

PRINCIPLES AND LABS FOR

FITNESS & WELLNESS



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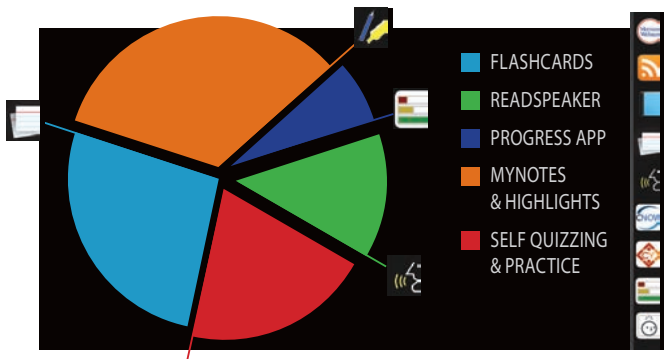
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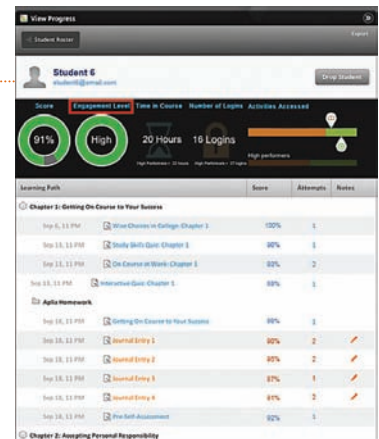
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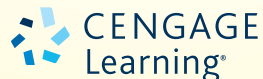
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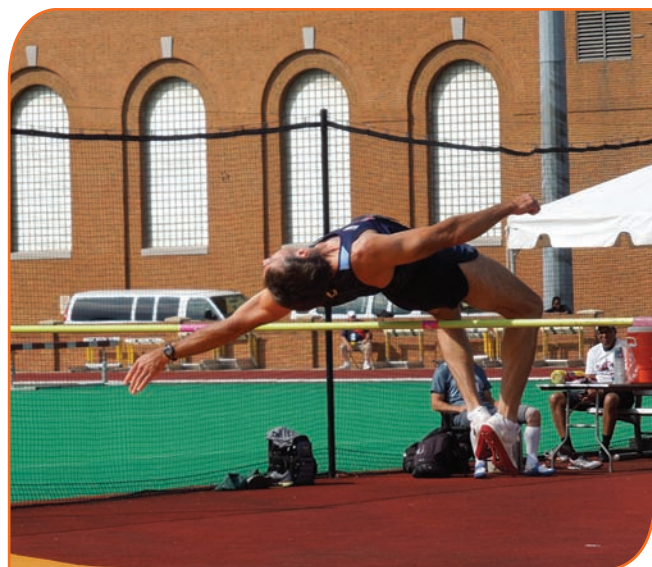


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Preface

The current American way of life does not provide people with sufficient physical activity to maintain good health and improve quality of life. Actually, our way of life is such a serious threat to our health that it increases the deterioration rate of the human body and leads to premature illness and mortality.

The most recent data released by the Centers for Disease Control and Prevention (CDC) indicate that only 19.4 percent of U.S. adults 18 and over meet the Federal Physical Activity Guidelines for both aerobic and muscular fitness activities, whereas 46.1 percent meet the guidelines for aerobic fitness and just 23 percent do so for muscular fitness. Another 34 percent of Americans are completely inactive during their leisure time. Yet, most people in the United States say they believe that physical activity and positive lifestyle habits promote better health. However, many do not reap benefits because they simply do not know how to implement a sound fitness and wellness program that will yield the desired results.

The U.S. Surgeon General has determined that lack of physical activity is detrimental to good health. As a result, the importance of sound fitness and wellness programs has assumed an entirely new dimension. The Office of the Surgeon General has identified physical fitness as a top health priority by stating that the nation's top health goals in the 21st century are exercise, increased consumption of fruits and vegetables, smoking cessation, and the practice of safe sex. All four of these fundamental healthy lifestyle factors are thoroughly addressed in this book.

Furthermore, the science of behavioral therapy has established that many behaviors we adopt are a product of our environment. Unfortunately, we live in a “toxic” health and fitness environment. Becoming aware of how the environment affects our health is vital if we wish to achieve and maintain wellness. Yet, we are so habituated to this modern-day environment that we miss the subtle ways in which it influences our behaviors, personal lifestyle, and health each day.

Along with the most up-to-date health, fitness, and nutrition guidelines, the information in this book provides extensive behavior modification strategies to help you abandon negative habits and adopt and maintain healthy behaviors. As you study and assess physical fitness and wellness parameters, you need to take a critical look at your behaviors and lifestyle—and most likely make selected permanent changes to promote your overall health and wellness.

Principles and Labs for Fitness & Wellness contains 15 chapters and 42 laboratories (labs) that serve as guides to imple-

ment a complete lifetime fitness and wellness program. The book contents point out the need to go beyond the basic components of fitness to achieve total well-being.

In addition to a thorough discussion of physical fitness, including all health- and skill-related components, extensive and up-to-date information is provided on behavior modification, nutrition, weight management, stress management, cardiovascular and cancer-risk reduction, exercise and aging, prevention of sexually transmitted infections (STIs), and substance abuse control (including tobacco, alcohol, and other psychoactive drugs). The information has been written to provide you with the necessary tools and guidelines for an active lifestyle and a wellness way of life.

