
Basic Nutrition Module



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Basic Nutrition Module

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Introduction

Food is an enjoyable part of our everyday lives. Whether it's hot soup on a winter's day or ice-cold lemonade in July, food tantalizes our taste buds and satisfies our appetites. But let's not forget what food is really all about — *survival*. Food helps us breathe, move and think. Food keeps us alive and well.

Have you ever thought about how the nutrients in food keep us healthy? How does the body turn a bowl of cereal and glass of juice into energy for activity? How does a turkey sandwich help us make blood cells and repair skin? And exactly how does a glass of milk make our bones stronger? The answers are found in the study of nutrition. Nutrition is the science of diet and health — everything from how and why we choose certain foods to how the body digests, absorbs, and uses food. Indeed, all the pieces that comprise the body come from the nutrients in the food we eat. The old saying is true — you *are* what you eat.

Each day, we make food choices that can either benefit or harm our bodies in some small way. And, over months and years, the choices we make can greatly impact our overall health. So, while a lifetime of poor food choices can contribute to the development of disease, a lifetime of healthy choices can bring benefits throughout life. Good nutrition plays a key role in preventing and treating diseases such as diabetes, heart disease, obesity, high blood pressure, and osteoporosis. And, while other key factors influence health such as heredity, environment, lifestyle and mental attitude, nutrition is one thing people usually have quite a bit of control over.

This module covers the basic concepts of good nutrition — from the nutrients in food to current topics such as vegetarian diets and weight management. By understanding these concepts, you'll become a more effective educator, plus you'll have a chance to impact your own health, as well as the health and well-being of others.



Nutrients in the Foods We Eat

1

Overview

Nourishing our bodies is no small task. In fact, it takes over 40 nutrients to keep our bodies going. Many are **essential**, meaning we have to get them from our food supply in order to survive. In this section of the *Basic Nutrition Module*, we'll cover the six major categories of nutrients:

- **Carbohydrates** are the body's major source of energy, or calories. Scientific evidence suggests that at least 55 percent of our daily calories should come from carbohydrates.
- **Fats** transport nutrients, plus they're part of the structure in many body cells. Fats also contribute calories – lots of them. Experts say we should limit our intake of fat to less than 30 percent of our calories, though many Americans go overboard.
- **Proteins** are made up of amino acids that the body uses to build, repair, and maintain tissues. Proteins also contribute calories to the diet.
- **Vitamins** don't provide calories, yet they're extremely important, helping with all kinds of chemical reactions in the body.
- **Minerals** are similar to vitamins; they don't provide calories, and they play very specific roles in our body's metabolism.
- **Water** is often called “the forgotten nutrient” because people don't think of it as an essential part of the diet. But consider this: our bodies can survive for up to six weeks without food, but we can't make it past seven days or so without water.

*The human body isn't able to produce **essential nutrients**, so we have to get them from the foods we eat.*

Certain Nutrients Provide Energy

Before reviewing the six groups of nutrients in more detail, it's important to talk about energy. How would you feel about eating a food that was described as high in energy? How about a food high in calories? The two words really mean the same thing. A **calorie** is what we use to measure energy for the body, just as we use *pound* or *ounce* to measure the body's weight.

Three types of nutrients in our foods provide calories: proteins, fats and carbohydrates. Vitamins, minerals, and water don't have calories so we don't use them for energy. Protein and carbohydrate each have 4 calories per gram; fat has 9 calories per gram. For example, a teaspoon of sugar (pure carbohydrate) weighs 4 grams, so it has 16 calories. A teaspoon of oil (pure fat) weighs 5 grams and provides 45 calories.

There is one other source of calories – alcohol, which provides 7 calories per gram. Alcohol isn't a nutrient since our bodies don't need it to function; however, alcoholic beverages can contribute a significant number of calories to a person's diet.

Sources of Calories in the Diet

Carbohydrate	4 calories/gram
Protein	4 calories/gram
Fat	9 calories/gram
Alcohol	7 calories/gram

Later in this module, we'll cover energy, energy balance, and weight management in more detail. But first we'll take a closer look at the six categories of nutrients, including their functions and food sources, plus we'll address how you can help WIC clients make healthier food choices.

Objectives

Why do so many health experts praise foods like pasta, cereals, and whole-grain breads? It's all about carbohydrates – the foundation of a healthy diet. Thanks to carbohydrates, you have the energy to walk, run, breathe, and even read this module. Plus they help your body in other ways. But, be advised, not all carbohydrates are created equal. After reading this section, you'll be able to:

- identify various functions of carbohydrates in the body;
- identify the three main types of carbohydrates;
- define and list empty-calorie foods;
- define lactose intolerance;
- identify sources of complex carbohydrates; and
- explain the health benefits of fiber.

Functions of Carbohydrates

The world would be an awful place without carbohydrates. Just think – we’d have no rice, bread, cereal, pasta, cookies, or many other popular foods. Worse yet, our bodies wouldn’t have the energy to function without carbohydrates. That’s because the primary role of carbohydrates is to *provide energy to every cell in the body*. Each gram of carbohydrate in a food provides 4 calories. Also, carbohydrates serve as fuel for the brain. Glucose, a carbohydrate, is the primary energy source for the brain and the rest of the central nervous system.

There are three main categories of carbohydrates: **sugars**, **starches**, and **fiber**. The body digests sugars and starches, and eventually converts them into a sugar called glucose. Fiber isn’t digested, but it offers other unique benefits related to the intestinal tract. The following pages describe the three types of carbohydrates.

The main function of carbohydrates is to provide energy to the body.

There are three types of carbohydrates:

- **sugars**,
 - **starches**, and
 - **fiber**.
-

Sugars (Simple Carbohydrates)

Most people think of table sugar when they hear the word “sugar,” but there are actually different kinds of sugars. A sugar can be either a monosaccharide (a single sugar unit) or a disaccharide (two sugar units joined together). Because sugars have a fairly simple structure, they are also called simple carbohydrates or simple sugars.

While some sugars occur naturally in food, many foods contain added sugars. Either way, your body can’t tell the difference – it treats all sugars as basically the same. First, enzymes in the intestine break the sugar down to single units. Then they’re absorbed into the bloodstream, carried to the cells, and converted to energy. Here are some of the common sugars:

- **Sucrose** is the same thing as table sugar. Sucrose comes from plants such as beets, sugar cane, and corn.
- **Lactose** is the main sugar in milk. During digestion, the body breaks lactose down to glucose and galactose. Some people have trouble digesting lactose, which is known as lactose intolerance.

- **Fructose** is the sweetest of all sugars. It occurs naturally in fruits and fruit juices. Plus, it's also added to certain foods, especially in the form of **high-fructose corn syrup (HFCS)**.
- **Glucose** is found in the blood, so it's often called blood sugar. Glucose is the main form of carbohydrate that our cells use to produce energy. Glucose is also present in some foods such as fruits, vegetables, corn syrup, and honey.
- **Other types and names of sugars** – When you look at ingredients on a food label, you'll find all kinds of terms referring to sugars. A food is likely to be high in sugars if one of these names appears first or second in the ingredient list, or if several names are listed:

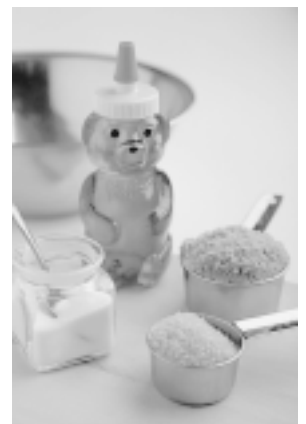
Brown sugar	Malt syrup
Corn syrup	Mannitol
Dextrose	Molasses
Dextrin	Raw sugar
Fructose	Sorbitol
Honey	Sucrose
Invert sugar	Syrup
Maltose	

Table Sugar vs. Honey and Brown Sugar

It's a common misconception that honey and brown sugar are more nutritious than table sugar. In fact, they're nutritionally about the same. The body breaks honey down into glucose, just as if it were table sugar. However, honey is sweeter than table sugar so you can use less of it, plus it has a different consistency and flavor.

Brown sugar is simply sugar crystals with added molasses for flavor. So, just like table sugar, it has 16 calories and 4 grams of carbohydrate per teaspoon, and is nutritionally the same. Likewise, "raw sugar" is just like table sugar from a nutritional standpoint.

High-fructose corn syrup (HFCS) is one of the most common sugars that Americans consume. It's added to sodas, salad dressings, candies, baked goods, ketchup, syrups, etc.



Lactose Intolerance

People with lactose intolerance have difficulty digesting lactose, the sugar that is naturally present in milk. The problem is that they don't make enough lactase, the enzyme that breaks down lactose in the small intestine. So milk and foods that contain milk cause bloating, cramping, gas, discomfort, and diarrhea.

Infants are born with the ability to digest lactose, but some infants can experience temporary lactose intolerance after a gastrointestinal illness.

Babies are born with the enzyme necessary to digest lactose, but some people lose this ability as they get older. It's an inherited condition, and certain groups have higher rates of lactose intolerance, including Native Americans, Asians, African Americans, Middle Easterners, and people of Mediterranean descent.

The severity of the intolerance varies from person to person. Many people with lactose intolerance can drink a small glass of milk or eat products like yogurt, pudding, and cheese without any problems. Also, products that have been treated with lactase are available (such as Lactaid®). Calcium-fortified soy milk is also an option. For more information on lactose intolerance, refer to page 1-60.

Many people mistakenly refer to lactose intolerance as a milk allergy. There is such a thing as a milk allergy, but it's quite different. With milk allergy, a person's immune system reacts to the protein in milk.

Empty-calorie Foods

Have you ever heard the term "empty-calorie foods"? These are foods that contribute calories or energy without providing many other nutrients. Often, foods high in refined sugars fall into this category. Empty-calorie foods, like those in **Table 1.1**, replace other, more nutritious foods in the diet. And, to make matters worse, some of these foods, such as doughnuts and pastries, contain lots of added fat, which means even more empty calories. So the advice is to make smart choices and limit your intake of empty-calorie foods and beverages.



Table 1.1 Added Sugar in Empty-Calorie Foods

Food	Added Sugar (Approximate)
Candy (assorted, i.e., chocolate bar, 1 oz.)	5 tsp.
Cake, frosted (1/16 of 9" cake)	8 tsp.
Cookies, commercial (4–5)	5 tsp.
Doughnut, yeast, glazed (1)	5 tsp.
Fruit punch (8 oz.)	6 tsp.
Fruit rolls (fruit leather) (1 roll)	3 tsp.
Gelatin desserts (1 cup)	5 tsp.
Granola bar (1)	4 tsp.
Lemonade (8 oz.)	6 tsp.
Pastry, pan dulce (1)	5 tsp.
Pie (1/6 of 9" fruit pie)	5 tsp.
Popcorn, caramelized (1 cup)	5 tsp.
Popsicle (1)	4 tsp.
Sherbet (1/2 cup)	7 tsp.
Soft drinks, cola (12 oz.)	9 tsp.
Sweetened fruit drinks (12 oz.)	12 tsp.

Source: *California Daily Food Guide: Dietary Guidance for Californians*.

Starches (Complex Carbohydrates)

The next category of carbohydrates is starches. Most of us refer to foods like potatoes and rice as “starchy” foods, but what exactly is a starch? Simply put, a starch is a number of sugar units linked together (a polysaccharide). This structure is more complex than that of sugars, so we call starches “complex carbohydrates.” Grains, such as wheat, rice, corn, and oats are the richest source of starches. Other sources include legumes (dry beans and peas) and starchy vegetables, such as potatoes, yams, and cassava.

Part 1



Foods high in starches generally offer more vitamins, minerals, and fiber compared to high-sugar foods.

Starches are also added to foods during cooking and food processing. For example, when you add flour to a sauce or gravy to thicken it, it's the starches in the flour that cause the thickening. Likewise, food manufacturers commonly use starches in products such as gravies, frozen foods, baby foods, salad dressings, and instant puddings.

Digestion: From Starches to Sugar

The body uses enzymes in the mouth and intestinal tract to break starches down into glucose. Then the bloodstream absorbs the glucose from the intestine and carries it to the cells where it's converted to energy. So starches are digested the same way simple sugars are. In fact, your body can't tell whether the glucose originally came from a starch or a simple sugar. However, foods high in starches offer more benefits than simple sugars, especially in terms of vitamins and minerals.

So, if starches are just sugars linked together, why don't they taste sweet? It has to do with the size of the molecules. Our taste buds can't taste the sugar units of a starch molecule until they're broken down to individual sugars. The digestive enzymes in our mouths start this process, and if you keep a starchy food in your mouth long enough, you can start to detect a sweeter taste.

Fiber

Fiber is the third category of carbohydrates. Fiber is similar to starch because both are classified as complex carbohydrates. But the key difference is that we can't digest fiber. As humans, we don't have the enzymes to break it down into smaller units for absorption. So what good is it? Well, the very fact that we can't digest fiber is what makes it so important. Fiber acts like a sponge, absorbing water as it travels through the digestive tract. This adds bulk to the stool, which forces the colon to work harder to push food through. This extra bulk reduces constipation and may help prevent some diseases, such as colorectal cancer.

Humans don't have the enzymes to digest fiber, so it moves through the intestine, adding bulk and binding to substances to promote their excretion.

Health Benefits of Fiber

<u>Problem</u>	<u>Possible Health Benefit</u>
Constipation	Fiber holds water which increases bulk of stool, producing softer stools, and reducing constipation.
Hemorrhoids	Larger, softer stools reduce straining during bowel movements.
Diverticulosis	Larger, softer stools reduce pressure in colon, so less outpouching to form diverticuli.
Obesity	Increased feeling of fullness from high-fiber food, resulting in less food eaten.
Heart disease	Eating certain kinds of fiber reduces heart-disease risk.
Colorectal cancer	Large, soft stools may dilute carcinogens; also faster time through colon reduces contact of carcinogen with intestinal wall.

Increasing Fiber in the Diet

Typically, Americans consume about 12 to 15 grams of fiber a day, but nutrition experts recommend an intake of 20 to 35 grams a day. Fiber is in the walls of plant cells and forms the tough structural parts of plants.

When grains are milled and refined, the fiber is removed, along with much of the protein, vitamins, and minerals. If a grain is “enriched,” it means the processor has added iron, thiamin, riboflavin, and niacin back into the grain. However, other nutrients lost in milling, such as magnesium, vitamin B₆, zinc, vitamin E, and fiber, are not restored. So whole-grain breads and cereals have more fiber, vitamins, and minerals than refined cereal products. **Table 1.2** gives the fiber content of various foods.

Part 1

Table 1.2 Approximate Fiber Content of Various Foods

	Serving	Calories	Fiber (g)
Breads, Grains, and Cereals			
All-Bran Extra Fiber®	½ cup	50	15.3
Fiber One®	½ cup	60	14.3
Bran Buds®	⅓ cup	85	12.0
All-Bran®	½ cup	80	9.7
100% Bran™	⅓ cup	85	8.3
Whole-wheat spaghetti	1 cup	175	6.3
Cracklin' Oat Bran®	¾ cup	200	5.0
Bran flakes	¾ cup	95	5.0
Grape-Nuts®	½ cup	210	5.0
Multi-Bran Chex®	½ cup	100	4.0
Air-popped popcorn	1 cup	40	3.0
Whole-wheat bread	1 slice	70	1.9
Brown rice	½ cup	110	1.7
Legumes, cooked			
Black beans	½ cup	115	7.5
Pinto beans	½ cup	115	7.4
Kidney beans	½ cup	110	7.3
Navy beans	½ cup	110	6.0
Vegetables, cooked			
Green peas	½ cup	55	3.6
Corn	½ cup	70	2.9
Parsnip	½ cup	50	2.7
Potato, with skin	1 medium	95	2.5
Carrots	½ cup	25	2.3
Brussels sprouts	½ cup	30	2.3
Broccoli	½ cup	20	2.2
Beans, green	½ cup	15	1.6
Cabbage, red and white	½ cup	15	1.4
Kale	½ cup	20	1.4

	Serving	Calories	Fiber (g)
Fruits			
Apple (with skin)	1 medium	80	3.7
Raisins	1/4 cup	110	3.1
Strawberries	1 cup	45	3.0
Dried prunes	3	60	3.0
Orange	1 medium	60	2.6
Apricot, fresh	3 medium	50	2.5
Banana	1 medium	105	2.4
Blueberries	1/2 cup	40	2.0
Dates, dried	3	70	1.9
Peach	1 medium	35	1.9
Grapefruit	1/2	40	1.6
Apricot, dried	5 halves	40	1.6
Cherries	10	50	1.2
Pineapple	1/2 cup	40	1.1
Cantaloupe	1/4 melon	50	1.0

Sources: Product labels; USDA Nutrient Database for Standard Reference, Release 13; and *California Daily Food Guide: Dietary Guidance for Californians*.

Choosing Whole-grain Foods

Reading labels is the key to choosing whole-grain products. For example, while some brown breads may look like whole-grain breads, you can't be sure unless you read the ingredients. Many are made with refined white flour and caramel coloring. This doesn't mean they're unhealthy choices; they do have some nutritious qualities. But, to get the most fiber from your bread choices, look for "whole-wheat" bread made from 100 percent whole-wheat flour.

For cereals, read the labels to compare the amount of fiber in different brands. Also, descriptions on the package can tell about fiber content. "High-fiber" cereals offer 5 or more grams of fiber per serving, while a cereal that's a "good source" of fiber has 2.5 to 5 grams of fiber in a serving.

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Self-test Questions – Carbohydrates

1. The main function of carbohydrate is to (*check one*):

- provide energy to the body
- provide materials to build new tissue
- make fat
- insulate the body to prevent heat loss

2. List the three types of carbohydrates:

3. Mark the following statements **TRUE** or **FALSE**.

- _____ Sucrose is the same thing as table sugar.
- _____ The body is able to digest fiber and convert it to a sugar called glucose.
- _____ The brain uses glucose as its main source of energy.
- _____ Starch is made up of sugar units linked together.

4. Define *lactose intolerance* and name at least two populations with higher rates of lactose intolerance.

5. An excellent source of complex carbohydrates is (*check one*):

- orange juice
- whole-wheat bread
- skim milk
- tuna fish
- ice cream

6. Define the term *empty-calorie food* and list three examples.

7. List two benefits of eating lots of fiber.

8. Which of the following are good sources of fiber? (*Check all that apply.*)

- orange juice
- apples
- raisins
- raw cauliflower
- hamburger
- milk
- wheat bran

Objectives

Dietary fat has become an obsession for many Americans. It is true that too much fat in the diet is related to chronic diseases such as obesity and heart disease, but fat in and of itself isn't such a bad thing. In fact, our bodies need a certain amount of fat to survive. After reading this section, you'll be familiar with the role of fat in the body, as well as the issues surrounding dietary fat and cholesterol. Specifically, you'll be able to:

- identify functions of fat in the body;
- list the three types of fatty acids;
- define cholesterol; and
- identify foods that contain cholesterol.

Functions of Fat

In foods, fat provides flavor, aroma, and texture. But, besides making our ice cream creamier and our cheese tastier, fat serves a number of important functions in the body:

- **Fat provides energy.** Each gram of fat provides nine calories, so fat is a very concentrated source of energy compared to protein and carbohydrate. Also, the body stores extra calories as fat, creating an energy reserve for times of famine.
- **Fat is needed for the absorption, storage, and circulation of vitamins A, D, E, and K** in the body. These four are the fat-soluble vitamins.
- **Fat provides essential fatty acids.** Fatty acids are part of the chemical structure of fats. There are three essential fatty acids that must come from the diet. These are linoleic acid, linolenic acid, and arachidonic acid. Essential fatty acids are necessary for proper growth and brain function, especially in infants.
- **Fat provides cushioning for internal body parts** like the liver. Fat underneath the skin acts as insulation to help the body maintain a constant internal temperature.
- **Fat also provides the sensation of satiety** or the feeling of fullness.

Types of Fat in Foods

Most of the fat found in foods is in the form of **triglycerides**. Each triglyceride molecule is made up of two basic parts: glycerol and fatty acids. Glycerol makes up the “backbone” of the molecule, and three fatty acids are attached to the glycerol backbone. The glycerol portion is always the same, while the fatty acids can vary. The three types of fatty acids are:

- saturated,
- monounsaturated, and
- polyunsaturated.

All foods that contain triglycerides contain a mixture of saturated and unsaturated fatty acids. The type of fatty acid that is most prevalent determines whether a fat is referred to as saturated, monounsaturated, or polyunsaturated. For example, most of the fatty acids in butter are saturated, so butter is known as a saturated fat. Similarly, corn oil contains mostly polyunsaturated fatty acids, so we say that it's polyunsaturated.

Saturated Fats

Saturated fats are generally solid at room temperature and are usually from animal sources like meat, whole milk, cheese, butter, egg yolk, and cream. There are some plant sources of saturated fats, including coconut oil, palm oil, and chocolate. Eating large amounts of saturated fats can significantly raise blood cholesterol.



Foods High in Saturated Fats

<u><i>Animal Sources</i></u>	<u><i>Plant Sources</i></u>
certain cuts of beef and pork	coconut oil
chicken and turkey skin	palm kernel oil
whole-milk dairy products	palm oil
butter	cocoa butter
lard	chocolate
	some hydrogenated shortenings

Unsaturated Fats

Unsaturated fats are generally liquid at room temperature and are usually from plant sources. Unsaturated fats can be either **monounsaturated** or **polyunsaturated**. Both types reduce blood cholesterol when they replace saturated fats in the diet. The essential fatty acids mentioned earlier – linolenic acid, linoleic acid, and arachidonic acid – are all polyunsaturated fatty acids.



Foods High in Unsaturated Fats

<u>Polyunsaturated</u>	<u>Monounsaturated</u>
safflower oil	canola oil
sunflower oil	olive oil
corn oil	peanut butter
soybean oil	avocado

Dietary Recommendations for Fat

Eating a diet high in fat, especially too much saturated fat, can increase the risk of heart disease. But, remember, the body needs a certain amount of fat to survive, plus many of our favorite foods would be extremely bland and boring without fat. So the key is moderation. According to the Dietary Guidelines, Americans should limit fat intake to less than 30 percent of total calories, and no more than one-third of this amount should come from saturated fats. That means most fat should come from foods higher in polyunsaturated and monounsaturated fat. To keep fat intake at an acceptable level, consumers should:

- Use lean meats and skim or low-fat dairy products.
- Use liquid unsaturated vegetable oils for cooking instead of lard or shortening.



- Read nutrition labels on food packages to check the kinds and amounts of fat.
- Bake, broil, steam, and grill more often, rather than frying.
- Eat plenty of fruits, vegetables, and whole grains – foods naturally low in total fat and high in starch and fiber.

Cholesterol

Cholesterol is a waxy, fat-like substance found in every cell in the body. Cholesterol is also found in all foods of animal origin, although you can't see it or taste it.

Cholesterol isn't an essential nutrient because your liver can make all the cholesterol your body needs, even if you don't eat any. The body uses cholesterol to make hormones like estrogen and testosterone, plus it's needed to make cell walls, bile, and vitamin D. But, even though cholesterol performs some very important and necessary functions in the body, it's also true that cholesterol deposited in arteries is a risk factor for heart disease.

When discussing cholesterol, it's important to clarify whether you're referring to dietary cholesterol or blood cholesterol. The cholesterol that circulates throughout the body is known as **blood cholesterol**. The cholesterol that comes from food is called **dietary cholesterol**. Dietary cholesterol is found only in foods of animal origin. Plant products do not contain cholesterol. So, contrary to what some consumers think, certain high-fat foods such as nuts, peanut butter, vegetable oil, and avocados don't contain cholesterol because they come from plants. Still, they are high in fat, so the advice is to enjoy them in moderation.

Cholesterol in the Blood

Just like oil and water, cholesterol and blood don't mix. So, for cholesterol to travel through your blood, it's coated with a layer of protein to make a "lipoprotein." Two lipoproteins you may have heard about are low-density lipoprotein (**LDL**) and high-density lipoprotein (**HDL**). LDL carries most of the cholesterol in the blood. When too much LDL cholesterol is in the blood, it can lead to cholesterol buildup in the arteries, thus increasing your risk for heart disease. That's why LDL cholesterol is called "bad" cholesterol. HDL cholesterol helps remove cholesterol from the blood and helps prevent the fatty buildup. So HDL cholesterol is called the "good" cholesterol.

LDL is associated with cholesterol deposits in blood vessels. A high LDL level means an increased risk of heart disease.

HDL removes cholesterol from the blood. A high HDL level means a decreased risk of heart disease.

Dietary Recommendations for Cholesterol

Cholesterol is present in different amounts in all animal foods such as beef, poultry, fish, milk, milk products, and egg yolks (examples are given in **Table 1.3**). Too much dietary cholesterol and saturated fat raises blood cholesterol levels in many people, increasing their risk for heart disease. Dietary recommendations suggest that we limit cholesterol intake to

Table 1.3 Cholesterol Content of Various Foods

Food	Cholesterol (mg)
Liver (3 ounces, cooked)	331
Egg (1 yolk)	213
Beef (3 ounces, cooked)	76
Chicken (3 ounces, cooked)	76
Whole milk (1 cup)	33
Cheddar cheese (1 ounce)	30
Bacon (3 medium slices)	16
Lard (1 tbsp.)	12
Skim milk (1 cup)	4

less than 300 milligrams per day. The Food Guide Pyramid, along with food labels, provides information that can help adults keep their cholesterol intake in check. It's not necessary to eliminate dietary cholesterol, but it is important for people to keep a check on their intake of total cholesterol, total fat and, most especially, saturated fats.

