, punches, sweetened hot and cold beverages, and alcohol.
- Eat at least two Food Guide Servings of fish each week.
- Build 30–60 minutes of moderate physical activity into daily life for adults and at least 90 minutes a day for children and youth.

The Canadian Food Guide recognizes the cultural, spiritual, and physical importance of traditional Aboriginal foods as well as the role of nontraditional foods in contemporary diets, with a First Nations, Inuit, and Métis guide available. The guide is available in 12 languages.

Data from Health Canada: Eating well with Canada's food guide, Her Majesty the Queen in Right of Canada, represented by the Minister of Health Canada, 2007. Accessed 17 January 2010 from <http://www.hc-sc.gc.ca/fn-an/food-gu>.

required at the point of purchase. If a food makes the claim of being organic, it also must meet certain criteria and labeling requirements.

Standardized Serving Sizes on Food Label

Serving sizes of products are set by the government based on reference amounts commonly consumed. For example, a serving of milk is 8 oz, and a serving of salad dressing is

Anatomy of MyPyramid

One size doesn't fit all

USDA's new MyPyramid symbolizes a personalized approach to healthy eating and physical activity. The symbol has been designed to be simple. It has been developed to remind consumers to make healthy food choices and to be active every day. The different parts of the symbol are described below.

Activity

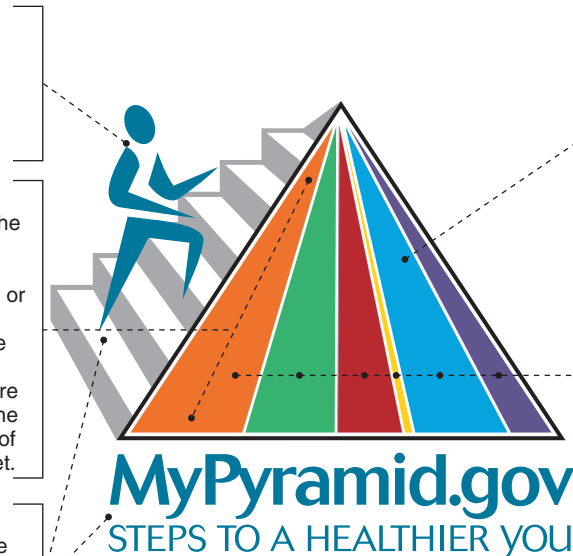
Activity is represented by the steps and the person climbing them, as a reminder of the importance of daily physical activity.

Moderation

Moderation is represented by the narrowing of each food group from bottom to top. The wider base stands for foods with little or no solid fats or added sugars. These should be selected more often. The narrower top area stands for foods containing more added sugars and solid fats. The more active you are, the more of these foods can fit into your diet.

Personalization

Personalization is shown by the person on the steps, the slogan, and the URL. Find the kinds and amounts of food to eat each day at MyPyramid.gov.



Proportionality

Proportionality is shown by the different widths of the food group bands. The widths suggest how much food a person should choose from each group. The widths are just a general guide, not exact proportions. Check the Web site for how much is right for you.

Variety

Variety is symbolized by the 6 color bands representing the 5 food groups of the Pyramid and oils. This illustrates that foods from all groups are needed each day for good health.

Gradual Improvement

Gradual improvement is encouraged by the slogan. It suggests that individuals can benefit from taking small steps to improve their diet and lifestyle each day.

For a 2,000-calorie diet, you need the amounts below from each food group. To find the amounts that are right for you, go to MyPyramid.gov.

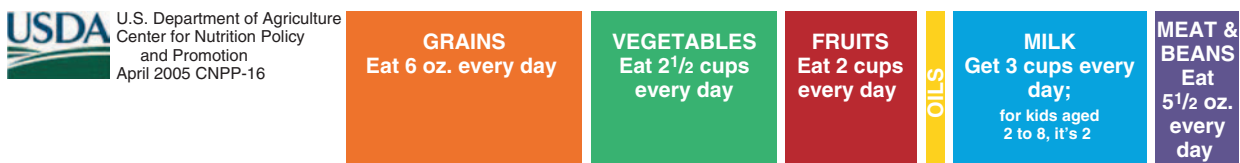


FIGURE 12-1 MyPyramid Food Guidance System adds physical activity for public awareness. (U.S. Department of Agriculture and U.S. Department of Health and Human Services. Accessed 22 May 2010 from <http://www.mypyramid.gov>.)

2 tbsp. Standardized serving sizes make it easier for consumers to compare the nutrient contents of similar products (Figure 12-3).

Nutrition Facts Label

The **nutrition facts label** on a food product provides information on its per-serving calories and calories from fat. The label must list the amount (in grams) of total fat, saturated fat, trans fat, cholesterol, sodium, total carbohydrate, dietary fiber, sugar, and protein. For most of these nutrients the label also shows the percentage of the **daily value (DV)** supplied by a serving, showing how a product fits into an overall diet by comparing its nutrient content with recommended intakes of those nutrients. DVs are not recommended intakes for individuals; they are simply reference points to provide some perspective on daily nutrient needs. DVs are based on a 2000-kcal diet. For example, individuals who consume diets supplying more or fewer calories can still use the DVs as a rough guide to ensure that they are getting

adequate amounts of vitamin C but not too much saturated fat.