Scientific evidence has clearly shown that improving the quality—and most likely the longevity—of your life is a matter of personal choice. As you work through the various chapters and laboratories in the book, you will be able to develop and regularly update your healthy lifestyle program to improve physical fitness and personal wellness. The emphasis throughout the book is on teaching you how to take control of your health and lifestyle habits so that you can make a constant and deliberate effort to stay healthy and achieve the highest potential for well-being.

New in the 13th Edition

All chapters in the 13th edition of *Principles and Labs for Fitness & Wellness* have been revised and updated according to recent advances and recommendations in the field, including information reported in the literature and at professional health, fitness, and sports medicine conferences.

In this edition, we continue to provide the MyProfile feature at the beginning of each chapter for students to evaluate their current knowledge of the chapter's topic. Included also are the Confident Consumer and Diversity Considerations boxes to help students make healthier choices and be discerning fitness and wellness consumers. These features, along with the Real Life Story and FAQ sections, are intended to perk the students' interest in the chapter contents. Beyond the individual chapter updates listed in the next section, new figures and photography are included throughout the textbook.

Chapter Updates

- All statistics related to the leading causes of death, life expectancy, and health care costs have been brought up-to-date in the opening chapter, “Physical Fitness and Wellness.” A new section on *Sitting Disease*, a 21st century

ailment coined by the scientific community to explain the detrimental effects of excessive sitting on health and wellness, has been added to this chapter. Information is also presented on recommendations for daily lifestyle changes to combat this deadly risk factor. The section on *Exercise and Brain Function* has been updated and enhanced and provides new information on the role of exercise in the prevention of mental decline and Alzheimer’s disease.

Further, information on exercise as a preventative health measure is explored, along with its use as a disease treatment modality as compared to other drug treatments.

- Chapter 2, “Behavior Modification,” includes a new section on *Values and Behavior* that explains the way core values are formed, with new information on the role of the prefrontal cortex of the brain in carrying out value-centered behavior. The section about the brain and habit formation has been updated and expanded, and new content introduces mindfulness, willpower, and examines the way these affect goal achievement. All statistics regarding the negative effects of a sedentary lifestyle and our food-abundant environment have been updated, and new information on the effect of social norms on behavior has also been added to the chapter. A new figure on SMART goals has also been added.
- The topic of Chapter 3, “Nutrition for Wellness,” was updated and revised to include new information on the health consequences of excessive sugar intake, sugar-sweetened beverages, and energy drinks. Additional information is provided on unsaturated fatty acids (including omega-9s); olive oil and canola oil; the key role of adequate protein intake throughout the day; complementary proteins for vegetarian diets; red-meat intake, chronic disease, and premature death; the Harvard Healthy Eating Plate; and the latest advances for the prevention and treatment of osteoporosis. Many other minor updates as related to nutrition principles were made to the chapter.
- New global recommendations for health metrics have been added to Chapter 4, “Body Composition,” including a discussion of the way waist circumference, waist-to-height-ratio (WHtR), and the Body Mass Index are being used in conjunction to prevent disease. The potential of WHtR to more accurately predict disease and to be used in public health education is discussed. Data and figures for the different obesity classes (I, II, and III) was also included.
- Important changes related to the recommendations and advances in the field of weight management are discussed in Chapter 5, “Weight Management.” The data on the obesity epidemic in the United States were brought up to date and include obesity prevalence estimates based on gender, level of education, and cultural ethnicity. EDNOS (Eating Disorders Not Otherwise Specified) and the Federal Trade Commission’s Weight-Loss Gimmick “7 Gut Check Claims” are included in the chapter. Enhancements were also made to the *Physiology of Weight Loss* and *Weight Loss Strategies* sections, including a better explanation on

the rule of thumb that one pound of fat represents 3,500 calories; a new section on the *Overweight and Fit Debate* (fit and fat); the value of having three regular meals and two healthy snacks daily; the importance of adequate amount of lean protein sources with each meal; and the benefits of exercise-intensity, interval training, and the effects of cold-water swimming on weight loss.

- The “Cardiorespiratory Endurance” chapter (Chapter 6) includes updates on the number of people who meet the 2008 Federal Guidelines for Physical Activity. Additional information on energy drinks, the new FITT-VP acronym used for exercise prescription, “physical stillness,” the importance of maintaining some physical activity throughout the day, exercise volume, and fitness apps are all addressed in this chapter.
- The title of Chapter 7 has been changed to “Muscular Fitness,” a new term that describes the general health, strength, and endurance of a person’s muscular system. Updates were also made to the *Strength Training Benefits* section, aging and sarcopenia (loss of muscle mass), effects of aging on visceral fat, free weights versus strength-training machines, dietary protein guidelines for strength development, exercise safety guidelines, and an introduction to the concepts of myofibrillar and plasmic hypertrophy.
- In Chapter 8, “Muscular Flexibility,” the section on preventing and rehabilitating low back pain has been expanded to include information on the importance of core-strengthening exercise to strengthen muscles that stabilize the spine. New studies are cited, emphasizing the benefit of exercise therapy over bed rest as a treatment for chronic back pain, including data supporting yoga as effective for reducing pain and improving function. Also added to the chapter was a new figure listing ergonomic tips to improve the computer workspace, provide optimal lower back support, and ensure correct sitting posture while working at a desk.
- In Chapter 9, “Skill Fitness and Fitness Programming,” all information regarding 2014 fitness trends has been brought up to date and incorporates new discussions on various activities, including functional fitness, bike commuting and outdoor training, the Tabata high-intensity training program, the reemergence of high-intensity circuit training (HICT), and senior fitness solutions incorporating Tai Chi.
- Information on the importance of proper breathing as a natural mechanism to reduce stress has been added to Chapter 10, “Stress Assessment and Management Techniques.” The benefits of mindfulness meditation, Tai Chi, and yoga for stress management have also been expanded in this edition.
- Data on the prevalence of cardiovascular disease have been updated in Chapter 11, “Preventing Cardiovascular Disease.” New information is provided in many sections, including the role of trans fat in cardiovascular disease,

trans fat content of selected foods, warning signs for stroke, ECG recommendations, the new heart disease and stroke prevention guidelines by the American Heart Association and the American College of Cardiology, HDL cholesterol subgroups, recommendations to lower LDL cholesterol, exercise and type 2 diabetes, stress and heart disease, and “other risk factors for CHD.”

