12th Edition

Nutrition & Diet Therapy

Ruth A. Roth • Kathy L. Wehrle

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&
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***Nutrition & Diet Therapy,* Twelfth Edition**
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To my family and friends
who love and support me.

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SECTION 2

NUTRITION THROUGH THE LIFE CYCLE 169

Preface

In our health-conscious society, the link between good nutrition and good health is seen everywhere, from magazine and newspaper headlines to television shows, websites, apps, and blogs. The latest diets and stories about foods that claim to prevent certain diseases and health ailments abound. This presents a challenge to nurses working with clients to help them focus on improving both their nutrition and their overall health. ***Nutrition & Diet Therapy,*** 12th edition, provides sound nutritional information based upon fact. It is important that nurses have a solid foundation in the basic principles and concepts of good nutrition; then they can help clients debunk the myths and help them move toward better health through nutritional awareness.

Section 1, **Fundamentals of Nutrition**, includes chapters on the relationship of nutrition and health; planning a healthy diet; digestion, absorption, and metabolism; as well as chapters on each of the six nutrient groups (carbohydrates, lipids, proteins, vitamins, minerals, and water). Content has been thoroughly revised to embrace the newest MyPlate guidelines.

Section 2, **Nutrition Through the Life Cycle**, includes chapters on nutritional care during the various stages of life, from pregnancy and lactation through infancy, childhood, adolescence, and adulthood. This information provides sound knowledge of the changes in nutritional requirements across the lifespan.

Section 3, **Medical Nutrition Therapy**, includes discussion and research for many nutrition-related disorders. It covers the effects of disease and surgery on nutrition and the appropriate uses of diet therapy in restoring and maintaining health. It includes chapters with specific nutritional information for clients requiring help with weight control, diabetes, cardiovascular disease, renal disease, gastrointestinal problems, and cancer. It also discusses the nutritional needs of surgical clients, clients suffering burns and infections including HIV, and clients requiring enteral and parenteral nutrition. There is also a chapter on foodborne illness, allergies, and intolerances as well as the general nutritional care of clients.

CHAPTER OUTLINE AND FEATURES

Chapters follow a consistent format to help facilitate and enhance learning:

- **Objectives**—learning goals to be achieved upon completion of the chapter
- **Key Terms**—a list of terms used in text and defined in the margin; these are also included in the master glossary

- **In The Media**—boxes highlighting current trends, events, and fads and the potential impact on clients' health
- **Supersize USA**—boxes highlighting information and current events surrounding the national obesity epidemic
- **Exploring the Web**—directions to Internet resources and websites
- **Spotlight on Lifecycle**—boxes focusing on nutritional concerns for the different stages of life
- **Health and Nutrition Considerations**—recommendations for health care professionals to help clients achieve optimal health through the knowledge of nutrition
- **Summary**—a brief narrative overview of the most important chapter highlights
- **Discussion Topics**—critical thinking activities that encourage synthesis and application of new concepts
- **Suggested Activities**—creative suggestions on how to implement the knowledge presented in the chapter
- **Review**—study questions to test understanding of content and to help prepare for examinations
- **Case in Point**—reality-based case studies that apply to the chapter topics, followed up by a "Rate This Plate" challenge that asks for evaluation of a proposed meal plan for a client
- **MyPlate guidelines**—recommended and embraced throughout the text
- **Dietary Guidelines for Americans, 2015–2020**—located in the appendices and throughout the chapters

NEW TO THIS EDITION

- **Chapter 1** *The Relationship of Nutrition and Health* now sheds light on our national targets for health, "Healthy People 2020," and introduces the concept of health disparities, health literacy, and food deserts and their effect on the health of our population. There is new information on the six standard characteristics to diagnose adult malnutrition.
- **Chapter 2** *Planning a Healthy Diet* offers a complete look at the new Dietary Guidelines for Americans 2015–2020, including the five overarching principles in detail. The new proposed food label is compared to the existing label to highlight improvements.
- **Chapter 14** *Weight Management Across the Life Cycle* includes the latest on weight regulation, obesity trends in children and adults, and inflammation as a root cause of obesity. The health consequences of being overweight are discussed as well as the latest prevention and treatment strategies for successful diet therapy. The newer behavioral techniques of motivational interviewing, coaching, mindfulness, and readiness for change are highlighted as well. There is important information on the newer weight loss drugs and a snapshot of surgical treatment for obesity including bariatric surgery, as well as the new gastric balloon placement.

- **Chapter 15** *Diet, Prediabetes, and Diabetes* includes new information on the growing problem of prediabetes. Up-to-date statistics and diagnostic criteria are presented as well as the latest list of oral medications and insulin currently available to treat diabetes. There is a new list of alternative sweeteners and their pros and cons.
- **Chapter 18** *Diet and Gastrointestinal Disorders* includes current information on celiac disease and the growing incidence of gluten sensitivity, as well as new information about irritable and short bowel syndrome.
- **In The Media** boxes have been refreshed throughout the chapters to keep students up to speed on current events and fads in nutrition and health-related topics.
- Updated **Recommended Dietary Allowances (RDA)** and **Daily Recommended Intake (DRI)** can be found in tables throughout the book.
- The **MyPlate** method gives guidelines for intake of nutrients with various calorie levels. Information about the MyPlate method is introduced in Chapter 2, and is referenced throughout the text.
- **Supersize USA** boxes have been refreshed to bring current nutrition concerns to the forefront and to generate discussion in the classroom.
- ***Dietary Guidelines for Americans, 2015–2020*** has been updated with current recommendations for nutritional intake and exercise.

LEARNING PACKAGE FOR THE STUDENT

MindTap

MindTap is the first of its kind in an entirely new category: the Personal Learning Experience (PLE). This personalized program of digital products and services uses interactivity and customization to engage students, while offering a range of choice in content, platforms, devices, and learning tools. MindTap is device agnostic, meaning that it will work with any platform or learning management system and will be accessible anytime, anywhere: on desktops, laptops, tablets, mobile phones, and other Internet-enabled devices. MindTap can be accessed at http://www.CengageBrain.com. ***Nutrition & Diet Therapy,*** 12th edition, on MindTap includes:

- An interactive eBook with highlighting, note-taking functions, and more
- Self-quizzes, multiple-choice questions, and exercises
- Client scenarios
- Flashcards for practicing chapter terms
- Video scenarios
- NCLEX-style quizzing
- Diet & Wellness app

TEACHING PACKAGE FOR THE INSTRUCTOR

Instructor Resources

The ***Instructor Resources to Accompany Nutrition & Diet Therapy***, 12th edition, contains a variety of online tools to help instructors successfully prepare lectures and teach within this subject area. This comprehensive package provides something for all instructors, from those teaching nutrition for the first time to seasoned instructors who want something new. The following components in the website are free to adopters of the text:

- A downloadable, customizable *Instructor's Manual* containing suggested learning and teaching strategies, additional discussion questions, answers to the text Review Questions, and suggested responses to the Case in Point/Rate This Plate features.
- A *Computerized Test Bank* with several hundred questions and answers, for use in instructor-created quizzes and tests.
- Chapter slides created in PowerPoint® to use for in-class lecture material and as handouts for students.

MindTap

In the new ***Nutrition & Diet Therapy,*** 12th edition, on MindTap platform, instructors customize the learning path by selecting Cengage Learning resources and adding their own content via apps that seamlessly integrate the MindTap framework with many learning management systems. The guided learning path demonstrates the relevance of basic principles in nutrition through engagement activities, interactive exercises, and real-world scenarios, elevating the study by challenging students to apply concepts to practice. To learn more, visit www.cengage.com/mindtap.

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How to Use This Text

OBJECTIVES

Read the chapter Objectives before reading the chapter content to set the stage for learning. Return to the Objectives when the chapter study is complete to see which entries you can respond to with "Yes, I can do that."


CHAPTER 1

KEY TERMS

24-hour recall
anthropometric measurements
atherosclerosis
biochemical tests
caliper
carbohydrates (CHO)
circulation
clinical examination
cumulative effects
deficiency diseases
dietary-social history
dietitian nutritionist
digestion
elimination
essential nutrients
fats (lipids)
food diary
goiter
health disparities
health literacy
iron deficiency
malnutrition
minerals
nutrient density
nutrients
nutrition
nutrition assessment
nutritional status
nutritious
obesity
osteomalacia
osteoporosis
proteins
respiration
rickets
vitamins
water
wellness

THE RELATIONSHIP OF NUTRITION AND HEALTH

OBJECTIVES

After studying this chapter, you should be able to:

- Name the six classes of nutrients and their primary functions
- Recognize common characteristics of well-nourished people
- Recognize symptoms of malnutrition
- Describe ways in which nutrition and health are related
- List the four basic steps in nutrition assessment

Nutrition is the branch of science that studies nutrients in foods in relation to growth, maintenance, and health of the body. Food is the fuel that sustains human life and it is required for virtually all body processes. And it is the quality of food that individuals consume over time that will determine, to a large extent, their health, growth, and development.

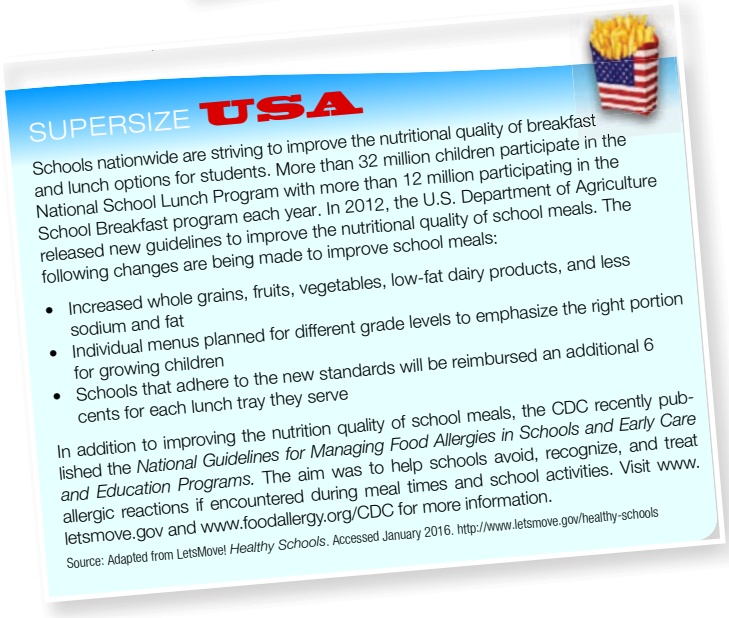
3

KEY TERMS

Glance over this list of terms before you tackle the chapter. Flip through the pages to check the definitions in the margins and make a list of those terms that are unfamiliar.

SUPERSIZE USA

Obesity has become a national health epidemic. Read over these boxes to find out why and also for suggestions on what you, as a consumer and as a nurse, can do to help curb this trend.


SUPERSIZE USA

Schools nationwide are striving to improve the nutritional quality of breakfast and lunch options for students. More than 32 million children participate in the National School Lunch Program with more than 12 million participating in the School Breakfast program each year. In 2012, the U.S. Department of Agriculture released new guidelines to improve the nutritional quality of school meals. The following changes are being made to improve school meals:

- Increased whole grains, fruits, vegetables, low-fat dairy products, and less sodium and fat
- Individual menus planned for different grade levels to emphasize the right portion for growing children
- Schools that adhere to the new standards will be reimbursed an additional 6 cents for each lunch tray they serve

In addition to improving the nutrition quality of school meals, the CDC recently published the *National Guidelines for Managing Food Allergies in Schools and Early Care and Education Programs*. The aim was to help schools avoid, recognize, and treat allergic reactions if encountered during meal times and school activities. Visit www.letsmove.gov and www.foodallergy.org/CDC for more information.