The DVs exist for nutrients for which RDAs already exist (in which case they are known as **reference daily intakes [RDIs]**) (Table 12-3) and for which no RDAs exist (in which case they are known as **daily reference values [DRVs]**) [Table 12-4]). However, food labels use only the term *daily value*. RDIs provide a large margin of safety; in general, the RDI for a nutrient is greater than the RDA for a specific age-group. The term *RDI* replaces the term *U.S. RDAs* used on previous food labels. The previously mentioned nutrients must be listed on the food label.

As new DRIs are developed in various categories, labeling laws are updated. Figure 12-4 shows a sample nutrition facts label, and Box 12-3 provides tips for reading and understanding food labels. The FDA has a helpful website to assist consumers with reading labels (<http://www.fda.gov/Food/LabelingNutrition/ConsumerInformation/UCM078889.htm>).



FIGURE 12-2 Eating well with Canada's food guide. (Reprinted with permission from Health Canada. Data from Health Canada: *Eating well with Canada's food guide*, Her Majesty the Queen in Right of Canada, represented by the Minister of Healthy Canada, 2007. Accessed 22 May 2010 from www.bc-sc.gc.ca/fn-an/food-guide-aliment.

Make each Food Guide Serving count...
wherever you are – at home, at school, at work or when eating out!

- ▶ **Eat at least one dark green and one orange vegetable each day.**
 - Go for dark green vegetables such as broccoli, romaine lettuce and spinach.
 - Go for orange vegetables such as carrots, sweet potatoes and winter squash.
- ▶ **Choose vegetables and fruit prepared with little or no added fat, sugar or salt.**
 - Enjoy vegetables steamed, baked or stir-fried instead of deep-fried.
- ▶ **Have vegetables and fruit more often than juice.**

- ▶ **Make at least half of your grain products whole grain each day.**
 - Eat a variety of whole grains such as barley, brown rice, oats, quinoa and wild rice.
 - Enjoy whole grain breads, oatmeal or whole wheat pasta.
- ▶ **Choose grain products that are lower in fat, sugar or salt.**
 - Compare the Nutrition Facts table on labels to make wise choices.
 - Enjoy the true taste of grain products. When adding sauces or spreads, use small amounts.

- ▶ **Drink skim, 1%, or 2% milk each day.**
 - Have 500 mL (2 cups) of milk every day for adequate vitamin D.
 - Drink fortified soy beverages if you do not drink milk.
- ▶ **Select lower fat milk alternatives.**
 - Compare the Nutrition Facts table on yogurts or cheeses to make wise choices.

- ▶ **Have meat alternatives such as beans, lentils and tofu often.**
- ▶ **Eat at least two Food Guide Servings of fish each week.***
 - Choose fish such as charr, herring, mackerel, salmon, sardines and trout.
- ▶ **Select lean meat and alternatives prepared with little or no added fat or salt.**
 - Trim the visible fat from meats. Remove the skin on poultry.
 - Use cooking methods such as roasting, baking or poaching that require little or no added fat.
 - If you eat luncheon meats, sausages or prepackaged meats, choose those lower in salt (sodium) and fat.



* Health Canada provides advice for limiting exposure to mercury from certain types of fish. Refer to www.healthcanada.gc.ca for the latest information.

Advice for different ages and stages...

Children

Following Canada's Food Guide helps children grow and thrive.

Young children have small appetites and need calories for growth and development.

- Serve small nutritious meals and snacks each day.
- Do not restrict nutritious foods because of their fat content. Offer a variety of foods from the four food groups.
- Most of all... be a good role model.

Women of childbearing age

All women who could become pregnant and those who are pregnant or breastfeeding need a multivitamin containing **folic acid** every day. Pregnant women need to ensure that their multivitamin also contains **iron**. A health care professional can help you find the multivitamin that's right for you.

Pregnant and breastfeeding women need more calories. Include an extra 2 to 3 Food Guide Servings each day.

Here are two examples:

- Have fruit and yogurt for a snack, or
- Have an extra slice of toast at breakfast and an extra glass of milk at supper.

Men and women over 50

The need for **vitamin D** increases after the age of 50.

In addition to following Canada's Food Guide, everyone over the age of 50 should take a daily vitamin D supplement of 10 µg (400 IU).

Eat well and be active today and every day!

The benefits of eating well and being active include:

- Better overall health.
- Lower risk of disease.
- A healthy body weight.
- Feeling and looking better.
- More energy.
- Stronger muscles and bones.

Take a step today...

- ✓ Have breakfast every day. It may help control your hunger later in the day.
- ✓ Walk wherever you can – get off the bus early, use the stairs.
- ✓ Benefit from eating vegetables and fruit at all meals and as snacks.
- ✓ Spend less time being inactive such as watching TV or playing computer games.
- ✓ Request nutrition information about menu items when eating out to help you make healthier choices.
- ✓ Enjoy eating with family and friends!
- ✓ Take time to eat and savour every bite!

Be active

To be active every day is a step towards better health and a healthy body weight.

Canada's Physical Activity Guide recommends building 30 to 60 minutes of moderate physical activity into daily life for adults and at least 90 minutes a day for children and youth. You don't have to do it all at once. Add it up in periods of at least 10 minutes at a time for adults and five minutes at a time for children and youth.