- Updated information has been added to Chapter 12, “Cancer Prevention,” to reflect the latest research and breakthroughs in our understanding of cancer development at the cellular level. Innovative information regarding telomeres and their role in cancer and aging has been included. A new section explores genetic versus environmental influences on cancer risk. An introduction to epigenetics, with a biological explanation of the epigenome, a discussion on how its discovery changed scientific understanding of how lifestyle choices can turn genes on or off, and that behaviors and preferences learned during person’s lifetime can be passed on to offspring are all reviewed in this new section. All data on the incidence and mortality rates for cancer have been updated and enhanced, along with updates on the most common site-specific cancer risk factors.
- Data on the most recent trends in substance abuse reported in the *National Survey on Drug Use and Health* by the U.S. Department of Health and Human Services have been updated in Chapter 13, “Addictive Behavior.” A new section describing the alarming spread of what the Commission on Narcotic Drugs has termed new psychoactive substances (NPS) is included in this edition, along with additional information on synthetic cannabinoids, the most prevalent NPS in the United States. New data and recent trends in illicit drug use, energy drink consumption, and tobacco products have also been updated and expanded in this chapter.
- New content is presented on the prevalence and prevention of Hepatitis B as an STI in Chapter 14, “Preventing Sexually Transmitted Infections.” In this edition, extensive updates on the types and causes of the eight most common STIs and their treatment modality and potential for cure are given in this chapter. The most recent findings in the success of antiretroviral therapy in the suppression of the HIV virus in infected patients, particularly newborns, is also discussed in the text and self-quiz at the end of the chapter. Current data and graphs on the prevalence of STIs have been added and updated according to the newest data available from the Centers for Disease Control and Prevention (CDC).
- Chapter 15, “Lifetime Fitness and Wellness,” now includes expanded guidelines for choosing a personal fitness trainer; new information on the growing trend of integrative medicine in hospitals, practices, and treatment centers; and updated resources where students can access credible research on health and wellness topics. Updates to Lab 15A also include the latest life expectancy data for the United States.

Ancillaries

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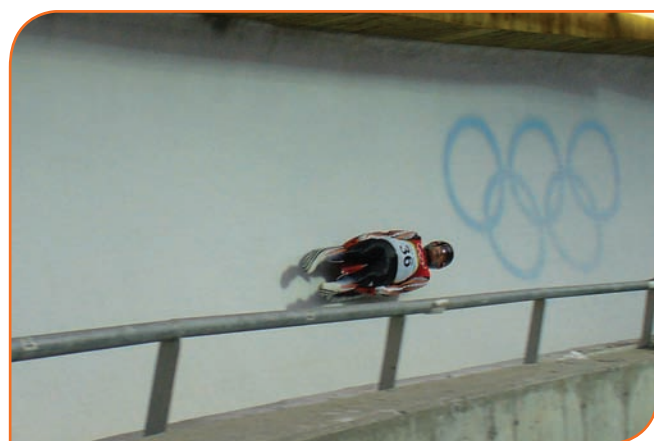
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This unique booklet takes students through the complicated process of picking the type of career they want to pursue; explains how to prepare for the transition into the working world; and provides insight into different types of career paths, education requirements, and reasonable salary expectations. A designated chapter discusses some of the legal issues that surround the workplace, including discrimination and harassment. This supplement is complete with personal development activities designed to encourage students to focus on and develop better insight into their futures.

Brief Author Biographies

Werner W.K. Hoeger is a professor emeritus of the Department of Kinesiology at Boise State University. He remains active in research and continues to lecture in the areas of exercise physiology, physical fitness, and wellness.

Dr. Hoeger completed his undergraduate and master's degrees in physical education at the age of 20 and received his doctorate degree with an emphasis in exercise physiology at the age of 24. He is a fellow of the Society of Health and Physical Educators (SHAPE America-previously the American College of Sports Medicine) and of the Research Consortium of the American Alliance for Health, Physical Education, Recreation, and Dance). In 2002, he was recognized as the outstanding alumnus from the College of Health and Human Performance at Brigham Young University. He is the recipient of the first Presidential Award for Research and Scholarship in the College of Education at Boise State University in 2004. In 2008, he was asked to be the keynote speaker at the seventh Ibero-American Congress of Sports Medicine and Applied Sciences in Mérida, Venezuela, and was presented with the Distinguished Guest of the City recognition. In 2010, he was also honored as the keynote speaker at the Western Society for Kinesiology and Wellness in Reno, Nevada.



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Using his knowledge and personal experiences, Dr. Hoeger writes engaging, informative books that thoroughly address today's fitness and wellness issues in a format accessible to students. Since 1990, he has been the most widely read fitness and wellness college textbook author in the United States. He has published a total of 60 editions of his nine fitness and wellness-related titles. Among the textbooks written for Wadsworth/Cengage Learning are *Lifetime Physical Fitness and Wellness: A Personalized Program*, 13th edition; *Fitness & Wellness*, 11th edition; *Principles and Labs for Physical Fitness*, 10th edition; *Wellness: Guidelines for a Healthy Lifestyle*, 4th edition; and *Water Aerobics for Fitness & Wellness*, 4th edition (with Terry-Ann Spitzer Gibson).