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Self-test Questions – Fats

1. *Check* each statement that describes a function of fat.

- provides essential fatty acids
- aids in bone formation
- prevents heart disease
- provides cushioning for internal body parts
- provides vitamin C

2. What are the three types of fatty acids? (*Check one.*)

- glycerol, triglyceride, and cholesterol
- HDL, LDL, and VLDL
- unsaturated, monounsaturated, and polyunsaturated
- safflower, soybean, and sunflower

3. *Fill in the blanks* to complete the following simple definition of cholesterol.

Cholesterol is a _____ substance that is needed to
(protein-like, fat-like, water-like)

form _____ such as estrogen and testosterone, to form
(hormones, enzymes, fatty acids)

bile, and to make vitamin _____.
(A, C, D)

4. *Circle* the foods that contain cholesterol.

skim milk

tomato

beef

egg

avocado

tuna fish

peanut butter

chicken

cereal

coconut

whole milk

french fries

Objectives

What foods do you think of when you hear the word *protein*? If you said milk, eggs, meat, or beans, you're right – those are all examples of great sources of protein. But exactly what is protein? How do our bodies use it, and how much protein do we need? After reading this section, you'll be able to:

- list the functions of protein;
- identify true statements about dietary protein;
- describe what amino acids are in relation to protein;
- identify sources of complete and incomplete proteins;
- determine the approximate protein content of a meal; and
- identify various aspects of protein deficiency.

Functions of Proteins

When we were kids, most of us learned that it was important to eat protein so that we would “grow up to be big and strong.” More specifically, proteins perform the following functions in the body:

- **Proteins help build and maintain body tissue** – Our bodies constantly break down and rebuild tissue, so we need a steady supply of dietary protein, especially during periods of growth such as childhood and pregnancy. Almost every tissue and fluid in the body contains protein (the two exceptions are bile and urine). Muscle tissue accounts for almost 50 percent of the body’s protein.
- **Proteins regulate body processes** – All kinds of metabolic processes are taking place in your body right this second, and proteins are a key to making those reactions happen. We need certain proteins to produce enzymes and hormones; plus, we rely on proteins for blood clotting, fluid balance, visual processes, antibodies, and cell repair. Proteins also help transport nutrients and oxygen through the body. For example, hemoglobin is a protein that contains iron and transports oxygen through the blood.
- **Proteins provide energy (or calories)** – When the body doesn’t get enough carbohydrates and fats for energy, it uses protein for energy. One gram of protein has 4 calories.

Amino Acids – Building Blocks of Proteins

Proteins are made up of **amino acids**, nitrogen-containing compounds that combine in different ways to make up thousands of different proteins in the body. When you eat a food that contains protein, your body breaks it down into amino acids, and then recombines these building blocks to make new proteins that it needs. The human body requires 20 different amino acids to manufacture proteins. Our bodies can make 11 of these amino acids, but we have to get the other nine from foods, so we call those nine the **essential amino acids**.

Food Sources of Protein

Both plant and animal products contain protein, but they differ when it comes to amino acids. Animal foods contain all nine essential amino acids in sufficient amounts to meet our needs, so we call them **complete** or **high-quality proteins**. Foods of plant origin, however, usually lack adequate amounts of certain essential amino acids, so they're known as **incomplete** or **lower-quality proteins**. However, different plant foods have different amino acid profiles, so eating a combination of various plant proteins provides all the essential amino acids. For example, rice is low in lysine (an essential amino acid) and beans are low in methionine (another essential amino acid). But rice and beans together make up a complete protein. For more information, see page 3-26.

Also note that soybeans have an amino acid pattern similar to that of cow's milk, so health professionals commonly consider soy protein to be a complete, high-quality protein. And, these days, products such as soy milk, tofu, and all-vegetable burgers made with soy are becoming popular alternatives to milk and meat.

Meeting Protein Needs

A person's daily protein requirement depends on body weight. **Adults need 0.8 grams of protein for each kilogram of body weight.** Protein needs increase during periods of rapid growth. So children, as well as pregnant and breastfeeding women, need more protein.

It's important to get enough protein. But do we really need all the high-protein foods, drinks, and diets that are on the market these days? The fact is, most Americans get more than enough protein to meet their needs. For example, consider how easy it is to meet the protein needs of a typical 150-pound person. First, let's determine how much protein a 150-pound person would need (note: 1 kg = 2.2 lbs.):



Complete proteins, found in animal products as well as soybeans, supply a good balance of all nine essential amino acids.



Incomplete proteins are found in foods of plant origin and are low in certain essential amino acids. However, different plant sources can complement each other to create a complete protein.

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(1) Convert pounds to kilograms by dividing by 2.2:

$$150 \text{ lbs.} \div 2.2 \text{ lbs./kg} = 68 \text{ kg}$$

(2) Then multiply by 0.8:

$$68 \text{ kg} \times 0.8 \text{ g protein/kg} = 54 \text{ g protein}$$

So our 150-pound person needs 54 grams of protein a day. What does he need to eat to get those 54 grams of protein? To answer this question, refer to the example on page 1-29. We designed three sample meals, and used the values in **Table 1.4** to estimate the protein content of each meal. You can use these values in Table 1.4 to get a ballpark figure of how much protein is in any meal. Foods with the highest content of protein are in the meat and milk groups. Foods in the vegetable and grain groups contribute smaller amounts of protein.

More Than Enough Protein

As you can see from the example, protein intake adds up pretty quickly, especially when a person includes meats and dairy foods in the diet. What happens to the extra protein we eat? The body turns extra protein into fat or glucose and either stores it or uses it for energy. Many experts stress that eating too much protein over a long period of time can strain the kidneys. What's more, consider that many high-protein animal products can contain significant amounts of fat and saturated fat, which are linked to heart disease.

Table 1.4 *Estimated Protein Content of Various Food Groups*

Food Group	Protein
Dairy (8 oz. milk, 1–1½ oz. cheese)	8 g
Meat (1 oz. meat/poultry, ½ cup legumes)	7 g
Grains (1 slice bread, 1 portion cereal)	3 g
Vegetables (½ cup cooked, 1 cup raw)	2 g
Fruits	0 g

Protein in a Typical Day

What would a 150-pound person need to eat to get the 54 grams of protein that he needs? To answer this question, we've designed three sample meals and used the values in Table 1.4 to estimate the protein content of each meal.

Breakfast

1 cup cornflakes	3 grams
1 cup milk.....	8 grams
1 slice bread	3 grams
1 glass orange juice	0 grams
	<hr/>
total:	14 grams

Lunch

1 hamburger:	
3 oz. meat	21 grams
1 bun	6 grams
1 salad	2 grams
1 milkshake	8 grams
	<hr/>
total:	37 grams

Dinner

2 cheese enchiladas:	
2½ oz. cheese	16 grams
2 tortillas	6 grams
½ cup pinto beans	7 grams
½ cup rice	3 grams
¼ cantaloupe	0 grams
1 glass iced tea	0 grams
	<hr/>
total:	32 grams

The approximate total for the day comes to **83 grams of protein**, more than enough to meet the protein needs our 150-pound person. Typically, most Americans eat much more protein than what they need. What if our sample person doesn't like to eat meat? No problem. He'd still get enough protein even without the meat he had for lunch.

Do You Need to Eat Meat to Get Enough Protein?

As you can see, the person in our example would have eaten enough protein even without the meat he had for lunch. However, pure vegetarians who don't eat meat, eggs, or dairy products do have to be careful to be sure they get the quantity and quality of protein that they need each day. Remember, plant foods usually don't contain complete protein, so vegetarians need to be sure they get a balanced variety of foods.

What Happens if You Don't Eat Enough Protein?

Inadequate protein consumption in the United States is rare; it's much more common in Third World countries. Inadequate protein can lead to serious deficiency diseases:

- **Protein-energy malnutrition (PEM).** This is a deficiency disease that occurs when a person, usually a young child, suffers from both lack of calories and lack of protein. PEM leads to stunted growth in both height and weight. This is the world's most common malnutrition problem, occurring mostly in Third World countries.
- **Kwashiorkor.** This is a serious condition caused by lack of protein but with adequate calories. Kwashiorkor often occurs when a young child is weaned from the breast upon arrival of a new baby. Sometimes a mother will substitute a weak cereal drink that provides enough calories but insufficient protein. Common symptoms include apathy, digestive problems, water retention, fatty liver, and lack of immune function. These children often die of common infections when their bodies can't produce sufficient antibodies to ward off disease. Children with this condition have a sickly appearance with large, bloated stomachs from excessive water retention.

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Self-test Questions – Proteins

1. *Fill in the blanks:*

The building blocks of protein are called _____. Our bodies can make 11 of these but we have to get the other nine from foods, so we call those nine _____.

2. State one function of protein in the body:

3. Mark the following statements **TRUE** or **FALSE**.

_____ The main function of protein is to provide energy to the body.

_____ Pinto beans are a source of incomplete protein.

_____ Protein needs decrease during periods of growth, such as pregnancy.

_____ Most Americans need more protein in their diets.

4. Approximately how much protein would the following meal provide? (*Refer to Table 1.4.*)

3 oz. of grilled fish

½ cup of broccoli

1 cup of salad greens

4 slices of honeydew melon

1 small roll

1 cup of milk

5. Protein-energy malnutrition (*check all that apply*):

- is common in the United States.
- decreases resistance to infection.
- slows or even halts growth.
- results from eating too much fat.
- is the world's most common malnutrition problem.

6. Put a **C** next to complete proteins and an **I** next to incomplete proteins.

- baked chicken
- skim milk
- cheese pizza with olives and green peppers
- green beans
- soy burger
- corn on the cob
- baked potato with the skin

Objectives

Vitamins are essential nutrients that our bodies need in very small amounts. In fact, if you added up all the vitamins you need in a day, you'd only get about $\frac{1}{50}$ of a teaspoon! But these tiny amounts perform some very amazing tasks in the body. After reading this section on vitamins, you'll be able to:

- state the purpose of the new DRIs;
- identify general characteristics of vitamins;
- identify major functions of vitamins A and C and folic acid;
- list food sources of vitamins A and C and folic acid;
- recognize the results of various vitamin deficiencies; and
- identify the effects of excessive intakes of certain vitamins.

Vitamin Basics

Vitamins partner up with other nutrients to build, maintain, and repair body tissues and regulate body processes. Vitamins don't provide energy themselves, but they help us produce energy from carbohydrates, fats, and proteins. It's the same idea as oil in a car: a car relies on gasoline for energy, but it still needs oil to run and stay in working condition. Similarly, your body relies on calories for energy, but it also needs vitamins to run and stay in good shape.

Vitamins are widely distributed in food. Some are found mostly in fruits and vegetables, others in enriched and whole grain breads and cereals, and others in meats and dairy products. So, needless to say, the best way to get enough vitamins is to eat a wide variety of foods.

How Much Do We Need of Each Vitamin?

Vitamins are micronutrients, meaning our bodies require only small amounts. But how much is enough? To answer that question, a group of researchers and nutrition experts known as the Food and Nutrition Board of the National Academy of Sciences (FNB/NAS) routinely publishes standard recommendations for daily nutrient intakes.

Until recently, these recommendations have been known as the **Recommended Dietary Allowances (RDAs)**, daily levels of nutrients that researchers determined to be adequate for healthy people. The original goal was to prevent vitamin-deficiency diseases, such as scurvy and rickets. But the board recently changed its approach; the emphasis is now on decreasing the risk of chronic diseases such as heart disease, cancer, and osteoporosis. So the FNB/NAS is now in the process of developing new standards known as the **Daily Reference Intakes (DRIs)**, which are levels determined to be optimal for healthy people.

The DRIs are much more comprehensive than earlier recommendations. Instead of a single recommended level for each nutrient, the DRIs encompass four categories (the

*The new **DRIs** are optimal nutrient amounts aimed at decreasing the risk of chronic diseases.*

estimated average requirement, the recommended dietary allowance, the adequate intake, and the tolerable upper intake level). Developing the DRIs is a huge task, and, once all of the DRIs have been established, they will be available in a series of seven reports. As of March 2000, four of the seven reports have been completed. For summary tables of the current nutrient recommendations for various age groups, refer to **Appendixes A, B, and C.**

Fat-Soluble and Water-Soluble Vitamins

There are 13 vitamins that we know humans need. These 13 vitamins fall into two groups depending on how they exist in food and how they're carried in the body: fat-soluble vitamins and water-soluble vitamins.

Vitamins A, D, E, and K are **fat-soluble vitamins**, meaning they dissolve in fat rather than water or body fluids. Instead of excreting excess amounts, the body stores them in body fat. If you take dietary supplements, it's possible to take in extremely high levels of fat-soluble vitamins, which can have toxic effects. If, however, you rely on foods to supply your vitamins, there's no danger of toxic amounts. Since our bodies store fat-soluble vitamins, we don't have to take in 100 percent of the daily values of these vitamins every single day, though it's a good goal to have. In foods, fat-soluble vitamins are fairly stable, meaning they aren't really affected by food preparation, storage, or cooking.

Water-soluble vitamins dissolve in water, and the body easily gets rid of excess amounts in the urine. Water-soluble vitamins include vitamin C and eight different B-complex vitamins: thiamin, riboflavin, niacin, vitamin B₆, vitamin B₁₂ (also called cobalamin), folic acid, pantothenic acid and biotin. In foods, water-soluble vitamins are not as stable as fat-soluble vitamins, so heat, air and cooking can easily destroy them. The body doesn't store any significant amounts of these vitamins, so it's important to get enough each day. And, even though our bodies don't accumulate toxic levels of water-soluble vitamins, scientists have learned that excessive intakes of certain water-soluble vitamins can be harmful. For

*Vitamins A, D, E, and K are the four **fat-soluble vitamins**.*

*The nine **water-soluble vitamins** are vitamin C, thiamin, riboflavin, niacin, B₆, vitamin B₁₂, folic acid, pantothenic acid, and biotin.*

example, large doses of vitamin C from supplements can lead to problems such as kidney stones and diarrhea, and megadoses of niacin can cause flushing of the skin, nausea, and liver damage.

What About Supplements?

A balanced and varied diet provides all the vitamins most people need. However, someone experiencing rapid growth, stress to the body, or other conditions may need extra vitamins in the form of supplements. People who potentially need supplements include pregnant and breastfeeding women, infants, teenagers, those recovering from illness, and those on weight-loss diets.

But many consumers who aren't at risk of a deficiency feel the need to take vitamin supplements. In fact, according to a survey by the American Dietetic Association, about half of the adults in the U.S. take a vitamin/mineral supplement on a daily basis. While some people feel that supplements provide extra "insurance" for days when they don't eat well, others see supplements as cure-alls or preventives for numerous discomforts and illnesses. Nutrition experts stress that supplements shouldn't take the place of a healthy diet. People should try to improve their eating habits rather than rely on supplements. Also, contrary to what many people believe, vitamins and minerals don't supply extra energy. Remember, energy only comes from carbohydrates, protein, and fats.



Dietary supplements, including those that supply megadoses of nutrients, do not have to be tested for safety or approved by the Food and Drug Administration.

For persons who do want to take a supplement, it's safe to take one that provides no more than 100% of the recommended levels, like a daily multivitamin. Unfortunately, many people routinely take supplements that supply megadoses, which are levels of nutrients in excess of 10 times the amount the body needs. Taking excessive amounts of nutrients without medical supervision is dangerous. Depending on the supplement and the dosage, the effects can include anything from hair loss, fatigue, or gastrointestinal distress to more serious results such as kidney stones, nerve damage, birth defects, and even death. Also, be aware that dietary supplements don't have to be tested for safety or approved by the Food and Drug Administration.

Vitamins of Special Interest in WIC: Vitamins A and C and Folic Acid

While all 13 vitamins are important, the WIC program spends extra time teaching clients about vitamins A and C and folic acid. Many people don't get enough of these key vitamins and, since they're crucial for growth and healthy tissues, they're especially significant for pregnant and breastfeeding women, infants, and children.

Vitamin A

The body needs vitamin A to resist infection and keep the eyes, skin, and internal organs moist. Healthy, moist surfaces inside the mouth, in air passages, and in the vagina and other mucous membranes are more resistant to infection, thanks to vitamin A. Also, vitamin A helps us see in dim light, and it's needed for proper bone growth, tooth development, and reproduction. The body stores vitamin A in the liver and then transports it to various tissues when needed.



Different Forms of Vitamin A in Foods

In foods, vitamin A exists in two different forms: retinol (in animal foods) and carotenoids (in plant foods). When you look at the typical American diet, about half of our vitamin A comes from retinol and the other half from carotenoids.

- **Retinol** – Animal products such as eggs, liver, butter, margarine, fortified milk, and cheese contain retinol. The body is able to absorb most of the retinol from foods.
- **Carotenoids** – Carotenoids, such as beta carotene, exist in the yellow pigments of plants including carrots, sweet potatoes, pumpkins, cantaloupes, tomatoes, red peppers, apricots, mango, and papaya. Our bodies only absorb 5 percent to 50 percent of the carotenoids we eat. Then the body converts them to active forms of vitamin A. But, after they're converted, carotenoids are less active than retinol. For example, it takes about 6 µg of beta carotene to equal the biological activity of 1 µg of retinol.

Because the vitamin A in plant foods is different from the vitamin A in animal products, it's not easy to compare the two. As a result, there are several units of measure to express the vitamin A content of foods. Some tables list vitamin A in International Units (IU), while other tables list Retinol Equivalents (RE). **Table 1.5** lists the vitamin A content of important sources in Retinol Equivalents.

What if You Don't Get Enough Vitamin A?

Vitamin A deficiency may cause eye changes, inability to see in dim light, and even blindness. Vitamin A deficiency also decreases resistance to infection, slows growth, affects tooth formation, and results in dry, scaly skin. In children, failure to grow is one of the first signs of poor vitamin A status. When these children receive vitamin A supplements, they gain weight and grow taller. Children who receive adequate amounts of vitamin A are better able to survive infectious diseases.

In many poor countries, severe vitamin A deficiency is a serious problem. Lack of vitamin A causes a quarter of a million cases of blindness every year in Asia alone. Luckily, few people in the United States have such low levels of vitamin A as to cause blindness. However, many Americans diets are low enough in vitamin A that they may have other, less severe symptoms. People at risk for inadequate vitamin A intake include groups who have a tendency not to eat enough vegetables, such as preschoolers and the elderly. And, since

Table 1.5 Approximate Vitamin A Content of Various Foods

	Serving size	Approximate Retinol Equivalents (µg RE)*
Sweet potato, cooked	1 medium (5 in. long)	2490
Carrot, raw	1 medium (6 in. long)	1715
Spinach, cooked	½ cup cooked	735
Cantaloupe	1 cup cubes	515
Mango	½ medium	405
Turnip greens, cooked	½ cup cooked	395
Winter squash, cooked	½ cup cubes	365
Collard greens, cooked	½ cup	300
Spinach, raw	1½ cups	300
Red bell pepper, raw	½ cup sliced	260
Apricots, dried	10 halves	250
Chinese cabbage, cooked	½ cup	220
Apricots, fresh	½ cup sliced	215
Vegetable juice, canned	6 oz.	215
Milk, skim	1 cup	150
Romaine lettuce	1 cup shredded	145
Pumpkin, cooked	½ cup mashed	135
Broccoli, cooked	½ cup chopped	110
Egg	1 large	85

*The recommended intake for Vitamin A for women is 700 µg RE/day.
Source: USDA Nutrient Database for Standard Reference, Release 13.

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vitamin A is stored in the liver, individuals with alcoholism or liver disease can have poor vitamin A status. Also, people with diseases that affect fat absorption can become deficient in vitamin A.

What if You Get Too Much Vitamin A?

Megadoses of vitamin A from supplements can cause vitamin A toxicity. This is especially dangerous during pregnancy since too much vitamin A can cause fetal deformities of the face and head, such as cleft lip, heart malformations, brain disorders, or even fetal death. Also, a special oral form of vitamin A that is prescribed for severe acne can produce serious birth defects. This drug, called Accutane, shouldn't be used prior to or during pregnancy. Similarly, Retin-A, the topical form, should only be used under a doctor's advice.

On the other hand, getting large amounts of carotene from plant foods such as carrots, carrot juice, and sweet potatoes doesn't appear to be dangerous for pregnant women or other persons. One side effect that can occur is a harmless condition called **hypercarotenemia**. Basically, the skin takes on a yellow-orange color as a result of high levels of carotene in the body.

While megadoses of retinol can cause birth defects, getting large amounts of carotene from plant foods doesn't appear to be harmful.

Tips for Including Vitamin A

One good strategy for including vitamin A in the diet is to snack on fresh fruits and vegetables throughout the day. Also, everyone should try to eat at least one vitamin A fruit or vegetable every day. A good tip to pass along is that dark green and orange choices are the best sources of vitamin A, so it helps to prepare colorful meals.

Vitamin C

Vitamin C is also known as ascorbic acid or ascorbate. Vitamin C is especially important for the WIC population because it helps the body resist infection and increases iron absorption. Vitamin C also produces and maintains collagen,

an important protein which holds the cells of the body together. Plus it helps to heal wounds, gives structure to blood vessels, and helps mend broken bones.

What if You Don't Get Enough Vitamin C?

A severe vitamin C deficiency causes a disease known as scurvy. Symptoms include slow wound healing, poor appetite, slow growth, loose teeth, bleeding gums, bruises, and swollen, painful joints (Note: Keep in mind that bleeding gums are often a result of poor dental hygiene rather than vitamin C deficiency.) Scurvy is very rare in the United States; however, there are a number of groups at risk for either severe or moderate vitamin C deficiency:

- **Infants who drink fresh cow's milk, evaporated milk, goat's milk, or powdered milk, instead of breastmilk or formula,** don't get enough vitamin C unless they receive fruit juice or other foods with vitamin C. Breastmilk and commercial infant formula, however, do supply adequate amounts of vitamin C.
- Certain **groups with poor eating habits** have low vitamin C intake, particularly teenagers who don't eat fruits or vegetables, and the elderly who cook for themselves and avoid "acid foods" because of heartburn.
- **People who smoke** need about twice as much vitamin C each day compared to non-smokers. Smoking cigarettes, among its many harmful effects, interferes with the body's use of vitamin C.
- **People who drink large amounts of alcohol** can experience a vitamin C deficiency due to inadequate intake and/or altered liver metabolism.

What if You Get Too Much Vitamin C?

Vitamin C is a water-soluble vitamin, so your body excretes excess amounts. However, very large doses, or megadoses, can lead to kidney stones. You may have heard that taking megadoses of vitamin C helps prevent colds and cure

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Current research doesn't support taking large doses of vitamin C to increase a person's resistance to infection.

infections. Adequate levels of vitamin C do help to fight infection, but current research doesn't support taking large doses of vitamin C to increase your resistance to infection. Again, most healthy people can easily get enough vitamins and minerals from foods, without the risk of getting too much. In cases where someone has a medical need for supplements, a health-care provider should prescribe them.

Where Is Vitamin C Found?

Numerous fruits and vegetables provide significant amounts of vitamin C, as listed in **Table 1.6**. Be aware that vitamin C is easily destroyed by things such as heat, light, and air, so the vitamin C content of a food varies depending on whether the food is raw, steamed, boiled, freshly harvested, previously stored, etc.



Tips for Including Vitamin C in the Diet

Everyone should try to eat one vitamin C food every day. Since vitamin C is easily destroyed, here are suggestions for getting the most vitamin C from foods:

- Avoid soaking vegetables in water.
- Steam vegetables or cook them in a small amount of water for a short a time.
- Cook potatoes in their skins.
- Cover and refrigerate juices.
- When choosing fresh produce, choose items that look fresh and aren't wilted.

- Grow your own fruits and vegetables at home.
- Choose either fresh produce in season or frozen produce. Fresh and frozen produce will generally offer more vitamin C than canned.

Table 1.6 Approximate Vitamin C Content of Various Foods

	Serving size	Vitamin C (mg)
Guavas	½ cup	150
Red bell pepper, raw	½ cup sliced	85
Kiwi fruit	1 medium	75
Orange juice	6 oz.	75
Orange	1 medium	70
Cantaloupe	1 cup cubes	70
Broccoli, cooked	½ cup chopped	60
Strawberries	8 medium	55
Grapefruit juice	6 oz.	55
Vegetable juice, canned	6 oz.	50
Brussels sprouts, cooked	½ cup	50
Grapefruit	½ medium	45
Papaya	½ cup cubes	45
Green bell pepper, raw	½ cup sliced	40
Potato w/ skin, baked	1 medium (5 in. long)	30
Sweet potato w/ skin, baked	1 medium (5 in. long)	30
Cauliflower, cooked	½ cup	25
Tomato, raw	1 medium	25
Mango	½ cup sliced	25
Green or red chiles, canned	¼ cup	25
Green cabbage, raw	1 cup shredded	20
Turnip greens, cooked	½ cup cooked	20

*The recommended intake for Vitamin C for women is 75 mg/day.
Source: USDA Nutrient Database for Standard Reference, Release 13.