Start slowly and build up.

Eat well

Another important step towards better health and a healthy body weight is to follow Canada's Food Guide by:

- Eating the recommended amount and type of food each day.
- Limiting foods and beverages high in calories, fat, sugar or salt (sodium) such as cakes and pastries, chocolate and candies, cookies and granola bars, doughnuts and muffins, ice cream and frozen desserts, french fries, potato chips, nachos and other salty snacks, alcohol, fruit flavoured drinks, soft drinks, sports and energy drinks, and sweetened hot or cold drinks.

How do I count Food Guide Servings in a meal?

Here is an example:

Vegetable and beef stir-fry with rice, a glass of milk and an apple for dessert	
250 mL (1 cup) mixed broccoli, carrot and sweet red pepper	= 2 Vegetables and Fruit Food Guide Servings
75 g (2 1/2 oz.) lean beef	= 1 Meat and Alternatives Food Guide Serving
250 mL (1 cup) brown rice	= 2 Grain Products Food Guide Servings
5 mL (1 tsp) canola oil	= part of your Oils and Fats intake for the day
250 mL (1 cup) 1% milk	= 1 Milk and Alternatives Food Guide Serving
1 apple	= 1 Vegetables and Fruit Food Guide Serving

Read the label

- Compare the Nutrition Facts table on food labels to choose products that contain less fat, saturated fat, trans fat, sugar and sodium.
- Keep in mind that the calories and nutrients listed are for the amount of food found at the top of the Nutrition Facts table.

Nutrition Facts

Amount	% Daily Value
<i>Per 10 mL (0 g)</i>	
Calories 0	
Fat 0 g	0 %
Saturated 0 g	0 %
+ Trans 0 g	
Cholesterol 0 mg	
Sodium 0 mg	0 %
Carbohydrate 0 g	0 %
Fibre 0 g	0 %
Sugars 0 g	
Protein 0 g	
Vitamin A 0 %	Vitamin C 0 %
Calcium 0 %	Iron 0 %

Limit trans fat

When a Nutrition Facts table is not available, ask for nutrition information to choose foods lower in trans and saturated fats.

For more information, interactive tools, or additional copies visit Canada's Food Guide on-line at:
www.healthcanada.gc.ca/foodguide

or contact:
 Publications
 Health Canada
 Ottawa, Ontario K1A 0K9
E-Mail: publications@hc-sc.gc.ca
Tel.: 1-866-225-0709
Fax: (613) 941-5366
TTY: 1-800-267-1245

Également disponible en français sous le titre:
 Bien manger avec le Guide alimentaire canadien

This publication can be made available on request on diskette, large print, audio-cassette and braille.

FIGURE 12-2, cont'd

Nutrition Facts
 Serving Size: About (20g)
 Servings Per Container: 16

	Amount Per Serving	%Daily Value*
Total Calories	60	
Calories From Fat	15	
Total Fat	2 g	3%
Saturated Fat	1 g	4%
Trans Fat	0 g	
Cholesterol	0 mg	0%
Sodium	45 mg	2%
Total Carbohydrates	15 g	5%
Dietary Fiber	4 g	17%
Sugars	4 g	
Sugar Alcohols (Polyols)	3 g	
Protein	2 g	
Vitamin A		0%
Vitamin C		0%
Calcium		2%
Iron		2%

*Percent Daily Values are based on a 2,000 calorie diet.

Ingredients: Wheat flour, unsweetened chocolate, erythritol, inulin, oat flour, cocoa power, evaporated cane juice, whey protein concentrate, corn starch (low glycemic), natural flavors, salt, baking soda, wheat gluten, guar gum

FIGURE 12-3 Standard food label showing serving size.

Nutrition Facts
 Serving Size 1 cup (228g)
 Servings Per Container 2

Amount Per Serving	% Daily Value*
Calories 250	Calories from Fat 110
Total Fat 12g	18%
Saturated Fat 3g	15%
Trans Fat 3g	
Cholesterol 30mg	10%
Sodium 470mg	20%
Potassium 700mg	20%
Total Carbohydrate 31g	10%
Dietary Fiber 0g	0%
Sugars 5g	
Protein 5g	
Vitamin A	4%
Vitamin C	2%
Calcium	20%
Iron	4%

* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.

	Calories: 2,000	2,500
Total Fat	Less than 65g	80g
Sat Fat	Less than 20g	25g
Cholesterol	Less than 300mg	300mg
Sodium	Less than 2,400mg	2,400mg
Total Carbohydrate	300g	375g
Dietary Fiber	25g	30g

FIGURE 12-4 Nutrition facts label information. (Source: U.S. Food and Drug Administration. Accessed 22 May 2010 from http://www.health.gov/dietaryguidelines/dga2005/healthieryou/html/tips_food_label.html.)

TABLE 12-3

Reference Daily Intakes

Nutrient	Amount
Vitamin A	5000 IU
Vitamin C	60 mg
Thiamin	1.5 mg
Riboflavin	1.7 mg
Niacin	20 mg
Calcium	1 g
Iron	18 mg
Vitamin D	400 IU
Vitamin E	30 IU
Vitamin B ₆	2 mg
Folic acid	0.4
Vitamin B ₁₂	6 mcg
Phosphorus	1 g
Iodine	150 mcg
Magnesium	400 mg
Zinc	15 mg
Copper	2 mg
Biotin	0.3 mg
Pantothenic acid	10 mg
Selenium	70 mcg

From Center for Food Safety & Applied Nutrition: A food labeling guide, College Park, Md, 1994, U.S. Department of Agriculture, revised 1999.