Source: Adapted from LetsMove! *Healthy Schools*. Accessed January 2016. http://www.letsmove.gov/healthy-schools

SPOTLIGHT *on Life Cycle*

Does breastfeeding a child lessen its chances of obesity later in childhood? Several studies have indicated that breastfed infants have a lower risk of childhood obesity than that of formula-fed infants while other studies have not reported a clear association. A large review study was undertaken in 2014 to provide a thorough look at the latest research. Twenty-five studies were reviewed from 1997 to 2014, with over 200,000 participants from 12 countries. This analysis revealed a dose-response effect between breastfeeding duration and reduced risk of childhood obesity and showed in particular that children breastfed for >7 months are significantly less likely to be obese in later childhood.

SPOTLIGHT ON LIFE CYCLE

Nutritional concerns and needs will change at each stage of life. Test your knowledge of the needs of children, adolescents, pregnant women, and the elderly.

In The Media

Sitting Is a Negative Even If You Work Out

According to the World Health Organization, physical inactivity has been identified as the fourth-leading risk factor for death. Sedentary behavior can lead to cardiovascular disease, cancer, and diabetes. Researchers from Toronto analyzed 47 studies of sedentary behavior. Data was adjusted to incorporate the amount someone exercises in a day; however, researchers still found that the amount of sedentary time engaged in outweighed the benefit from exercise. Tactics to help you sit less include taking frequent breaks during the work day to stretch and walk, and decreasing TV time or taking time to stand up during commercial breaks.

IN THE MEDIA

Which of these "hot topics" do you already know something about? Check here for current trends, events, and fads, and understand the potential impact on clients' health.

Exploring THE WEB

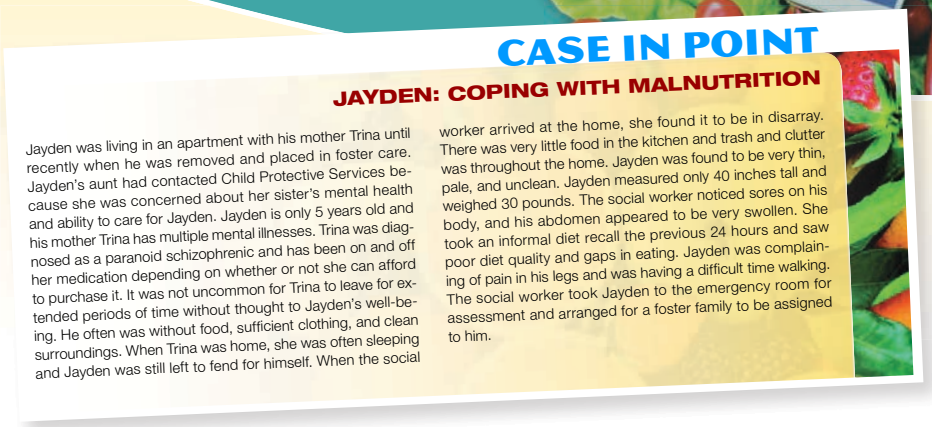
Search the Web for information on protein supplements. What are some of the claims of these products? Are they based on solid research and fact? Create fact sheets on protein supplements citing common myths and providing the truth behind the myths. How would you approach a person inquiring about the use of protein supplements?

EXPLORING THE WEB

Be sure to visit these websites for more depth on chapter topics. These are also excellent sources for information to make care plans and teaching guides.

CASE IN POINT

Two case studies conclude each chapter. Read these real-life stories, then look at the sample diet and **Rate This Plate**. Visit CengageBrain.com to see how your answers match up to those of the experts.



CASE IN POINT

JAYDEN: COPING WITH MALNUTRITION

Jayden was living in an apartment with his mother Trina until recently when he was removed and placed in foster care. Jayden's aunt had contacted Child Protective Services because she was concerned about her sister's mental health and ability to care for Jayden. Jayden is only 5 years old and his mother Trina has multiple mental illnesses. Trina was diagnosed as a paranoid schizophrenic and has been on and off her medication depending on whether or not she can afford to purchase it. It was not uncommon for Trina to leave for extended periods of time without thought to Jayden's well-being. He often was without food, sufficient clothing, and clean surroundings. When Trina was home, she was often sleeping and Jayden was still left to fend for himself. When the social worker arrived at the home, she found it to be in disarray. There was very little food in the kitchen and trash and clutter was throughout the home. Jayden was found to be very thin, pale, and unclean. Jayden measured only 40 inches tall and weighed 30 pounds. The social worker noticed sores on his body, and his abdomen appeared to be very swollen. She took an informal diet recall the previous 24 hours and saw poor diet quality and gaps in eating. Jayden was complaining of pain in his legs and was having a difficult time walking. The social worker took Jayden to the emergency room for assessment and arranged for a foster family to be assigned to him.

SUMMARY

This brief narrative overview of the most important chapter highlights is ideal for testing your grasp of the chapter material. Always start your study sessions with a quick glance at the Summary to refresh your memory on the basics of the chapter.

SUMMARY

Nutrition is directly related to health, and its effects are cumulative. Good nutrition is normally reflected by good health. Poor nutrition can result in poor health and even in disease. Poor nutrition habits contribute to atherosclerosis, osteoporosis, obesity, diabetes, and some cancers.

To be well nourished, one must eat foods that contain the six essential nutrients: carbohydrates, fats, proteins, minerals, vitamins, and water. These nutrients provide the body with energy, build and repair body tissue, and regulate body processes. When there is a severe lack of specific nutrients, deficiency diseases may develop. The best way to determine deficiencies is to do a nutrition assessment.

With sound knowledge of nutrition, the health professional will be an effective health care provider and will also be helpful to family, friends, and self.

DISCUSSION TOPICS

Critical thinking is the key to your success as a nurse. Use these activities to synthesize and apply what you have read and learned.

DISCUSSION TOPICS

1. Think about possible health disparities in your area. What have been the contributing factors? What are some solutions?
2. What relationship might nutrition and heredity have to each of the following?
   a. development of physique
   b. ability to resist disease
   c. life span
3. What habits, in addition to good nutrition, contribute to making a person healthy?
4. What are the six classes of nutrients? What are their three basic functions?
5. Why are some foods called low-nutrient-density foods? Give some examples found in vending machines.
6. Explore why it is important to support the nutrition care of a hospitalized patient from a nursing standpoint especially as it relates to malnutrition.
7. What is meant by the saying "You are what you eat"? Give specific examples of how the food we eat can affect our body and long-term consequences.
8. What is meant by the phrase "the cumulative effects of nutrition"? Describe some.
9. How could someone be overweight and at the same time suffer from malnutrition?
10. Discuss why health care professionals should be knowledgeable about nutrition.

SUGGESTED ACTIVITIES

Put your knowledge to the test; see how many of these activities you can successfully complete once you finish studying the chapter. Make a list of any areas needing additional attention.

SUGGESTED ACTIVITIES

1. List 10 signs of good nutrition and 10 signs of poor nutrition.
2. List the foods you have eaten in the past 24 hours. Underline those with low nutrient density.
3. Write a brief description of how you feel at the end of a day when you know you have not eaten
5. Write a brief paragraph discussing the nutrition assessment by a dietitian and its importance.
6. Briefly describe rickets, osteomalacia, and osteoporosis. Include their causes.
7. Ask a registered dietitian to speak to your class about nutrition problems commonly seen in your area

REVIEW

These study questions are in multiple-choice format, perfect for preparing for your nursing examinations.

REVIEW

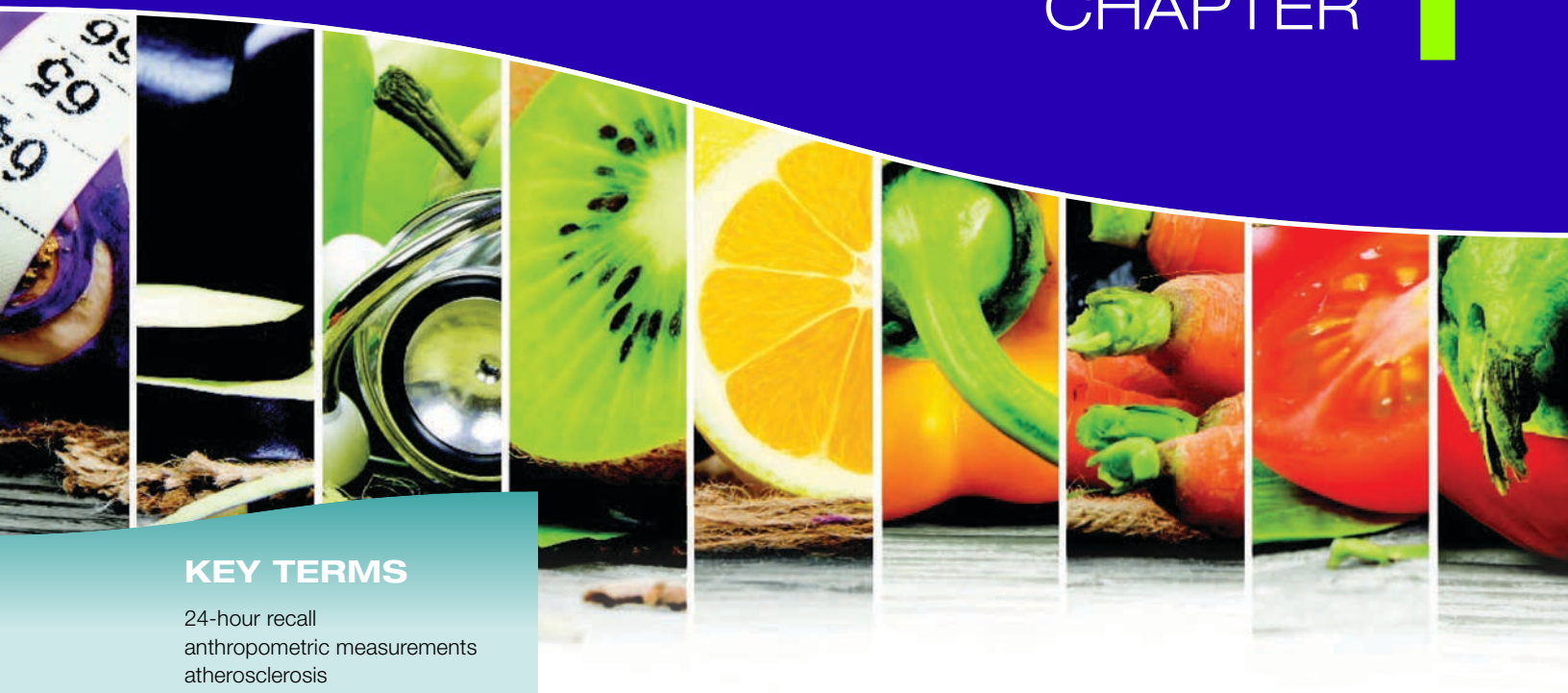
Multiple choice. Select the *letter* that precedes the best answer.

1. The result of those processes whereby the body takes in and uses food for growth, development, and maintenance of health is
   a. respiration
   b. diet therapy
   c. nutrition
   d. digestion
2. Nutritional status is determined by
   a. heredity
   b. employment
   c. personality
9. A cumulative condition is one that develops
   a. within a very short period of time
   b. over several years
   c. only in women under 52
   d. in premature infants
10. Malnutrition is assessed by
   a. food records and measurement of vitamin status
   b. how fast weight has been lost and if there is diarrhea
   c. disease progression and blood pressure instability
   d. weight loss, muscle and fat loss, strength of handgrip, and edema

SECTION 1

Fundamentals of Nutrition

CHAPTER 1



KEY TERMS

24-hour recall
anthropometric measurements
atherosclerosis
biochemical tests
caliper
carbohydrates (CHO)
circulation
clinical examination
cumulative effects
deficiency diseases
dietary-social history
dietitian nutritionist
digestion
elimination
essential nutrients
fats (lipids)
food diary
goiter
health disparities
health literacy
iron deficiency
malnutrition
minerals
nutrient density
nutrients
nutrition
nutrition assessment
nutritional status
nutritious
obesity
osteomalacia
osteoporosis
proteins
respiration
rickets
vitamins
water
wellness

THE RELATIONSHIP OF NUTRITION AND HEALTH

OBJECTIVES

After studying this chapter, you should be able to:

- Name the six classes of nutrients and their primary functions
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- Recognize symptoms of malnutrition
- Describe ways in which nutrition and health are related
- List the four basic steps in nutrition assessment

Nutrition is the branch of science that studies nutrients in foods in relation to growth, maintenance, and health of the body. Food is the fuel that sustains human life and it is required for virtually all body processes. And it is the quality of food that individuals consume over time that will determine, to a large extent, their health, growth, and development.