Folic Acid

Folic acid is also called folate or folacin. Folic acid is common in green, leafy vegetables. In fact, this vitamin got its name from the Latin word *folium*, meaning 'leaf.' The body uses folic acid to make new cells, including red blood cells. Also, it's needed for protein synthesis and growth. Folic acid is especially important for women because it can help prevent a serious group of birth defects known as **neural-tube defects (NTDs)**. With this type of birth defect, the baby's brain, spinal cord, or both don't develop properly and the results can be serious. In addition, children and infants need ample amounts of folic acid during periods of rapid growth.

Folic Acid and Neural-tube Defects

Women who don't get enough folic acid during the first few weeks of pregnancy run a higher risk of giving birth to an infant with a type of neural-tube defect, such as spina bifida. Normally, the neural tube of the fetus develops and closes within the first 30 days of pregnancy, a time frame when many women don't even know they're pregnant. So public health experts recommend that all women in their childbearing years get adequate amounts of folic acid on a continuous basis from foods and/or daily vitamin/mineral supplements. That way, if a woman does get pregnant, she'll be getting the folic acid she needs in the early weeks. What's more, some drugs such as aspirin and oral contraceptives interfere with folic acid in the body, making it even more important for women to be sure they get enough.

To reduce the risk of NTDs, experts recommend that women of childbearing age consume 400 micrograms (μg) of synthetic folic acid daily along with food folate from a varied diet. Synthetic folic acid found in fortified foods and vitamin supplements is nearly 100 percent absorbed by the body, whereas naturally-occurring food folate is only about 50 percent absorbed.

Other Problems Related to Folic-acid Deficiency

Besides increasing the risk of NTDs, folic-acid deficiency interferes with normal cell division, protein synthesis,

To reduce the risk of neural-tube defects, all women of childbearing age should get 400 μg of synthetic folic acid a day (from supplements or fortified foods), along with naturally occurring sources of folic acid.



and growth. In particular, inadequate folic acid can lead to megaloblastic anemia. In this type of anemia, which is different from iron-deficiency anemia, the blood cells are malformed and can't carry enough oxygen. Cases of megaloblastic anemia do occur in the U.S., especially among pregnant women and people with alcoholism.

What if You Get Too Much Folic Acid?

Like vitamin C, folic acid is water-soluble so the body doesn't store excess amounts. But megadoses of folic acid could interfere with medications and could also mask a vitamin B₁₂ deficiency.

Table 1.7 Naturally Occurring Sources of Folic Acid

	Serving size	Folic acid (µg)*
Lentils	½ cup	180
Pinto beans	½ cup	150
Garbanzo beans	½ cup	140
Black beans	½ cup	130
Spinach	½ cup cooked	130
Asparagus	½ cup	130
Orange juice	1 cup, from frozen concentrate	110
Collard greens	½ cup cooked	90
Romaine lettuce	1 cup shredded	80
Sunflower seeds	¼ cup	75
Split peas	½ cup	65
Wheat germ	2 tbsp.	50
Brussels sprouts	½ cup	45
Broccoli	½ cup cooked	40
Orange	1 medium	40
Walnuts	¼ cup, halves	25

Source: USDA Nutrient Database for Standard Reference, Release 13.



Where Is Folic Acid Found?

As shown in **Table 1.7**, folic acid is naturally present in leafy, green vegetables, as well as other foods. Folic acid is sensitive to heat, so it's best to include raw vegetables in your diet, and for cooked vegetables, try to limit cooking time to 5 or 10 minutes.

Sources of Synthetic Folic Acid

In 1998, in an effort to reduce the incidence of neural-tube defects, the Food and Drug Administration began requiring that synthetic folic acid be added to grain products such as breads, flours, corn meal, rice, noodles, macaroni. A single serving of most fortified products supplies about 40 μg of folic acid (10 percent of the recommended level). However, a number of fortified breakfast cereals provide 200–400 μg of folic acid in just one serving. It's always best to check the label to be sure.

A Summary of the 13 Vitamins

Tables 1.8 and **1.9** provide a summary of the food sources, specific functions and problems related to deficiencies and excesses of the fat-soluble and water-soluble vitamins. These tables are for general reference.

Table 1.8 A Summary of the Fat-soluble Vitamins

Vitamin	Best Sources	Functions	Deficiency Symptoms	Toxicity Symptoms
A	<p>Retinol: Butter, milk, cheese and eggs.</p> <p>Carotene: Carrots, yams, sweet potatoes, peppers, spinach, kale, mango, papaya, apricot, cantaloupe.</p>	<ul style="list-style-type: none"> • Maintains eye health & needed for night vision. • Maintains skin & mucous membranes. • Helps resist infection. • Helps develop bones & teeth. 	Night blindness; eye changes leading to blindness; decreased resistance to infection; dry, scaly skin.	<p>Birth defects; miscarriage; severe headaches; nausea; loss of appetite; itchy skin</p> <p>(Note: Toxicity symptoms occur with excess retinol, not carotene.)</p>
D	<p>Direct exposure of skin to sunlight.</p> <p>Foods: fortified milk, fish oils, egg yolk, liver.</p>	<p>Associated with calcium metabolism:</p> <ul style="list-style-type: none"> • Promotes calcium absorption; • improves bone formation; • helps maintain blood calcium levels. 	Rickets in children: soft, deformable bones	<p>Diarrhea; nausea; headache; calcium deposits in heart, kidneys blood vessels.</p> <p>Vitamin D is the most toxic vitamin. Symptoms can appear at an intake of five times the Daily Value.</p>
E	Vegetable oils and shortening, butter, green vegetables, legumes, whole grains, nuts, liver.	Protects vitamin A and polyunsaturated fats in the body from oxidation.	Destruction of red blood cells; deficiency is rare except in premature babies.	Nausea, diarrhea, vomiting. Cases are rare.
K	Produced by bacteria in the intestine; also found in green leafy vegetables.	Helps clot blood.	Slow blood clotting; bleeding disorder in newborns (newborns routinely get a Vitamin K shot soon after birth).	In infants: jaundice, lung problems, anemia. Only the form of vitamin K called menadione is toxic in large amounts.

Table 1.9 A Summary of the Water-soluble Vitamins

Vitamin	Best Sources	Functions	Deficiency Symptoms	Toxicity Symptoms
C	Citrus fruits & their juices; broccoli, strawberries, kiwi, cantaloupe, guava, mango, papaya, cabbage, snow peas, peppers.	<ul style="list-style-type: none"> • Necessary for collagen formation. • Helps to heal wounds, develop healthy gums and teeth. • Helps resist infection. • Increases iron absorption. • Converts folic acid to its active form. • Strengthens blood vessels. 	Scurvy: easy bruising; loss of appetite, poor growth; depression; weakness; bleeding gums; painful joints; poor wound healing.	Vitamin C has little toxicity. However, people taking large doses can show signs of scurvy if they abruptly quit taking the vitamin.
Thiamin (B ₁)	Meats, especially liver & pork; wheat germ; whole-grain & enriched breads; legumes; peanuts; fresh green vegetables.	Part of an enzyme system that breaks down carbohydrates for energy.	Beriberi: confusion, loss of appetite, muscle wasting, heart failure, swelling of limbs.	No evidence of symptoms to date.
Riboflavin (B ₂)	Milk, organ meats, meat, fish, eggs, legumes, whole-grain and enriched breads & cereals; cheese, green leafy vegetables. (Note: Riboflavin is destroyed by sunlight.)	Helps break down fat for energy.	Cracks in corner of mouth; red swollen tongue; teary eyes; scaly skin around the nose; anemia.	No evidence of symptoms to date.
Niacin (B ₃)	Liver, meat, fish, poultry, peanuts, whole-grain & enriched breads & cereals.	<ul style="list-style-type: none"> • Helps break down carbohydrates, fats, protein. • Helps the body make some hormones and fat. 	Pellagra: weakness; loss of appetite; diarrhea; skin rash in areas exposed to the sun; sore tongue; dementia.	Flushing; nausea; liver damage.

Vitamin	Best Sources	Functions	Deficiency Symptoms	Toxicity Symptoms
B ₆ (Pyridoxine)	Meat, fish, poultry, milk, eggs, green vegetables, avocado, prunes, beans, bananas, whole-grain cereals, potatoes.	<ul style="list-style-type: none"> • Helps make body protein. • Helps break down proteins for energy. 	Abnormal brain function; skin changes.	Neurological problems.
Folic Acid (Folacin)	Green leafy vegetables, red meats, organ meats, oranges & juice, whole grains, beans, nuts, asparagus, broccoli, spinach.	Helps make new cells, including blood cells.	Anemia; sore tongue; diarrhea.	Hides vitamin B ₁₂ deficiency.
B ₁₂	Found only in animal products or yeast: meat, fish, poultry, eggs, milk, cheese.	<ul style="list-style-type: none"> • Helps make new cells, including red blood cells. • Helps keep nervous system healthy. 	Anemia; swollen tongue; poor appetite, poor coordination, mental disturbances.	No evidence of symptoms to date.
Pantothenic Acid	Organ meats, salmon, eggs, broccoli, mushrooms, pork, whole grains, legumes. Widespread in foods & produced by intestinal bacteria.	Assists in the breakdown & production of protein, hormones, cholesterol, and hemoglobin.	Deficiency is unlikely, unless it's part of a deficiency of all B vitamins. Nausea; diarrhea; cramps.	No evidence of symptoms to date.
Biotin	Widespread in foods, esp. organ meats, eggs, milk, whole-grain cereals, some vegetables.	Assists in the breakdown of carbohydrate, protein and fat for energy.	Lack of appetite; depression; dry skin; numb feet and hands.	No evidence of symptoms to date.

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Self-test Questions — Vitamins

1. The original goal of the RDAs was to prevent vitamin-deficiency diseases. What is the focus of the new DRIs?
2. Mark the following statements **TRUE** or **FALSE**:
 Vitamins are a good source of energy.
 Vitamins A, D, E, and K are stored in body fat.
 Taking megadoses of vitamins and minerals is advisable for healthy adults.
 It's very easy for the body to accumulate toxic levels of water-soluble vitamins.
3. Which of the following can increase the risk of birth defects in pregnant women?
(Check all that apply.)
 inadequate intakes of folic acid, especially during the first trimester
 Accutane
 large amounts of carrots and sweet potatoes
 megadoses of retinol (vitamin A)
 green leafy vegetables
4. List six good sources of vitamin A:
5. List two main functions of vitamin C:

6. Signs of vitamin C deficiency include (*check one*):

bleeding gums and easy bruising

depression

dental caries

night blindness

7. List six good sources of vitamin C:

8. Why is folic acid especially important for women of childbearing age?

9. List six good sources of folic acid:

Objectives

If the word “minerals” has you thinking of rock formations, gold mines, or heavy metals, then think again. Minerals in the body are anything but heavy – in fact, we need just tiny amounts of minerals in our diet. After reading this section, you’ll be familiar with the various roles of certain minerals, as well as problems that can occur with deficiencies and toxicities. Specifically, you’ll be able to:

- identify basic characteristics of minerals;
- list five risk factors for osteoporosis;
- define anemia and the function of iron in healthy blood;
- list three ways to increase iron absorption;
- identify true statements about sodium in the diet; and
- list four ways to reduce sodium intake.

Mineral Basics

Minerals are similar to vitamins in a number of ways. First, they're micronutrients, so we only need small amounts. Also, minerals are involved in numerous chemical reactions, plus they don't contribute calories to the diet. But, unlike vitamins, minerals aren't destroyed by heat. That means cooking doesn't affect the mineral content of a food. In fact, if you burn a food completely leaving nothing but ash, the ash is the food's mineral content.

While different minerals play specific roles in the body, most of their functions fall under two main headings:

Minerals are part of many cells in the body's structure, including:

- red blood cells
- bones, teeth, and nails
- muscle tissue

Minerals regulate many chemical reactions in the body, such as:

- helping maintain the right amount of water inside and outside the body's cells;
- keeping the heart beating normally;
- helping nerves respond normally;
- making the blood clot in wounds; and
- regulating the release of energy from food.

Types of Minerals

We divide minerals into two categories, based on how much the body needs: **major minerals** and **trace minerals**. Our bodies need major minerals in greater amounts as compared to trace minerals. The major minerals include calcium, phosphorus, potassium, sodium, chlorine, magnesium, and sulfur.

Trace minerals make up less than 1 percent of the total minerals in the body. Still, they're essential for good health. The trace minerals include iron, iodine, fluoride, zinc, manganese, chromium, cobalt, molybdenum, copper, and selenium. In addition to these, scientists have identified other trace minerals, but they're still learning about their functions and how much our bodies need.

Can You Get All the Minerals You Need from Foods?

As with other nutrients, most people who eat a balanced and varied diet can get all the minerals they need. However, some people need additional amounts of certain minerals; more than what they can get from their diet. For example, people who have had chronic blood loss or multiple pregnancies typically need extra iron. Also, physicians often prescribe extra calcium for women at risk of osteoporosis.

Can You Get Too Much of Any Mineral?

Yes, excessive intakes of minerals can be dangerous. However this is usually a result of taking too many supplements rather than ingesting high levels from foods. One dangerous example is accidental iron poisoning in young children who consume excessive quantities of iron supplements. An overdose of supplemental iron can kill a young child.

Minerals of Special Interest in WIC: Calcium, Iron, Fluoride, and Sodium

While all minerals are important, WIC is especially interested in teaching clients about calcium, iron, and fluoride. These minerals are significant for good health, especially during periods of growth. Sodium is also a mineral of special interest since Americans tend to get more sodium than they need.

Calcium

Forming and maintaining bones is calcium's main job, and, in fact, the human skeleton contains 99 percent of the body's

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calcium. But calcium's role goes beyond the skeleton. The bones are in a continuous state of change — they constantly take up calcium and then release it back into the blood. This action helps maintain a steady calcium supply in the bloodstream for functions such as:

- forming teeth;
- clotting blood;
- stimulating nerves;
- maintaining normal blood pressure;
- helping muscles contract; and
- maintaining the heartbeat.



As your body uses calcium, you need to replace it by eating more calcium-rich foods. If you don't eat enough, your bones end up releasing more calcium than they take up. This leaves space in the bones where calcium should be, so they become porous and fragile. But if you eat a healthy diet with plenty of calcium-rich foods you'll have stronger bones.

Calcium During Childhood and Adolescence

Have you noticed how children and young teenagers seem to suddenly grow, as if overnight? Rapid growth means the bones are getting longer and thicker, so those are times when the body needs even more calcium. Nearly *half* of the body's bone mass is formed between ages 11 and 15 in girls and ages 12 and 17 in boys. Calcium recommendations are higher for adolescents, plus their bones are programmed to take up calcium more easily. It's crucial that kids in this age group get enough calcium in their diets. Those who don't put themselves at risk because they start their adult lives with a calcium deficit.

Calcium During Adulthood

After age 19 or so, our bones quit growing, but we still keep building more bone mass throughout our twenties. Then, after about age 30 or 35, the bones start to lose more calcium than they gain, a natural part of the aging process. This slow

Once we reach our mid-30s, our bones start to lose more calcium than they gain.

bone loss that occurs in adulthood gradually weakens the skeleton. For women in their childbearing years, the hormone estrogen helps protect bones but, after menopause, bone loss seems to speed up due to hormonal changes.

Osteoporosis

In later adulthood, if there's a long history of poor calcium intake and/or other risk factors, *osteoporosis* can develop. This condition is also called porous bones or brittle-bone disease. A person with osteoporosis may have a humped back because the bones of the spine have shrunk. Also, sufferers have a high risk of breaking bones, even with a slight knock or fall. Osteoporosis is a painful disease with no cure. Risk increases with:

- being a woman
- early menopause
- a family history of osteoporosis
- being of Caucasian or Asian race
- being underweight
- smoking cigarettes
- alcohol abuse
- a sedentary lifestyle
- a very low intake of dietary calcium

The best way to try to avoid osteoporosis is to make sure you reach adulthood with a strong skeleton and to try to reduce calcium loss as you age. In young people, eating a diet rich in calcium helps build and maintain strong bones. For adults, a high-calcium diet helps reduce bone loss. Also, exercising, not smoking, not abusing alcohol, and receiving hormone treatment during and after menopause can help to prevent osteoporosis.

Many adults wonder if they can make up for their teen years when they didn't eat enough high-calcium foods. Unfortunately, after we reach about 30 to 35 years old, we don't add extra calcium to the bone matrix, so our bones are as dense as they'll ever be. Still, it's never too late to start



Getting more calcium during your later adult years won't increase your bone density, but it can slow down the process of bone loss.

consuming more calcium. Adults can slow down the natural process of bone loss by eating more calcium-rich foods and by making healthy lifestyle choices.

Who is in Danger of Not Getting Enough Calcium?

- Women and girls – From about the age of 10 years on, most females don't consume enough calcium. Many are concerned about getting too much fat and too many calories so they avoid many foods including dairy products.
- Vegans – Strict vegetarians who don't consume any dairy products have to be very careful about getting calcium from other sources or they won't meet their calcium needs (see page 3-27).
- Persons with lactose intolerance – As explained below, people in this group tend to avoid dairy products, so there's a tendency for these individuals not to get enough calcium.

Lactose Intolerance and Calcium Intake

Many people have difficulty digesting lactose, the sugar in milk. This includes most people of Asian, African, Native American, or Middle Eastern origin. If they drink a large glass of milk, they get cramps, gas, and diarrhea, a condition known as lactose intolerance. Those who avoid milk and foods made with milk can find it hard to get enough calcium. Here are some suggestions for people with lactose intolerance:

- Try small amounts of milk with meals.
- Try cheese, yogurt and pudding. These foods are sometimes easier to digest and cause less stomach upset.
- Purchase lactose-reduced milk.
- Try foods and recipes that include milk or cheese as ingredients, such as pancakes, waffles, milk-based soups, and casseroles with cheese.
- Try non-dairy sources of calcium (see listing of calcium-rich foods).

How Much Calcium Do We Need?

The Food and Nutrition Board of the National Academy of Sciences released new calcium recommendations in 1997. To reduce the risk of osteoporosis, the recommendations for most age groups are higher than earlier recommendations (Table 1.10).

Food Sources of Calcium

Milk and milk products are the main source of calcium for most Americans, providing about 73 percent of the calcium in our food supply. Dairy products also offer protein, vitamin D, and phosphorus, all of which help the body to use calcium.



People who don't consume many dairy products can get their calcium from a number of non-dairy choices, although it's not easy. Fortified soy milk, firm tofu, and fish with edible bones offer considerable amounts, as well as fortified foods, like calcium-fortified grapefruit and orange juice. Some vegetables and leafy greens contribute calcium to the diet,

Table 1.10 Recommended Intakes of Calcium

Age/condition	mg/day
1–3 years	500
4–8 years	800
9–18 years	1300
Adults to age 50	1000
Adults over 50	1200
Pregnant & lactating (up to 18 years)	1300
Pregnant & lactating (19–50 years)	1000

Source: Food and Nutrition Board, National Academy of Sciences, 1997.

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Oxalates, phytates, and caffeine are compounds in foods and beverages that interfere with calcium absorption.

although certain plant foods (spinach, Swiss chard, beet greens, rhubarb, and amaranth) have high amounts of oxalates that bind to some of the calcium, making it unavailable. Likewise, grains may contain phytates that reduce calcium availability, and caffeine is also a culprit that interferes with calcium absorption. **Table 1.11** lists various foods that contribute calcium to the diet.

Table 1.11 *Approximate Calcium Content of Various Foods*

	Serving Size	Calcium (mg)*
Total® cereal	¾ cup	1000
Calcium-fortified orange juice	8 oz.	350
Lowfat yogurt	1 cup	300
Cheddar cheese	1.5 oz.	300
Skim milk	1 cup	300
Canned sardines with bones	3 oz.	265
Firm tofu, set with calcium sulfate	1 cup	200
Calcium-fortified bread	1 slice	200
Blackstrap molasses	1 tbsp.	170
Pudding, made with milk	½ cup	150
Spinach, cooked	½ cup	120
Turnip greens, cooked	½ cup	100
Almonds	¼ cup	90
Sesame seeds	1 tbsp.	90
Ice cream	½ cup	85
Lowfat cottage cheese (1% milkfat)	½ cup	80
Parmesan cheese	1 tbsp.	70
Pinto beans, cooked	½ cup	50
Okra, cooked	½ cup	50
Corn tortillas, made with lime-processed corn	2 tortillas	40
Broccoli, cooked	½ cup	35

*Actual amounts of calcium can vary quite a bit among brands, especially for foods such as tofu, yogurt and other processed foods. Read the labels to determine calcium levels in various brands.

Source: USDA Nutrient Database for Standard Reference, plus product labels.

What About Calcium Supplements?

Physicians sometimes recommend calcium supplements for individuals who don't get enough calcium in their diets, especially post-menopausal women. However, people shouldn't rely on supplements as their major source of calcium, nor should they let supplements take the place of a healthy lifestyle. Also, calcium supplements can interfere with iron absorption, so it's best to avoid taking them along with iron-rich meals or iron supplements.

Fluoride

During early childhood, fluoride helps to strengthen developing tooth enamel and protect teeth from decay. When fluoride is lacking, tooth decay is common. In one study that followed individuals from birth to adolescence from 1946 through 1979, water fluoridation resulted in a 40 to 60 percent reduction in caries of permanent teeth compared to an area where there was no fluoride in the water.

Some people oppose water fluoridation, claiming that it can lead to cancer and other chronic health problems. However, the American Dental Association has collected extensive research to show that such claims are unfounded. Water fluoridation is one of the most carefully studied public health measures, and data show that fluoridation does not increase the incidence of cancer, heart disease, Down Syndrome, liver disease, kidney disease, or any other chronic illness.

Sources of Fluoride

The main source of dietary fluoride is water. Fluoride may be naturally present in water or added to the community water supply, although fluoride levels will vary from one area to another. The ideal level in Texas is 0.8 ppm (eight-tenths part fluoride per million parts water).

Topical fluoride treatments, as well as toothpastes and rinses with fluoride, offer additional protection against



Water fluoridation is one of the most effective ways to reduce the occurrence of cavities and research shows that fluoridation is safe.

dental caries, although fluoridated water is a much more reliable source. Also, some foods contribute fluoride, including tea, fish with edible bones, and some commercially prepared foods.

What About Fluoride Supplements?

Over the years, there have been different recommendations regarding fluoride supplementation for infants and toddlers, especially for infants who are exclusively breastfed. A 1997 American Academy of Pediatrics policy paper states that the organization does not recommend giving fluoride to either breastfed or bottle-fed infants during the first 6 months of life. From 6 months to age 3, the policy states that children require fluoride supplements only if the levels of fluoride in the water supply are very low (< 0.3 ppm). Parents should check with their dentist or pediatrician to see what the recommendations are in their area.

When giving fluoride supplements, it's important to carefully follow the recommended dosage. Too much fluoride may discolor the teeth in children, and at very high levels can result in extremely weak and brittle teeth.

Fluoride supplements are recommended in areas with very low fluoride levels (< 0.3 ppm), starting at 6 months of age.

Iron

Our bodies only need small amounts of iron, yet getting enough in the diet can be a challenge. Iron needs are highest during rapid periods of growth, so infants, children, and pregnant women are at higher risk for becoming deficient. One of the goals of the WIC Program is to prevent iron-deficiency anemia in low-income women, infants, and children.

Iron is a trace mineral that our bodies need for normal growth, to prevent infections, and to promote learning. But iron's main job is to help form **hemoglobin**, a protein in red blood cells. Specifically, iron carries oxygen within the hemoglobin molecule. When hemoglobin combines with oxygen, it turns red, giving blood its red color. Then hemoglobin travels to all of the body's cells, taking oxygen to the tissues for energy production.

*Iron helps to form **hemoglobin**, which supplies oxygen to the body's cells. When you run low on iron, your cells don't get all the oxygen they need, so they can't produce as much energy.*

If you don't get enough iron in your diet, or if your body's iron stores get too low, your red blood cells can't carry as much oxygen. That means there's less oxygen going to the body's cells, so they can't produce as much energy. The end result? You feel tired, weak, and irritable – symptoms of **iron-deficiency anemia**.

Iron-deficiency Anemia

If you don't get enough iron to meet your needs, over time you'll develop an iron deficiency, which then leads to anemia. A person who is anemic may have enough energy for most activities of daily living, but any physical effort becomes very difficult. Running, climbing stairs, or even rapid walking is hard, because the muscle cells do not have the oxygen they need to produce energy.

Causes of Iron-deficiency Anemia

Iron-deficiency anemia is a widespread health problem, especially among infants, growing children, and women in their childbearing years. The main causes are poor dietary intake, rapid growth, major blood loss, or a combination of these factors.

Symptoms of Iron-deficiency Anemia

- difficulty learning
- slow growth
- shorter attention span
- poor appetite
- problems breathing, especially during exercise
- less resistance to infection
- pale skin and nails
- reduced ability to exercise
- less ability to regulate temperature
- changes in behavior

Poor Iron Intake — Poor iron intake is a common cause of anemia. Many foods are relatively low in iron, so it takes a well balanced diet with plenty of iron-rich foods to meet recommended levels. And it's a well known fact that many people don't eat a well balanced diet.