TABLE 12-4

Daily Reference Values

Food Component	DRV	Calculation
Fat	65 g	30% of kcal
Saturated fat	20 g	10% of kcal
Cholesterol	300 mg	Same regardless of kcal
Carbohydrates (total)	300 g	60% of calories
Fiber	25 g	11.5 g per 1000 kcal
Protein	50 g	10% of kcal
Sodium	2400 mg	Same regardless of kcal
Potassium	3500 mg	Same regardless of kcal

DRV, Daily reference value.

NOTE: The DRVs were established for adults and children over 4 years old. The values for energy yielding nutrients below are based on 2,000 calories per day.

BOX 12-3**Tips for Reading and Understanding Food Labels**

Interpret the Percent Daily Value.

- Nutrients with %DV of 5 or less are considered low.
- Nutrients with %DV of 10-19 or less are considered moderate or “good sources.”
- Nutrients with %DV of 20 or more are considered high or “rich sources.”

Prioritize nutrient needs and compare %DV levels accordingly. For example, if a consumer wishes to lower osteoporosis risk versus limiting sodium, a packaged food containing 25%DV calcium and 15%DV sodium may be considered a sensible food selection.

Note the calories per serving and the servings per container. Consider how the energy value of a specific food fits into the total energy intake “equation.” Be conscious of the portion size that is consumed and “do the math” as to how many servings per container that portion would be.

Be aware of specific nutrient content claims. As shown in Box 12-4, there are many nutrient content claims, but only specific ones may relate to personal health priorities. For example, if there is a positive family history for heart disease, the “low fat” nutrient claim of 3 grams or less per serving may serve as a useful guide during food selection.

Review the ingredient list. Ingredients are listed in order of prominence. Pay particular attention to the top five items listed. Ingredients that contain sugar often end in *-ose*. The term *hydrogenated* signals that processed, trans, or saturated fats may have been incorporated. Sodium-containing additives may be present in multiple forms. In an effort to lower the amount of heavily processed food consumed, look for ingredient lists containing more nutrient-dense food items and fewer additives.

Nutrient Content Claims

Nutrient content terms such as *reduced sodium*, *fat free*, *low calorie*, and *healthy* must now meet government definitions that apply to all foods (Box 12-4). For example, *lean* refers to a serving of meat, poultry, seafood, or game meat with less than 10 g of fat, less than 4 g of saturated fat, and less than 95 mg of cholesterol per serving or per 100 g. Extra lean meat or poultry contains less than 5 g of fat, less than 2 g of saturated fat, and the same cholesterol content as lean, per serving, or per 100 g of product.

Health Claims

A **health claim** is allowed only on appropriate food products that meet specified standards. The government requires that health claims be worded in ways that are not misleading (e.g., the claim cannot imply that the food product itself

helps prevent disease). Health claims cannot appear on foods that supply more than 20% of the DV for fat, saturated fat, cholesterol, and sodium. The following is an example of a health claim for dietary fiber and cancer: “Low-fat diets rich in fiber-containing grain products, fruits, and vegetables may reduce the risk of some types of cancer, a disease associated with many factors.” Box 12-5 lists health claims that manufacturers can use to describe food-disease relationships.

DIETARY PATTERNS AND COUNSELING TIPS**Vegetarian Diet Patterns**

Vegetarian diets are popular. Those who choose them may be motivated by philosophic, religious, or ecologic concerns, or by a desire to have a healthier lifestyle. Considerable evidence attests to the health benefits of a vegetarian diet. Studies of Seventh-Day Adventists indicate that the diet results in lower rates of type 2 diabetes, breast and colon cancer, and cardiovascular and gallbladder disease.

Of the millions of Americans who call themselves vegetarians, many eliminate “red” meats but eat fish, poultry, and dairy products. A lactovegetarian does not eat meat, fish, poultry, or eggs, but does consume milk, cheese, and other dairy products. A lactoovovegetarian also consumes eggs. A **vegan** does not eat any food of animal origin. The vegan diet is the only vegetarian diet that has any real risk of providing inadequate nutrition, but this risk can be avoided by careful planning (American Dietetic Association [ADA], 2009). A new type of semivegetarian is known as a **flexitarian**. Flexitarians generally adhere to a vegetarian diet for the purpose of good health and do not follow a specific ideology. They view an occasional meat meal as acceptable.