Now more than ever, science has upheld the strong influence diet has on health. Many chronic diseases such as diabetes, heart disease, and stroke are known to be largely preventable and attributed to poor diet and lifestyle habits. As a future clinician, you will likely begin to understand the urgency with which active measures need to be taken to make our social, cultural, political, and economic environment in relation to diet a health-promoting one.

For three decades, national health targets have been set. *Healthy People* is the foundational government platform that provides national objectives every 10 years for improving the health and welfare of all Americans. *Healthy People* serves to empower individuals to make informed decisions, encourages collaboration in communities for health-related behaviors, and serves to measure the impact of such strategies. *Healthy People 2020* has set targets for our nation to reach on leading health indicators that include obesity in children and adults, physical activity, and fruit and vegetable consumption. Growing attention is being given to the environmental and social determinants of health; therefore, the overarching goals of *Healthy People 2020* also include achievement of **health literacy** and equity with an elimination of **health disparities**.

Taking care of one's health is all about prevention. In the past, the focus was on treatment of diseases, with little, if any, attention to prevention. Prevention, however, can often be less costly than treatment and offers a better quality of life for an individual as well as the community. Nutrition and diet choice form a logical starting point for preventive health care measures and education to improve quality of life.

Achieving **wellness** is an active process by which individuals make informed choices toward a more successful existence. Wellness is a state of optimal well-being, not just the absence of disease. It is multidimensional and lends itself to a holistic perspective of the person in terms of mind, body, and spirit. This can be accomplished through lifestyle changes such as focusing on healthy food choices, not smoking, participating in regular physical activity, and maintaining a healthy weight. Expanding one's mind through continued education, in both nutrition and other areas, and finding a source of inner strength to deal with life changes will all contribute to one's sense of wellness.

Living a long life without major health problems is possible. The younger one is when positive changes are made, the healthier one is throughout the life span.

health literacy
the capacity to obtain, process, and understand basic health information needed to make appropriate health decisions

health disparities
a difference in health outcomes among subgroups often linked to social, economic, or environmental disadvantages

wellness
a state of physical, mental, and social well-being

nutrients
chemical substances found in food that are necessary for good health

essential nutrients
nutrients found only in food

NUTRIENTS AND THEIR FUNCTIONS

To maintain health and function properly, the body must be provided with **nutrients**. Nutrients are chemical substances that are necessary for life. They are divided into six classes:

- Carbohydrates (CHO)
- Fats (lipids)
- Proteins
- Vitamins
- Minerals
- Water

The body can make small amounts of some nutrients, but most must be obtained from food in order to meet the body's needs. Those available only in food are called **essential nutrients**. There are about 40 of them, and they are found in all six nutrient classes.

TABLE 1-1 The Six Essential Nutrients and Their Functions

ORGANIC NUTRIENTS	FUNCTION
Carbohydrates	Provide energy
Fats	Provide energy
Proteins	Build and repair body tissues; provide energy
Vitamins	Regulate body processes
INORGANIC NUTRIENTS	**FUNCTION**
Minerals	Regulate body processes
Water	Regulates body processes

The six nutrient classes are chemically divided into two categories: organic and inorganic (Table 1-1). Organic nutrients contain hydrogen, oxygen, and carbon. (Carbon is an element found in all living things.) Before the body can use organic nutrients, it must break them down into their smallest components. Inorganic nutrients are already in their simplest forms when the body ingests them, except for water.

Each nutrient participates in at least one of the following functions:

- Providing the body with energy
- Building and repairing body tissue
- Regulating body processes

Carbohydrates (CHO), **proteins**, and **fats (lipids)** furnish energy. Proteins are also used to build and repair body tissues with the help of vitamins and minerals. **Vitamins**, **minerals**, and **water** help regulate the various body processes such as **circulation**, **respiration**, **digestion**, and **elimination**.

Each nutrient is important, but none works alone. For example, carbohydrates, proteins, and fats are necessary for energy, but to provide it, they need the help of vitamins, minerals, and water. Proteins are essential for building and repairing body tissue, but without vitamins, minerals, and water, they are ineffective. Consuming foods rich in the antioxidant vitamins such as C, E, and beta-carotene may help to enhance your immune system. Foods that contain substantial amounts of nutrients are described as **nutritious**. Nutrients are discussed in detail in Chapters 4 through 9.

CHARACTERISTICS OF GOOD NUTRITION

Most people find pleasure in eating. Eating allows one to connect with family and friends in pleasant surroundings. This connection creates pleasant memories. Unfortunately, in social situations, it is easy for one to make food choices that may not be conducive to good health.

What determines when one needs to eat? Does one wait until the body signals hunger or eat when one sees food or when the clock says it is time? Hunger is the physiological need for food. Appetite is a psychological desire for food based on pleasant memories. When the body signals hunger, it indicates a decrease in blood glucose levels that supply the body with energy. If one ignores the signal and hunger becomes intense, it is possible to make poor food choices. The choices one makes will determine one's nutrition status. A person who habitually chooses to overeat, or not eat, as a way of coping with life's emotional

carbohydrates (CHO)
the nutrient class providing the major source of energy in the average diet

proteins
the only one of the six essential nutrient classes containing nitrogen

fats (lipids)
highest calorie-value nutrient class

vitamins
organic substances necessary for life although they do not, independently, provide energy

minerals
one of many inorganic substances essential to life

water
major constituent of all living cells; composed of hydrogen and oxygen

circulation
the body process whereby the blood is moved throughout the body

respiration
breathing

digestion
breakdown of food in the body in preparation for absorption

elimination
evacuation of wastes

nutritious
foods or beverages containing substantial amounts of essential nutrients

FIGURE 1-1 Good nutrition shows in the happy faces of these children.

struggles may be suffering from an eating disorder. The various eating disorders will be discussed in Chapter 14.

Once food has been eaten, the body must process it before it can be used. **Nutrition** is the result of the processes whereby the body takes in and uses food for growth, development, and the maintenance of health. These processes include digestion, absorption, and metabolism. (They are discussed in Chapter 3.) One's physical condition as determined by diet is called **nutritional status**.

nutrition
the result of those processes whereby the body takes in and uses food for growth, development, and the maintenance of health

nutritional status
one's physical condition as determined by diet

Nutrition helps determine the height and weight of an individual. Nutrition can also affect the body's ability to resist disease, the length of one's life, and the state of one's physical and mental well-being (Figure 1-1).

Good nutrition enhances appearance and is commonly exemplified by shiny hair, clear skin, clear eyes, erect posture, alert expressions, and firm flesh on well-developed bone structures. Good nutrition aids emotional health, provides stamina, and promotes a healthy appetite. It also helps establish regular sleep and elimination habits (Table 1-2).

TABLE 1-2 Characteristics of Nutritional Status

GOOD	POOR
Alert expression	Apathy
Shiny hair	Dull, lifeless hair
Clear complexion with good color	Greasy, blemished complexion with poor color
Bright, clear eyes	Dull, red-rimmed eyes
Pink, firm gums and well-developed teeth	Red, puffy, receding gums and missing or cavity-prone teeth
Firm abdomen	Swollen abdomen
Firm, well-developed muscles and strength	Flaccid, wasted muscle, weakness, and diminished handgrip strength
Well-developed bone structure	Bowed legs, "pigeon" chest
Normal weight for height	Overweight or underweight, recent weight loss
Erect posture	Slumped posture
Emotional stability	Easily irritated; depressed; poor attention span
Good stamina; seldom ill	Easily fatigued; frequently ill
Healthy appetite	Excessive or poor appetite
Healthy, normal sleep habits	Insomnia at night; fatigued during day
Normal elimination	Constipation or diarrhea

MALNUTRITION

Malnutrition is a condition that results when the body does not receive enough nutrients: the body's cells do not receive an adequate supply of the essential nutrients because of poor diet intake or poor utilization of food. It can occur when individuals do not or cannot eat enough of the foods that provide the essential nutrients to satisfy body needs (undernutrition). Even though we think of an individual with malnutrition being at a low body weight, normal weight or even obese individuals can suffer some degree of malnourishment if their diet is of poor nutrition quality. Overweight and obese individuals with overnutrition, who develop a severe acute illness or experience a major traumatic event, are at risk for malnutrition and need intensive nutrition intervention. At other times, people may eat well-balanced diets but they may suffer from diseases of digestion or absorption that prevent normal usage of the nutrients. Malnutrition is critical to identify, as it is a major contributor to increased morbidity and mortality and increased frequency and length of hospital stay.

Nutrient Deficiency

A nutrient deficiency occurs when a person lacks one or more nutrients over a period of time. Nutrient deficiencies are classified as primary or secondary. Primary deficiencies are caused by inadequate dietary intake. Secondary deficiencies are caused by something other than diet, such as a disease condition that may cause malabsorption, accelerated excretion, or destruction of the nutrients. Nutrient deficiencies can result in malnutrition.

INDIVIDUALS AT RISK FROM POOR NUTRITIONAL INTAKE

Individuals of all ages and from all walks of life could be at risk of poor nutrition intake. Persons with recent illness, hospitalizations, or surgery likely experience a disruption in their intake that poses risk. Others may meet or exceed energy intake, but consume foods that are of low nutrient quality. Foods with low **nutrient density** provide an abundance of calories, but the nutrients are primarily carbohydrates (especially added sugars) and fats and, except for sodium, provide very limited amounts of proteins, vitamins, and minerals.

Some individuals may have heightened risk of poor nutritional intake due to budget concerns that preclude them from purchasing nourishing foods. Some lack access to healthy food simply because of their geographic location. It is known that approximately 29 million Americans lack access to healthy, affordable foods. These individuals live in a food desert, which means they do not have a grocery store within 1 mile of their home if they live in an urban area, or within 10 miles if they live in a rural area. Those individuals living in lower-income neighborhoods seem to suffer the most diet-related disease and obesity. The National Health and Nutrition Examination Survey (NHANES), which tracks the health and nutrition status of our population, is a source of information that highlights the sobering disparities in health seen in communities across America.

We think of teenagers as being a generally healthy lot; however, teenagers may eat often but at unusual hours. They may miss regularly scheduled meals, become hungry, and satisfy their hunger with foods that have low nutrient density, such as potato chips, cakes, soda, and candy. Teenagers are subject to peer pressure; that is, they are easily influenced by the opinions of their friends. If friends favor foods with low nutrient density, it can be difficult for a teenager not to go along with them. Fad diets, which unfortunately are common among teens, sometimes

Supersizing in the fast food industry and large quantities served in restaurants lead to portion distortion. Those growing up in the supersized world may have no concept of what constitutes a normal portion. Children who are encouraged to, or have been made to, eat everything on their plates may feel compelled to finish their supersized meals, easily contributing to obesity and type 2 diabetes.

malnutrition
any nutrition imbalance

nutrient density
nutrient value of foods compared with number of calories

SPOTLIGHT on Life Cycle

Infants, young children, teenage girls, and adults are at risk for iron-deficiency anemia. Full-term infants are born with enough iron stores to last four to six months. A premature infant is at even greater risk for iron-deficiency anemia. Baby foods and cereals are fortified with iron to help prevent iron deficiency in young children. Underweight teens or teenage girls who have heavy monthly periods are at increased risk for iron-deficiency anemia. Women of childbearing age are also at risk. Pregnant women are prone to anemia due to the increased need for iron during pregnancy. A supplement that is higher in iron may be prescribed for pregnant women. Internal bleeding can lead to iron-deficiency anemia due to blood loss. Clients who have undergone kidney dialysis or gastric bypass surgery are also at an increased risk. Treatments include dietary changes and supplements, medicines, and surgery.