- **Children and teenagers** often eat a lot of iron-poor foods, such as soft drinks, snack crackers, chips, cookies, and candies, and these replace iron-rich foods in the diet.
- Many **women and teenage girls** put themselves on calorie-restricted diets to lose weight, making it difficult for them to eat adequate amounts of iron-rich foods.
- For many **infants**, there's a sudden drop in dietary iron at 1 year of age when they switch from either iron-fortified formula or breastmilk to cow's milk, since cow's milk is a poor source of iron.
- Some **children** drink more milk than they need, and, as a result, don't eat enough iron-rich foods. This combination of a low intake of solid foods and excessive milk intake can contribute to iron-deficiency anemia.



If a child fills up on too much milk, his intake of iron-rich foods can suffer.

Blood Loss — 60 percent to 70 percent of all the iron in the body is contained in the blood, so losing large amounts of blood can lead to anemia.

- **Menstruation:** Women lose iron with blood during menstruation. Women with heavy menstrual periods may need iron supplements to prevent anemia.
- **Childbirth:** Blood lost during delivery can cause women to have less iron in reserve. Women who have pregnancies close together without iron supplementation may not be able to build up their iron stores between pregnancies. Mild anemia has little effect on the quantity of iron in breastmilk, but the mother may be at greater risk of developing infections.
- **Intestinal bleeding:** This can occur in very young infants fed cow's milk. Also, untreated ulcers and excessive, long-term use of aspirin can cause intestinal bleeding.

- **Parasites:** Worms that attach to the intestine can cause a small but daily loss of blood which often leads to anemia.
- **Blood donation:** Donating blood too often can cause anemia. Blood banks test for anemia before allowing people to donate blood.

Rapid Growth – Growth requires more iron to make extra blood and muscle. Rapid growth occurs during pregnancy, infancy, early childhood and adolescence.

- **Pregnancy** doubles a woman’s iron needs because of increased blood volume. Pregnant women have at least 3 more pints of blood compared to their pre-pregnancy state. During the last three months of pregnancy, the fetus stores iron in its body, even if the mother is anemic. So mild anemia in a pregnant woman won’t harm the fetus, but the mother may experience fatigue and an increased heart rate. The mother is also at greater risk of developing infections.
- **In infants, children, and adolescents**, rapid growth combined with poor intake often leads to anemia. Adolescent boys who are growing rapidly and building larger muscles need additional iron for their muscles and their larger blood volume. Young girls need extra iron at puberty for increased growth and because they start losing blood with menstruation.
- **Premature infants and twins** often don’t have the opportunity to build up their iron stores the last few months before birth. Full-term infants, on the other hand, are usually born with enough iron to last through the first four to six months of age.

Food Sources of Iron

Iron is found in many foods (**Table 1.12**). Iron is present in foods in two different forms: heme and non-heme iron.

Heme iron – Most of the iron found in animal products is heme iron. The body absorbs about 15 to 35 percent of heme iron, which is pretty good compared to non-heme. Excellent sources of heme iron are meats like chicken, beef, pork, and fish.



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Non-heme iron – The iron in plant sources is called non-heme iron. The body only absorbs about 2 to 20 percent of non-heme iron. Moderately good sources include dried beans, tofu, blackstrap molasses, dried fruit, and fortified cereals.

Table 1.12 *Approximate Iron Content of Various Foods*

	Serving size	Iron (mg)*
Total® cereal	¾ cup	18.0
Soybeans, cooked	½ cup	4.4
Blackstrap molasses	1 tbsp.	3.5
Potato, baked with skin	1 medium	2.7
Beef (ground, extra lean, cooked)	3 oz.	2.2
Pinto beans, cooked	½ cup	2.2
Figs, dried	5 medium	2.0
Tofu, firm	½ cup	1.8
Apricots, dried	10 halves	1.6
Almonds	¼ cup	1.5
Sesame seeds	1 tbsp.	1.3
Raisins	⅓ cup packed	1.1
Prunes	5 medium	1.0
Chicken (without skin, cooked)	3 oz.	1.0
Bread	1 slice	0.9
Pork (cooked)	3 oz.	0.9
Turnip greens, cooked	½ cup	0.6
Peanut butter	2 tbsp.	0.6
Mustard greens, cooked	½ cup	0.5
Fish (cooked)	3 oz.	0.5

*The recommended intake for iron for women is 18 mg/day and 27 mg/day for pregnant women. Source: USDA Nutrient Database for Standard Reference, plus product labels.

Iron Absorption

It's possible either to help or to hinder the amount of iron your body absorbs. For example, eating vitamin C-rich foods along with foods containing iron increases iron absorption. Also, heme iron helps the body to absorb non-heme iron. On the other hand, tea, coffee, spinach, chocolate, soy protein, wheat bran, calcium supplements, and fiber all interfere with iron absorption. So, to increase the amount of iron that you absorb, here are some tips:

- **Include vitamin C-rich foods when you plan meals.** For example, serve green and red peppers along with chicken or beef, or orange juice along with iron-fortified cereal.
- **Avoid drinking tea and coffee with meals,** including decaffeinated coffee and tea (it's not the caffeine that decreases iron absorption, but substances called polyphenols).
- **Cook foods in iron pots.** When highly acid foods such as tomatoes in spaghetti sauce or chili are cooked in iron pots, a small amount of the iron is absorbed into the food, increasing its iron content.
- **Include meat in your diet.** The iron in meat is well absorbed, plus it helps the body absorb iron from plant sources.

In addition to choosing iron-rich foods, you can maximize your iron intake if you carefully plan your meals.

Sodium

Sodium is one of the major minerals in the fluid that surrounds body cells. Our bodies need sodium to:

- transmit nerve impulses
- help balance fluids in the cells
- help muscles relax
- regulate blood pressure

While sodium is essential for body function, the flip side is that too much



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dietary sodium is associated with high blood pressure. High blood pressure causes the heart to work harder and, if it goes undetected, it can eventually damage the heart, brain, kidney, and/or arteries. So, while high blood pressure is itself an illness, it's also a major risk factor for heart attacks, strokes and kidney disease.

A number of factors can contribute to high blood pressure – a high-sodium diet is just *one* factor that contributes to the disease, and only in *some* individuals. But there's no way to tell who might develop high blood pressure from eating too much salt. And since cutting back on sodium isn't harmful, it's good advice for most Americans.

Another health concern regarding excess sodium is that it can increase the amount of calcium excreted in the urine. So, eating less salt may cut down on calcium lost from bone, which in turn could lower the risk of osteoporosis and fractures.

Reducing Sodium Intake

Obviously, there are some good reasons to limit dietary sodium, although, for many people, that's easier said than done. Americans dine on all kinds of processed foods loaded with sodium: canned and instant soups; canned meat and fish; crackers, chips and pretzels; lunch meats and cheese; frozen meals; and condiments such as soy sauce, ketchup and pickles. In fact, most Americans get six to 12 times the amount of sodium their bodies actually need! Still, with a little effort, most people can lower their salt intake. Here are some tips:

- Rather than ordinary canned vegetables, choose fresh, frozen, or low-sodium canned vegetables.
- Choose fresh or frozen meat, poultry, and seafood rather than canned, cured, or smoked products.

Only certain individuals appear to be sensitive to sodium in foods. Still, eating less sodium is a good idea for everyone.



- Read the label to check the sodium content of processed foods, especially frozen dinners, packaged mixes, soups, salad dressings, and sauces.
- Look for labels that say “low-sodium.” They contain 140 mg (about 5% of the Daily Value) or less of sodium per serving.
- Go easy on the condiments.
- Rather than salt, learn to use spices and herbs to enhance the flavor of food.
- Leave the salt shaker in the cupboard.

A Summary of Important Minerals

Table 1.13 provides a summary of the food sources, specific functions, and problems related to deficiencies and excesses of important minerals in the diet. This table is for general reference.

Table 1.13 Important Minerals in the Diet

Mineral	Best Sources	Functions	Deficiency Symptoms	Toxicity Symptoms
Calcium	Milk and milk products; salmon and small fish with bones; dark green vegetables, legumes.	<ul style="list-style-type: none"> • Helps blood to clot. • Stimulates nerves. • Helps muscles contract. 	Poor bone development and bone weakening leading to osteoporosis.	Constipation, kidney stones. An excess cannot be caused by food intake alone.
Iron	<p>Heme: chicken, beef, pork, fish.</p> <p>Non-heme: Legumes, dried fruit, green vegetables, fortified cereals.</p>	Forms hemoglobin in the red blood cells and myoglobin in the muscle cells, which transport and hold oxygen in the body.	Anemia: Weakness, tiredness, irritability, loss of appetite, increased susceptibility to infections, decreased attention span. If prolonged, growth retardation.	Iron overload: Infections, liver injury, acidosis, bloody stools, shock. Cannot be produced by food intake alone.
Fluoride	<p>Fluoridated water, toothpaste and mouth rinses with fluoride, some processed foods.</p> <p>Naturally occurring fluoride in water.</p>	<ul style="list-style-type: none"> • Prevents tooth decay by hardening tooth enamel. • Helps prevent osteoporosis. 	Fluoride is not an essential nutrient. But without it, there is increased tooth decay in children and increased bone loss in older adults.	Discolored teeth when the excess occurs in childhood. Massive doses are toxic.
Phosphorus	Distributed widely in foods. Milk and milk products are rich sources; soft drinks, meat, eggs, poultry, nuts, legumes, whole grains, processed foods.	<ul style="list-style-type: none"> • Forms bones and teeth. • Needed to make proteins, enzymes and new cells. • Helps maintain acid-base balance. 	Rare. Stunted growth, poor bone development, weakness, loss of appetite, pain in bones.	No symptoms reported. High intakes can increase calcium loss.
Sodium	Table salt, soy sauce, MSG, salty snack foods, foods prepared in brine,	<ul style="list-style-type: none"> • Helps maintain water balance. • Helps maintain acid-base balance. 	Rare. Nausea, vomiting, tiredness, cramps.	If prolonged, may lead to high blood pressure in some persons.

*Nutrients in the
Foods We Eat*

Mineral	Best Sources	Functions	Deficiency Symptoms	Toxicity Symptoms
Sodium (cont'd)	such as olives or pickles, salty smoked meat or fish, cheeses, canned or instant soup. Milk, meat, poultry and eggs also contain sodium.	<ul style="list-style-type: none"> • Stimulates nerves; • Helps muscles contract. 		
Potassium	Orange juice, bananas, dried fruits, potatoes are rich sources. Also found in meats, fish, poultry, whole grains, fruits and vegetables.	<ul style="list-style-type: none"> • Maintains the heartbeat; • Helps muscles contract; • Stimulates nerves. 	Tiredness, weakness in limbs, rapid heartbeat, heart failure, kidney damage.	Cannot be produced by food alone.
Magnesium	Green leafy vegetables, nuts, whole grains, meats, milk, seafood, chocolate.	<ul style="list-style-type: none"> • Forms bones; • Helps muscles function. 	Tremors, convulsions.	Heart changes, coma. Cannot be produced by food intake alone.
Iodine	Iodized salt, seafood, and food grown near the ocean.	Part of thyroid hormones that control energy production in the body.	Goiter (enlarged thyroid gland). During pregnancy, deficiency causes cretinism, a form of mental retardation, in the baby.	Thyroid disturbances.
Zinc	Meat, liver, oysters, herring, fish, milk, whole grains, nuts, legumes.	<ul style="list-style-type: none"> • Helps form enzymes and insulin; • Helps produce body proteins; • Helps the body use vitamin A; • Provides normal taste sensations. 	Poor wound healing; decreased sense of taste; retarded growth and sexual development.	Nausea, vomiting, diarrhea. Difficult to produce from food alone.

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Self-test Questions – Minerals

1. Mark the following statements **TRUE** or **FALSE**.

_____ Minerals are easily destroyed by heat.

_____ Minerals are an excellent source of energy.

_____ Accidental iron poisoning can be fatal in young children who consume excessive quantities of iron supplements.

2. List five risk factors for osteoporosis:

_____	_____
_____	_____

3. Mark the following statements **TRUE** or **FALSE**.

_____ After you reach your early to mid-30s, your bones are as dense as they'll ever be.

_____ People with lactose intolerance must avoid all forms of dairy foods.

_____ Iron's main job is to form hemoglobin, a protein in red blood cells.

_____ There's no danger of getting excessive amounts of fluoride from supplements.

4. Which nutrient increases iron absorption? (*Check one.*)

- vitamin C
- biotin
- vitamin D
- vitamin A

5. Which food listed provides iron in the most absorbable form? (*Check one.*)

- spinach
- rice
- hamburger
- peas
- pinto beans

6. Iron-deficiency anemia is (*check all that apply*):

- most commonly caused by a low dietary intake of iron, rapid growth, and/or major blood loss.
- avoidable by eating a low-sodium diet.
- a condition of the blood in which iron stores are higher than normal.
- common among adult men.

7. List three tips for increasing the amount of iron absorbed from foods:

8. Mark the following statements **TRUE** or **FALSE**.

- _____ Most Americans consume six to 12 times the amount of sodium their bodies require.
- _____ Excess sodium can increase the amount of calcium excreted in the urine.
- _____ It's easy to tell if a person will develop high blood pressure from a high-salt diet.
- _____ A high-sodium diet is the only factor that contributes to high blood pressure.

9. List four tips for reducing sodium in the diet:

Objectives

Water does a lot more than simply quench our thirst. It's a vital nutrient for health and survival. In fact, losing just 10 percent of your body's water can cause severe weakness and heat stroke. And, while the human body can live for weeks without food, biological processes stop within days without water. After reading this section, you'll be able to:

- recognize various functions of water;
- identify appropriate recommendations concerning daily fluid needs;
- list three factors that increase a person's need for water; and
- state three practical ways to consume more fluid on a daily basis.

Water in the Body

Our bodies are about 55 to 75 percent water – that translates to about 10 to 12 gallons in most adults. Since we carry around that much water, it's no surprise that this essential nutrient performs some very important functions in the body:

Composition of body fluids – Water is the main component of fluids such as blood, saliva, urine, gastric juices in the stomach and amniotic fluid in pregnant women.

Lubrication – Water helps to lubricate the joints and moisten the eyes and mucous membranes.

Regulation of body temperature – Thanks to water, the human body is able to maintain a fairly constant temperature of about 98.6 degrees. When your body needs to get rid of excess heat, you lose water in the form of sweat, similar to the water in your car's radiator. So in hot, humid weather, or when you exercise vigorously, you perspire to get rid of the heat. To make sure you don't overheat, you need to drink plenty of water.

Removal of waste products – Most of the waste products and unwanted substances in our bodies are water-soluble. Water carries these substances out of the body through the urine.



Adults should consume 8-12 cups of fluid each day in the form of drinking water, non-caffeinated and nonalcoholic beverages, and solid foods.

Meeting Water Needs in Adults

We lose water every day – about 10 cups on the average. Some is excreted in urine and feces, some is lost through the skin as perspiration and some leaves the lungs when we breathe. Also, certain factors can increase fluid needs, including pregnancy, breastfeeding, being elderly, eating a high-fiber diet, being sick, being exposed to extreme temperatures, and performing strenuous work or exercise.

Since our bodies don't store extra water, we have to make up for what we lose by consuming water on a daily basis. Most adults should consume about 8 to 12 cups of fluids every day. While a large part of this should come from drinking water,

foods and other beverages also contribute a significant amount to our daily fluid intake. In fact, solid foods provide about 4 cups of water each day for the average adult.

So how do you know if you're getting enough fluids? Usually, thirst is a signal that you need more fluids, but don't rely completely on thirst. Keep an eye on urinary output. If you're excreting about one to two liters of fairly clear urine, then you're getting enough water. But a small amount of dark-colored urine means you need more fluids. Also, it helps to make a conscientious effort to drink plenty of fluids throughout the day. Here are some practical tips:

- Fill a large pitcher with water, store it in the refrigerator, and use this water for all your drinking needs during the day. Aim to drink about 64 ounces, keeping in mind you'll also get fluids from foods and other beverages.
- If you're on the go, keep a water bottle with you throughout the day. Or, if you work at a desk, always have a glass of water handy to sip on.
- Avoid beverages that contain caffeine and alcohol. These act as diuretics, so you end up losing water in the urine.
- Always include water, soup, or some other beverage with every meal and snack.
- Be sure to drink some water before, during, and after physical activity. This is especially important if you exercise outside in hot weather.
- Since many fruits and vegetables have a high water content, enjoy them on a routine basis – especially foods like lettuce, broccoli, watermelon, oranges, and grapefruit.



Dehydration

If you don't replace the water you lose, the body becomes dehydrated. Essentially, the body overheats, resulting in weakness, dizziness, and headache. Severe dehydration is dangerous – the symptoms can progress rapidly from exhaustion to delirium and end in death. In Texas, where

You should drink fluids at the first signs of mild dehydration (thirst, dry mouth, flushed skin, fatigue, and headache). Otherwise, it can easily progress.

extreme summer temperatures are common, dehydration is a very real concern. People who work or play outdoors during the day or those who don't have air conditioning in their homes need to be extremely careful and drink plenty of fluids.

Even mild dehydration is something to be concerned about. Losing as little as 2 percent of body weight in the form of fluids can affect physiological responses and impair performance. Plus, new studies suggest that fluid and water intake may affect a person's risk of various disorders, including urinary stone disease and certain types of cancer.

Fluids for Children

Children need about 6 to 8 cups of fluids each day, depending on their weight. Like adults, they get their fluids from water, as well as milk, juice, and solid foods. And, while adequate fluids are important, too many fluids can interfere with the intake of calories and nutrients from other foods. For example, if a toddler drinks an excessive amount of juice throughout the day, he probably won't consume the amount and variety of other foods he needs to meet his nutrient needs. So the recommendation is to avoid giving more than 4 to 6 ounces of juice per day. For milk, the recommendation is 16 ounces of milk a day.

Healthy infants are generally able to get all the fluids they need from breastmilk or infant formula that is properly diluted. Parents who are concerned about hot climates, etc., should talk with their health-care provider about situations where small amounts of water (a total of about 4 to 8 ounces for the day) for older, healthy infants may be recommended.



Dehydration in Children and Infants

Infants and young children have a greater portion of their body weight as water, so fluid loss from diarrhea, vomiting, or

sweating can easily lead to dehydration. Symptoms to look for include a reduced amount of urine, dry membranes in the mouth, no tears when crying, sunken eyes, and restlessness, irritability, or lethargy. Children who are dehydrated should be seen by a physician immediately.

Water Intoxication in Infants

While dehydration can be a concern for infants, getting too much water can be just as dangerous. Overdiluted formula or too much plain water can lead to a number of problems. First, infants who get too much water don't get enough calories to meet their needs for growth and development. And, in more serious cases, excess water leads to water intoxication. The symptoms of this life-threatening condition include respiratory failure, seizures, and convulsions.

Water intoxication can occur when caregivers give excessive amounts of water for reasons such as diarrhea, infection, irritability, fussiness, because an infant seems "very thirsty" or because it's a very hot day. Also, caregivers who can't afford adequate amounts of formula may try to stretch it by overdiluting the formula or by substituting bottles of water for formula feedings. So it's important to teach clients to dilute formula properly and instruct them on the dangers of giving excess water.

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Self-test Questions – Water

1. How does water function in the body? *(Check all that apply.)*

- lubricates the joints
- maintains body temperature
- provides energy
- removes waste products from the body

2. List three factors that increase fluid needs:

3. Mark the following statements **TRUE** or **FALSE**.

- Adults should consume about 8–12 cups of fluid on a daily basis from water, foods, and other beverages.
- Solid foods contribute negligible amounts of fluid so they don't count as part of your daily fluid consumption.
- Young children shouldn't get more than 4–6 ounces of juice per day.
- Newborns need lots of extra water in addition to breastmilk or formula so they don't get dehydrated.

4. List three ways you can help ensure that you're meeting your fluid needs:



What Should Americans Eat?

2

Overview

Now that you've learned about the nutrients the body needs, how do you go about transforming that information into dietary recommendations for WIC clients? Fortunately, the U.S. Department of Agriculture and other government agencies have done some of the groundwork for you. Since the 1950s, the U.S. government has collaborated with scientists, universities, nutrition professionals, and the food industry to design guidelines and nutrition education information for Americans. The government periodically updates this information to reflect current scientific and medical advice. Currently, there are three key tools that can support and enhance your nutrition education efforts:

- the Dietary Guidelines for Americans,
- the Food Guide Pyramid, and
- the Nutrition Facts Label.

In this section, we'll take a look at each of these guides to see how they can help you educate clients and help all of us make healthier food choices.

Objectives

What would you eat if you didn't know which foods were the most nutritious, or which choices offered balance and variety? Left to our own devices, some of us might choose to live on nothing but chocolate and ice cream! But, fortunately, the Dietary Guidelines for Americans are available to help us make healthy decisions regarding food choices and physical activity. After completing this section, you'll be able to:

- state the purpose of the Dietary Guidelines;
- identify specific Dietary Guidelines; and
- list three tips for creating practical messages based on the Dietary Guidelines.

The Dietary Guidelines for Americans

In 1980, the United States Department of Health and Human Services and the United States Department of Agriculture issued the first Dietary Guidelines for Americans. Since then, they've published an updated version of the guidelines at least every five years to make sure the messages stay current.

The main purpose of the guidelines is to help healthy Americans ages 2 years and over make food choices that promote health and prevent disease. While it's likely that many Americans have never seen the actual guidelines, chances are that they've gotten the messages in other ways. Nutrition professionals incorporate the guidelines into their counseling and educational efforts; the food industry uses them to develop messages for consumers; and numerous health programs, including WIC, utilize the guidelines when developing programs and educational materials.

In May 2000, the government released the fifth edition of the Dietary Guidelines for Americans. The document carries three basic messages referred to as the "ABCs for good health":

- Aim for fitness.
- **Build** a healthy base.
- Choose sensibly.

Grouped under each of these three messages are specific recommendations, a total of 10 guidelines in all (see page 2-5). In the following pages, we'll cover each one briefly. For more detailed information, refer to the report *Dietary Guidelines for Americans 2000*.*

Guideline #1: "Aim For A Healthy Weight"

The premise of maintaining a healthy body weight is basic — it's a matter of balancing the number of calories consumed

* The guidelines are available as a PDF document from the U.S. Department of Health and Human Services Web site at: <http://www.health.gov/dietaryguidelines/dga2000/DIETGD.PDF> .



DIETARY GUIDELINES FOR AMERICANS



AIM FOR FITNESS ...

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



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 food safe to eat.



CHOOSE SENSIBLY ...

- Choose a diet that is 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.



... for good health

Part 2

with the number of calories burned off. Yet reaching a healthy weight and staying there is a pretty complex issue for many Americans. And while many people want to lose the extra pounds so they can look better, the fact is, maintaining a healthy weight throughout life reduces the risk for high blood pressure, heart disease, stroke, diabetes, certain types of cancer, and other illnesses.

Evaluating an adult's weight involves more than just reading the number on a bathroom scale. One of the current standards for evaluating weight is the **Body Mass Index (BMI)**, which measures weight in relation to height, using a mathematical equation. In general, people with more body fat have a higher BMI than people who have a higher proportion of muscle. To learn about calculating a person's BMI, refer to the section on "Assessing an Adult's Weight" starting on page 3-4.

*The **Body Mass Index (BMI)** is a tool for evaluating body weight and determining whether a person is at risk for weight-related health problems.*

In addition to your BMI, your waist measurement also provides important information. Excess abdominal fat can indicate a greater risk of health problems, even if a person's BMI is in the healthy range. As the waist measurement increases, health risks increase, particularly if the waist is greater than 35 inches for women or 40 inches for men.

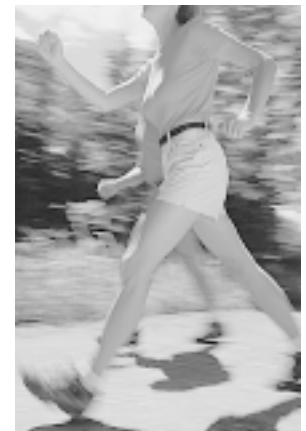
People who are at a healthy weight should avoid weight gain. Those who are already overweight should first prevent further weight gain and then lose weight to improve their health. To manage weight, the guideline suggests eating plenty of vegetables, fruits, and grains with little added fat or sugar, selecting sensible portion sizes, and including regular physical activity.

This guideline also addresses children and their weight, since the number of overweight U.S. children has risen dramatically in recent years. But weight loss generally isn't recommended for children since their nutrient needs must allow for growth. Therefore, it's important to help children develop healthy eating habits and encourage them to take part in vigorous

activities. Likewise, parents need to limit the time children spend watching TV and playing computer or video games. Parents who are concerned about their child's weight should talk with a health-care professional.

Guideline #2: "Be Physically Active Each Day."