Vegetarian diets tend to be lower in iron than omnivorous diets, although the nonheme iron in fruits, vegetables, and unrefined cereals is usually accompanied either in the food or in the meal by large amounts of ascorbic acid that aids in iron assimilation. Vegetarians do not have a greater risk of iron deficiency than those who are not vegetarians (ADA, 2009). Vegetarians who consume no dairy products may have low calcium intakes, and vitamin D intakes may be inadequate among those in northern latitudes where there is less exposure to sunshine. The calcium in some vegetables is inactivated by the presence of oxalates. Although phytates in unrefined cereals also can inactivate calcium, this is not a problem for Western vegetarians, whose diets tend to be based more on fruits and vegetables than on the unrefined cereals of Middle Eastern cultures. Long-term vegans may develop megaloblastic anemia because of a deficiency of vitamin B₁₂, found only in foods of animal origin. The high levels of folate in vegan diets may mask the neurologic damage of a vitamin B₁₂ deficiency. Vegans should have a reliable source of vitamin B₁₂ such as fortified breakfast cereals, soy beverages, or a supplement. Although most vegetarians meet or exceed the requirements

BOX 12-4

Nutrient Content Claims

Free: *Free* means that a product contains no amount of, or only trivial or “physiologically inconsequential” amounts of, one or more of these components: fat, saturated fat, cholesterol, sodium, sugar, or calories. For example, *calorie-free* means the product contains fewer than 5 calories per serving, and *sugar-free* and *fat-free* both mean the product contains less than 0.5 g per serving. Synonyms for *free* include *without*, *no*, and *zero*. A synonym for fat-free milk is *skim*.

Low: *Low* can be used on foods that can be eaten frequently without exceeding dietary guidelines for one or more of these components: fat, saturated fat, cholesterol, sodium, and calories. Synonyms for low include *little*, *few*, *low source of*, and *contains a small amount of*.

- **Low fat:** 3 g or less per serving
- **Low saturated fat:** 1 g or less per serving
- **Low sodium:** 140 mg or less per serving
- **Very low sodium:** 35 mg or less per serving
- **Low cholesterol:** 20 mg or less and 2 g or less of saturated fat per serving
- **Low calorie:** 40 calories or less per serving

Lean and extra lean: *Lean* and *extra lean* can be used to describe the fat content of meat, poultry, seafood, and game meats.

Lean: less than 10 g fat, 4.5 g or less saturated fat, and less than 95 mg cholesterol per serving and per 100 g

Extra lean: less than 5 g fat, less than 2 g saturated fat, and less than 95 mg cholesterol per serving and per 100 g

Reduced: *Reduced* means that a nutritionally altered product contains at least 25% less of a nutrient or of calories than the regular, or reference, product. However, a *reduced* claim cannot be made on a product if its reference food already meets the requirement for a “low” claim.

Less: *Less* means that a food, whether altered or not, contains 25% less of a nutrient or of calories than the reference food. For example, pretzels that have 25% less fat than potato chips could carry a *less* claim. *Fewer* is an acceptable synonym.

Light: *Light* can mean two things:

- First, that a nutritionally altered product contains one-third fewer calories or half the fat of the reference food. If the food derives 50% or more of its calories from fat, the reduction must be 50% of the fat.
- Second, that the sodium content of a low-calorie, low-fat food has been reduced by 50%. In addition, *light in sodium* may be used on food in which the sodium content has been reduced by at least 50%.

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

High: *High* can be used if the food contains 20% or more of the daily value for a particular nutrient in a serving.

Good source: *Good source* means that one serving of a food contains 10% to 19% of the daily value for a particular nutrient.

More: *More* means that a serving of food, whether altered or not, contains a nutrient that is at least 10% of the daily value more than the reference food. The 10% of daily value also applies to *fortified*, *enriched*, *added*, *extra*, and *plus* claims, but in these cases the food must be altered.

Data from Food and Drug Administration. Accessed 18 January 2010 from <http://www.fda.gov/Food/GuidanceComplianceRegulatoryInformation/GuidanceDocuments/FoodLabelingNutrition/FoodLabelingGuide/default.htm>.

for protein, their diets tend to be lower in protein than those of omnivores. This lower intake may help vegetarians retain more calcium from their diets. Furthermore, lower protein intake usually results in lower dietary fat because many high-protein animal products are also rich in fat (ADA, 2009).

Well-planned vegetarian diets are safe for infants, children, and adolescents and can meet all of their nutritional requirements for growth. They are also adequate for pregnant and lactating females. The key is that the diets be well planned. Vegetarians should pay special attention to ensure that they get adequate calcium, iron, zinc, and vitamins B₁₂ and D. Calculated combinations of complementary protein sources is not necessary, especially if protein sources are reasonably varied. Table 12-5 highlights many of the phytochemicals and functional components rich in many

vegetable-based diets. A useful website on vegetarian meal planning is available at <http://www.eatright.org/> through the American Dietetic Association. See also *Focus On: The “Healthy Food In Health Care” Pledge* earlier in the chapter.

CULTURAL ASPECTS OF DIETARY PLANNING

To plan diets for individuals or groups that are appropriate from a health and nutrition perspective, it is important that registered dietitians and health providers use resources that are targeted to the specific client or group. Numerous population subgroups in the United States and throughout the world have specific cultural, ethnic, or religious beliefs and practices to consider. These groups have their own

BOX 12-5

Health Claims for Diet-Disease Relationships

(APPROVED CLAIM [MODEL CLAIM, STATEMENTS AND CLAIM REQUIREMENTS])

Calcium and Osteoporosis (Regular exercise and a healthy diet with enough calcium helps teens and young adult white and Asian women maintain good bone health and may reduce their high risk of osteoporosis later in life.)