Source: Adapted from "Who Is at Risk for Iron-Deficiency Anemia?" National Heart, Lung, and Blood Institute. U.S. Department of Health and Human Services. 2014. http://www.nhlbi.nih.gov

Exploring THE WEB

Search the Web to find information on osteomalacia and osteoporosis. What are the leading causes? Should you take a calcium plus vitamin D supplement?

result in a form of malnutrition. This condition occurs because some nutrients are eliminated from the diet when the types of foods eaten are severely restricted.

Pregnancy increases a woman's hunger and the need for certain nutrients, especially proteins, minerals, and vitamins. Pregnancy during adolescence requires extreme care in food selection. The young mother-to-be requires a diet that provides sufficient nutrients for the developing fetus as well as for her own still-growing body.

Many factors influence nutrition in the elderly. Depression, loneliness, lack of income, inability to shop, inability to prepare meals, and the state of overall health can all lead to malnutrition.

CUMULATIVE EFFECTS OF NUTRITION

There is an increasing concern among health professionals regarding the **cumulative effects** of nutrition. Cumulative effects are the results of something that is done repeatedly over many years. For example, eating excessive amounts of saturated fats (saturated fats are discussed in Chapter 5) for many years contributes to **atherosclerosis**, which leads to heart attacks. Years of overeating can cause **obesity** and may also contribute to hypertension, type 2 (noninsulin-dependent) diabetes, gallbladder disease, foot problems, certain cancers, and even personality disorders.

cumulative effects
results of something done repeatedly over many years

atherosclerosis
a form of arteriosclerosis affecting the intima (inner lining) of the artery walls

obesity
excessive body fat and BMI over 30

deficiency diseases
diseases caused by the lack of one or more specific nutrients

iron deficiency
a condition in which the body does not have enough usable iron due to inadequate intake, bleeding, or absorption problems

Deficiency Diseases

When nutrients are seriously lacking in the diet for an extended period, **deficiency diseases** can occur. The most common form of deficiency disease in the United States is **iron deficiency**, which is caused by a lack of the mineral iron and can cause iron-deficiency anemia, which is discussed further in Chapter 8. Iron deficiency is particularly common among children and women. Iron is a necessary component of the blood and is lost during each menstrual period. In addition, the amount of iron needed during childhood and pregnancy is greater than normal because of the growth of the child or the fetus.

TABLE 1-3 Nutritional Deficiency Diseases and Possible Causes

DEFICIENCY DISEASE	NUTRIENT(S) LACKING
Iron deficiency	Iron
Iron-deficiency anemia	Iron
Beriberi	Thiamin
Night blindness	Vitamin A
Goiter	Iodine
Kwashiorkor	Protein
Marasmus	All nutrients
Osteoporosis	Calcium and vitamin D
Osteomalacia	Calcium and vitamin D, phosphorus, magnesium, and fluoride
Pellagra	Niacin
Rickets	Calcium and vitamin D
Scurvy	Vitamin C
Xerophthalmia (blindness)	Vitamin A

Rickets is another example of a deficiency disease. It causes poor bone formation in children and is due to insufficient calcium and vitamin D. The same deficiencies cause **osteomalacia** in young adults and **osteoporosis** in older adults. Osteomalacia is sometimes called "adult rickets." It causes the bones to soften and may cause the spine to bend and the legs to become bowed. Osteoporosis is a condition that causes bones to become porous and excessively brittle. Too little iodine may cause **goiter**, and a severe shortage of vitamin A can lead to blindness.

Examples of other deficiency diseases (and their causes) are included in Table 1-3. Information concerning these conditions can be found in the chapters devoted to the given nutrients.

NUTRITION ASSESSMENT

That old saying, "You are what you eat," is true, indeed; but one could change it a bit to read, "You are *and will be* what you eat." Good nutrition is essential for the attainment and maintenance of good health. In a clinical setting, determining whether a person is at risk requires completion of a **nutrition assessment**, which should be part of a routine examination done by a registered **dietitian nutritionist (RDN)** or other health care professional specifically trained in the diagnosis of at-risk individuals. A proper nutrition assessment includes **anthropometric measurements**, **clinical examination**, **biochemical tests**, and **dietary-social history**. Collected data guides the RDN to make the appropriate nutrition diagnosis using the nutrition care model. Interventions are then instituted with follow-up monitoring and evaluation.

Anthropometric measurements include height and weight and measurements of the head (for children), chest, and skinfold (Figure 1-2). The skinfold measurements are done with a **caliper**. They are used to determine the percentage of adipose and muscle tissue in the body. Measurements out of line with expectations may reveal failure to thrive in children, wasting (catabolism), edema, or obesity, all of which reflect nutrient deficiencies or excesses.

rickets
deficiency disease caused by the lack of vitamin D; causes malformed bones and pain in infants and children

osteomalacia
a condition in which bones become soft, usually in adults because of calcium loss and vitamin D deficiency

osteoporosis
condition in which bones become brittle because there have been insufficient mineral deposits, especially calcium

goiter
enlarged tissue of the thyroid gland due to a deficiency of iodine

nutrition assessment
evaluation of one's nutritional condition

dietitian nutritionist (RDN)
professionals who translate the science of nutrition into practical solutions for improved health

anthropometric measurements
of height, weight, head, chest, skinfold

clinical examination
physical observation

biochemical tests
laboratory analysis of blood, urine, and feces

dietary-social history
evaluation of food habits, including client's ability to buy and prepare food

caliper
mechanical device used to measure percentage of body fat by skinfold measurement

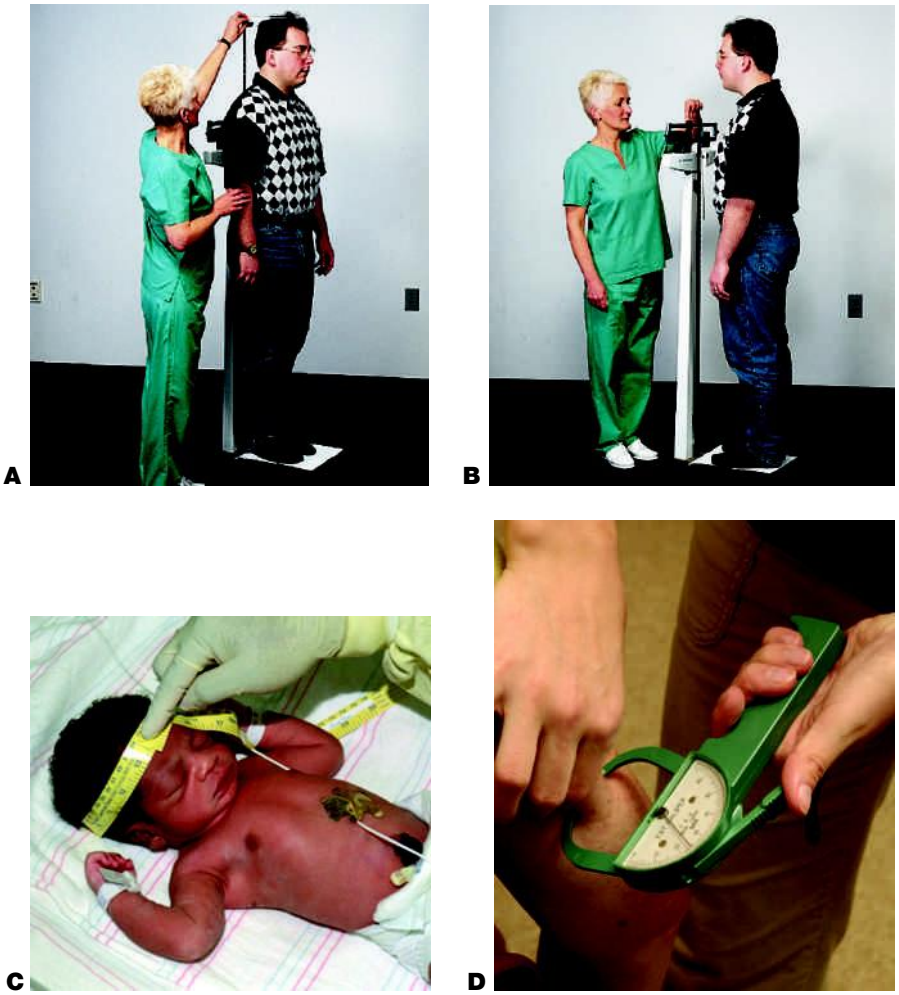


FIGURE 1-2 (A) Height is one anthropometric measurement used in the nutrition assessment. (B) Weight is an anthropometric measurement used in the nutrition assessment. (C) Head circumference is an anthropometric measurement used to assess brain development during the first year of life. (D) Skinfold is an anthropometric measurement used to assess lean muscle mass versus fat.

During the clinical examination, signs of nutrient deficiencies are noted. Some nutrient deficiency diseases, such as scurvy, rickets, iron deficiency, and kwashiorkor, are obvious; other forms of nutrient deficiency can be far more subtle. Table 1-4 lists some clinical signs and probable causes of nutrient deficiencies.

Biochemical tests include various blood, urine, and stool tests. A deficiency or toxicity can be determined by laboratory analysis of the samples. There are a variety of blood tests the registered dietitian nutritionist evaluates when completing the nutrition assessment. Blood urea nitrogen (BUN) may indicate renal failure, insufficient renal blood supply, or blockage of the urinary tract. Serum creatinine is used for evaluating renal function. A 24-hour creatinine excretion test can be used in estimating muscle mass loss. Other evaluations include the hemoglobin (Hgb), hematocrit (Hct), red blood cell (RBC), and white blood cell (WBC) tests. A low Hgb and Hct can indicate anemia. Clients with heart conditions may have a lipid profile ordered, which includes total serum cholesterol, high-density lipoprotein (HDL), low-density lipoprotein (LDL), and serum triglycerides. Urinalysis also can detect protein and sugar in the urine, which can

TABLE 1-4 Clinical Signs of Nutrient Deficiencies

CLINICAL SIGN	POSSIBLE DEFICIENCIES
Pallor; blue half circles beneath eyes	Iron, copper, zinc, B12, B6, biotin
Edema	Protein
Bumpy "gooseflesh"	Vitamin A
Lesions at corners of mouth	Riboflavin
Glossitis	Folic acid
Numerous "black-and-blue"	Vitamin C spots and tiny, red "pinprick" hemorrhages under skin
Emaciation	Carbohydrates, proteins; calories
Poorly shaped bones or teeth	Vitamin D or calcium or delayed appearance of teeth in children
Slow clotting time of blood	Vitamin K
Unusual nervousness, dermatitis	Niacin diarrhea in some client
Tetany	Calcium, potassium, sodium
Goiter	Iodine
Eczema	Fat (linoleic acid)

indicate kidney disease and diabetes. The hemoglobin A1c and/or fasting blood sugar test is used to determine blood glucose control (see Chapter 15).