While it seems like more people are walking, jogging, biking, and exercising than ever before, there are many Americans who are fairly inactive. Physical activity and nutrition go hand in hand. Activity not only increases the amount of calories you use, but it also helps maintain strength and develop strong bones. Since so many Americans spend their workday in activities that require little energy, the advice for most adults is to engage in at least 30 minutes of moderate physical activity on most days, preferably daily. Children need at least 60 minutes a day. Also, your routine should include aerobic activities, such as walking and swimming, as well as activities for strength and flexibility, such as lifting weights, gentle stretching, and yoga.



Aerobic activities speed your heart rate and breathing. Examples include walking, jogging, biking, and swimming.

Guideline #3: "Let the Pyramid Guide Your Food Choices."

No single food can supply all the nutrients in the amounts the body needs. For example, oranges provide vitamin C and folate but no vitamin B₁₂. Cheese provides vitamin B₁₂ and calcium but no vitamin C. To get all the nutrients you need, you should include a variety of foods from all the food groups in your daily diet. The Food Guide Pyramid is a tool to help Americans choose the right amount of food from each group to promote optimal health. Likewise, food labels offer information about processed foods so that you know what nutrients they offer.

Some people have specific nutrient needs and, in addition to following the Food Guide Pyramid, they may require a vitamin-mineral supplement to meet their needs. However, supplements are supposed to do just what their name implies – supplement a diet of healthy foods, not replace them.

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To see if a food is made from whole grains, look for words like “whole wheat” or “whole grain” at the top of the ingredient list. Be aware that “wheat flour” and “enriched flour” are not whole grains.

So the advice is to rely on the Food Guide Pyramid when choosing foods rather than depend on supplements to meet your usual nutrient needs.

Guideline #4: “Choose a Variety of Grains Daily, Especially Whole Grains.”

Foods made from grains like wheat, rice, and oats are the foundation of a healthy diet. Whole grains provide important vitamins, minerals, and complex carbohydrates, and eating plenty of whole grains may help protect the body against many chronic diseases. Also, they’re low in fat, unless we add things like butter or shortening during processing, preparation, or at the table. What’s more, enriched grains are now fortified with folic acid. Folic acid is a B vitamin that reduces the risk of a serious type of birth defect.

Whole grain products differ from refined grains in the amount of fiber and nutrients they provide, and whole grain foods also differ from one another in terms of nutrients. So the key is to choose a variety of grain products, and to eat six or more servings each day.

Guideline #5: “Choose a Variety of Fruits and Vegetables Daily.”

Fruits and vegetables provide essential vitamins, minerals, and fiber, and they’re generally low in fat. Eating plenty of fruits and vegetables of different kinds may help protect us against heart disease, stroke, and some types of cancer. It also promotes healthy bowel function.

Most people eat fewer servings of fruits and vegetables than are recommended. To promote health, Americans should eat at least two servings of fruits and three servings of vegetables each day by finding ways to include different fruits and vegetables in meals and snacks. Variety is important since different fruits and vegetables offer different nutrients.

Guideline #6: “Keep Food Safe to Eat.”

Eating food that contains harmful bacteria, toxins, parasites, viruses, or chemical contaminants can cause a foodborne illness. Signs and symptoms of a foodborne illness may appear within 30 minutes or they may not develop for up to three weeks. To keep food safe, follow these tips:

- Wash hands and surfaces often.
- Separate raw, cooked, and ready-to-eat foods while shopping, preparing, and storing.
- Cook foods to a safe temperature.
- Refrigerate perishable foods promptly.
- Follow safety instructions on the package label.
- Keep hot foods hot (above 140°F) and cold foods cold (below 40°F).
- When in doubt, throw it out.

Pregnant women, young children, older persons, and people with weak immune systems are at high risk of foodborne illness and should be especially careful. They should take extra precautions by avoiding unpasteurized juices, sprouts, and inadequately cooked meat products.

Guideline #7: “Choose a Diet that is Low in Saturated Fat and Cholesterol and Moderate in Total Fat.”

Fats supply energy and essential fatty acids, and they promote the absorption of the fat-soluble vitamins A, D, E, and K. However, diets high in saturated fat and cholesterol are associated with increased blood cholesterol levels and an increased risk for heart disease. And, while fat intake in the U.S. is lower than it was many years ago, most people still eat too much saturated fat. What’s more, eating too much fat of any type can provide excess calories.

This guideline specifies that Americans should limit their fat intake to 30 percent of their total calories, keep saturated fat at less than 10 percent of calories and keep cholesterol intake



Many people can lower their intake of fat and saturated fat by switching to fat-free milk.

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to less than 300 mg/day. People can achieve these goals by using fats and oils sparingly and by making wise food choices. For example, many foods in the milk and meat groups are notoriously high in fat, but there also are many low-fat and even fat-free choices available in these groups (fat-free milk rather than whole milk). Also, the Nutrition Facts Label on processed foods can be an extremely useful tool to help keep track of fat, saturated fat, and cholesterol intake.

Guideline #8: “Choose Beverages and Foods to Moderate Your Intake of Sugars.”

Sugars and starches occur naturally in many nutritious foods such as milk, fruits, vegetables, breads, cereals, and grains. Sugars are also added to foods during processing or preparation. The body can't tell the difference between naturally occurring and added sugars, because chemically they're identical.

This guideline offers several reasons for moderating sugar intake. First, foods containing sugars and/or starches can promote tooth decay. The more often a person eats foods that contain sugars or starches and, the longer these foods remain in the mouth before brushing, the greater the risk for tooth decay.

Another concern is that many foods with added sugars tend to contribute calories without providing many other nutrients. These high-sugar foods can lead to weight gain, plus they can take the place of more nutritious foods. For example, choosing a candy bar as a mid-day snack contributes extra calories, but few nutrients. What's more, it takes the place of what could have been a healthy snack choice. (For more information on empty-calorie foods, see page 1-6.)

So this guideline suggests that Americans choose foods sensibly to limit their intake of beverages and foods that are high in added sugars. That doesn't mean avoiding sweets altogether, but it's important that these types of foods don't

Some foods with added sugars do offer vitamins and minerals. Examples include chocolate milk, sweetened cereals, and sweetened canned fruits. If choosing these foods, keep in mind they usually provide extra calories along with those other nutrients.

crowd out other foods needed to maintain health. Also, Americans should follow daily oral-hygiene practices to keep teeth healthy.

Guideline #9: “Choose and Prepare Foods with Less Salt.”

Sodium and sodium chloride (commonly known as salt) occur naturally in foods, usually in small amounts. Most of the salt we eat comes from sodium added to processed foods such as frozen dinners, packaged meals, cheese, soups, salad dressings, etc. Also, recipes often include salt or high-sodium ingredients, plus many people add salt or salty seasonings to their food at the table.



Since sodium plays a role in the regulation of fluids and blood pressure, this guideline suggests that people at risk for high blood pressure should consume less salt and thereby reduce their chances of developing high blood pressure. Since there's no way to tell who might develop high blood pressure from eating too much salt, and because lowering your salt intake is safe, the recommendation to use less salt can apply to most healthy people.

Guideline #10: “If You Drink Alcoholic Beverages, Do So in Moderation.”

Alcoholic beverages, such as wine, beer, and liquor, supply calories but few or no nutrients. Excessive amounts of alcohol can alter judgment, lead to dependency, and increase the risk for high blood pressure, stroke, heart disease, accidents, violence, and birth defects. This guideline states that some people shouldn't drink alcoholic beverages at all, including:

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- children and adolescents;
- persons of any age who cannot restrict their drinking to moderate levels;
- women who may become pregnant or who are pregnant;
- persons who plan to drive, operate machinery, or take part in activities that require attention or skill; and
- persons taking certain prescription or over-the-counter medications.

As for others who choose to drink alcoholic beverages, the guideline emphasizes drinking sensibly and in moderation, limiting intake to no more than one drink per day for women, two for men.

Using the Dietary Guidelines in WIC Nutrition Education

Our goal is to provide meaningful and practical messages that our clients will appreciate and act on. So, rather than presenting clients with a list of the Dietary Guidelines, we want to customize and focus our messages, using the Guidelines as a framework. Here are some tips for creating practical messages based on the dietary guidelines, adapted from *Reaching Consumers With Meaningful Health Messages* (Dietary Guidelines Alliance 1996).

- **Know your audience.** Make use of consumer research, focus groups, and/or information you collect in an individual counseling session.
- **Keep it simple.** Create a message that's short and to the point.
- **Support the main message with tips** that illustrate a positive action. For example, rather than suggesting that a person avoid buying snacks from the vending machine (a negative idea with no action), suggest that the person take a snack to work each day such as fruit or yogurt.
- **Be realistic** in your messages and your expectations. For example, don't expect even the most motivated clients to immediately start trying a new vegetable each time they go

- to the store. But if you suggest that they “try one new vegetable every other month,” you might get some results.
- **Avoid labeling foods** as “good” or “bad.” All foods can be a part of a healthy eating lifestyle.
 - **Be sensitive** to your clients’ preferences, lifestyle, and culture. Use examples of foods and activities that they’re familiar with.
 - **Use humor** in appropriate situations. Humor and health can go hand in hand.
 - **Offer practical ideas that save time.** According to consumers, one of the main barriers to good health is “lack of time.”

References

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Self-test Questions – The Dietary Guidelines

1. Write one sentence that describes the main purpose of the Dietary Guidelines for Americans.

2. Which of the following are current Dietary Guidelines? *(Check all that apply.)*
 - Keep food safe to eat.
 - Be physically active each day.
 - To lose weight, follow the Pyramid weight-loss diet.
 - Choose a variety of grains daily, especially whole grains.
 - Choose a wide variety of meats and poultry daily.
 - If you drink sodas, do so in moderation.
 - Aim for a diet that is totally free of saturated fat and cholesterol.
 - Choose beverages and foods that offer substantial amounts of protein.
 - Choose and prepare foods with less salt.
 - Aim to floss your teeth at least once a day.

3. List three tips for creating practical messages based on the Dietary Guidelines:

The Food Guide Pyramid

*What Should
Americans Eat?*

Objectives

In the 1970s and 1980s, children in school studied the basic four food groups. But times have changed. These days, children and adults alike are learning about the Food Guide Pyramid, an up-to-date and meaningful guide to a healthy daily intake. After reading this section, you'll be able to:

- list the food groups and recommended number of servings from each group;
- identify certain characteristics of the Food Guide Pyramid;
- explain the significance of the pyramid shape; and
- use the Pyramid to evaluate your own intake.

The Food Guide Pyramid – The Basics

There's an old saying, "a picture is worth thousand words." When the United States Department of Agriculture (USDA) introduced the Food Guide Pyramid in 1992, the goal was to create an easy-to-use graphic that illustrated the main nutrition messages set forth in the Dietary Guidelines.

The Food Guide Pyramid (**Figure 2.1**) is an outline of what to eat each day, with a focus on reducing fat. It's not a rigid dietary plan, but a general guide that lets people choose what's right for them, allowing flexibility in daily food choices. Originally, USDA designed the Food Guide Pyramid as a guide for healthy Americans, 2 years of age and older. Then in 1999, USDA introduced the Food Guide Pyramid for Young Children, which is tailored to the nutritional needs of children, ages 2 through 6.* Also, certain groups have developed cultural adaptations of the Pyramid that depict foods more common in various cultures. Still, even among these different versions of the Pyramid, the basic messages about variety, moderation and balance remain the same.

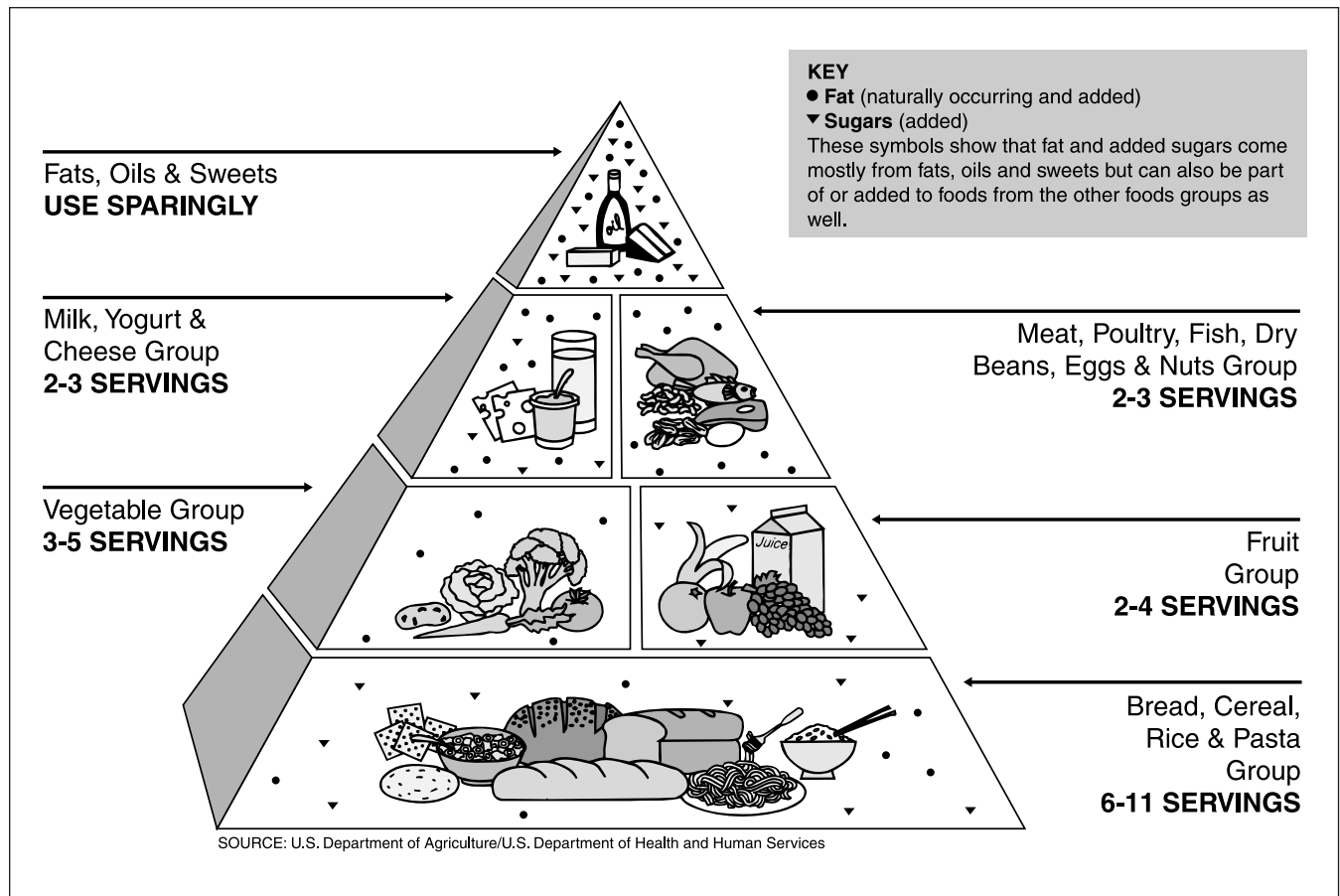
The Structure of the Food Guide Pyramid

Imagine trying to build a real pyramid. You'd need to start with a strong, wide base, and then add smaller layers as you approached the top. That's exactly how the Food Guide Pyramid is built. The food groups are arranged in a pyramid shape to illustrate that we need more servings from groups at the bottom of the pyramid and fewer servings from those near the top.

Why do we need more of some and less of others? It's all about balance and variety. The foods at the bottom of the pyramid tend to be lower in fat than those at the top, plus they're high in fiber, vitamins, and minerals. So the idea is to eat more servings of breads, cereals, rice, pasta, fruits, and vegetables – foods in the bottom three sections. The small tip of the Pyramid contains fats, oils, and sweets, all of which

* For more information, refer to the WIC *Preschool Nutrition Module*, TDH stock no. 13-40.

Figure 2.1 The Food Guide Pyramid



provide calories but not much else in terms of nutrients. And, since they're at the top of the Pyramid, they should be used sparingly.

Servings and Serving Sizes

For each major food group, the Pyramid shows a range of servings. The number of servings that is right for each person depends on how many calories they need, which in turn depends on age, sex, size, and activity level. Even though we need more servings from certain groups, there's not any one group that's more important than another. For good health, we need them all.

While the right number of servings will vary from person to person, almost everyone should have at least the lowest number of servings for each group.

What Counts as a Serving in the Food Guide Pyramid?

The serving sizes for the Food Guide Pyramid are intended to be realistic sizes that an average person would consume. If a person eats a larger amount of a food, then it counts as more than one serving. Likewise, smaller amounts count as partial servings.

Bread, Cereal, Rice, and Pasta

1 slice of bread

1 ounce of ready-to-eat cereal

$\frac{1}{2}$ cup of cooked cereal, rice or pasta

Vegetables

1 cup of raw leafy vegetables

$\frac{1}{2}$ cup of other vegetables, cooked or chopped raw

$\frac{3}{4}$ cup of vegetable juice

Fruits

1 medium apple, banana or orange

$\frac{1}{2}$ cup of chopped, cooked or canned fruit

$\frac{1}{4}$ cup dried fruit

$\frac{3}{4}$ cup of fruit juice

Milk, Yogurt, and Cheese

1 cup of milk or yogurt

1½ ounces of natural cheese

2 ounces of process cheese

Meat, Poultry, Fish, Dry Beans, Eggs, and Nuts

2–3 ounces of cooked lean meat, poultry or fish

$\frac{1}{2}$ cup of cooked dry beans

$\frac{1}{4}$ cup nuts

(1 egg counts as half a serving)

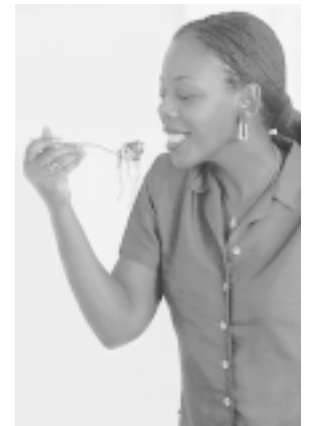
(2 tablespoons of peanut butter counts as half a serving)

A Closer Look at the Food Groups

There are five major food groups in the Pyramid. Each group is distinct because the foods within each group provide certain key nutrients. So when planning a daily intake, foods from one group can't take the place of foods from another group.

Breads, Cereals, Rice, and Pasta: 6–11 servings

This group is at the base of the Pyramid, meaning we need the most servings from this food group. Why are foods made from grains so important? They provide complex carbohydrates, energy, vitamins, and minerals. This group also provides fiber, especially if a person eats whole grain products, such as whole wheat bread and whole grain cereals like oatmeal. Contrary to popular belief, starchy foods aren't fattening. It's what we add to these foods — the extra margarine, butter, cream, cheese, sugar, etc., that can more than double the calories and lead to extra weight.



A total of 6–11 servings from the breads and cereals group may sound like a lot, but it's easy to show a client how quickly they add up over the course of a day.

Vegetables: 3–5 servings

The vegetable group is the second largest group in the Pyramid. Vegetables provide vitamins A and C, folic acid, iron, magnesium, and fiber. Also, vegetables are naturally low in fat, but we often smother them with spreads, butter, mayonnaise, or salad dressing. Better seasoning choices include fresh herbs, lemon juice, and low-fat margarines and salad dressings.

Different types of vegetables offer different nutrients, so variety is important. There are plenty of vegetables to choose from:

- dark green leafy vegetables (spinach, turnip greens, broccoli)
- deep yellow vegetables (carrots, sweet potatoes, winter squash)
- starchy vegetables (potatoes, corn, peas)
- other vegetables (tomatoes, onions, green beans, peppers, etc.)



Fruit: 2–4 servings

Fruits and fruit juices provide vitamins A and C, potassium, plus they're low in fat and sodium. Choose fresh, frozen, dried, or canned fruit, but pass on the fruit canned in heavy syrup. As for juice, only 100 percent fruit juice counts as a fruit serving since punches, fruitades, fruit sodas, and most fruit drinks contain only a little juice and a lot of added sugars. Compared to fruit juices, whole fruits are good choices because they provide a lot more fiber.

Milk, Yogurt, and Cheese: 2–3 Servings

The milk group is one of the smaller sections in the Pyramid, indicating we don't need as many servings. That doesn't mean dairy foods are less important; it's just that we need fewer servings to get the target nutrients. Milk products provide protein and vitamins, and are excellent sources of calcium. Because some milk products contain a significant amount of fat and cholesterol, the best choices are low-fat and fat-free milk products. One and one-half ounces of natural

cheese, 2 ounces of processed cheese, and 8 ounces of yogurt each supply the same amount of calcium as 1 cup of milk. Cottage cheese, however, is lower in calcium than most cheese. One cup of cottage cheese counts as only one-half serving of milk. Finally, remember that children younger than 2 years should drink whole milk products.

Meat, Poultry, Fish, Dry Beans, Eggs, and Nuts: 2–3 Servings

The foods in this group supply protein, B vitamins, iron, and zinc. Like the milk group, this group contains many foods that are high in fat and cholesterol. To reduce the amount of fat from this group:

- choose more lean meat, poultry without skin, fish, and dry beans;
- trim away all visible fat and broil, roast, or boil instead of frying;
- go easy on high-fat nuts and seeds; and
- use egg yolks and whole eggs in moderation. (Use egg whites and egg substitutes freely when cooking since they contain no cholesterol and little or no fat.)

Fats, Oils, and Sweets: Use Sparingly

This group is at the top of the Pyramid and should be used sparingly. The specific amount of fat a person can have depends on that individual's calorie needs. Foods in this group include butter, margarine, gravy, salad dressing, sugar, jelly, candy, and soft drinks. The tip of the Pyramid is filled with small yellow dots, representing naturally occurring or added fats, and small white triangles, representing added sugars. These symbols are also found in other sections of the Pyramid as a reminder that some foods from other groups may also be high in fat or sugars. In general, foods that come from animals (milk and meat groups) are naturally higher in fat than foods that come from plants. The following suggestions can help limit fat and sugar intake:

The Pyramid suggests two to three servings each day of foods from the meat group. That adds up to the equivalent of 5 to 7 ounces of cooked lean meat, poultry, or fish per day.

Counting fat grams every day isn't necessary, but everyone should do a "fat checkup" once in a while to help in staying on track.

Part 2

- Choose lower-fat foods from each of the food groups.
- Limit fats and sugars added to food during preparation, such as butter, margarine, gravy, salad dressing, sugar, and jelly.
- Limit foods that are high in sugar – candy, sweet desserts, and soft drinks.

Using the Food Guide Pyramid in WIC Nutrition Education

The Food Guide Pyramid can be a wonderful teaching tool, especially if you do more than simply display it on the wall. So get creative! Use it in individual counseling sessions, as well as group classes; create interactive games and quizzes; share it with adults as well as kids; use it in conjunction with dietary recalls and food models; display it as a 3D model or hanging mobile; and the list goes on. Once you start thinking about ways to use the Pyramid in your clinic, you'll find that the possibilities are endless.

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Self-test Questions — The Food Guide Pyramid

1. List the food groups and the recommended number of servings from each group according to the Food Guide Pyramid:

2. **TRUE** or **FALSE**? The Food Guide Pyramid ...

_____ is an outline of what to eat each day, with a focus on reducing sodium.

_____ is a rigid dietary plan to help people lose weight.

_____ contains five major food groups, plus the Fats, Oils, and Sweets group.

_____ illustrates the main nutrition messages set forth in the Dietary Guidelines.

3. What is the significance of the pyramid shape?

4. Evaluate your own intake. On the next page (blank), write down everything you ate yesterday, being careful to include all snacks, beverages, salad dressings, margarine, etc. Then, using the Pyramid as a reference, add up the servings from each food group and see how your intake compares to the recommended servings of different foods. Answer the following questions.

Did you get enough servings of fruits and vegetables?

Did you choose low-fat foods from the meat and dairy groups?

How much added fat and sugar did you take in over the day?

List at least two things you can do to improve your dietary habits:

Objectives

Curious about the fat in your mayonnaise or the sodium in your soup? Well, you don't have to look any further than the food label on the package. Food labels offer a wealth of information about the nutrient content of our foods, plus the food label is a great tool for teaching clients about eating healthier. After reading this section, you'll be able to:

- identify certain characteristics of food labels;
- define the term "Daily Value"; and
- evaluate the nutrient content of a food based on its label.

Food Labels

Today's food labels provide clear and helpful information about the food inside a package, although this wasn't always the case. Prior to 1994, food labels were confusing, complicated, and hard to read. They offered little help for consumers trying to make healthy food choices. Then in 1994, new label regulations brought about some positive changes. Today, consumers can use labels to make accurate, informed choices about the foods they purchase. Food labels have a number of parts including the front panel, the ingredient list, and the Nutrition Facts panel.

Front Panel

Along with the product's name, the front panel often carries certain nutritional descriptions about the food, such as "low-sodium," "fat-free," etc. These descriptors offer quick information about a product's nutritional makeup. Here are some of the terms you'll see, along with their definitions –

Low-fat: 3 grams or less per serving.

Fat-free: less than 0.5 grams per serving.

Low-sodium: 140 milligrams or less per serving.

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

Low-calorie: 40 calories or less per serving.

High: This term can be used if the food contains 20 percent or more of the Daily Value from a particular nutrient in a serving.

Sugar-free: less than 0.5 grams per serving.