Dr. Hoeger was the first author to write a college fitness textbook that incorporated the wellness concept. In 1986, with the release of the first edition of *Lifetime Physical Fitness & Wellness*, he introduced the principle that to truly improve fitness, health, and quality of life and to achieve wellness, a person needed to go beyond the basic health-related components of physical fitness. His work was so well received that every fitness author in the field immediately followed his lead.

As an innovator in the field, Dr. Hoeger has developed many fitness and wellness assessment tools, including fitness tests such as the Modified Sit-and-Reach, Total Body Rotation, Shoulder Rotation, Muscular Endurance and Muscular Strength and Endurance, and Soda tests. Proving that he practices what he preaches, he was the oldest male competitor in the 2002 Winter Olympics in Salt Lake City, Utah, at the age of 48. He raced in the sport of luge, along with his then-17-year-old son Christopher. It was the first time in Winter Olympics history that father and son competed in the same event. In 2006, at the age of 52, he was the oldest competitor at the Winter Olympics in Turin, Italy. In 2011, he raced in the 800-, 1,500-, and 5,000-meter events in track and field at the World Masters Athletic (Track and Field) Championships held in Sacramento, California. At different

times in 2012, 2013, and 2014, he reached All-American standards for his age group by USA Track and Field, including the 800-meter, 1,500-meter, and 1.0-mile events.

Sharon A. Hoeger is vice president of Fitness & Wellness, Inc., of Boise, Idaho. Sharon received her degree in computer science from Brigham Young University. In the 1980s, she served as a computer science instructor at the University of Texas of the Permian Basin. She is extensively involved in the research process used in retrieving the most current scientific information that goes into the revision of each textbook. She is also the author of the software that was written specifically for the fitness and wellness textbooks. Her innovations in this area since the publication of the first edition of *Lifetime Physical Fitness & Wellness* in 1986 set the standard for fitness and wellness computer software used in this market today.

Sharon is a coauthor of five of the seven fitness and wellness titles. She also served as chef de mission (chief of delegation) for the Venezuelan Olympic Team at the 2006 Winter Olympics in Turin, Italy. A former gymnast, she now participates in a variety of fitness activities to enjoy good health and maintain a high quality of life.

Husband and wife have been jogging and strength training together for more than 37 years. They are the proud parents of five children, all of whom are involved in sports and lifetime fitness activities. Their motto: “Families that exercise together, stay together.”

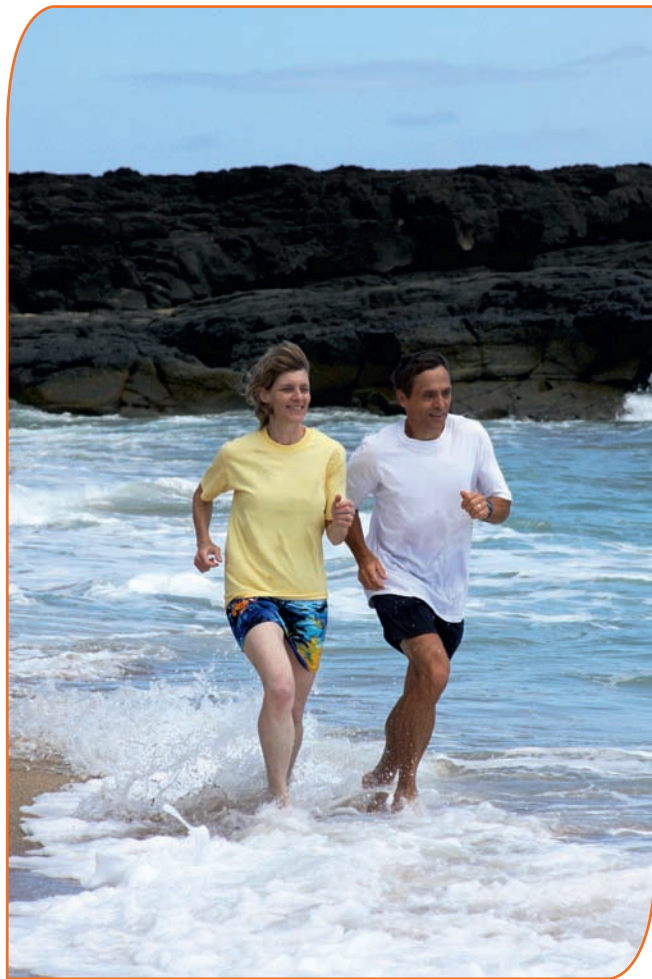
Acknowledgments

The completion of the 13th edition of *Principles and Labs for Fitness & Wellness* was made possible through the contributions of many professionals throughout the country. In particular, we express our gratitude to the reviewers of the 12th edition; their valuable comments and suggestions are sincerely appreciated.

Kevin B. Kinser, *Tarrant Country College*

Holly J. Molella, *Dutchess Community College*

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Physical Fitness and Wellness

The human body is extremely resilient during youth—not so during middle and older age. The power of prevention, nonetheless, is yours: It enables you to make healthy lifestyle choices today that will prevent disease in the future and increase the quality and length of your life.