Sodium and Hypertension (Diets low in sodium may reduce the risk of high blood pressure, a disease associated with many factors.)

Sodium and Hypertension (Diets low in sodium may reduce the risk of high blood pressure, a disease associated with many factors.)

Dietary Fat and Cancer (Development of cancer depends on many factors. A diet low in total fat may reduce the risk of some cancers.)

Dietary Saturated Fat and Cholesterol and Risk of Coronary Heart Disease (Although many factors affect heart disease, diets low in saturated fat and cholesterol may reduce the risk of this disease.)

Fiber-Containing Grain Products, Fruits, and Vegetables and Cancer (Low-fat diets rich in fiber-containing grain products, fruits, and vegetables may reduce the risk of some types of cancer, a disease associated with many factors.)

Fruits, Vegetables and Grain Products that contain Fiber, particularly Soluble Fiber, and Risk of Coronary Heart Disease (Diets low in saturated fat and cholesterol and rich in fruits, vegetables, and grain products that contain some types of dietary fiber, particularly soluble fiber, may reduce the risk of heart disease, a disease associated with many factors.)

Fruits and Vegetables and Cancer (Low-fat diets rich in fruits and vegetables [*foods that are low in fat and may contain dietary fiber, vitamin A, or vitamin C*] may reduce the risk of some types of cancer, a disease associated with many factors. Broccoli is high in vitamin A and C, and it is a good source of dietary fiber.)

Folate and Neural Tube Defects (Healthful diets with adequate folate may reduce a woman's risk of having a child with a brain or spinal cord defect.)

Dietary Noncariogenic Carbohydrate Sweeteners and Dental Caries (Full claim: Frequent between-meal consumption of foods high in sugars and starches promotes tooth decay. The sugar alcohols in [*name of food*] do not promote tooth decay; Shortened claim on small packages only: Does not promote tooth decay.)

Soluble Fiber from Certain Foods and Risk of Coronary Heart Disease (Soluble fiber from foods such as [*name of soluble fiber source, and, if desired, name of food product*], as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease. A serving of [*name of food product*] supplies __ grams of the [*necessary daily dietary intake for the benefit*] soluble fiber from [*name of soluble fiber source*] necessary per day to have this effect.)

Soy Protein and Risk of Coronary Heart Disease (1. 25 grams of soy protein a day, as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease. A serving of [*name of food*] supplies __ grams of soy protein. 2. Diets low in saturated fat and cholesterol that include 25 grams of soy protein a day may reduce the risk of heart disease. One serving of [*name of food*] provides __ grams of soy protein.)

Plant Sterol and Stanol Esters and Risk of Coronary Heart Disease (1. Foods containing at least 0.65 gram per of vegetable oil sterol esters, eaten twice a day with meals for a daily total intake of at least 1.3 grams, as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease. A serving of [*name of food*] supplies __ grams of vegetable oil sterol esters. 2. Diets low in saturated fat and cholesterol that include two servings of foods that provide a daily total of at least 3.4 grams of plant stanol esters in two meals may reduce the risk of heart disease. A serving of [*name of food*] supplies __ grams of plant stanol esters.)

Whole Grain Foods and Risk of Heart Disease and Certain Cancers (“Diets rich in whole grain foods and other plant foods and low in total fat, saturated fat, and cholesterol may reduce the risk of heart disease and some cancers.”)

Potassium and the Risk of High Blood Pressure and Stroke (“Diets containing foods that are a good source of potassium and that are low in sodium may reduce the risk of high blood pressure and stroke.”)

Fluoridated Water and Reduced Risk of Dental Caries (“Drinking fluoridated water may reduce the risk of [*dental caries or tooth decay*].”)

Saturated Fat, Cholesterol, and *Trans* Fat, and Reduced Risk of Heart Disease (“Diets low in saturated fat and cholesterol, and as low as possible in *trans* fat, may reduce the risk of heart disease.”)

Data from Food and Drug Administration. Accessed 18 January 2010 from <http://www.fda.gov/Food/GuidanceComplianceRegulatoryInformation/GuidanceDocuments/FoodLabelingNutrition/FoodLabelingGuide/ucm064919.htm>.

FOCUS ON

What is a Locovore?

There is a growing movement in the United States fueled by books like the *Omnivore's Dilemma* (Pollan et al., 2006). One component of this movement is a collaborative effort to build a more locally based, self-reliant food economy—one in which sustainable food production, processing, distribution, and consumption are integrated to enhance the economic, environmental, and social health of a particular place. **Locovores** are those who eat food grown or produced locally or within a certain radius. The locovore movement encourages consumers to buy from farmers' markets or even to produce their own food. They argue that locally produced food is fresher and more nutritious and uses less fossil fuel to grow and transport. Another component of this movement is the condemnation of the factory farming method of grain feeding animals. These operations are known as concentrated animal feeding operations. There is a growing demand for meat that is grass or range fed and not transported long distances.

set of dietary practices or beliefs, which are important when considering dietary planning (Diabetes Care and Education Dietetic Practice Group, 2010). The IOM report entitled *Unequal Treatment* recommends that all health care professionals receive training in cross-cultural communication to reduce ethnic and racial disparities in health care; indeed, cultural competence is central to professionalism and quality (Betancourt and Green, 2010).