Reduced: This term means the product has been altered and contains 25 percent less of a nutrient or of calories than the regular or reference product.

Ingredient List

This list tells you what's in the food. The key here is that the ingredients are listed in descending order by weight. So, if corn syrup is the first ingredient listed, then the food is high in sugar. Likewise, the ingredient list can help consumers

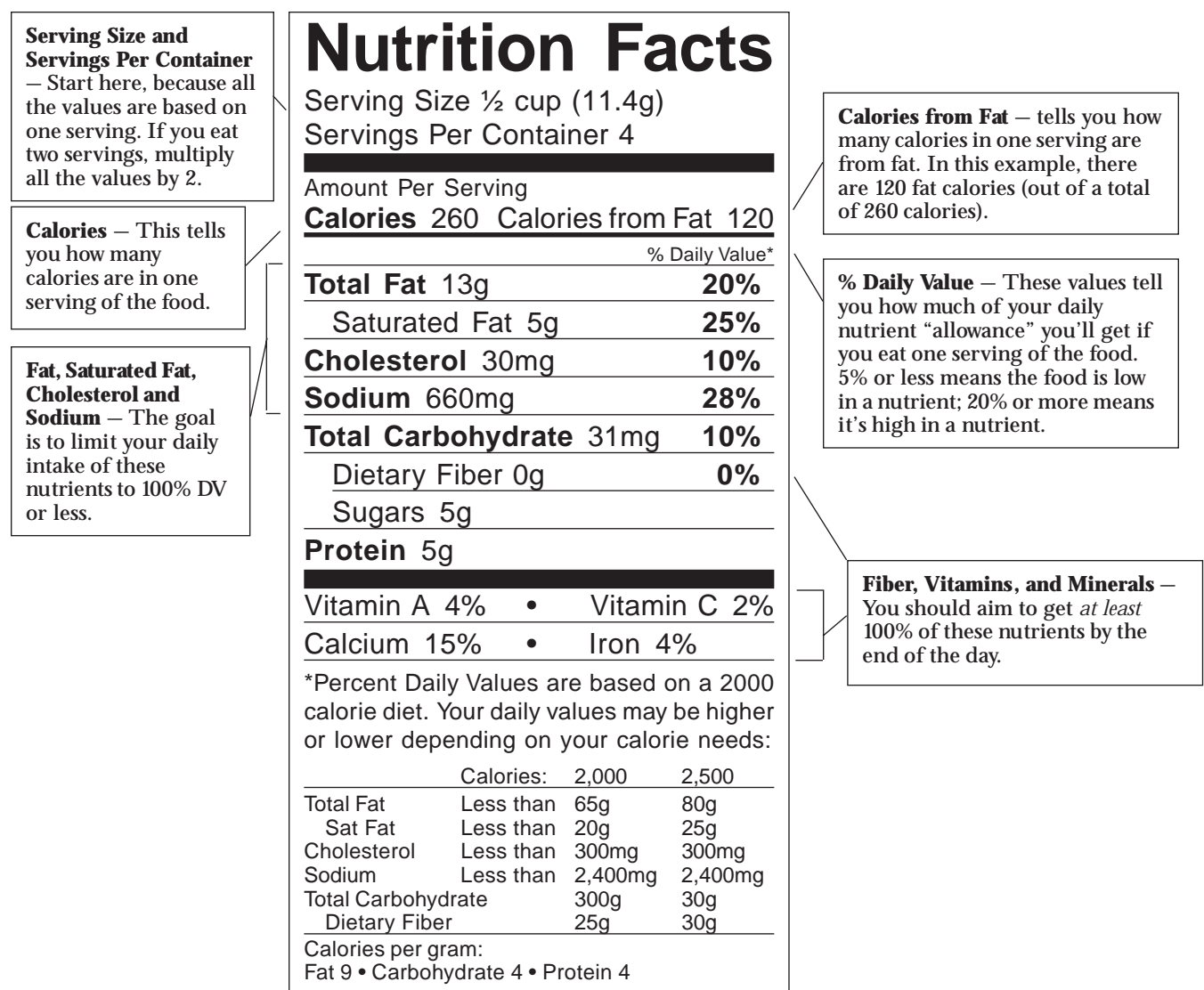


determine if a food is made from whole grains or if certain nutrients have been added. Also, it's an essential tool for persons who have to avoid specific ingredients because of food allergies.

Nutrition Facts Panel

The Nutrition Facts panel (see **Figure 2.2**) gives you very specific information about nutrients in a food. This part of

Figure 2.2 Nutrition Facts Panel



the label lists the amounts of various nutrients in the food, plus it tells you how a serving of the food contributes to your daily intake of nutrients.

Information on the Nutrition Facts panel is based on the nutrients found in one serving of the food, so it's important to start reading the label at the top where the serving size and servings per container are listed. Serving sizes are expressed in common household units (e.g., *cup*, *tablespoon*, *teaspoon*, *slice* and *piece*), and, in general, they reflect the amount people actually eat. What's more, serving sizes are standardized, so consumers can easily compare different brands. For example, if you're comparing different brands of canned beans, you'll find that the Nutrition Facts labels all are based on ½-cup servings.

Next the label indicates how many calories are in one serving, and also the calories from fat. Over the course of the day you should keep your fat intake to less than 30 percent of your calories (about 600 calories from fat based on a 2000-calorie diet).

The **percent Daily Value (% DV)** column tells you if a food is high or low in certain nutrients. For example, if a serving of a food provides 25 percent of the Daily Value for calcium, then it provides about one-fourth of a person's daily calcium needs, which is quite a bit. But if a serving has only 2 percent of the daily value for calcium, it won't do much in terms of helping you get your calcium for the day.

As a general guide, foods with 5% DV or less contribute a *small* amount of that nutrient to your daily intake, while those with 20% or more contribute a *large* amount. So, if you want to consume more of a nutrient, such as calcium, choose foods with a higher %DV for calcium. And, if you want to limit certain nutrients such as fat or sodium, look for foods with lower % DVs for those nutrients.

The % DVs are based on a 2000-calorie reference diet. In other words, these values reflect the nutrient needs of an average person who eats 2000 calories a day. Someone who

eats more than 2000 calories will have higher requirements and limits, while a person who eats less than 2000 calories will have lower needs. Still, anyone can use the % DVs as a quick and easy way to evaluate and compare foods, regardless of caloric intake.

Health Claims

Some products will also include a health claim on the package. A health claim is an approved statement about a nutrient or substance present in the food and its relationship to a disease or health-related condition. For example, the Food and Drug Administration (FDA) allows manufacturers of whole-grain breads and cereals to make a health claim about the role of fiber, particularly soluble fiber, in reducing the risk of coronary heart disease. You may have seen a claim like this on a package of oatmeal. Other examples of FDA-approved



claims include the role of folic acid in reducing the risk of birth defects, and the role of calcium in decreasing the risk of osteoporosis.

In order for a health claim to be used, there needs to be sufficient scientific agreement among qualified experts that the claim is factual and truthful. The FDA has very strict criteria regarding the types of health claims that manufacturers can use, the wording of health claims, and the types of products that can carry various claims. Although manufacturers may use these claims to market their products, the intended purpose of health claims is to educate consumers about healthful eating patterns that may help reduce the risk of heart disease, cancer, osteoporosis, high blood pressure, dental cavities, or certain birth defects.

Using Food Labels in Nutrition Education

While food labels are designed to inform consumers about the nutrient content of a product, they can also serve as wonderful nutrition-education tools. You can reinforce practically any nutrition message by having clients read and compare food labels. Whether you're discussing vitamins or minerals, protein or fat, heart health, or dental health, try enhancing that information with a label-reading activity. Of course it's always important to first make sure your clients understand how to read a label, which is a teaching opportunity itself.

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Self-test Questions – Food Labels

1. The ingredient list on a food package (*check all that apply*):
 - ___ lists ingredients needed to make a one-dish meal.
 - ___ lists ingredients that are in the product in descending order by weight.
 - ___ is helpful for consumers with food allergies.
 - ___ can help consumers determine if a food is made from whole grains.

2. **TRUE** or **FALSE**? The term “%DV” on a food label:
 - _____ stands for “percent daily vitamins.”
 - _____ tells you if a food is high or low in certain nutrients.
 - _____ is based on a 2000-calorie reference diet.
 - _____ should be completely ignored by people who eat less than 2000 calories/day.

3. Suppose you are teaching a WIC client how to read the Nutrition Facts label. How would you explain the meaning of the term “% Daily Value”?

Use the label on the facing page to answer questions 4-8.

4. How many calories are in one serving of this food?

5. Would you consider this food to be high or low in vitamin C?

6. What percentage of the Daily Value of sodium would you get if you ate one serving of this food?
7. Suppose you ate 1 cup of this food. How much saturated fat would you get?
in grams _____ as % Daily Value _____
8. Assuming you ate 1 cup of this food, what would you know about your saturated-fat intake for the day?

Nutrition Facts	
Serving Size ½ cup (11.4g)	
Servings Per Container 4	
<hr/>	
Amount Per Serving	
Calories 260	Calories from Fat 120
<hr/>	
	% Daily Value*
Total Fat 13g	20%
Saturated Fat 5g	25%
Cholesterol 30mg	10%
Sodium 660mg	28%
Total Carbohydrate 31mg	10%
Dietary Fiber 0g	0%
Sugars 5g	
Protein 5g	
<hr/>	
Vitamin A 4%	• Vitamin C 2%
Calcium 15%	• Iron 4%
<hr/>	
*Percent Daily Values are based on a 2000 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 30g
Dietary Fiber	25g 30g
<hr/>	
Calories per gram:	
Fat 9 • Carbohydrate 4 • Protein 4	



Important Nutrition Issues

3

Overview

Nutrition encompasses more than nutrient needs, food labels, and dietary guidelines. In fact, there are all kinds of specific issues related to the foods we eat. In this section, we'll move beyond the basics and discuss four important topics that are relevant to WIC clients:

- weight management;
- vegetarian diets;
- oral health; and
- cultural dietary practices.

You'll see how each of these issues can impact a person's nutritional needs and food choices, plus you'll learn practical tips and important information that can help WIC clients make healthier decisions.

Objectives

In theory, losing weight sounds easy – you simply need to burn more calories than you take in. But, as many of us know, losing weight seems anything but easy. After reading this section, you'll be more familiar with various concepts related to weight management, including weight assessment, energy balance, food composition, and practical strategies for managing weight. Specifically, you'll be able to:

- identify appropriate weight-management approaches;
- determine body mass index;
- define the term “energy balance”;
- identify average caloric intakes and factors affecting calorie needs;
- state at least five strategies for weight management for someone who is overweight;
- state at least three strategies for weight management for someone who is underweight; and
- look up and compare the protein, fat, carbohydrate, and calorie content of various foods.

A Weighty Issue



Many Americans are learning about **weight management**, a long-term plan of healthy eating and exercise.

There are plenty of Americans striving to reach and maintain a healthy weight. The National Heart, Lung and Blood Institute estimates that over one-half of all Americans (about 97 million) are overweight or obese. While many people simply want to lose weight so they can look better, others have learned that the real benefit of a healthy weight is *feeling* better. Staying at an appropriate weight can help a person feel more energetic and robust, plus it reduces the risk of many chronic diseases including high blood pressure, high blood cholesterol, heart disease, stroke, diabetes, certain types of cancer, arthritis, and breathing problems.

These days, nutrition professionals are encouraging people to shift their focus from the ideas of weight loss and weight gain, and instead focus on **weight management**. The American Dietetic Association defines weight management as “achieving the best weight possible in the context of overall health.” More specifically, it means adopting healthful and long-term eating and exercise patterns in order to reduce risk for disease risk and improve feelings of energy and well-being.

Assessing an Adult’s Weight

Evaluating an adult’s weight involves more than just reading the number on a scale. Consider two people who weigh exactly the same, but one person is taller with more muscle mass while the other is shorter with a high percentage of body fat. Without even seeing them, we can presume that the leaner individual is at a healthier weight. So, besides weight, it’s also important to consider height and amount of body fat. Figuring a person’s Body Mass Index can help you do just that.

Body Mass Index (BMI)

Body Mass Index (BMI) measures weight in relation to height, using a mathematical equation:

$$\text{weight (kilograms)} / \text{height (meters)}^2 = \text{BMI}$$

Conversion factors:

2.2 pounds = 1 kilogram; 39.4 inches = 1 meter

If you'd rather skip the math, you can use the Body Mass Index table (**Table 3.1**), which does all the calculations for you. Simply find the person's height (in inches) and then find the number that's closest to the person's weight (in pounds). The number at the top of the table is the BMI for that individual. At this point, take a few minutes to determine your own BMI. Then, once you know your BMI, you can determine which weight range you're in:

BMI	Weight Range
below 18.5	underweight
18.5–24.9	healthy weight
25.0–29.9	overweight
30.0 and above	obese

In general, people with more body fat have a higher BMI, but there are exceptions. For example, a lean and muscular body builder who weighs a lot will likely have a higher BMI. So while his BMI may be in the “overweight” range, he wouldn't be overly fat. Or consider this – your BMI may be in the “healthy” range, but, if you have lots of fat and little muscle, you may actually be at an unhealthy weight. Keep in mind that the BMI is simply a guideline, and people should consult a doctor about achieving the weight that's right for them.

In general, a higher BMI suggests that a person has a higher percentage of body fat and a higher risk for health problems related to body weight.

In addition to BMI, other tools are available to assess weight. Health professionals often use measurements such as triceps skinfold and waist circumference to determine a person's percentage of body fat. Also, they check for risk factors such as high blood pressure, high LDL cholesterol, high blood glucose, a family history of heart disease, physical inactivity, and cigarette smoking. If a patient is overweight and also has several of these risk factors, then losing weight is especially important. Even a small weight loss of 10 percent of current

Table 3.1 Body Mass Index

BMI (kg/m ²)	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Height (in.)	Weight (lbs.)																
58	91	96	100	105	110	115	119	124	129	134	138	143	148	153	158	162	167
59	94	99	104	109	114	119	124	128	133	138	143	148	153	158	163	168	173
60	97	102	107	112	118	123	128	133	138	143	148	153	158	163	168	174	179
61	100	106	111	116	122	127	132	137	143	148	153	158	164	169	174	180	185
62	104	109	115	120	126	131	136	142	147	153	158	164	169	175	180	186	191
63	107	113	118	124	130	135	141	146	152	158	163	169	175	180	186	191	197
64	110	116	122	128	134	140	145	151	157	163	169	174	180	186	192	197	204
65	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210
66	118	124	130	136	142	148	155	161	167	173	179	186	192	198	204	210	216
67	121	127	134	140	146	153	159	166	172	178	185	191	198	204	211	217	223
68	125	131	138	144	151	158	164	171	177	184	190	197	203	210	216	223	230
69	128	135	142	149	155	162	169	176	182	189	196	203	209	216	223	230	236
70	132	139	146	153	160	167	174	181	188	195	202	209	216	222	229	236	243
71	136	143	150	157	165	172	179	186	193	200	208	215	222	229	236	243	250
72	140	147	154	162	169	177	184	191	199	206	213	221	228	235	242	250	258
73	144	151	159	166	174	182	189	197	204	212	219	227	235	242	250	257	265
74	148	155	163	171	179	186	194	202	210	218	225	233	241	249	256	264	272
75	152	160	168	176	184	192	200	208	216	224	232	240	248	256	264	272	279
76	156	164	172	180	189	197	205	213	221	230	238	246	254	263	271	279	287

To determine a person's BMI, simply find the height (in inches) in the left column. Then move across the row to the number that is closest to the person's weight (in pounds). The number at the top of the column is the BMI for that particular weight and height.

BMI (kg/m²)	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
Height (in.)	Weight (lbs.)																
58	172	177	181	186	191	196	201	205	210	215	220	224	229	234	239	244	248
59	178	183	188	193	198	203	208	212	217	222	227	232	237	242	247	252	257
60	184	189	194	199	204	209	215	220	225	230	235	240	245	250	255	261	266
61	190	195	201	206	211	217	222	227	232	238	243	248	254	259	264	269	275
62	196	202	207	213	218	224	229	235	240	246	251	256	262	267	273	278	284
63	203	208	214	220	225	231	237	242	248	254	259	265	270	278	282	287	293
64	209	215	221	227	232	238	244	250	256	262	267	273	279	285	291	296	302
65	216	222	228	234	240	246	252	258	264	270	276	282	288	294	300	306	312
66	223	229	235	241	247	253	260	266	272	278	284	291	297	303	309	315	322
67	230	236	242	249	255	261	268	274	280	287	293	299	306	312	319	325	331
68	236	243	249	256	262	269	276	282	289	295	302	308	315	322	328	335	341
69	243	250	257	263	270	277	284	291	297	304	311	318	324	331	338	345	351
70	250	257	264	271	278	285	292	299	306	313	320	327	334	341	348	355	362
71	257	265	272	279	286	293	301	308	315	322	329	338	343	351	358	365	372
72	265	272	279	287	294	302	309	316	324	331	338	346	353	361	368	375	383
73	272	280	288	295	302	310	318	325	333	340	348	355	363	371	378	386	393
74	280	287	295	303	311	319	326	334	342	350	358	365	373	381	389	396	404
75	287	295	303	311	319	327	335	343	351	359	367	375	383	391	399	407	415
76	295	304	312	320	328	336	344	353	361	369	377	385	394	402	410	418	426

weight will help to lower a person's risk of developing obesity-related diseases, such as diabetes, stroke, certain cancers, and heart disease.

Energy Balance

Energy balance is the state in which caloric intake from food or alcohol matches the energy the body expends through metabolism and physical activity.

One key to managing weight is understanding the concept of energy balance. As discussed earlier in this module, energy and calories mean the same thing – we refer to “calories” when we talk about how much energy a food provides and how much energy the body uses to perform certain tasks. The body has an **energy balance** when the number of calories eaten equals the number of calories burned. So, if you're in energy balance, your weight stays the same. If you consistently take in more calories than you use for energy, you'll have a positive energy balance and gradually gain weight. And, if you routinely consume fewer calories than your body needs, you'll have a negative energy balance and eventually lose weight.

The average woman needs about 2000 calories per day and the average man needs about 2700 calories. But energy needs vary from person to person. For example, shorter people usually need less energy than taller people. Pregnant and breastfeeding women need more calories than before they were pregnant. Athletes require more energy than non-active people do. And here's something to think about – after we reach age 30, our calorie needs decrease about 5 percent each decade.

To lose weight, a person must reduce calorie intake and/or increase physical activity. The most successful weight loss programs combine both – eating less while doing more. A pound of body fat is equivalent to 3500 calories. So, for every 3500 calories you burn off above and beyond your normal needs, you lose one pound of body fat. Likewise, for every 3500 calories of food you cut back on, you'll also lose a pound of body fat.



Increasing Physical Activity

Studies show that routine physical activity is one of the most effective tools for losing weight and keeping it off. Experts suggest that everyone, regardless of weight goals, get a total of 30 minutes of moderate physical activity on most days. And it doesn't have to be all at once; you can accumulate your activity over the course of a day.

If you plan to burn extra calories through physical activity, you'll need to consider the type of activity and how long you keep it up. You can start out by walking 30 minutes for three days a week and can build to 45 minutes of more intense walking, at least five days a week. With this regimen, you can burn 100 to 200 calories more per day.

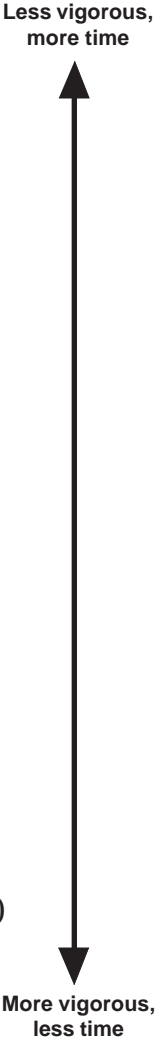
To avoid soreness and injury, people who plan to increase their activity level should start out slowly and gradually build up to the target level. People with health problems should first talk with a doctor before starting a new program.

Likewise, men over age 40 and women over age 50 who plan to begin a vigorous physical activity program should consult a doctor to be sure they don't have heart disease or other health problems.

Part 3

Examples of Moderate Amounts of Activity

Less intensive activities burn fewer calories, so you need to do those for a longer time in order to get the same results.

Washing and waxing a car for 45–60 minutes	
Washing windows or floors for 45–60 minutes	
Playing volleyball for 45–60 minutes	
Playing touch football for 45 minutes	
Gardening for 30–45 minutes	
Wheeling self in wheelchair for 30–40 minutes	
Walking 1¾ miles in 35 minute (20 min./mile)	
Basketball (shooting baskets) for 30 minutes	
Bicycling 5 miles in 30 minutes	
Dancing fast (social) for 30 minutes	
Pushing a stroller 1½ miles in 30 minutes	
Raking leaves for 30 minutes	
Walking 2 miles in 30 minutes (15 min/mile)	
Water aerobics for 30 minutes	
Swimming laps for 20 minutes	
Basketball (playing game) for 15–20 minutes	
Bicycling 4 miles in 15 minutes	
Jumping rope for 15 minutes	
Running 1½ miles in 15 minutes (10 min./mile)	
Shoveling dirt for 15 minutes	
Stairwalking for 15 minutes	

Reducing Caloric Intake

In addition to increasing activity, cutting calories can help a person lose weight. The key to reducing calories is to cut back *moderately*, reducing current intake by about 500 calories a day. That doesn't mean skipping meals, but rather eating moderate portions of a well balanced diet that offers carbohydrate, protein, and fat. Cutting out 500 calories a day reduces a person's intake by about

3500 calories a week, leading to a weight loss of about one pound each week.

Unfortunately, many people go to extremes, drastically cutting their caloric intake to less than 1000 calories a day and essentially starving themselves. These diets don't have enough nutrients to maintain health and they can lead to loss of energy, hunger, poor appearance, and poor concentration. What's more, people on very low-calorie diets often give up quickly, frustrated by hunger and deprivation. Some people tend to "go off" a diet with a vengeance, bingeing on high-calorie foods and gaining back more weight than what they initially lost. Soon they find themselves caught up in the **dieting cycle** – dieting, losing, gaining, dieting, losing, gaining, etc. Research suggests this cycle is unhealthy, possibly increasing the risk of heart disease and perhaps slowing down the body's rate of metabolism, making it even harder to lose weight.

In addition to very low-calorie diets, there are plenty of other diet fads and trends to avoid. Ignore plans that include quick-weight-loss claims; anything that says you'll lose more than two pounds a week is too quick. And there are all kinds of diet pills, potions, candies, wafers, wraps, and other diet aids designed to get your money, not help you to lose weight. Remember, the healthiest, safest, and most palatable weight-loss plan includes a balanced choice of foods from all food groups, combined with increased activity. Once you reach your target weight, you can maintain that weight by eating the same well balanced diet but with slightly larger portions.

Diet cycling, also known as "yo-yo" dieting, is the pattern of repeatedly losing and regaining weight. It's often the result of quick-fix diets and other gimmicks. Not only is it unhealthy, but it can lead to feelings of failure and frustration.

Practical Weight-management Suggestions

It's one thing to talk about weight loss, another to do it. Most people who want to lose or maintain their weight need plenty of practical tips to help them modify their behavior. Here are a few:

Quit "dieting"

A diet is something you go on and off. What you need to do is discover your own healthy eating plan and enjoy it for

years to come, not just a few months. And the best way to develop that plan is to use the Food Guide Pyramid.

Get physical

Find an activity you like to do on a routine basis, such as walking, swimming, dancing, jogging, or biking. And, for extra motivation, find a friend or family member to join you. Always check with a doctor before beginning an exercise program.



Recognize your hunger cues

Many people turn to food for reasons other than hunger – they may be upset, bored, lonely, or feeling some other emotion that food seems to satisfy – but only temporarily. Before you reach for something to eat, ask yourself if you’re truly hungry or just trying to fulfill some other need. Some people learn a lot about their eating habits by keeping a food diary for a week.

Slow down and taste your food!

If you take more time to eat your healthy snack or meal, you’ll not only enjoy it more, but you’ll give your brain some time to react and give the signal when you’re full. You may find that you feel full before you finish what’s on your plate.

Choose foods that are lower in fat and calories

Drink fat-free milk instead of whole milk; try low-fat salad dressings and mayonnaise; opt for baking and grilling instead of frying; and take that fatty skin off the chicken. But do shop wisely – when it comes to packaged foods, remember that low-fat doesn’t necessarily mean low-calorie. Manufacturers often add extra sugar when they cut down on fat, so their products end up having the same calories as their high-fat

counterparts. Look for flavorful products that truly save on the fat and calories.

Quit counting every calorie

While it helps to know the caloric content of foods, don't go overboard obsessing over every calorie and gram of fat. You'll end up restricting yourself too much and losing sight of what your goal should be – to enjoy a balanced variety of healthy foods.

Reach for fruit and vegetables every chance you get



Every time you plan a meal or snack, try to include some fruit and/or vegetables. As long as you don't add extra sugar, butter, salad dressing, and the like, fruits and vegetables are remarkably low in calories. And, the more low-calorie

fruits and vegetables you enjoy, the fewer high-calorie foods you'll take in.