OBJECTIVES

- Understand the health and fitness consequences of physical inactivity.
- Identify the major health problems in the United States.
- Learn how to monitor daily physical activity.
- Learn the *Physical Activity Guidelines for Americans*.
- Define wellness and list its dimensions.
- Define physical fitness and list health-related and skill-related components.
- State the differences among physical fitness, health promotion, and wellness.
- Distinguish between health fitness standards and physical fitness standards.
- Understand the benefits and significance of participating in a comprehensive wellness program.
- List key national health objectives for 2020.
- Determine whether you can safely initiate an exercise program.
- Learn to assess resting heart rate and blood pressure.

REAL LIFE STORY | Jeremy's Experience

I was a multisport athlete in high school. I played soccer, football, basketball, and ran track. I was not the best athlete on these teams, and I didn't have a chance to make a college team, but I sure loved sports and athletic competition. To earn extra money for college, I worked for a fast-food chain that summer. I was so busy that I didn't do any fitness activities or play sports that summer, and I ate too much junk food, which caused me to gain some weight. Later in college, it took some time to get used to my new surroundings and the newfound freedom from my home life. My friends kept stressing that I needed to enjoy college life as much as possible and not worry so much about academics. We went to a lot of parties and watched sporting events. There was always plenty of alcohol at these activities. I



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know we drank way too much, we didn't exercise, and my grades suffered as a result. I shouldn't have been so shocked when I saw my final grades. To add insult to injury, it really hit home when I signed up for the fitness and wellness class and found out I had gained more than 15 pounds since high school graduation. My fitness test results showed I was not even in an average fitness category for most components.

I am so glad the fitness course was a required class, as I was able to correct my lifestyle before it spiraled out of control and I wasted more time in college. I started to exercise on an almost daily basis, and I learned so much about nutrition and healthy eating. Parties and alcohol were no longer important to me. I had a life to live and prepare for. It felt so good to once again become fit and eat a healthy/balanced diet. I rearranged my activities so that schoolwork and fitness were right at the top of my list. I stopped procrastinating on my schoolwork, and I was doing cardio five times a week and lifting twice per week. My goal is to keep this up for the rest of my life. I now understand that if I want to enjoy wellness, I have to make fitness and healthy living a top priority in my life.

Movement and physical activity are basic functions that the human organism evolved to perform with vigor and proficiency. Advances in technology, however, have almost eliminated the necessity for physical exertion in daily life. Physical

activity is no longer a natural part of our existence. We live in an automated society, in which most of the activities that used to require strenuous exertion can be accomplished by machines with the simple pull of a handle or push of a button.



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Modern-day conveniences lull people into a sedentary lifestyle.

FAQ

Why should I take a fitness and wellness course?

Most people go to college to learn how to make a living, but a fitness and wellness course teaches you how to *live*—truly live life to its fullest potential. Some people seem to think that success is measured by how much money they make. Making a good living does not help you unless you live a wellness lifestyle that allows you to enjoy what you earn. You may want to ask yourself: Of what value are a nice income, a beautiful home, and a solid retirement portfolio if at age 45 I suffer a massive heart attack that will seriously limit my physical capacity or end my life?

Is the attainment of good physical fitness sufficient to ensure good health?

Regular participation in a sound physical fitness program provides substantial health benefits and significantly decreases the

risk of many chronic diseases. And although good fitness often motivates us toward adoption of additional positive lifestyle behaviors, to maximize the benefits for a healthier, more productive, happier, and longer life, we have to pay attention to all seven dimensions of wellness: physical, social, mental, emotional, occupational, environmental, and spiritual. These dimensions are interrelated, and one frequently affects the others. A wellness way of life requires a constant and deliberate effort to stay healthy and achieve the highest potential for well-being within all dimensions of wellness.

If a person is going to do only one thing to improve health, what would it be?

This is a common question. It is a mistake to think, though, that you can modify just one factor and enjoy wellness. Wellness requires a constant and deliberate effort to change unhealthy behaviors and reinforce healthy behaviors. Although it is difficult to work on many lifestyle changes at once, involvement in a regular physical activity program, proper nutrition, and avoidance of addictive behavior are lifestyle factors to work on first. Others should follow, depending on your current lifestyle behaviors.

MyProfile: General Understanding of Fitness and Wellness

To the best of your ability, answer the following questions. If you do not know the answer(s), this chapter will guide you through them.

- I. Wellness implies making a constant and deliberate effort to stay healthy and achieve the highest potential for well-being. True False
- II. The minimum requirement in the *U.S. Federal Physical Activity Guidelines* is that you accumulate minutes of moderate-intensity aerobic activity or minutes of vigorous-intensity aerobic activity weekly.
- III. Cardiorespiratory endurance, strength, power, flexibility, agility, and speed are the basic components of health-related fitness. True False
- IV. My current blood pressure is / mm Hg, which is classified as (mark one) normal, prehypertension, or hypertension.
- V. Are you aware of potential risk factors in your life and personal health family history that may increase your chances of developing disease? Yes No

Research findings clearly show that physical inactivity and a negative lifestyle seriously threaten health and hasten the deterioration rate of the human body. Most of the world's industrialized nations are experiencing an epidemic of physical inactivity. In the United States, physical inactivity is the second-greatest threat to public health and has been termed **sedentary death syndrome**, or **SeDS** (the number-one threat is tobacco use—the largest cause of preventable deaths).