Attitudes, rituals, and practices surrounding food are part of every culture in the world and there are so many cultures in the world that it defies enumeration. Many world cultures have influenced American cultures as a result of immigration and intermarriage. This makes planning a menu that embraces cultural diversity and is sensitive to the needs of a specific group of people a major challenge. It is tempting to simplify the role of culture by attempting to categorize dietary patterns by race, ethnicity, or religion. However, this type of generalizing can lead to inappropriate labeling and misunderstanding.

To illustrate this point, consider the case of Native Americans. There are more than 500 different tribes spread across all 50 states. The food and customs of the tribes in the Southwest are drastically different than those of the Northwest. When discussing traditional foods among Native

TABLE 12-5

Phytochemicals and Functional Components in Foods

Compound	Function	Food Sources
Carotenoids		
β -carotene	May neutralize free radicals that damage cells, boost antioxidant defenses	Carrots, dark orange fruits, butternut squash, cantaloupe
Lutein	Much discovered about its role in protecting the eyes from oxidation; also being investigated for potentially reducing the risk of colon, breast, lung, and skin cancer (www.luteininfo.com)	Deep green vegetables, kale, spinach, collards, corn, eggs, citrus
Lycopene	Protects prostate health by reducing risk of prostate cancer; may also aid in preserving bone health	Processed tomato products, guava, pink grapefruit, watermelon
Diallyl sulfides	Along with promoting heart health, boosts production of enzymes that benefit the immune system	Onions, garlic, scallions, leeks, chives
Ellagic acid	May block body's production of enzymes needed for tumor growth; causes cancer cell death in the test tube; functions as antioxidant; possible antiviral and antibacterial activities	Strawberries, raspberries, pomegranates, cranberries, walnuts
Flavonoids		
Anthocyanins	Most studied; may neutralize free radicals, bolster antioxidant defenses, especially at the DNA level; contributes to heart health and vision and brain function by reducing oxidation of LDL cholesterol	Berries, (especially dark-colored), cherries, red grapes
Lignans	Acting as phytoestrogens, may boost immune function and contribute to maintaining heart health; may also help block some hormone related cancers	Flax seed, rye, some vegetables

Continued

TABLE 12-5

Phytochemicals and Functional Components in Foods—cont'd

Compound	Function	Food Sources
Limonene	Boosts levels of naturally occurring liver enzymes involved in detoxification of carcinogens	Essential oils of citrus fruits and other plants
Phytic acid	May suppress oxidation reactions in the colon that produce free radicals; reduces rate of starch digestion and thus blood glycemic response; converted to related compounds in body involved in cellular communication; may be effective in slowing tumor growth	Wheat bran, flax seed, sesame seeds, beans and other high-fiber foods
Proanthocyanidins (condensed tannins or procyanidins)	The active component of cranberries that contributes to urinary tract health but may also have a role in heart health	Cranberries, cocoa, cinnamon, peanuts, wine, grapes, strawberries, peanut skins
Phenols	May boost antioxidant defense while maintaining healthy vision	Apples, pears, citrus fruits, parsley, carrots, broccoli, cabbage, cucumbers, squash, yams, tomatoes
Phytoestrogens	Genistein and daidzein; may contribute to healthy bones, brain function, and immune function; relationship of phytoestrogens and cancers is still being debated	Soybeans, soybean products
Plant stanols and sterols	May help bolster the benefits of a heart-healthy diet with exercise, thus reducing the risk of heart disease	Corn, soy, wheat, fortified foods, beverages, fortified table spreads, fortified chocolate, peanut oil
Prebiotics		
	Nondigestible food ingredients such as dietary fibers that provide food for gut bacteria to grow on; may improve gastrointestinal health and immune function; insulin and oligofructose are the most commonly studied prebiotics	Whole grains (especially oatmeal), flax and barley; greens; berries, bananas, and other fruits; legumes; onions, garlic, honey, leeks
Probiotics		
	Beneficial bacteria that improve gastrointestinal health and may improve calcium absorption	Yogurt (with active, live culture), kefir, buttermilk and other fermented dairy products; fermented vegetables such as kim chi and sauerkraut; and fermented soy products such as miso and tempeh
Organosulfuric compounds	Believed to fight cancer cell growth; may be useful in treating arthritic joints	Garlic, onions, chives, citrus fruits, broccoli, cabbage, cauliflower, Brussels sprouts

From Center for Food Safety & Applied Nutrition: A Food Labeling Guide, College Park, Md, 1994, U.S. Dept of Agriculture, revised 1999.
DNA, Deoxyribonucleic acid; LDL, low-density lipoprotein.

Americans, the situation is further complicated by the fact that many tribes were removed from their traditional lands by the U.S. government. Thus a Montana tribe that once depended on hunting bison and gathering local roots and berries may now be living in Oklahoma.

Another example of the complexity of diet and culture in the United State is that of African Americans. “Soul food” is commonly identified with African Americans from the

South. Traditional food choices include grits, collard greens prepared with ham hocks and lard, with a side of corn bread. But this by no means represents the diet of all African Americans. African Americans may be eating the foods of their homeland. An Ethiopian meal might consist of a vegetable stew served atop bread known as *injera*, whereas someone eating the food of Ghana would probably be eating a stew atop rice or yams.