Everything in moderation

There are no such things as bad foods. So, it's okay to eat a cookie or two when you want something sweet, just don't consume the whole bag! Let yourself eat your favorite foods in moderation.

Don't buy it if you don't want to eat it

While it's important not to deprive yourself, there are probably a number of empty-calorie foods that you don't need to have sitting on your pantry shelves. So shop wisely, passing up the packages of chips, sodas, doughnuts, etc., that you don't need. Again, this doesn't mean you can never eat any of these foods, but don't stock your shelves with items that you generally want to eat less of.

Drink plenty of water

If you're not getting your eight to 10 glasses a day, try carrying a bottle of water around with you and keep it filled. And drink water with your meals – it'll help you slow down, eat less, and appreciate the flavors of your food.

Not so fast on those fast foods

Fast food is notorious for fat and calories. But, if you take a minute to look at the menu, you'll find that you can make some smart choices. Try a salad with low-fat dressing, a baked potato topped with veggies, or a plain hamburger with tomato and lettuce, catsup, and mustard.



Get rid of the bathroom scale

Some people watch their weight on a daily basis, and, if the scale tips in the wrong direction, they get discouraged and give up on the whole idea of losing weight. Real weight loss happens over time. So, instead of watching the scale, check your progress by seeing how your clothes fit. That way you can focus on your new and improved lifestyle habits instead of obsessing about how many pounds you have or haven't lost.

Get real – set goals you can achieve

Be realistic and take it slow. It's best to drop just one to two pounds a week, at the most. And, if you're not meant to be a size 6 or 8, don't knock yourself out trying to get there! Aim for a weight that's good for you.

When Someone Is Too Thin

Some people have a completely different kind of challenge when it comes to weight management, and that's being too thin. And many of these people will tell you that trying to put on some additional pounds can be just as frustrating and difficult as trying to lose weight.

There are health risks associated with extreme thinness, including menstrual irregularity, infertility, and an increased risk of osteoporosis. Also, if thinness is a result of undereating, a person can suffer from fatigue, lose the ability to concentrate, experience irritability, and have trouble avoiding infections. What's more, persons suffering from eating disorders often put their health at further risk with unhealthy practices such as excessive exercise, self-induced vomiting, and laxative abuse.

In some cases, there is a serious underlying cause for being underweight such as hyperthyroidism, anorexia nervosa, drug abuse, or depression. These situations require medical intervention. However, there are other healthy persons who simply need and want to gain weight. In those cases, there are some practical suggestions for weight management:

Follow the Food Guide Pyramid – Rather than simply adding lots of extra fat and sugar calories, it's best to follow a varied and balanced diet. So follow the Pyramid, aiming for the higher number of servings from all of the food groups.

Keep Fat to a Moderate Level – It's best to keep fat intake to less than 30 percent of calories, unless a physician recommends more. Keeping fat, especially saturated fat, under control is important for heart health.

Concentrate the Calories – It's easy to add calories to food so that you can take in additional calories without a lot of added volume. For example, add dried fruits to cereal, enjoy sherbet with your fresh fruit, and try adding dry milk powder to fluid milk when you make soups and casseroles. Also, it's fine to add a little extra fat with toppings, dressings, cheeses, and condiments. Just don't go overboard.



Eat More Often – If you have a small appetite, it may help to eat five or six smaller meals throughout the day rather than two or three large meals.

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Fill up on Food at Meals – Don't drink too much fluid immediately before or during a meal so that you'll have more room for food.

Reach for Nutrient-Rich – For example, rather than drinking a diet soda that has no calories or other nutrients, enjoy a refreshing glass of orange juice.

Stimulate Your Appetite – Do all you can to make your meals appetizing – select and prepare your own foods, using foods with lots of color, flavor, and texture. Keep your favorite foods handy for snacking or cooking. Make your meals enjoyable – sit down, take your time and share your meals with friends and family.

Stay active – Remember, experts recommend that everyone get a total of 30 minutes of physical activity on a daily basis. Activity can help stimulate a healthy appetite, plus certain types of exercises can increase strength and muscle mass.

Food Composition

If part of your job involves assessing other people's diets and helping them manage their weight, then it's important to know about the composition of foods. Food-composition



tables are useful tools, providing the nutrient data for thousands of foods. Here are a few tips to keep in mind when using food-composition tables:

- Always be sure you're looking up the correct form of the food (raw, cooked, canned, frozen, reduced-fat, etc.).
- Check the serving size that's listed. It's often different from the amount or volume you need, in which case you'll need to do a little math.
- Keep in mind that values in tables are average values – actual nutrient content can vary widely. This is especially true for the vitamin and mineral content of fruits and vegetables grown in different parts of the country.
- Don't forget to include data for added toppings, spreads, creamers, sugar, etc.
- When it comes to processed foods, many food-composition tables don't list specific brands. To get specific data for a particular brand, refer to the label on the container.

Getting Help with Weight Management

Starting a weight-management program can be tricky. While there are many legitimate programs and health professionals who can help clients achieve their goals, there are also plenty of costly products and self-proclaimed “experts” who are simply out there to make money. Remember, it's always best to talk with a doctor before embarking on a new eating and activity program. Also, a registered dietitian is trained to properly assess a person's weight status and recommend appropriate weight management strategies, as well as offer practical advice. Talk with a nutritionist at your WIC clinic to see what resources are available in your area so you'll be better prepared to refer clients who need additional help.

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Self-test Questions – Weight Management

1. Which examples illustrate the concept of weight management? *(Check all that apply.)*

- Taking a daily walk.
- Skipping breakfast every day as a way of reducing intake by 500 calories a day.
- Going on a high-protein, low-carbohydrate diet for 1 month.
- Adopting a long-term, low-fat eating style that includes regular exercise.
- Drinking a dietary supplement beverage every day in place of lunch.
- Including common chores as part of your daily physical activity (i.e., washing floors, raking leaves, walking stairs, etc.).

2. Mark the following statements **TRUE** or **FALSE**.

- Body Mass Index measures weight in relation to height, using a mathematical equation.
- In general, people with more body fat have a higher BMI.
- Body Mass Index involves weighing a person underwater.
- BMI is a guideline, and people should consult a doctor about achieving the weight that's right for them.
- BMI can only be used to assess the weight of adult women.

3. Rebecca is the 28-year-old mother of a 4-year-old. She weighs 146 pounds and is 5 feet 3 inches tall. Rebecca's secretarial job involves answering phones and sitting at a computer all day. She claims that she doesn't like to exercise and says that, whenever she has spare time, she enjoys watching TV.

- a. What is Rebecca's BMI?
- b. Which weight range is she in?
- c. What's one strategy you would suggest to Rebecca for managing her weight?

4. Fill in the blanks:

When the number of calories eaten equals the number of calories burned, the body is in _____ . If you take in more calories than you use for energy, you'll gradually _____ weight. If you consume fewer calories than your body needs, you'll eventually _____ weight.

5. For each statement, *circle* the correct answer:

- a. The average woman needs (1000 / 2000 / 2700) calories a day.
- b. Shorter people usually need (more / fewer) calories than taller people.
- c. Breastfeeding women need (more / fewer) calories compared to their pre-pregnancy state.
- d. Athletes require (more / less) energy than non-active people.
- e. After a person reaches age 30, his calorie needs (increase / decrease / remain the same).

6. List five practical weight-management suggestions for someone who is overweight.

7. State three strategies for weight management for someone who is underweight.

8. Anna is trying to eat healthier, so for lunch she has a chef salad and a glass of milk. Unfortunately, her meal has more fat and calories than she thinks. Using a standard food-composition reference and the chart provided, look up the calorie, protein, fat, and carbohydrate content of her meal. (Note: Most clinics should have a copy of *Perspectives in Nutrition* by Gordon Wardlaw, which you can use for this activity. Refer to the food-composition table immediately following page 728.)

Salad Ingredient	Amount	Energy (kcal)	Carbohydrate (g)	Protein (g)	Fat (g)
Fresh romaine lettuce	2 cups				
Tomato, fresh	1 medium				
Pepper (sweet, green)	½ medium				
Cheese (cheddar, regular)	1½ ounces				
Ham (11% fat)	1 oz. (28.4 g)				
Hard-boiled egg	1 large				
Bacon	1 slice				
Seasoned croutons	½ cup				
Ranch salad dressing (regular)	2 tbsp.				
Whole milk (3.3% fat)	8 oz.				
TOTALS					

9. Next, look up the values for these lower-fat ingredients.

Salad Ingredient	Amount	Energy (kcal)	Carbohydrate (g)	Protein (g)	Fat (g)
Cheddar cheese (reduced-fat)	1½ ounces				
Ranch salad dressing (fat-free)	2 tbsp.				
Fat-free milk (skim milk)	8 oz.				

10. Now, go back and add up the total fat and calories in Anna's meal, but this time use the values for reduced-fat cheddar cheese (instead of regular cheddar), fat-free Ranch dressing (instead of regular dressing), and fat-free milk (instead of whole milk). How many calories and grams of fat are in the lower-fat meal?

11. Suppose Anna says she's willing to try the reduced-fat cheese and fat-free milk, but she doesn't like the idea of using fat-free dressing. Suggest at least one other option that she could try instead of using two tablespoons of regular dressing.

Objectives

While some people will never give up their burgers, steaks, and drumsticks, many Americans are making a switch to a vegetarian lifestyle. What exactly is a vegetarian diet and how do you make sure that it's nutritionally adequate? After reading this section you'll be more familiar with the types of vegetarian diets and the nutritional issues surrounding them. Specifically you'll be able to:

- distinguish between different types of vegetarian diets;
- identify various nutrients that vegetarians need to be careful to include;
- list sources of various nutrients for vegetarians; and
- identify appropriate dietary recommendations for vegetarians.

Vegetarian Diets

If you're a vegetarian, your meals undoubtedly feature a number of foods from plant sources. However, depending on the specific type of vegetarian diet you follow, you might also eat eggs and various dairy products. Here are the main types of vegetarians:

Vegans, also known as pure or strict vegetarians, don't eat eggs, milk, dairy products, or any foods containing animal products.

A **vegan** or **pure vegetarian** consumes *only plant foods*; no animal products whatsoever. Originally, the term vegan referred to people who avoided the use of all animal products — foods as well as leather, fur, etc. Today, the term is mainly used to refer to dietary choices.

A **lacto-vegetarian** consumes foods of plant origin, *plus milk and milk products*.

A **lacto-ovo-vegetarian** eats foods of plant origin, as well as milk, milk products *and eggs* (“lacto” refers to milk and “ovo” refers to egg).

A **semi-vegetarian** eats plant foods, as well as eggs, milk, and milk products, *plus small amounts of fish or poultry on occasion*. Although some people may not think of semi-vegetarians as “true vegetarians,” their diet can be very similar to a lacto-ovo-vegetarian's if they eat fish and poultry infrequently.

Potential Benefits of Vegetarian Diets



From a nutritional standpoint, plant-based diets have some wonderful advantages. Vegetarians generally eat plenty of fruits, vegetables, grains, and legumes, so they get lots of fiber, magnesium, and vitamins A, C, and E. Also, plant-based diets generally have less saturated fat and cholesterol than diets based on meat. In fact, vegetarian diets fall right in line with most of the current recommendations outlined in the Food Guide Pyramid and the Dietary Guidelines for Americans. Which is why it's no surprise that

vegetarian diets are linked to a lower risk of many chronic diseases including colorectal cancer, coronary heart disease, diabetes, diverticular disease, hypertension, obesity, and renal disease.

Potential Risks of Vegetarian Diets

On the flipside, certain nutritional risks are associated with some types of vegetarian diets. The more restrictive the diet, the riskier it is, so vegans, or pure vegetarians, run the greatest risk of not getting all the nutrients they need. Still, well-planned vegetarian diets can provide adequate nutrition during all stages of the life cycle, including infancy, childhood, pregnancy, and lactation. The bottom line is that vegetarians, especially vegans, need to make careful food choices, paying special attention to the following nutrients: energy, protein, calcium, vitamin D, vitamin B₁₂, iron, and zinc. Each of these is discussed below.

Energy

Most plant-based foods are high in fiber and low in fat, so they're low in calories. For example, an ounce of pinto beans has only 25 calories while an ounce of lean ground beef has about 80 calories. So, in general, vegetarian meals provide fewer calories than meat-based meals. For adults looking to lose weight, this is a benefit and, indeed, it's one of the reasons some people adopt a vegetarian diet. But it can be a concern for infants, children, adolescents, and pregnant women who consume vegetarian diets. These persons need adequate calories for growth and development. What's more, fat shouldn't be restricted in infants and children younger than 2 years of age. To counter these risks, vegetarians can increase their caloric intake by eating more whole-grain breads and cereals, legumes, nuts, and seeds. Also, depending on a person's vegetarian style, eggs and dairy products can contribute calories to the diet. Young children following a vegetarian diet need lots of nutrient-dense snacks and meals.

While most foods of plant origin are low in fat and calories, there are exceptions. Nuts, seeds, avocados, olives, peanut butter, and vegetable oil are all relatively high in fat (unsaturated) and calories.

Protein

The requirement for protein is really a requirement for the nine essential amino acids. As discussed earlier in this module, animal proteins provide all nine essential amino acids in sufficient amounts to meet our needs, so they're known as *complete proteins*. Foods of plant origin, however, usually lack adequate amounts of certain essential amino acids, so they're known as *incomplete proteins*.

Although vegans don't consume any animal products, they can still meet their protein needs fairly easily. Since some plant foods provide the essential amino acids that other plant foods lack (and vice versa), vegans simply need to eat a variety of plant foods over the course of the day to get sufficient quantities of all nine essential amino acids.

When two or more incomplete proteins can be combined to create a complete protein, those foods are known as **complementary proteins**. For example, peanut butter alone won't supply all the amino acids your body needs, but the wheat in bread provides essential amino acids that are lacking in peanut butter. So, by combining the two foods together, you get a peanut butter sandwich that contains all the essential amino acids. Contrary to what we used to think, complementary proteins don't have to be eaten together at the same meal. Research shows that by eating various sources of plant protein throughout the day, adults can get enough essential amino acids to meet their needs. However, infants and preschoolers need a greater proportion of essential amino acids, so, if they aren't getting breastmilk, infant formula, or another source of complete protein, they should eat complementary proteins within a few hours of one another.

A vegetarian's daily intake should include a variety of legumes and whole grains along with seeds or nuts. Several protein sources to be aware of are soybeans, amaranth, and quinoa, all of which have amino acid patterns similar to that of cow's milk. Soy protein in particular has become a popular meat alternative since it is a complete protein without the cholesterol and saturated fat found in animal products.



When the amino-acid profiles of two plant foods "complement" one another to form a complete protein, they're known as **complementary proteins**.

What's more, researchers are studying other potential health benefits of soy, including its cholesterol-lowering abilities, role in bone health, and possible anti-cancer properties. Vegetarians can choose among numerous products made from soy, including tofu, soy milk, and soy burgers.

Calcium

Since milk provides a large share of the required calcium for most people, vegetarians who don't consume milk or dairy products may not get enough calcium. The most reliable and practical source of calcium for pure vegetarians is calcium-fortified soy milk. Also, firm tofu (set with calcium sulfate) is a significant source, as are some of the calcium-fortified products that can fit into a vegetarian diet, including calcium-fortified orange juice, grapefruit juice, bread, and cereal. Other sources that offer moderate to small amounts of calcium include soy cheese, blackstrap molasses, sesame seeds, tahini (sesame butter), almonds and almond butter, tempeh, and certain vegetables (collards, kale, mustard greens, turnip greens, broccoli, okra, and rutabaga). Calcium supplements may be necessary if dietary intake is insufficient. For more information about calcium and the calcium content of various foods, refer to the section on calcium on page 1-57.

Vitamin D

In addition to calcium, we need vitamin D for healthy bones. Vitamin D may be a concern for vegans since they don't eat eggs or drink fortified cow's milk, two important food sources of vitamin D in the typical American diet. And while it's true that our bodies make vitamin D through exposure of the skin to sunlight (20 to 30 minutes two or three times a week), vegetarians shouldn't rely on this as a source, especially considering current recommendations to stay out of the sun. Also, things like sunscreen, smog, and winter temperatures all cut down on sun exposure. Plus, people with darker skin need even longer exposure (30 minutes to 3 hours per day). So vegans, especially children and adolescents, need to take extra steps to be sure they get the vitamin D they need. Some

brands of soy milk, breakfast cereals, and margarine are fortified with vitamin D. It's important to check the package labels to be sure. Finally, an infant who is exclusively breastfed by a vegan mother may need a vitamin D supplement, especially if the infant is dark-skinned and/or doesn't get enough sun exposure.

Vitamin B₁₂ is primarily found in animal products, including eggs and dairy products. So vegans must rely on fortified foods, nutritional yeast, and/or vitamin B₁₂ supplements.

Vitamin B₁₂

Vitamin B₁₂, also known as cobalamin, is essential for growth, formation of red blood cells, and function of the central nervous system. Vitamin B₁₂ is primarily found in animal products, including eggs and dairy products. While some foods of plant origin contain B₁₂, plant foods aren't a reliable source. For example, seaweed, miso, tempeh, tamari, sauerkraut, spirulina, and algae are often cited as good sources of vitamin B₁₂, but they generally contain an inactive form of the vitamin that the body can't use. So vegans need other sources of cobalamin. Their best bet is to look for foods fortified with B₁₂ such as breakfast cereals, soy products, or vegetarian burger products. Also, nutritional yeast can contribute vitamin B₁₂ to the diet. However, it's important to realize that nutritional yeast is different than brewer's yeast and baking yeast, neither of which contain B₁₂. Another alternative is vitamin B₁₂ supplements. In particular, breastfed infants of women who consume a vegan diet should receive vitamin B₁₂ supplements. Formula-fed infants should get soy formula, which is fortified with vitamin B₁₂.

Iron

Getting enough iron is hard enough for people who eat a mixed diet, so it can be especially challenging for vegetarians. As discussed earlier on page 1-68, plant products contain non-heme iron, which the body doesn't absorb as well as the heme iron found in meat, fish, and poultry. Eggs contain heme iron, but only in small amounts, and milk has negligible amounts. So all types of vegetarians need to optimize their iron intake and absorption. That means consuming high-iron foods on a daily basis. Fortified

breakfast cereals, blackstrap molasses, legumes, tofu, dried fruits, and enriched pasta and bread all contribute iron. It's also important to avoid iron inhibitors such as coffee, tea, and wheat bran, or at least try not to consume them with iron-rich foods. Also, to increase iron absorption, vegetarians should include vitamin C-rich foods along with foods high in iron. For more information about iron and the iron content of foods, refer to page 1-64.

Zinc

Zinc is essential for growth and development. This mineral is widely available in animal products, including milk and eggs, and, to a lesser extent, in foods of plant origin. Although most vegetarians get adequate levels of zinc, it's still a nutrient to be aware of, especially because substances in plants such as fiber and phytates can reduce zinc absorption.

Plant sources of zinc include legumes, tofu, miso, tempeh, nuts, seeds, wheat germ, and whole grains. Zinc is lost in the refining of flour. To increase absorption and ensure adequate zinc intake, vegetarians should avoid raw wheat bran and limit the consumption of unleavened bread. Also it helps to soak legumes one to two hours and then discard the water before cooking. Calcium interferes with zinc absorption, so people should avoid taking calcium supplements with sources of zinc. As for infants, both breastmilk and soy formula will provide adequate amounts of zinc.

Meal Planning for Vegetarians

As with any type of meal plan, it's important to assess a vegetarian's diet before making recommendations. Not only are there different types of vegetarians, but the intake of individual vegetarians can vary quite a bit. Still there are some general guidelines to suggest when discussing vegetarian diets:

- *Choose a variety of foods, including whole grains, vegetables, fruits, legumes, nuts, seeds, and, if desired, dairy products and eggs. Many people, vegetarians and non-vegetarians*

alike, tend to get stuck in a dietary rut, making the same meals over and over, with the same vegetable choices, same breads, etc. Variety is a key to healthy eating.

- *Limit heavily refined foods that are high in fat and sugar.* Instead, opt for whole, unrefined foods that offer plenty of vitamins, minerals, and complex carbohydrates. This is another universal guideline that applies to vegetarians and non-vegetarians alike.



- For vegetarians who choose to include dairy or eggs, *go easy on the eggs, cheese, and other high-fat dairy foods which are high in saturated fat.* Also, choose skim or low-fat dairy products. And don't rely solely on eggs and dairy for protein. For variety and nutrition, it's important to consume protein from plant foods as well.
- *Vegans need a routine source of vitamin B₁₂ from fortified foods and/or supplements.* Also, if they don't get much sun, they need a source of *vitamin D.*
- *Breastfed infants need a dietary source of iron (infant cereal, tofu) or iron supplements at 4 to 6 months of age.* In addition, if they have limited sun exposure, they need a source of *vitamin D.* Also, infants of vegan mothers who are exclusively breastfed should get *vitamin B₁₂* supplements.
- *Don't restrict dietary fat in children younger than 2 years.* For older children, offer *nutrient dense foods* to help them meet their calorie needs. Include foods higher in unsaturated fats such as nuts, seeds, nut and seed butters, avocados, and vegetable oils.

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Self-test Questions – Vegetarian Diets

1. Write the letter of each term next to its definition.

- (a) Lacto-vegetarians
- (b) Vegans
- (c) Semi-vegetarians
- (d) Lacto-ovo vegetarians

___ eat only foods of plant origin; no animal products whatsoever.

___ eat foods of plant origin, plus milk and milk products.

___ eat foods of plant origin, as well as milk, milk products, and eggs.

___ eat plant foods, eggs, milk, and milk products, plus fish or poultry on occasion.

2. Mark the following statements **TRUE** or **FALSE**.

_____ One advantage of a vegan diet is that it supplies large amounts of iron.

_____ Soy protein is a plant product that is considered to be a complete protein.

_____ Seaweed, miso, tempeh, tamari, sauerkraut, spirulina, and algae are all excellent sources of vitamin B₁₂.

_____ If a vegetarian becomes pregnant, it is impossible for her to meet all of her nutrient needs while following a vegetarian diet.

3. List three sources of iron for someone following a vegetarian diet:

4. Vegans are at special risk of not getting enough of the following nutrients to meet their needs (*check all that apply*):

- iron
- vitamin K
- calcium
- sodium
- cholesterol
- energy
- fiber
- vitamin B₁₂

5. List five food sources of calcium for someone who follows a *vegan* diet:

6. Appropriate dietary suggestions for vegans include (*check all that apply*):

- Rely on sunshine for vitamin D.
- Add nutritional yeast to foods as one source of vitamin B₁₂.
- Always eat complementary proteins at the same meal.
- Eat a variety of foods from plant sources.
- For more calories, eat more whole-grain breads and cereals, legumes, nuts, and seeds.
- Limit heavily refined foods that are high in fat and sugar.

Objectives

Have you ever had a toothache? If so, you know firsthand that aching teeth and gums make it hard to chew healthy foods like cereals, nuts, and fresh fruits and vegetables. Good dental health is one of the keys to good nutrition. And the reverse is true as well. Good nutrition is important in the development of healthy gums and teeth that are functional, durable, and resistant to disease. After completing this section, you'll be able to:

- identify characteristics of two types of dental disease;
- identify characteristics of baby-bottle tooth decay; and
- list four ways to prevent baby-bottle tooth decay.

Education and Oral Health

Some form of dental disease affects almost every American. By age 17, about 85 percent of adolescents have experienced dental caries (cavities) and, by age 19, about half have gingivitis, an early form of periodontal (gum) disease. These are surprising statistics when you consider that cavities and gum disease are preventable with regular dental care. Unfortunately, many people simply don't realize that routine dental hygiene can make a difference or they don't care until it's too late.

Educating people about oral health is one of the main keys to reducing dental disease. And, since oral health and good nutrition go hand in hand, the WIC Program is an excellent opportunity to provide dental health screening and education to both parents and children.

Types of Dental Disease

There are two common types of dental disease: tooth decay and gum disease.

Tooth decay is a combination of factors: Plaque + Sugar + Tooth Enamel = Decay.

Tooth decay refers to destruction of the tooth enamel. It happens when the plaque on teeth comes in contact with the sugar in a food or beverage. Plaque is the soft, sticky layer of bacteria that continuously forms on the teeth. (If you scratch a tooth with your fingernail, the sticky film you remove is plaque.) When the plaque mixes with foods like sugars, starches, milk, breastmilk, juice, and baby formula, an acid forms. The acid attacks the tooth surface and can create a hole or cavity. So if you snack on sugar-rich foods throughout the day, your teeth are in contact with acid all day, which can lead to tooth decay.

Gum disease (periodontal disease) is an infection of the gums, also caused by plaque. When plaque remains on the teeth, it hardens and turns into tartar, which causes inflammation of the gums. First, a condition known as *gingivitis* develops – the gums become inflamed, red, and tender, and they bleed easily. Bleeding gums are a sign of gum disease. At this stage, proper brushing and flossing can

About 75 percent of adults have some form of gum disease, and it occurs in children as well.

usually reverse the problem. But, if the inflamed gums go untreated, the disease becomes more advanced. The gums pull away from the teeth and pockets form between the teeth and gums. Eventually, the infection destroys the bone around the teeth, and the teeth become loose or have to be removed.