Widespread interest in **health** and preventive medicine in recent years, nonetheless, is motivating people to partici-

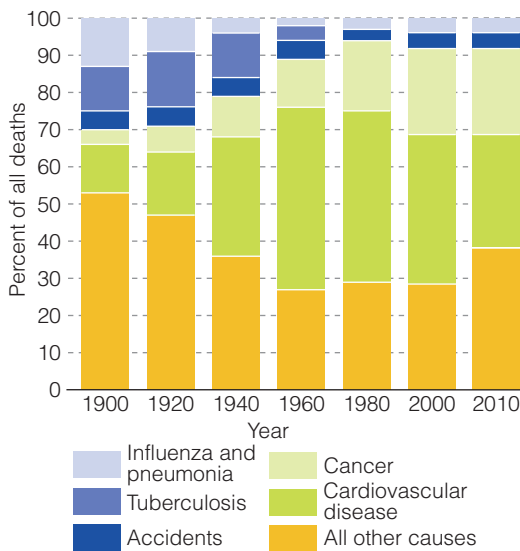
pate in organized fitness and wellness programs. The growing number of participants is attributed primarily to scientific evidence linking regular physical activity and positive lifestyle habits to better health, longevity, quality of life, and overall well-being.

Sedentary death syndrome

(SeDS) Cause of deaths attributed to a lack of regular physical activity.

Health State of complete well-being—not just the absence of disease or infirmity.

FIGURE 1.1 Causes of death in the United States for selected years.



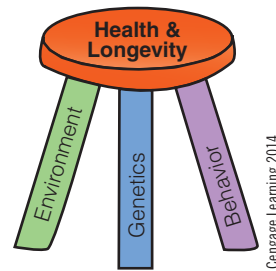
Source: National Center for Health Statistics, Division of Vital Statistics.

At the beginning of the 20th century, **life expectancy** for a child born in the United States was only 47 years. The most common health problems in the Western world were infectious diseases, such as tuberculosis, diphtheria, influenza, kidney disease, polio, and other diseases of infancy. Progress in the medical field largely eliminated these diseases. Then, as more people started to enjoy the “good life” (**sedentary** living, alcohol, fatty foods, excessive sweets, tobacco, drugs, etc.), a parallel increase appeared in the incidence of **chronic diseases** such as cardiovascular disease, cancer, diabetes, and chronic respiratory diseases (Figure 1.1). According to the World Health Organization (WHO), chronic diseases account for 60 percent of all deaths worldwide.¹

As the incidence of chronic diseases climbed, we recognized that prevention is the best medicine. Consequently, a fitness and wellness movement developed gradually in the 1980s. We began to realize that good health is mostly self-controlled and that the leading causes of premature death and illness could be prevented by adhering to positive lifestyle habits. We all desire to live a long life, and wellness programs seek to enhance the overall quality of life—for as long as we live.

Three basic factors determine our health and longevity: genetics, the environment, and our behavior (Figure 1.2). Although we cannot change our genetic pool, we can exert control over the environment and our health behaviors so that we may reach our full physical potential based on our own genetic code. How we accomplish this goal is thoroughly discussed throughout the chapters of this book.

FIGURE 1.2 Factors that impact health and longevity.



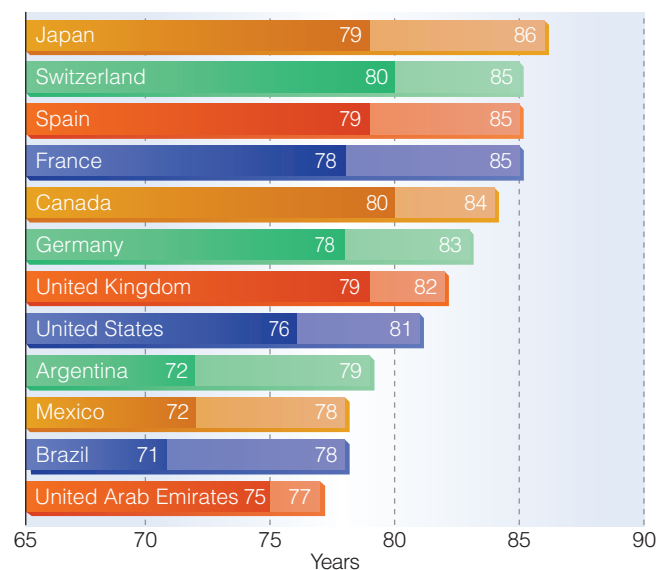
Cengage Learning 2014

Life Expectancy

Based on the most recent data available, the average life expectancy in the United States is 78.7 years (76.3 years for men and 81.1 years for women). While in the past decade alone life expectancy has increased by 1 year, the news is not all good. The data show that people now spend an extra 1.2 years with a serious illness and an extra 2 years experiencing disability. Mortality has been postponed, because medical treatments allow people to live longer with various chronic ailments (cardiovascular disease, cancer, diabetes, etc).

Based on WHO data, the United States ranks 33rd in the world for life expectancy (Figure 1.3). Japan ranks first in the world, with an overall life expectancy of 82.6 years. While the United States was once a world leader in life expectancy, over recent years, the increase in life expectancy in the United States has not kept pace with that of other developed countries.

FIGURE 1.3 Life expectancy at birth for selected countries: 2005–2015 projections.