While the blood tests albumin and prealbumin have long been used as diagnostic indicators of malnutrition, evidence has shown in recent years that these acute phase proteins do not consistently indicate malnutrition but rather are a function of the severity of the inflammatory response. Because of this, these values should be interpreted with caution. In May of 2012, the Academy of Nutrition and Dietetics published a consensus statement in the *Journal of Parenteral and Enteral Nutrition* to offer six standardized characteristics, with parameters, to diagnose adult malnutrition. In sum, they are:

- Insufficient energy intake
- Weight loss
- Loss of muscle mass
- Loss of subcutaneous fat
- Localized or generalized fluid accumulation (that may sometimes mask weight loss)
- Diminished functional status as measured by handgrip strength

The dietary-social history involves evaluation of food habits and is very important in the nutritional assessment of any client. It can be difficult to obtain an accurate dietary assessment. The most common method is the **24-hour recall**. In this method, the client is usually interviewed by the dietitian and asked to give the types of, amounts of, and preparation used for all food eaten in the 24 hours prior to admission. Another method is the **food diary**. The client is asked to list all foods as they are eaten in a three- to four-day period. Neither method is totally accurate because clients forget or are not always truthful about their eating habits. They are sometimes inclined to say they have eaten certain foods because they know they should have done so. Computer analysis of the diet is the best way to determine if nutrient intake is appropriate. It will reveal any nutrient deficiencies or toxicities.

In The Media

Thriving Grocery Chain in Philadelphia Food Deserts

As there are more than 6,500 food deserts in America, innovative approaches are being taken to offer access to healthier foods to curb our nation's obesity epidemic. Brown's Super Stores now have opened seven profitable supermarkets in low-income neighborhoods in and around Philadelphia. The key success factor was getting input from community leaders as to what they wanted in a neighborhood grocery store.

Source: Adapted from "Why One Grocery Store Chain Is Thriving in Philadelphia's Food Deserts." National Public Radio. May 14, 2015. http://www.npr.org

SUPERSIZE USA

Where do you live? Is your state one of the least active in the country? Don't know? Check this list of the 10 least active states, in descending order:

1. Mississippi
2. Tennessee
3. Arkansas
4. Oklahoma
5. Louisiana
6. Alabama
7. West Virginia
8. Indiana
9. Kentucky
10. Texas

Source: State Indicator Report on Physical Activity. 2014. http://www.cdc.gov

24-hour recall
listing the types, amounts, and preparation of all foods eaten in the past 24 hours

food diary
written record of all food and drink ingested in a specified period

Exploring THE WEB

Search the Web for nutritional assessment tools. What resources are available for the health care professional in making nutritional assessments of clients? Assess the advantages and disadvantages of each tool you find.

FIGURE 1-3 Nutritional intervention can improve hospital patients' outcomes.

The dietary-social history is important to determine whether the client has the financial resources to obtain the needed food and the ability to properly store and cook food once home. After completing the dietary-social history, the dietitian can assess for risk of food–drug interactions that can lead to malnutrition (see Appendix D). Clients need to be instructed by a dietitian on possible interactions, if any.

When the preceding steps are evaluated together, and in the context of the client's medical condition, the dietitian has the best opportunity of making an accurate nutrition assessment of the client. This assessment can then be used by the entire health care team. The doctor will find it helpful in evaluating the client's condition and treatment. The dietitian can use the information to plan the client's dietary treatment and counseling, and other health care professionals will be able to use it in assisting and counseling the client.

HEALTH AND NUTRITION CONSIDERATIONS

Nutrition is a foundational part of an individual's well-being. Positive diet and lifestyle changes promote vibrant health and can help reduce the risk of chronic disease. During health issues that result in nutrition impairment, timely assessment and quality nutrition intervention can improve outcomes (Figure 1-3). The health professional is obligated to have a sound knowledge of nutrition. Not only do your future clients depend on it, but so does your own personal health, as well as that of your family. Parents must have a good, basic knowledge of nutrition for the sake of their personal health and that of their children. Anyone, in fact, who plans and prepares meals should value, have knowledge of, and be able to apply the principles of sound nutrition practice.

Clients will have questions and complaints about their diets. Their anxieties can be relieved by clear and simple explanations provided by the health professional. Sometimes clients must undergo diet therapy, prescribed by their physicians, which becomes part of their medical treatment in the hospital. In many cases, diet therapy will have to be a lifelong practice for the client. In such cases, eating habits will have to be changed, and the client will need advice or instructions from a registered dietitian nutritionist and support from other health professionals.

Nutrition is currently a popular subject. It is important to recognize that some books and articles concerning nutrition may not be scientifically correct. Also, food ads can be misleading. Nutrition information on websites may not always be accurate or even factual. People with knowledge of sound nutrition practices will be less likely to be misled. They will recognize fad and distinguish it from fact.

SUMMARY

Nutrition is directly related to health, and its effects are cumulative. Good nutrition is normally reflected by good health. Poor nutrition can result in poor health and even in disease. Poor nutrition habits contribute to atherosclerosis, osteoporosis, obesity, diabetes, and some cancers.

To be well nourished, one must eat foods that contain the six essential nutrients: carbohydrates, fats, proteins, minerals, vitamins, and water. These nutrients provide the body with energy, build and repair body tissue, and regulate body processes. When there is a severe lack of specific nutrients, deficiency diseases may develop. The best way to determine deficiencies is to do a nutrition assessment.

With sound knowledge of nutrition, the health professional will be an effective health care provider and will also be helpful to family, friends, and self.

DISCUSSION TOPICS

1. Think about possible health disparities in your area. What have been the contributing factors? What are some solutions?
2. What relationship might nutrition and heredity have to each of the following?
   a. development of physique
   b. ability to resist disease
   c. life span
3. What habits, in addition to good nutrition, contribute to making a person healthy?
4. What are the six classes of nutrients? What are their three basic functions?
5. Why are some foods called low-nutrient-density foods? Give some examples found in vending machines.
6. Explore why it is important to support the nutrition care of a hospitalized patient from a nursing standpoint, especially as it relates to malnutrition.
7. What is meant by the saying "You are what you eat"? Give specific examples of how the food we eat can affect our body and long-term consequences.
8. What is meant by the phrase "the cumulative effects of nutrition"? Describe some.
9. How could someone be overweight and at the same time suffer from malnutrition?
10. Discuss why health care professionals should be knowledgeable about nutrition.

SUGGESTED ACTIVITIES

1. List 10 signs of good nutrition and 10 signs of poor nutrition.
2. List the foods you have eaten in the past 24 hours. Underline those with low nutrient density.
3. Write a brief description of how you feel at the end of a day when you know you have not eaten wisely.
4. Name the six clinical characteristics of malnutrition.
5. Write a brief paragraph discussing the nutrition assessment by a dietitian and its importance.
6. Briefly describe rickets, osteomalacia, and osteoporosis. Include their causes.
7. Ask a registered dietitian to speak to your class about nutrition problems commonly seen in your area.
8. Investigate *Healthy People 2020* and progress on goals to date with obesity and physical activity. Write a brief summary on this.

REVIEW

Multiple choice. Select the *letter* that precedes the best answer.

1. The result of those processes whereby the body takes in and uses food for growth, development, and maintenance of health is
   a. respiration
   b. diet therapy
   c. nutrition
   d. digestion
2. Nutritional status is determined by
   a. heredity
   b. employment
   c. personality
   d. diet
3. To nourish the body adequately and to maintain health, one must
   a. avoid all low-nutrient-density foods
   b. eat foods containing the six classes of nutrients
   c. include fats at every meal
   d. restrict proteins at breakfast
4. Nutrients used primarily to provide energy to the body are
   a. vitamins, water, and minerals
   b. carbohydrates, proteins, and fats
   c. proteins, vitamins, and fats
   d. vitamins, minerals, and carbohydrates
5. Nutrients used mainly to build and repair body tissues are
   a. proteins, vitamins, and minerals
   b. carbohydrates, fats, and minerals
   c. fats, water, and minerals
   d. fats, vitamins, and minerals
6. Foods such as potato chips, cakes, sodas, and candy are
   a. high-nutrient-density foods
   b. essential nutrient foods
   c. low-nutrient-density foods
   d. nutritious foods
7. Undernutrition of the six classes of nutrients in the diet may result in
   a. increased energy
   b. malnutrition
   c. indigestion
   d. diabetes
8. The cumulative effect of a high-fat diet could be
   a. iron deficiency
   b. blindness
   c. heart disease
   d. diabetes mellitus
9. A cumulative condition is one that develops
   a. within a very short period of time
   b. over several years
   c. only in women under 52
   d. in premature infants
10. Malnutrition is assessed by
    a. food records and measurement of vitamin status
    b. how fast weight has been lost and if there is diarrhea
    c. disease progression and blood pressure instability
    d. weight loss, muscle and fat loss, strength of handgrip, and edema
11. Nutritional status
    a. is determined by heredity
    b. has no effect on mental health
    c. is not reflected in one's appearance
    d. can affect the body's ability to resist disease
12. Infants, young children, adolescents, pregnant adolescents, and the elderly
    a. are commonly overweight
    b. are among those prone to malnutrition
    c. all commonly suffer from osteomalacia
    d. never suffer from primary nutrient deficiencies
13. Organic nutrients are
    a. only found in products grown without pesticides
    b. only sold at health-food stores
    c. substances that cannot be broken down
    d. substances containing a carbon atom
14. Which of the following would be an organic nutrient?
    a. fat
    b. folate
    c. calcium
    d. selenium
15. Anthropometric measures include measures of
    a. iron status
    b. fluid intake
    c. bone density
    d. weight

CASE IN POINT

JAYDEN: COPING WITH MALNUTRITION

Jayden was living in an apartment with his mother Trina until recently, when he was removed and placed in foster care. Jayden's aunt had contacted Child Protective Services because she was concerned about her sister's mental health and ability to care for Jayden. Jayden is only 5 years old and his mother Trina has multiple mental illnesses. Trina has been diagnosed as a paranoid schizophrenic and has been on and off her medication depending on whether she can afford to purchase it. It was not uncommon for Trina to leave for extended periods of time without thought to Jayden's well-being. He often was without food, sufficient clothing, and clean surroundings. When Trina was home, she was often sleeping and Jayden was still left to fend for himself. When the social worker arrived at the home, she found it to be in disarray. There was very little food in the kitchen and trash and clutter was throughout the home. Jayden was found to be very thin, pale, and unclean. Jayden measured only 40 inches tall and weighed 30 pounds. The social worker noticed sores on his body, and his abdomen appeared to be very swollen. She took an informal diet recall the previous 24 hours and saw poor diet quality and gaps in eating. Jayden was complaining of pain in his legs and was having a difficult time walking. The social worker took Jayden to the emergency room for assessment and arranged for a foster family to be assigned to him.

ASSESSMENT

1. List five characteristics of poor nutritional status.
2. Identify characteristics of malnutrition that Jayden is experiencing.
3. Jayden needs to be provided with good nutrition and adequate calories. What would be important to consider in providing meals for Jayden?

DIAGNOSIS

4. Write a nursing diagnosis for Jayden.

PLAN/GOAL

5. What two changes can you predict will occur with the introduction of a good, nutritionally sound diet?
6. Whom can you refer to for assistance?

IMPLEMENTATION

7. Name at least three nursing interventions that could be employed to improve Jayden's nutrition.
8. How might Jayden's dental status impact his nutrition?
9. Would a home visit be beneficial for Jayden and a caregiver?

EVALUATION/OUTCOME CRITERIA

10. What could the doctor assess at the next appointment to see if the plan is working?
11. What observations could the caregiver offer about the success of the plan?
12. What could be an important piece of information from Jayden?

THINKING FURTHER

13. How could the Internet be of benefit to the caregiver?

✓ rate this plate

Jayden has been through a lot of heartache for a child his age. He is placed in a foster home, and his foster mother asks him what he would like to eat for his first dinner with them. He thought and thought and finally decided on the following plate. Rate this plate. Take into consideration that Jayden is malnourished, has not eaten much lately, and is lacking many nutrients.

Fried chicken thigh

½ cup mashed potatoes and 2 Tbsp gravy

½ cup corn with butter

Biscuit with butter

2% milk—8 oz

Can Jayden eat all of this, and should he? Does this plate need to be changed, and how would you change it?