Maintaining Dental Health Throughout Life

The good news is that it's easy to prevent both tooth decay and gum disease in adults as well as toddlers and infants. The key points are having regular dental checkups and practicing good dental health habits at home starting at a young age.

Infancy and Early Childhood

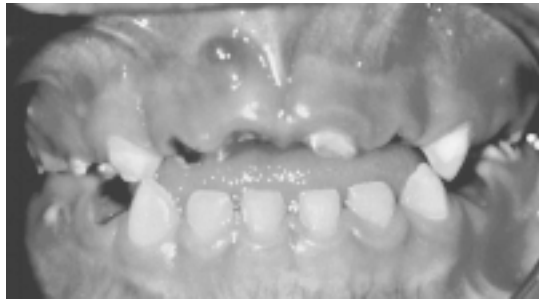
Dental care should start at a very early age. In fact, experts suggest wiping the baby's gums with a clean, damp washcloth or gauze pad starting the first few days after birth. Not only does this remove plaque, but it gets the baby used to having his gums cleaned and eventually oral hygiene becomes routine.

When an infant is 6 months old, a pediatrician should address the child's fluoride status. Fluoride from either water or fluoride supplements becomes crucial in helping to prevent decay. (For more information on fluoride and its role in dental health, refer to page 1-63 in this module.) There are a number of factors to consider, including the level of fluoride in the local water supply, the amount of fluoride in formula, and parents' use of bottled water. If fluoride levels are low, then a pediatrician or dentist can prescribe oral fluoride supplements.

Baby-bottle tooth decay is an important topic to address with parents. This type of decay, also known as nursing-bottle caries, results from improper infant feeding practices that some parents may not realize are harmful. It occurs when infants or toddlers are allowed to drink continuously from a bottle of milk, formula, sweetened liquids, or juice either in



Parents can find out about the fluoride level of their drinking water by calling the local health department or consulting with a local dentist.



bed or while playing during the day. The teeth are bathed in sugar, which mixes with plaque and pools around the baby's teeth for a long period of time. Usually, the decay starts as white spots on the upper front teeth near the

gum line. These teeth help a child's speech, help form the shape of the face, and make such a difference in a child's smile. Baby-bottle tooth decay can affect all of the teeth in a baby's mouth. If left untreated, the teeth turn brown or black and can be totally destroyed, requiring treatment in a hospital operating room under anesthesia.

Some parents feel that they don't need to be concerned with an infant's primary teeth (baby teeth) since the child will lose them and get permanent teeth later on. But baby teeth that are lost too early can lead to long-term problems such as crooked permanent teeth, speech problems, and high-cost dental treatment. And, since the primary teeth are not fully replaced by permanent teeth until a child is 12 to 14 years old, keeping them healthy and intact during the early years is especially important. WIC staff can make a huge impact in educating parents about baby-bottle tooth decay (see **box** on facing page).

Early Childhood

In addition to preventing baby-bottle tooth decay, there are a number of other dental health issues to address during early childhood. For very young toddlers, parents should continue using a clean, soft cloth to wipe gums and teeth. Next, parents need to teach toddlers to take care of their teeth with regular brushing and flossing. Parents should brush their toddler's teeth using a soft, child-size toothbrush and water, and then begin using a small amount of fluoride toothpaste starting at about age 3 (or whenever the child can spit out the toothpaste after brushing). Toddlers should see a dentist every six months starting at 1 year of age. A dentist will check for decay and other problems, and help children and their

parents learn about daily care at home. Also, it's still important to monitor fluoride intake, which may involve checking on fluoride levels in local water and at daycare facilities.

Preventing Baby-bottle Tooth Decay in Infants and Toddlers

- Never put juice or sweetened liquids in a bottle. Use bottles only for formula, breastmilk or water.
- Use bottles at feeding time only, not when going to bed. If the baby must have a bottle at sleep-time, put only plain water in it. Likewise, don't leave the child in a playpen with a bottle.
- Hold the baby during feedings instead of propping the bottle with a pillow or blanket.
- Don't let an infant or toddler sit alone or walk around with a bottle filled with sweetened liquid for a long period of time.
- Never give a baby a pacifier dipped in honey, syrup, sugar, or other sweetened liquid.
- Clean the baby's gums every day with a soft cloth even before teeth come in.
- Trade the bottle for a tippy cup at about 1 year of age. Most babies can start learning to use a tippy cup when they are about 6 months old.
- To help prevent the spread of germs, avoid sharing eating utensils or toothbrushes with your infant or child. Parents can spread bacteria (germs) by sharing utensils, pre-chewing food, and licking off bottle nipples and pacifiers.
- Keep your own teeth and mouth clean and healthy by brushing and flossing daily and having regular dental checkups.
- Put your baby to bed with a blanket or toy, not a bottle. Before sleep-time, give your baby a hug and some extra attention for comfort instead of a bottle.

Older Children and Adolescents

Snacking is always a factor that affects oral health, especially during middle childhood and adolescence. Many snacks tend to be high in carbohydrates and stick to the teeth. Even healthy snacks like cereals, crackers, and dried fruits can be bad for teeth. Without proper brushing and flossing, frequent snacking on sticky, high-sugar foods can lead to tooth decay. What's more, as children get older, they start making more of their own food choices, plus they're expected to take more responsibility for brushing and flossing. For adolescents, beverages such as sodas and sports drinks can be a concern. Also, use of bottled water may decrease fluoride intake.

Adulthood

Gum disease is the number one cause of tooth loss in adults, and cavities occur in adults as well. So adults should brush twice a day for two or three minutes with a fluoridated toothpaste and floss at least once a day. Plus, they should eat well balanced meals and watch how often they snack. And regular dental checkups are just as important for adults as they are for children. In fact, older adults can be especially prone to oral disease since gums can shrink with age and, as people keep their teeth longer, dentists are seeing more decay. Also, women may be at higher risk for gum disease during menstruation, pregnancy, and menopause since these all result in hormonal changes which can affect oral health. Again, the key to prevention is proper dental care at home and regular dental checkups.

Children with Special Health-care Needs

Certain conditions can present special challenges in terms of oral health.

- **Pre-term and low-birthweight infants** can have oral and dental malformations.
- **Children who are fed through gastrostomy tubes** can develop calcified deposits on their teeth, which may lead to chronic inflammation in the mouth.

- **Children with gastric reflux** can have enamel erosion similar to that seen with bulimia nervosa.
- **Children with intellectual and behavioral impairments** may be at increased risk for dental caries when they are in behavioral modification programs that use carbohydrate-rich foods as positive reinforcement for appropriate behavior.
- **Children who have difficulty chewing and swallowing** may leave more food on their teeth, which can generate plaque.
- **Children with various gastrointestinal conditions** may be at an increased risk for tooth malformations and lesions in the mouth.
- **Children who are fed intravenously** may have premature bone loss.
- **Children undergoing radiation and chemotherapy** are at increased risk for oral disease.

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Self-test Questions — Oral Health

1. Mark the following statements **TRUE** or **FALSE**.

_____ Tooth decay occurs when plaque on the teeth comes in contact with the sugar in a food or beverage.

_____ Tooth decay is an inherited tendency and cannot be prevented.

_____ Tooth decay only happens during childhood.

_____ Constant snacking on sugar-rich foods can contribute to tooth decay.

2. Gum disease (*check all that apply*):

___ is also called periodontal disease.

___ is the same thing as tooth decay.

___ usually clears up on its own.

___ can destroy the bone around the teeth.

___ can result in tooth loss.

3. Gum disease is caused by (*check all that apply*):

___ plaque.

___ dentures.

___ inadequate brushing and flossing.

___ not enough fluoride in the drinking water.

___ old toothbrushes.

4. Baby-bottle tooth decay (*check all that apply*):

___ only happens in infants less than 1 year old.

___ can result from routinely putting a baby to bed with a bottle with milk, formula, breastmilk, or juice.

_____ can result when a toddler is allowed to drink constantly from a bottle all day.
_____ is a minor problem that parents don't need to worry about.

5. List at least four ways to help prevent baby-bottle tooth decay:

Cultural Dietary Practices *Important Nutrition Issues*

Objectives

As a WIC nutrition educator, you have a wonderful opportunity to meet people from different cultures and learn about the foods they eat and the occasions they celebrate. But educating people from different cultures can be challenging. After reading this section, you'll be more familiar with various cultures and ways to communicate with clients from different backgrounds. Specifically, you'll be able to:

- name one resource that provides information on cultural dietary practices; and
- list ways to enhance communication with clients from a different culture.

Culture and Food

From sushi to tortillas, kimchee to poi, and grits to jicama, it's obvious that food choices vary widely between different population groups. Preparation methods vary as well – some cultures deep-fry many of their foods while others barbecue or stir-fry. And different cultures also have different health beliefs. For example, a traditional Chinese belief maintains that health is related to the balance between the “yin” and “yang” forces in the body. And, in Puerto Rico, foods are classified as hot or cold (not necessarily depending on temperature or spiciness), and the goal is to maintain a balance between these two types of foods.

There are regional differences within a culture, as well as differences among families and individuals. In addition, as people immigrate to the U.S., they often adopt certain beliefs and behaviors that affect their food choices. Similarly, influences such as the invasion of fast-food chains impact food choices among many cultures in today's world.

For an in-depth review of various cultures, refer to *Food and Culture in America* by Pamela Kittler and Kathryn P. Sucher (see References). The authors provide detailed information about the food practices of different cultures, as well as each group's history, demographics, family, religion, traditional health beliefs, adaptations of food habits in the U.S., and counseling tips in relation to cultural customs and beliefs. This is a valuable reference for nutrition professionals working with different cultures.

Also, the bibliography compiled by the American Dietetic Association (ADA) Diversity Committee and National Center for Nutrition and Dietetics staff is an excellent reference list. It can be viewed at <http://www.eatright.org/bibethnic.html> .

Guidelines for Cross-cultural Communication

Health professionals can become more effective by exploring a culture's food practices and health beliefs and incorporating

them into nutrition messages. This list can help guide you in this process.

- **Understand your own cultural values and biases.** Try to overcome any real or perceived differences between you and your clients.
- **Learn about the groups you routinely serve.** Acquire a basic knowledge of your clients' cultural values, health beliefs, and nutrition practices.
- **Respect your clients.** Be open, honest, non-judgmental, and willing to listen and learn.
- **Respect personal space.** Let clients sit where they want. Also, follow cultural rules about touching. For example, in some Asian cultures, a person's head shouldn't be touched because the head is considered the "seat of wisdom."
- **Talk with your client effectively.** Find out if you can understand each other and, if needed, arrange for an interpreter. Always speak directly to the client, whether an interpreter is present or not. Ask how the client prefers to be addressed. Avoid slang, technical jargon, and complex sentences. Use open-ended questions or questions phrased in several ways to obtain information. Determine the client's reading ability before giving written materials.
- **Establish rapport and express an interest in people.** Smile, share experiences, and ask questions (even about things you're unfamiliar or uncomfortable with). Paying attention to children is usually a good idea, although people from some cultures believe it is inappropriate to accept compliments about their children.
- **Try to get your message to the appropriate family member.** In some cultures, the oldest male is considered the head of the family while, in others, an elderly female has this role.
- **Pay attention to body language.** Avoid body language that may be offensive and misunderstood. For example, waving, pointing, or turning up the palms can convey

Part 3



different messages in different cultures. Also, notice how people make eye contact. Many cultures consider it impolite to look directly at the person who is speaking.

- **Promote positive change.** Build on cultural practices, reinforcing those which are positive, and promoting change only when a practice is harmful.
- **Study a person's responses.** A “yes” response doesn't necessarily mean that a person understands the message or is willing to do what is being discussed. Also, people may smile or laugh to mask emotions or prevent conflict.
- **Remember that not all seeds of knowledge fall into a fertile environment to produce change.** Of those that do, some will take years to germinate. Be patient and provide counseling in a culturally appropriate environment to promote positive health behavior.

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Self-test Questions – Cultural Dietary Practices

1. Name one resource that provides information on cultural dietary practices.

2. List three key guidelines for enhancing cross-cultural communication:

Appendixes

- A** Daily Reference Intakes for Vitamins:
Recommended Intakes for Individuals

- B** Daily Reference Intakes for Minerals:
Recommended Intakes for Individuals

- C** Tolerable Upper Intake Levels for Various Nutrients

Appendix A ***Dietary Reference Intakes for Vitamins:
Recommended Intakes for Individuals***
*Food and Nutrition Board, Institute of Medicine-
National Academy of Sciences*

Life Stage Group	Fat-soluble Vitamins				Water-soluble Vitamins		
	Vitamin A (µg/d)	Vitamin D (µg/d) ^{a,b}	Vitamin E ^c (µg/d)	Vitamin K (µg/d)	Vitamin C (mg/d)	Thiamin (mg/d)	Riboflavin (mg/d)
Infants							
0–6 mo	400*	5*	4*	2.0*	40*	0.2*	0.3*
7–12 mo	500*	5*	6*	2.5*	50*	0.3*	0.4*
Children							
1–3 y	300	5*	6	30*	15	0.5	0.5
4–8 y	400	5*	7	55*	25	0.6	0.6
Males							
9–13 y	600	5*	11	60*	45	0.9	0.9
14–18 y	900	5*	15	75*	75	1.2	1.3
19–30 y	900	5*	15	120*	90	1.2	1.3
31–50 y	900	5*	15	120*	90	1.2	1.3
51–70 y	900	10*	15	120*	90	1.2	1.3
> 70 y	900	15*	15	120*	90	1.2	1.3
Females							
9–13 y	600	5*	11	60*	45	0.9	0.9
14–18 y	700	5*	15	75*	65	1.0	1.0
19–30 y	700	5*	15	90*	75	1.1	1.1
31–50 y	700	5*	15	90*	75	1.1	1.1
51–70 y	700	10*	15	90*	75	1.1	1.1
> 70 y	700	15*	15	90*	75	1.1	1.1
Pregnancy							
≤ 18 y	750	5*	15	75*	80	1.4	1.4
19–30 y	770	5*	15	90*	85	1.4	1.4
31–50 y	770	5*	15	90*	85	1.4	1.4
Lactation							
≤ 18 y	1200	5*	19	75*	115	1.4	1.6
19–30 y	1300	5*	19	90*	120	1.4	1.6
31–50 y	1300	5*	19	90*	120	1.4	1.6

Note: This table presents Recommended Dietary Allowances in **bold type** and Adequate Intakes (AI) in ordinary type followed by an asterisk (*). RDAs and AIs may both be used as goals for individual intake. RDAs are set to meet the standards of almost all (97 to 98 percent) individuals in a group. For healthy breastfed babies, the AI is the mean intake. The AI for other life-stage and gender groups is believed to cover needs of all individuals in the group, but lack of data or uncertainty in the data prevent being able to specify with confidence the percentage of individuals covered by this intake.

^aAs cholecalciferol. 1 µg of cholecalciferol = 40 IU of vitamin D.

^bIn the absence of adequate exposure to sunlight.

^cAs α-tocopherol. α-Tocopherol includes RRR-α-tocopherol, the only form of α-tocopherol that occurs naturally in foods, and the 2R-stereoisometric forms of α-tocopherol (RRR-, RSR-, RRS-, and RSS-α-tocopherol) that occur in fortified foods and supplements. It does not include the 2S-stereoisomeric forms of α-tocopherol (SRR-, SSR-, SRS-, and SSS-α-tocopherol), also found in fortified foods and supplements.

Source: Reprinted with permission by the National Academy of Sciences. Adapted from National Academy Press, *Dietary Reference Intakes for Vitamin C, Selenium and Carotenoids* (Washington, 2000) and *Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc* (Washington, 2001).

<i>Water-soluble Vitamins (cont'd)</i>						
Niacin (mg/d) ^d	Vitamin B ₆ (mg/d)	Folate (µg/d) ^e	Vitamin B ₁₂ (µg/d)	Pantothenic Acid (mg/d)	Biotin (µg/d)	Life-stage Group
<u>Infants</u>						
2*	0.1*	65*	0.4*	1.7*	5*	0–6 mo
4*	0.3*	80*	0.5*	1.8*	6*	7–12 mo
<u>Children</u>						
6	0.5	150	0.9	2*	8*	1–3 y
8	0.6	200	1.2	3*	12*	4–8 y
<u>Males</u>						
12	1.0	300	1.8	4*	20*	9–13 y
16	1.3	400	2.4	5*	25*	14–18 y
16	1.3	400	2.4	5*	30*	19–30 y
16	1.3	400	2.4	5*	30*	31–50 y
16	1.7	400	2.4 ^f	5*	30*	51–70 y
16	1.7	400	2.4 ^f	5*	30*	> 70 y
<u>Females</u>						
12	1.0	300	1.8	4*	20*	9–13 y
14	1.2	400 ^g	2.4	5*	25*	14–18 y
14	1.3	400 ^g	2.4	5*	30*	19–30 y
14	1.3	400 ^g	2.4	5*	30*	31–50 y
14	1.5	400	2.4 ^f	5*	30*	51–70 y
14	1.5	400	2.4 ^f	5*	30*	> 70 y
<u>Pregnancy</u>						
18	1.9	600 ^h	2.6	6*	30*	≤ 18 y
18	1.9	600 ^h	2.6	6*	30*	19–30 y
18	1.9	600 ^h	2.6	6*	30*	31–50 y
<u>Lactation</u>						
17	2.0	500	2.8	7*	35*	≤ 18 y
17	2.0	500	2.8	7*	35*	19–30 y
17	2.0	500	2.8	7*	35*	31–50 y

^d As niacin equivalents (NE). 1 mg of niacin = 60 mg of tryptophan; 0–6 months = preformed niacin (not NE).

^e As dietary folate equivalents (DFE). 1 DFE = 1 µg of food folate = 0.6 µg of folic acid from fortified food or as a supplement consumed with food = 0.5 µg of a supplement taken on an empty stomach.

^f Because 10 to 30 percent of older people may malabsorb B₁₂, it is advisable for those older than 50 years to meet their RDA mainly consuming foods fortified with B₁₂ or a supplement containing B₁₂.

^g In view of evidence linking folate intake with neural-tube defects in the fetus, it is recommended that all women capable of becoming pregnant consume 400 µg from supplements or fortified foods in addition to intake of food folate from a varied diet.

^h It is assumed that women will continue consuming 400 µg from supplements or fortified food until their pregnancy is confirmed and they enter prenatal care, which ordinarily occurs after the end of the periconceptual period — the critical time for formation of the neural tube.

Appendix B ***Dietary Reference Intakes for Minerals:
Recommended Intakes for Individuals***
*Food and Nutrition Board, Institute of Medicine-
National Academy of Sciences*

Life-stage Group	Minerals					
	Calcium (mg/d)	Phosphorus (mg/d)	Magnesium (mg/d)	Iron (mg/d)	Zinc (mg/d)	Iodine (µg/d)
Infants						
0–6 mo	210*	100*	30*	0.27*	2*	110*
7–12 mo	270*	275*	75*	11	3	130*
Children						
1–3 y	500*	460	80	7	3	90
4–8 y	800*	500	130	10	5	90
Males						
9–13 y	1300*	1250	240	8	8	120
14–18 y	1300*	1250	410	11	11	150
19–30 y	1000*	700	400	8	11	150
31–50 y	1000*	700	420	8	11	150
51–70 y	1200*	700	420	8	11	150
> 70 y	1200*	700	420	8	11	150
Females						
9–13 y	1300*	1250	240	8	8	120
14–18 y	1300*	1250	360	15	9	150
19–30 y	1000*	700	310	18	8	150
31–50 y	1000*	700	320	18	8	150
51–70 y	1200*	700	320	8	8	150
> 70 y	1200*	700	320	8	8	150
Pregnancy						
≤ 18 y	1300*	1250	400	27	13	220
19–30 y	1000*	700	350	27	11	220
31–50 y	1000*	700	360	27	11	220
Lactation						
≤ 18 y	1300*	1250	360	10	14	290
19–30 y	1000*	700	310	9	12	290
31–50 y	1000*	700	320	9	12	290

Note: This table presents Recommended Dietary Allowances in **bold type** and Adequate Intakes (AI) in ordinary type followed by an asterisk (*). RDAs and AIs may both be used as goals for individual intake. RDAs are set to meet the standards of almost all (97 to 98 percent) individuals in a group. For healthy breastfed babies, the AI is the mean intake. The AI for other life-stage and gender groups is believed to cover needs of all individuals in the group, but lack of data or uncertainty in the data prevent being able to specify with confidence the percentage of individuals covered by this intake.

^a The average chromium content in well balanced diets was determined to be 13.4 µg / 1000 kcal; the average energy intake for adults was obtained from NHANES III.

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<i>Minerals</i>						
Selenium (µg/d)	Fluoride (mg/d)	Chromium ^a (µg/d)	Copper (µg/d)	Manganese (mg/d)	Molybdenum (µg/d)	Life-stage Group
						<u>Infants</u>
15*	0.01*	0.2*	200*	0.003*	2*	0–6 mo
20*	0.5*	5.5*	220*	0.06*	3*	7–12 mo
						<u>Children</u>
20	0.7*	11*	340	1.2*	17	1–3 y
30	1*	15*	440	1.5*	22	4–8 y
						<u>Males</u>
40	2*	25*	700	1.9*	34	9–13 y
55	3*	35*	890	2.2*	43	14–18 y
55	4*	35*	900	2.3*	45	19–30 y
55	4*	35*	900	2.3*	45	31–50 y
55	4*	30*	900	2.3*	45	51–70 y
55	4*	30*	900	2.3*	45	> 70 y
						<u>Females</u>
40	2*	21*	700	1.6*	34	9–13 y
55	3*	24*	890	1.6*	43	14–18 y
55	3*	25*	900	1.8*	45	19–30 y
55	3*	25*	900	1.8*	45	31–50 y
55	3*	20*	900	1.8*	45	51–70 y
55	3*	20*	900	1.8*	45	> 70 y
						<u>Pregnancy</u>
60	3*	29*	1000	2.0*	50	≤ 18 y
60	3*	30*	1000	2.0*	50	19–30 y
60	3*	30*	1000	2.0*	50	31–50 y
						<u>Lactation</u>
70	3*	44*	1300	2.6*	50	≤ 18 y
70	3*	45*	1300	2.6*	50	19–30 y
70	3*	45*	1300	2.6*	50	31–50 y

Appendix C

***Tolerable Upper Intake Levels or UL^a of Various Nutrients
(Highest Levels of Daily Intakes Likely to Have no Adverse Effects)***

Life-stage Group	Vitamin A (µg/d)	Vitamin K ^b	Arsenic ^c	Boron (mg/d)	Chromium	Copper (µg/d)	Iodine (µg/d)	Iron (mg/d)	Manganese (mg/d)	Molybdenum (µg/d)	Nickel (mg/d)	Silicon ^d	Vanadium (mg/d) ^e	Zinc (mg/d)
0-6 mo	600	ND	ND	ND	ND	ND	ND	40	ND	ND	ND	ND	ND	4
7-12 mo	600	ND	ND	ND	ND	ND	ND	40	ND	ND	ND	ND	ND	5
1-3 y	600	ND	ND	3	ND	1,000	200	40	2	300	0.2	ND	ND	7
4-8 y	900	ND	ND	6	ND	3,000	300	40	3	600	0.3	ND	ND	12
9-13 y	1,700	ND	ND	11	ND	5,000	600	40	6	1,100	0.6	ND	ND	23
14-18 y	2,800	ND	ND	17	ND	8,000	900	45	9	1,700	1.0	ND	ND	34
19-50 y	3,000	ND	ND	20	ND	10,000	1,100	45	11	2,000	1.0	ND	1.8	40
> 50 y	3,000	ND	ND	20	ND	10,000	1,100	45	11	2,000	1.0	ND	1.8	40
Pregnancy														
≤ 18 y	2,800	ND	ND	17	ND	8,000	900	45	9	1,700	1.0	ND	ND	34
19-50 y	3,000	ND	ND	20	ND	10,000	1,100	45	11	2,000	1.0	ND	ND	40
Lactation														
≤ 18 y	2,800	ND	ND	17	ND	8,000	900	45	9	1,700	1.0	ND	ND	34
19-50 y	3,000	ND	ND	20	ND	10,000	1,100	45	11	2,000	1.0	ND	ND	40

^a UL = Tolerable Upper Intake Level. The highest level of daily nutrient intake that is likely to pose no risks of adverse health effects to almost all individuals in the general population. As intake increases above the UL, the risk of adverse effects increases. Unless specified otherwise, the UL represents total nutrient intake from food, water, and supplements.

^b ND = Not determinable due to lack of data of adverse effects in this age group and concern about lack of ability to handle excess amounts. Source of intake should be from food only to prevent high levels if intake.

^c Although a UL was not determined for arsenic, there is no justification for adding arsenic to supplements.

^d Although silicon has not been shown to cause adverse effects in humans, there is no justification for adding silicon to supplements.

^e Although vanadium in food has not been shown to cause adverse effects in humans, there is no justification for adding vanadium to food and vanadium supplements should be used with caution. The UL is based on adverse effects in laboratory animals and this data could be used to set a UL for adults but not children and adolescents.

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