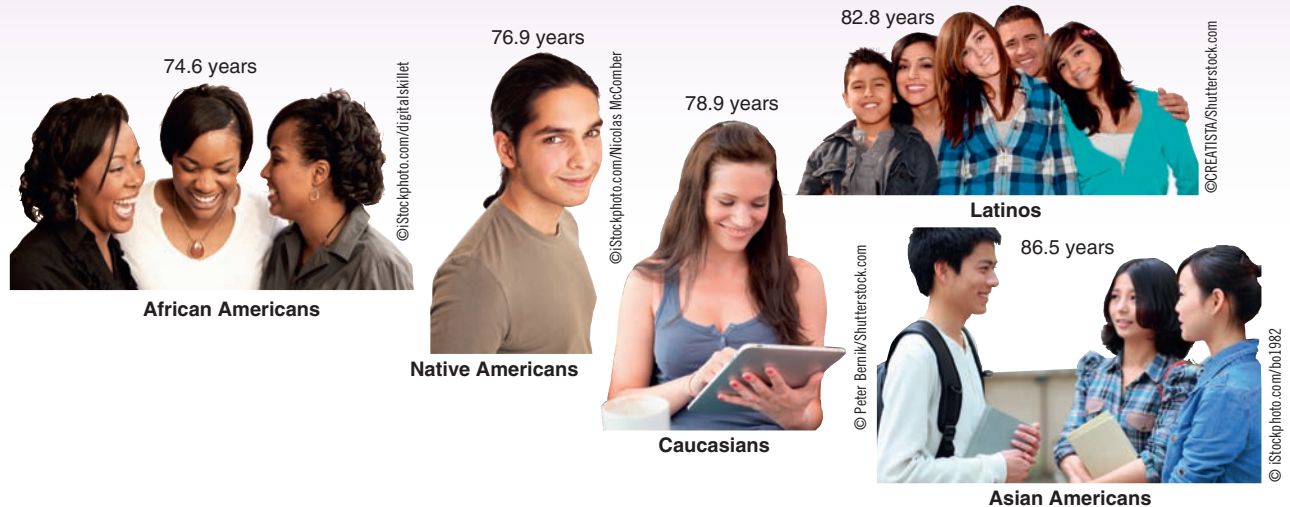


Dark color is men; light color is women.

Source: United Nations, “Social Indicators: Indicators on Health,” <http://unstats.un.org/unsd/demographic/products/socind/health.htm>, downloaded January 9, 2012.

DIVERSITY CONSIDERATIONS

Life expectancy in the United States has increased by 9 years since 1960. There is, however, a disparity among ethnic groups. Asian Americans live the longest, while African Americans have the shortest lifespan.



Decreasing Disparities: Improving lifestyle, how one grows up (e.g., access to health care, physical activity, good nutrition, and personal safety), work environment, and conditions under which one grows old greatly increase the chances for a longer and healthier life. Healthy choices you make *today* dictate quality of life and wellness during older age.

Several factors may account for the current U.S. life expectancy ranking: the extremely poor health of some groups (such as Native Americans, rural African Americans, and the inner-city poor), the low level of daily physical activity, the high incidence of tobacco use and coronary heart disease, fairly high levels of violence (notably homicides), and the obesity epidemic. Furthermore, a recent report by the Organisation for Economic Cooperation and Development (OECD) found that while the United States far outspent every other country in health care cost per capita, it also easily had the highest rates of obesity of all 36 OECD countries.²

Life expectancy for men in the United States is almost five years lower than for women. For years it has been assumed that the difference is based on biology, but most likely the gender gap is related to lifestyle behaviors most commonly observed in men. Around 1980, the gender gap in life expectancy was almost 8 years. This decrease in the gender gap is thought to be due to the fact that women are increasingly taking on jobs, habits, and stressors of men such as smoking, drinking, and employment outside the home.

Men, nonetheless, still report higher stress on the job and are less likely to engage in stress management programs. Also, 95 percent of employees in the 10 most dangerous jobs are men. Furthermore, men's health is not given the same degree of attention in terms of public health policies. Fewer programs are available that specifically target men's health issues. Thus, men need to take a more proactive role for their own health and public health policies.

“Masculinity” itself is also partially to blame. Men are less likely to visit a physician when something is wrong and are less likely to heed preventive care visits to be screened for potential risk factors such as hypertension, elevated cholesterol, diabetes, obesity, substance abuse, and depression or anxiety. Chronic diseases in men are often diagnosed at a later stage, when a cure or adequate management is more difficult to achieve.

Men typically drive faster than women and are more likely to engage in risk-taking activities. Of all road traffic fatalities among countries studied in the most recent OECD report, a disparate 74 percent of victims were men.

Although life expectancy in the United States has gradually increased by 30 years over the past century, scientists from the National Institute of Aging believe that in the coming decades, the average lifespan may decrease by as much as five years.

This decrease in life expectancy will be related primarily to the growing challenges of inactivity and obesity. According to current estimates from the Centers

Life expectancy Number of years a person is expected to live based on the person's birth year.

Sedentary Description of a person who is relatively inactive and whose lifestyle is characterized by a lot of sitting.

Chronic diseases Illnesses that develop as a result of an unhealthy lifestyle and last a long time.

for Disease Control and Prevention, 35.7 percent of the adult population in the United States is obese. As a nation, we are seeing the consequences of these numbers unfold. The latest statistical update from the American Heart Association reported that the incidence of diabetes has been climbing dramatically each year in parallel step with the increased incidence of obesity.³ If this trend continues, the current generation of children may not outlive their parents. Additional information on the obesity epidemic and its detrimental health consequences is given in Chapter 5.

Leading Health Problems in the United States

The leading causes of death in the United States today are largely lifestyle related (Figure 1.4). The U.S. Centers for Disease Control and Prevention have found that 7 of 10 Americans die of preventable chronic diseases. Specifically, about 53 percent of all deaths in the United States are caused by cardiovascular disease and cancer.⁴ Almost 80 percent of the latter deaths could be prevented through a healthy lifestyle program. The third- and fourth-leading causes of death, respectively, are chronic lower respiratory disease (CLRD) and accidents.