CASE IN POINT

ASNAKU: VITAMIN A DEFICIENCY

Asnaku lives in a small village in Ethiopia. Her family is not wealthy and is unable to travel to see a doctor. There is a nurse who visits the village a few times a year, but that is the extent of the medical care Asnaku's family receives. The last time the nurse visited, she talked to Asnaku's mother about what her family typically eats. The nurse was a little concerned that Asnaku's family eats mostly grains. They rarely get meat, fruit, or vegetables. She spoke with Asnaku's mother about some of the signs and symptoms of vitamin deficiencies that could result from a diet with little access to a wider variety of foods. The nurse told her mother she would return in a few months and would have a mission team with her. These nurses and doctors were coming to provide medical care and assistance to the entire village. She told Asnaku's mother they would be bringing vitamin supplements that would help prevent nutritional deficiencies as well as other medications. Asnaku's mother has been worried for a while that Asnaku may have a problem with her eyes. Asnaku is 7 years old now and has been fairly independent with her self-care. However, the mother has noticed that Asnaku has gotten lost in the night a couple of times trying to go to the bathroom. Asnaku also has had difficulty with tasks that her mother has asked her to do after the sun goes down. Her mother is worried that she is not able to see very well; however, during the day Asnaku seems fine. The mission team is to return in a couple of weeks, and her mother has requested Asnaku be evaluated to find out what could be wrong.

ASSESSMENT

1. What are the symptoms of vitamin A deficiency?
2. What is Asnaku experiencing that would suggest a vitamin A deficiency?
3. Make a list of foods that are high in vitamin A that should be incorporated into Asnaku's diet.
4. Think about Asnaku's grain-based diet. What other vitamin or mineral deficiencies could she have?

DIAGNOSIS

5. Write a nursing diagnosis for Asnaku.

PLAN/GOAL

6. What change can you predict will occur with the introduction of vitamin A?
7. What can be done to ensure that Asnaku is able to get the vitamin A her body needs?

IMPLEMENTATION

8. If Asnaku was hospitalized under your care, what interventions might you suggest?
9. In the United States, vitamin A deficiency is rare compared to third world countries. There are children in the United States who have diets that do not meet their caloric needs and have little nutritional quality. Why is vitamin A deficiency in the United States so much lower than in other countries?
10. Can you think of other examples of food sources that have been fortified to avoid deficiencies in vitamins or minerals?

EVALUATION/OUTCOME CRITERIA

11. What could the nurse assess at her next visit to Asnaku's village to see if the plan is working?

THINKING FURTHER

12. Access the World Health Organization's web page and read about the programs in place to provide vitamin A supplements to countries worldwide. Briefly discuss this program and the severity of this problem.

✓ rate this plate

Asnaku's night-blindness sounds like a vitamin A deficiency. As the family does not eat anything grown, such as vegetables and fruit, nutrient deficiencies can result. Having access to biofortified rice can provide Asnaku and her family with nutrients including vitamin A, iron, zinc, and iodine. Asnaku ate the following:

½ cup of fortified rice

¾ cup of vegetable stew

1 slice of flatbread

If Asnaku ate this meal three times a day, would the fortified rice be sufficient to provide her with 100% of her vitamin A and iron needs? What is the role of each nutrient within the biofortified rice?

CHAPTER 2

KEY TERMS

balanced diet
daily values
descriptors
Dietary Guidelines for Americans
dietary laws
Dietary Reference Intakes (DRIs)
flavonoids
food customs
foodways
fusion
lacto-ovo vegetarians
lactose intolerance
lacto-vegetarians
legumes
masa harina
mirin
miso
MyPlate
vegans
wasabi

PLANNING A HEALTHY DIET

OBJECTIVES

After studying this chapter, you should be able to:

- Define a balanced diet
- List the U.S. government's Dietary Guidelines for Americans and explain the reasons for each
- Identify the food groups and their placement on MyPlate
- Describe information commonly found on food labels
- List some food customs of various cultural groups
- Describe the development of food customs

The statement "eat a balanced diet" has been repeated so often that its importance may be overlooked. The value of this statement is so great, however, that it deserves serious consideration by people of all ages. A **balanced diet** includes all six classes of nutrients and calories in amounts that preserve and promote good health.

Exploring THE WEB

The *Dietary Guidelines for Americans 2015–2020* (8th edition) offers science-based advice and suggestions for improving health through sound nutrition and physical activity. These guidelines serve as helpful reminders to many Americans that healthy eating and regular physical activity can help people achieve and maintain good health and reduce the risk of chronic disease throughout all stages of the life span. Research the history of the Dietary Guidelines and the rationale for the new standards. Visit http://www.health.gov/dietaryguidelines/2015/.

Daily review of the **Dietary Reference Intakes (DRIs)** and the Recommended Dietary Allowances (RDAs) would provide enough information to plan balanced diets. However, ordinary meal planning would be cumbersome and time-consuming if that table had to be consulted each time a meal were planned. Fortunately, the U.S. Department of Agriculture (USDA) and the U.S. Department of Health and Human Services (USDHHS) developed an essential resource for health professionals and policymakers as they design and implement food and nutrition programs that influence Americans. It is called the **Dietary Guidelines for Americans**, now in its 8th edition (2015–2020). In addition, **MyPlate**, which was released initially in 2010 by the USDA, provides consumer-friendly food guidance and practical tools for daily food choices based on the Dietary Guidelines.

When thinking about helping people shift to healthier intakes, one must factor cultural diversity in food choices. America has historically been referred to as the "melting pot" because of the many nationalities who immigrated to this country in hopes of finding a better life. Individuals with different ethnic backgrounds may continue to favor foods or customs of their country while others may blend in westernized food habits. Regardless of what cuisine is preferred, it is important for a clinician to help clients shift toward healthier choices within those cuisines.

DIETARY GUIDELINES FOR AMERICANS

The Dietary Guidelines provide science-based advice to promote health and to reduce the risk of chronic diseases through diet and physical activity. The guidelines are designed for professionals to help all individuals ages 2 years and older and their families consume a healthy, nutritionally adequate diet. This newest set of guidelines helps Americans focus on their eating patterns over time, encouraging shifts in food intake to a healthier focus. Rather than a rigid prescription, the guidelines seek to help individuals find an adaptable framework with which they can enjoy foods that meet personal, cultural, and traditional preferences while still fitting into their budget.

While previous editions of the Dietary Guidelines focused on changes that need to be made with individual food groups and nutrients, the new guidelines help an individual focus on the big picture so that Americans make choices that add up to an overall healthy eating pattern. There are five overarching guidelines (see Figure 2-1):

- Follow a healthy eating pattern across the life span.
- Focus on variety, nutrient density, and amount.
- Limit calories from added sugars and saturated fats and reduce sodium intake.
- Shift to healthier food and beverages choices.
- Support healthy eating patterns for all.

Follow a Healthy Eating Plan Across the Life Span

This first theme helps individuals understand that food and beverage choices that are made over time do make a difference in someone's health. Chronic diet-related diseases have risen due in part to changes in lifestyle behaviors. A history of poor eating and physical inactivity has a cumulative effect and can lead

balanced diet
one that includes all the essential nutrients in appropriate amounts

Dietary Reference Intakes (DRIs)
combines the Recommended Dietary Allowances, Adequate Intake, Estimated Average Requirements, and the Tolerable Upper Intake Levels for individuals into one value representative of the average daily nutrient intake of individuals over time

Dietary Guidelines for Americans
national healthy eating guidelines for disease prevention and optimal health

MyPlate
practical food guidance tool for consumers for making selections based on *Dietary Guidelines for Americans* from the U.S. Department of Agriculture

U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans 2015–2020* (8th ed). Washington, DC: U.S. January 2016

FIGURE 2-1 New Dietary Guidelines summary.

to cardiovascular disease, high blood pressure, type 2 diabetes, some cancers, and poor bone health. In addition, obesity, which has persisted for more than two decades, sets the stage for many chronic diseases to happen and in fact is viewed by some as a chronic disease in itself.

By choosing a healthful diet pattern at the appropriate calorie level, nutrient adequacy is supported, a healthy body weight is achieved, and there is reduced risk for chronic disease. Individuals are guided on consuming a healthy eating pattern that accounts for all food and beverages within an appropriate calorie level.

Key Recommendations

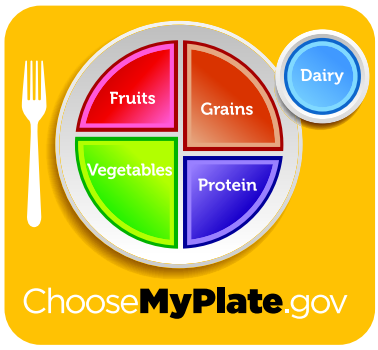
A healthy eating pattern includes:

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

MyPlate, found at the ChooseMyPlate.gov site is the consumer-friendly food guidance platform for creating healthy eating solutions. The site offers a plethora of practical advice, tips, and tools for all age groups. You can track your eating, figure out your BMI, look at pediatric growth charts, see meal pattern recommendations, find recipes, watch videos, download educational print materials, and more.

As you will notice on the website, the graphic of MyPlate shows five colored portions representing the five food groups. The divisions within the plate offer a general idea of portions from each specific food group needed to make a balanced diet (Figure 2-2). The five food groups and attributes of each are as follows:

- *Grains*—Any food made from wheat, rice, oats, corn, barley, or other cereal grains is considered a grain product. One half of all our grain servings should be whole grains. Whole grains provide dietary fiber, B vitamins, iron, and magnesium. Enriched products also contain B vitamins and iron, but if they are not made from whole grains, they contain little fiber.
- *Vegetables*—Vegetables provide carbohydrates, some protein, dietary fiber, and a variety of vitamins and minerals such as vitamin A, B-complex, C, E, and K as well as iron, calcium, phosphorus, magnesium, copper, manganese, and sometimes molybdenum. Vegetables are loaded with a vast array of nutrients, including naturally occurring plant



U.S. Department of Agriculture, Center for Nutrition Policy and Promotions. http://www.choosemyplate.gov

FIGURE 2-2 The ChooseMyPlate website offers many consumer friendly tools.

substances such as phytochemicals and **flavonoids** that enhance health. Individuals are encouraged to include all of the subgroups (specific recommendations can be referenced in the guidelines):

- *Dark green vegetables*—Broccoli, spinach, leafy salad greens (including romaine lettuce), collards, bok choy, kale, turnip, and mustard greens and green herbs
- *Red and orange vegetables*—Tomatoes, carrots, tomato juice, sweet potatoes, red peppers, winter squash, and pumpkin
- ***Legumes** (beans and peas)*—Pinto, white, kidney, and black beans; lentils; chickpeas; lima beans; split peas; and edamame (green soybeans)
- *Starchy vegetables*—Potatoes, corn, green peas, lima beans, plantains, and cassava
- *Other vegetables*—Onions, green beans, cucumbers, celery, green peppers, cabbage, mushrooms, avocado, summer squash, cauliflower, asparagus, snow peas, beets, lettuce (iceberg), and so forth

- *Fruit*—Fruits provide vitamin A and C, potassium, magnesium, carbohydrates, and fiber. Some have iron. It's important to consume more whole fruit, such as oranges, grapefruit, grapes, kiwi, melon, berries, apples, banana, apricots, pineapple, and so forth.
- *Dairy*—Milk, yogurt, and cheese contain excellent sources of calcium, phosphorus, and magnesium. Milk and yogurt contain lactose in greater concentrations than cheese. Riboflavin, vitamin A, vitamin B_{12}, and vitamin D are available in milk. Fat-free or low-fat products are preferred for best health.
- *Protein*—All meats, poultry, fish, eggs, soybeans, dry beans and peas, lentils, and nuts and seeds are included in the protein group. These foods provide not only protein but also iron, copper, phosphorus, zinc, sodium, iodine, and B vitamins, and some have fats and cholesterol. Foods selected should be of a more healthful nature, with less saturated fat and cholesterol.

Refer to Table 2-1 for guidance on healthy U.S. eating patterns.