When faced with planning a diet to meet the needs of an unfamiliar culture, it is important to avoid forming opinions that are based on inaccurate information or stereotyping (see Chapter 15). Some cultural food guides have even been developed for specific populations (Figure 12-5) for helping to manage disease conditions.

Religion and Food

Dietary practices have been a component of religious practice for all of recorded history. Some religions forbid the eating of certain foods and beverages; others restrict foods and drinks during holy days. Specific dietary rituals may be assigned to members with designated authority or with special spiritual power (e.g., medicine men, priests). Sometimes dietary rituals or restrictions are observed based on gender. Dietary and food preparation practices (e.g., halal and kosher meat preparation) can be associated with rituals of faith.

Fasting is practiced by many religions. It has been identified as a mechanism that allows one to improve one's body, to earn approval (as with Allah or Buddha), or to understand and appreciate the sufferings of others. Attention to specific eating behaviors such as overeating, use of alcoholic or stimulant-containing beverages, and vegetarianism are also considered by some religions. Before planning menus for members of any religious group, it is important to gain an understanding of some traditions or dietary practices (Table 12-6). In all cases, discussing the personal dietary



FIGURE 12-5 The Mexican Plate of Good Eating. (Accessed 22 May 2010 from <http://shrpnet.umdj.edu/iniglossary/cultures/mexico/diet.html>.)

TABLE 12-6

Some Religious Dietary Practices

	Buddhist	Hindu	Jewish (Orthodox)	Muslim	Christian Roman Catholic	Christian Eastern Orthodox	Christian Mormon	Christian Seventh Day Adventist
Beef	A	X						A
Pork	A	A	X	X				X
Meats, all	A	A	R	R	R	R		A
Eggs/dairy	O	O	R			R		O
Fish	A	R	R			R		A
Shellfish	A	R	X			O		X
Alcohol		A		X			X	X
Coffee/tea				A			X	X
Meat/dairy at same meal			X					
Leavened foods			R					
Ritual slaughter of meats			+	+				
Moderation	+			+				+
Fasting*	+	+	+	+	+	+	+	

Modified from Kittler PG, Sucher KP: *Food and culture*, ed 5, Belmont, Ca, 2008, Wadsworth/Cengage Learning.

Escott-Stump S: *Nutrition and diagnosis-related care*, ed 7, Baltimore, Md, 2011, Lippincott Williams & Wilkins.

+, Practiced; A, avoided by the most devout; O, permitted, but may be avoided at some observances; R, some restrictions regarding types of foods or when a food may be eaten; X, prohibited or strongly discouraged.

*Fasting varies from partial (abstention from certain foods or meals) to complete (no food or drink).

**CLINICAL SCENARIO**

Marty is a 45-year-old Jewish male who emigrated from Israel to the United States 3 years ago. He follows a strict kosher diet. In addition, he does not drink milk but does consume other dairy products. He has a body mass index of 32 and a family history of heart disease. He has come to you for advice on increasing his calcium intake.

Nutrition Diagnostic Statement

Knowledge deficit related to calcium as evidenced by request for nutrient and dietary information.

1. What type of dietary guidance would you offer Marty?
2. What type of dietary plan following strict kosher protocols would meet his daily dietary needs and promote weight loss?
3. What suggestions would you offer him about dietary choices for a healthy heart?
4. Which special steps should Marty take to meet calcium requirements without using supplements?
5. How can food labeling information be used to help Marty meet his weight loss and nutrient goals and incorporate his religious dietary concerns?

preferences of an individual is imperative (Kittler and Sucher, 2008).

USEFUL WEBSITES**American Dietetic Association**

<http://www.eatright.org>

Center for Nutrition Policy and Promotion, U.S. Department of Agriculture

<http://www.usda.gov/cnpp/>

Centers for Disease Control—Health Literacy

<http://www.cdc.gov/healthmarketing/healthliteracy/training/page5711.html>

Cost of Food at Home

<http://www.cnpp.usda.gov/USDAFoodCost-Home.htm>

Dietary Guidelines for Americans

<http://www.health.gov/DietaryGuidelines>

Eat Smart, Play Hard

<http://www.fns.usda.gov/eatsmartplayhardkids/>

Ethnic Food Guides

http://fnic.nal.usda.gov/nal_display/index.php?info_center=4&tax_level=3&_tax_subject=256&topic_id=1348&level3_id=5732

Food and Drug Administration, Center for Food Safety and Applied Nutrition

<http://www.cfsan.fda.gov>

Food and Nutrition Information Center, National Agricultural Library, U.S. Department of Agriculture

<http://www.nal.usda.gov/fnic/>

Health Canada

http://www.hc-sc.gc.ca/fn-an/index_e.html

Healthy Eating Index

<http://www.cnpp.usda.gov/HealthyEatingIndex.htm>

Institute of Medicine, National Academy of Sciences

<http://www.iom.edu/>

International Food Information Council

<http://ific.org>

MyPyramid Food Guidance System

<http://www.mypyramid.gov/>

National Center for Health Statistics

<http://www.cdc.gov/nchs/nhanes.htm>

Nutrition.gov (U.S. government nutrition site)

<http://www.nutrition.gov>

U.S. Department of Agriculture

<http://www.usda.gov>

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