Focus on Variety, Nutrient Density, and Amount

A diverse and nutrient-dense assortment of food and beverages are needed from all food groups and subgroups to fulfill the health needs in the recommended amounts, without exceeding total calorie limits. When one chooses nutrient-dense foods or beverages, there is an impressive array of vitamins, minerals, and other substances that contribute to positive health effects. Attributes of nutrient-dense foods are that they are in forms that retain naturally occurring components such as dietary fiber and have little or no solid fats, added sugars, refined starches, or sodium. All vegetables, fruits, whole grains, seafood, eggs, beans, peas, unsalted nuts and seeds, fat-free and low-fat dairy products, and lean meat and poultry would be considered nutrient-dense foods.

Key Recommendations for Calorie Balance

Consideration of calorie balance within healthy eating patterns is important. Energy taken "in" (foods, beverages) must balance energy "out" (calories expended from normal metabolic processes and physical activity). Monitoring

flavonoids
naturally occurring water-soluble plant pigments that act as antioxidants

legumes
plant food that is grown in a pod (e.g., beans or peas)

TABLE 2-1 Healthy U.S.-Style Eating Pattern

DAILY AMOUNT OF FOOD FROM EACH GROUP

The Healthy U.S.-Style Pattern includes 12 calorie levels to meet the needs of individuals across the life span. Identify the appropriate calorie level and choose a variety of foods in the recommended amounts that are nutrient dense, are lean or low fat, and are prepared without added fats, sugars, refined starches, or salt. A small number of calories remain within the overall calorie limit of the pattern (i.e., limit on calories for other uses). Calories up to the specified limit can be used for added sugars, added refined starches, solid fats, alcohol, or to eat more than the recommended amount of food in a food group. The overall eating pattern also should not exceed the limits of less than 10% of calories from added sugars and less than 10% of calories from saturated fats.

CALORIE LEVEL[1]

	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
Fruits	1 cup	1 cup	1.5 cups	1.5 cups	1.5 cups	2 cups	2 cups	2 cups	2 cups	2.5 cups	2.5 cups	2.5 cups
Vegetables	1 cup	1.5 cups	1.5 cups	2 cups	2.5 cups	2.5 cups	3 cups	3 cups	3.5 cups	3.5 cups	4 cups	4 cups
Grains	3 oz–eq	4 oz–eq	5 oz–eq	5 oz–eq	6 oz–eq	6 oz–eq	7 oz–eq	8 oz–eq	9 oz–eq	10 oz–eq	10 oz–eq	10 oz–eq
Meat and beans	2 oz–eq	3 oz–eq	4 oz–eq	5 oz–eq	5 oz–eq	5 1/2 oz–eq	6 oz–eq	6 1/2 oz–eq	6 1/2 oz–eq	7 oz–eq	7 oz–eq	7 oz–eq
Milk	2 cups	2 1/2 cups	2 1/2 cups	3 cups	3 cups	3 cups	3 cups	3 cups	3 cups	3 cups	3 cups	3 cups
Oils (1 tsp=5 g fat)	15 g	17 g	17 g	22 g	24 g	27 g	29 g	31 g	34 g	36 g	44 g	51 g
Limit on calories for other uses -% of calories	150	100	110	130	170	270	280	350	380	400	470	610

ESTIMATED DAILY CALORIE NEEDS

To determine which food intake pattern to use, check this chart for an estimate of individual calorie needs. The calorie range is based on age, gender, and physical activity level. Sedentary: light physical activity associated with typical day-to-day life. Active: physical activity equivalent to walking more than 3 miles per day at 3 to 4 miles per hour, in addition to activity of typical day-to-day life.

	CALORIE RANGE		
	SEDENTARY	→	ACTIVE
Children			
2–3 years	1,000	→	1,400
Females			
4–8 years	1,200	→	1,800
9–13	1,600	→	2,200
14–18	1,800	→	2,400
19–30	2,000	→	2,400
31–50	1,800	→	2,200
51+	1,600	→	2,200
Males			
4–8 years	1,400	→	2,000
9–13	1,800	→	2,600
14–18	2,200	→	3,200
19–30	2,400	→	3,000
31–50	2,200	→	3,000
51+	2,000	→	2,800

[1] Calorie levels are set across a wide range to accommodate the needs of different individuals.

Source: Adapted from U.S. Department of Health and Human Services and U.S. Department of Agriculture. *2015–2020 Dietary Guidelines for Americans* (8th ed.). December 2015. http://health.gov/dietaryguidelines/2015/guidelines/.

body weight and adjusting food intake and physical activity help ensure patients are on track for good health maintenance.

All Americans, including children and teens, adults, and older adults, are encouraged to achieve and/or maintain a healthy body weight. Specific recommendations include:

- *Children and adolescents*—Maintain calorie balance to support normal group and development. If overweight or obese, an adjustment should be made to eating and physical activity so as not to affect linear growth.
- *Pregnancy*—Before conceiving, women are encouraged to achieve and maintain a healthy weight. Women who are already pregnant should be encouraged to gain weight within the gestational weight guidelines.
- *Adults*—Obese adults are advised to change eating and activity to prevent additional weight gain and/or promote weight loss. Adults who are overweight should not gain additional weight and those with one or more cardiovascular risk factors (hypertension, hyperlipidemia), should change their lifestyle to lose weight. For a weight loss of 1–1 ½ pounds per week, daily intake should be reduced by 500–750 calories. A level of 1,200–1,500 calories a day for women and 1,500–1,800 calories for men usually is sufficient for weight loss.
- *Older Adults*—Those 65 years and older who are overweight or obese are encouraged to prevent additional weight gain. Those who are obese, especially with cardiovascular risk factors, should consider weight loss, as this can result in improved quality of life and reduced risk of chronic disease and associated disabilities.

Key Recommendations for Physical Activity

In addition to diet, physical activity is one of the most important things Americans can do to improve health and reduce the risk of chronic disease. Only 20% of adults meet the Physical Activity Guidelines for aerobic and muscle-strengthening activity. Adult males are more likely to report regular physical activity versus females (24% and 17%, respectively). Adolescent boys report they engage in exercise 30% of the time whereas their female counterpart only 13% of the time. Thirty percent of adults report no leisure-time physical activity. And, unfortunately, disparities exist in that those with lower income and lower education have lower rates of physical activity in addition to not engaging in leisure-time physical activity.

Diet and physical activity are the main tenets in the calorie balance equation to help manage body weight. The Dietary Guidelines include the key recommendation of meeting the Physical Activity Guidelines for Americans (Table 2-2).

Limit Calories from Added Sugars and Saturated Fats and Reduce Sodium Intake

A healthy eating pattern limits several food components that are of particular public health concern. The recommendations are to:

- *Consume less than 10% of calories per day from added sugars*—The recommendations to limit calories from added sugars is consistent with research examining eating patterns and health. Eating patterns that include lower intake of sources of added sugars are associated with reduced risk of cardiovascular disease in adults as well as obesity, type 2 diabetes, and some types of cancer. Evidence also suggests a relationship between added sugars and dental caries in children and adults. The two main sources of added sugars in the U.S. diet are sugar-sweetened beverages and snacks and sweets. Foods such as these provide few or no essential nutrients or fiber; therefore, they do

TABLE 2-2 National Physical Activity Guidelines

AGE GROUP	GUIDELINES
6 to 17 years	Children and adolescents should do 60 minutes (1 hour) or more of physical activity daily. • Aerobic: Most of the 60 or more minutes a day should be either moderate (a) or vigorous (b) intensity aerobic physical activity and should include vigorous-intensity physical activity at least 3 days a week. • Muscle-strengthening (c): As part of their 60 or more minutes of daily physical activity, children and adolescents should include muscle-strengthening physical activity on at least 3 days of the week. • Bone-strengthening (d): As part of their 60 or more minutes of daily physical activity, children and adolescents should include bone-strengthening physical activity on at least 3 days of the week. • It is important to encourage young people to participate in physical activities that are appropriate for their age, that are enjoyable, and that offer variety.
18 to 64 years	All adults should avoid inactivity. Some physical activity is better than none, and adults who participate in any amount of physical activity gain some health benefits. • For substantial health benefits, adults should do at least 150 minutes (2 hours and 30 minutes) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Aerobic activity should be performed in episodes of at least 10 minutes and, preferably, should be spread throughout the week. • For additional and more extensive health benefits, adults should increase their aerobic physical activity to 300 minutes (5 hours) a week of moderate-intensity, or 150 minutes a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity activity. Additional health benefits are gained by engaging in physical activity beyond this amount. • Adults should also include muscle-strengthening activities that involve all major muscle groups on 2 or more days a week.
65 years and older	Older adults should follow the adult guidelines. When older adults cannot meet the adult guidelines, they should be as physically active as their abilities and conditions will allow. • Older adults should do exercises that maintain or improve balance if they are at risk of falling. • Older adults should determine their level of effort for physical activity relative to their level of fitness. • Older adults with chronic conditions should understand whether and how their conditions affect their ability to do regular physical activity safely.

a. Moderate-intensity physical activity: Aerobic activity that increases a person's heart rate and breathing to some extent. On a scale relative to a person's capacity, moderate-intensity activity is usually a 5 or 6 on a 0 to 10 scale. Brisk walking, dancing, swimming, or bicycling on a level terrain are examples.

b. Vigorous-intensity physical activity: Aerobic activity that greatly increases a person's heart rate and breathing. On a scale relative to a person's capacity, vigorous-intensity activity is usually a 7 or 8 on a 0 to 10 scale. Jogging, singles tennis, swimming continuous laps, or bicycling uphill are examples.

c. Muscle-strengthening activity: Physical activity, including exercise that increases skeletal muscle strength, power, endurance, and mass. It includes strength training, resistance training, and muscular strength and endurance exercises.

d. Bone-strengthening activity: Physical activity that produces an impact or tension force on bones, which promotes bone growth and strength. Running, jumping rope, and lifting weights are examples.

Source: Adapted from U.S. Department of Health and Human Services. *2008 Physical Activity Guidelines for Americans.* Washington, DC. 2008. Accessed February 2016. http://health.gov/paguidelines

not contribute to diet quality. A swap to artificial sweeteners is not necessarily the answer for those who are overweight. High-intensity artificial sweeteners are not proven to help as a long-term weight management strategy.

- *Consume less than 10% of calories per day from saturated fats*—Replacing saturated fats with unsaturated fats (especially polyunsaturated fats) is associated with reduced blood levels of total cholesterol and low-density lipoprotein (LDL) cholesterol. The main

sources of saturated fats in the U.S. diet are mixed dishes containing cheese, meat, or both, such as burgers, sandwiches, tacos, pizza, meat, poultry, and seafood dishes.

- *Consume less than 2,300 milligrams (mg) per day of sodium*—The average sodium intake is 3,440 mg per day. The guidelines note the importance of reduction to 2,300 mg for adults and children ages 14 years and older. A Tolerable Upper Intake Level (UL) of sodium for children younger than 14 years has been established and is available in the Dietary Guidelines. Adults with prehypertension and hypertension would benefit from lowering to 1,500 mg a day. Further evidence shows that adults who would benefit from blood pressure lowering should consider the DASH (dietary approaches to stop hypertension) diet. The DASH eating plan will be described in detail in the cardiovascular chapter. Experts believe 75% of the sodium we consume is already in the food products at consumption.
- *If alcohol is consumed, it should be consumed in moderation*—This translates up to one drink per day for women and up to two drinks per day for men. The Dietary Guidelines do not recommend that individuals who do not drink should start drinking for any reason. Alcohol is not a component of the USDA food patterns.

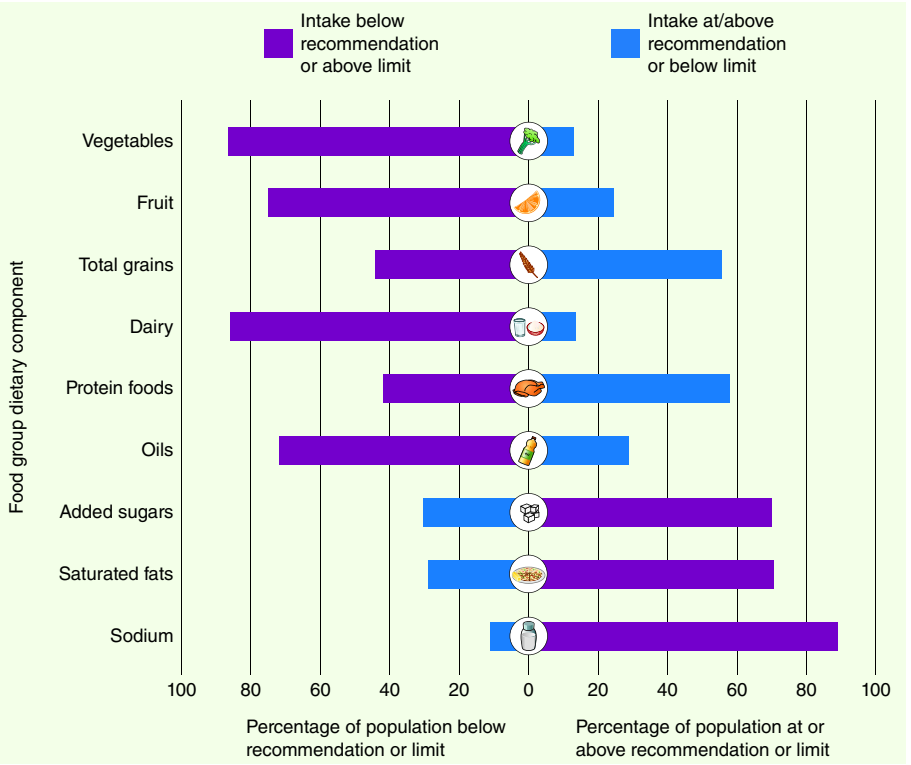
Shift to Healthier Food and Beverage Choices

The typical eating patterns engaged in by many in the United States do not align with the Dietary Guidelines for Americans. When analysis is done on typical eating patterns, various trends stand out:

- About three-fourths of the population has an eating pattern that is low in vegetables, fruits, dairy products, and oils.
- Over half of the population is meeting or exceeding total grain and protein foods; however, we are not meeting recommendation for the healthier subgroups within each of these food groups.
- Most of us exceed the recommendations for added sugars, saturated fats, and sodium. Further, many in the United States are overconsuming calories, as evidenced by the fact that more than two-thirds of all adults and nearly one-third of all children and youth are either overweight or obese.

Figure 2-3 shows a snapshot of what current dietary intakes are like compared to actual recommendations. This takes into account the percentage of the U.S. population ages 1 year and older who are below, at, or above each dietary goal or limit.

In addition to these food groups or dietary components, it is known that there are underconsumed nutrients of public health concern. They are calcium, potassium, fiber, and Vitamin D. In addition, for young children, women capable of becoming pregnant, and women who are pregnant, low intake of iron is also of public health concern. Choline; magnesium; and vitamins A, E, and C are also nutrients consumed by many individuals in amounts below the Estimated Average Requirement or Adequate Intake levels. The succeeding chapters in this book will offer a deeper look at food sources for each.



U.S. Department of Agriculture and U.S. Department of Health and Human Services. (2016). *Dietary Guidelines for Americans 2015–2020* (8th ed). Washington, DC, January 2016.

FIGURE 2-3 **Dietary intakes compared to recommendations. Percentage of U.S. population ages 1 year and older who are below, at, or above each dietary goal or limit.**

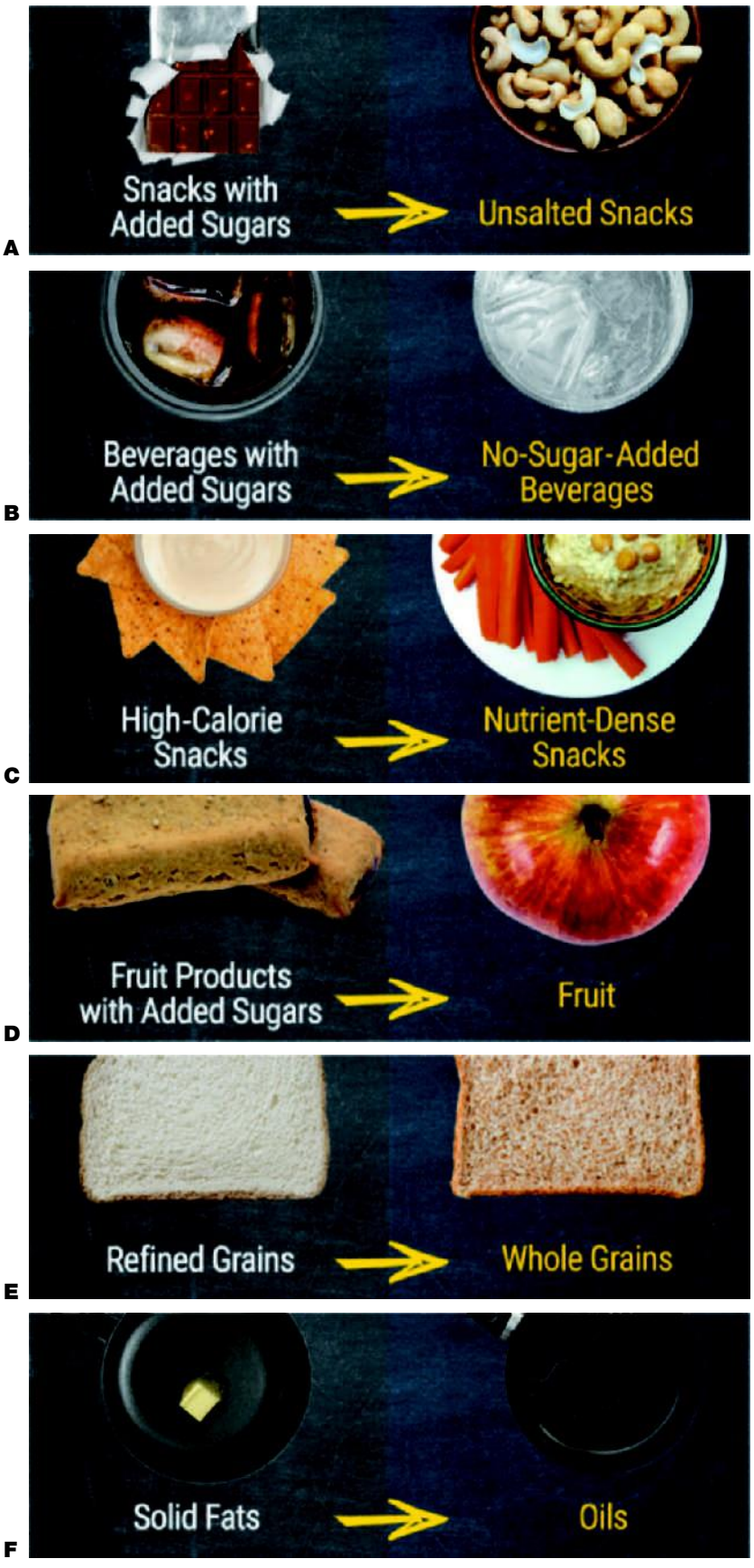
As you will note, shifts are needed to align current intakes to recommendations:

- *Shift to consume more vegetables*—Striving for the healthy meal patterns suggested would increase total vegetable intake for most individuals. Including nutrient-dense forms and an increase in the variety of vegetables would significantly improve health outcomes. Increasing vegetable content of mixed dishes while decreasing amounts of other food components that are often overeaten, such as refined grains or fatty and salty meats, would be advantageous. Also choosing a leafy green salad or a vegetable as a side dish and blending vegetables into most meals and snacks would boost intake significantly.
- *Shift to consume more fruits*—Increasing fruits, mostly in whole form, would benefit most individuals. Shifting to include more fruit as snacks, in salads, as side dishes, and as dessert in place of foods with added sugars, such as cakes, pies, cookies, doughnuts, ice cream, and candies, will yield an increased consumption of fruit.
- *Shift to make half of all grains consumed be whole grains*—Swapping refined grains with whole-grain versions of common foods will help meet recommendations. Going from white to 100% whole wheat breads, white to whole-grain pasta, and white to brown rice would increase whole-grain intakes and lower refined grains. The recommendations discuss selecting foods that have whole grains listed as their first grain ingredient. In addition, cutting back on refined-grain desserts and sweet snacks such as cakes, cookies, and pastries, which are a common source of excess calories, would help meet this goal. Choosing nutrient-dense forms such as plain popcorn increased of

buttered, bread instead of croissants, and English muffins instead of biscuits can also help meet guidelines.

- *Shift to consume more dairy products, in nutrient-dense forms*—Shifting toward fat-free or low-fat dairy, yogurt, and cheese or from fortified soy milk would help meet these recommendations. Cheese, however, contains more sodium; saturated fats; and less potassium, vitamin A, and vitamin D than milk or yogurt, so increased intake of dairy products is best served by using more fat-free or low-fat milk and yogurt versus cheese. Choosing yogurt as a snack or in an ingredient in prepared dishes such as salad dressings or spreads would be a positive step.
- *Shift to increase variety in protein foods choices and to make more nutrient-dense choices*—Increasing seafood intake twice per week and use of legumes or nuts and seeds in mixed dishes instead of meat or poultry would be a step in the right direction for meeting this goal. Choosing salmon, a tuna dish, a bean chili or adding almonds to a salad could all increase protein variety. Teen boys and adult men need to reduce overall intake of protein foods; however, the average intake of total protein foods for all others is close to recommendations.
- *Shift from solid fats to oils*—Use of vegetable oils in place of solid fats (butter, stick margarine, shortening, lard, coconut oil) when cooking would be advantageous for health. Shifts could be increasing the intake of foods that naturally contain oils, such as seafood and nuts, in place of some meat and poultry and choosing other foods such as salad dressings and spreads made with oils instead of solid fat.
- *Shift to reduce added sugars consumption to less than 10% of calories*—Shift to choosing beverages with no added sugars such as water in place of sugar-sweetened beverages. Decrease portion size of grain-based and dairy desserts and sweet snacks. Choose unsweetened or no-sugar-added versions of canned fruit, fruit sauces (applesauce), and yogurt.
- *Shift to reduce saturated fats intake to less than 10% of calories*—Choosing lower fat forms of foods and beverages that contain solid fats (lean meat rather than fatty cuts of meat, low-fat cheese in place of regular cheese, etc.) helps meet this goal. Changing ingredients in mixed dishes to increase the amounts of vegetables, whole grains, lean meat, and low-fat cheese in place of fatty meat and/or regular cheese helps with this recommended shift. Reading food labels to choose packaged foods lower in saturated fats and high in polyunsaturated and monounsaturated fats will help consumers as well. Using oil-based dressings and spreads on foods instead of butter, stick margarine, and cream cheese is a move in the right direction.
- *Shift food choices to reduce sodium intake*—Consumers would be wise to use the nutrition facts label to compare sodium content of foods and choose products with less sodium and buy low-sodium, reduced sodium, or no-salt-added versions of products when available. Choose fresh, frozen (no sauce or seasoning), or no-salt-added canned vegetables and fresh poultry, seafood, and lean meat rather than processed meat and poultry. Eating at home more often and cooking from scratch to control sodium makes sense to help uphold this guideline. Limiting sauces, mixes, and "instant" products including flavored rice, instant noodles, and ready-made pasta is also a logical health step toward lower sodium. Flavoring foods with herbs and spices instead of salt can help as well.

See Figure 2-4 for a practical representation of how food choices can shift to become healthier.



U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans 2015–2020* (8th ed). Washington, DC, January 2016

FIGURE 2-4 Examples of food shifts to make to meet dietary guidelines.