The most prevalent degenerative diseases in the United States are those of the cardiovascular system. About 30 percent of all deaths in this country are attributed to diseases of the heart and blood vessels. According to the American Heart Association (AHA), 83.6 million people in the United States are afflicted with diseases of the cardiovascular system, including 78 million with hypertension (high blood pressure) and 15.4 million with coronary heart disease (CHD). (Many of these people have more than one type of cardiovascular disease.) More than 900,000 people suffer heart attacks each year, and close to 405,000 deaths occur from CHD and heart attacks. The yearly estimated direct and indirect cost of cardiovascular disease exceeds \$204 billion.⁵ A complete cardiovascular disease prevention program is outlined in Chapter 11.

The second-leading cause of death in the United States is cancer. Even though cancer is not the number-one killer, it is the number-one health fear of Americans. Twenty-three percent of all deaths in the United States are attributable to cancer. About 600,000 Americans died in 2014 from this disease (that is, 1,600 each day), and an estimated 1.6 million new cases were diagnosed during the same year.⁶ The major contributor to the increase in the incidence of cancer during the past five decades is lung cancer, of which 80 percent is caused by tobacco use. Furthermore, smoking accounts for almost 30 percent of all deaths from cancer. Another 33 percent of deaths are related to nutrition, physical inactivity, excessive body weight, and other faulty lifestyle habits.

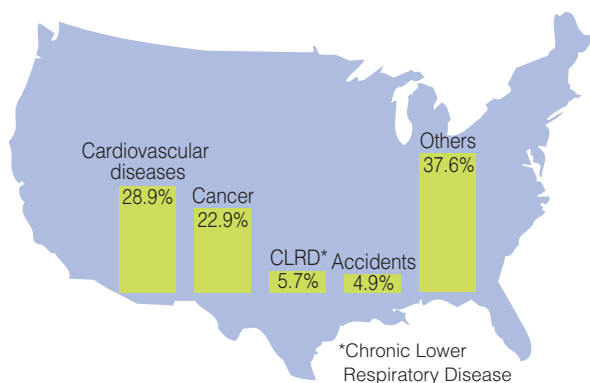
The American Cancer Society maintains that the most influential factor in fighting cancer today is prevention through health education programs. Evidence indicates that as much as 80 percent of all human cancer can be prevented through positive lifestyle behaviors. A comprehensive cancer-prevention program is presented in Chapter 12.

CLRD, the third-leading cause of U.S. deaths, is a general term that includes chronic obstructive pulmonary disease, emphysema, and chronic bronchitis (all diseases of the respiratory system). Although CLRD is related mostly to tobacco use (see Chapter 13 for discussion on how to stop smoking), lifelong nonsmokers also can develop CLRD.

Precautions to prevent CLRD include consuming a low-fat, low-sodium, nutrient-dense diet; staying physically active; not smoking and not breathing cigarette smoke; getting a pneumonia vaccine if over age 50 and a current or ex-smoker; and avoiding swimming pools if sensitive to chlorine vapor.

Accidents are the fourth-leading cause of death in the United States. Even though not all accidents are preventable, many are. Fatal accidents are often related to abusing drugs and not wearing a seat belt. Furthermore, with the advent of cell phones, 1.6 million car accidents (at least 28 percent of all traffic crashes) each year are caused by drivers using cell phones or reading or sending text messages. A report by

FIGURE 1.4 Leading causes of death in the United States, 2011.

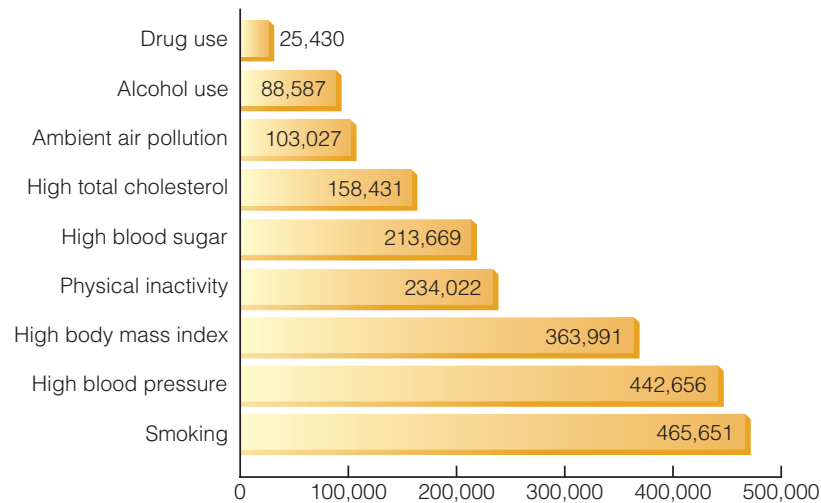


U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, "Deaths: Preliminary Data for 2011," National Center for Health Statistics, National Vital Statistics Reports 61, no. 6 (October 10, 2012).

Healthy Habits That Cut Risk for Serious Disease

According to the Centers for Disease Control and Prevention, four healthy living habits can reduce your risk of chronic diseases such as heart disease, cancer, and diabetes by almost 80 percent:

- Get at least 30 minutes of daily moderate-intensity physical activity.
- Never smoke.
- Eat a healthy diet (ample fruits and vegetables, whole-grain products, and low meat consumption).
- Maintain a body mass index (BMI) under 30.

FIGURE 1.5 Death from all causes attributable to lifestyle-related risk factors for men and women in the United States.

Source: Institute for Health Metrics and Evaluation News Release: July 10, 2013, "Dietary risks are leading cause of disease burden in the US and contributed to more health loss in 2010 than smoking, high blood pressure, and high blood sugar," <http://www.healthmetricsandevaluation.org/news-events/news-releases>, downloaded Feb. 28, 2014.

Traffic Injury Prevention indicates that texting while driving is as dangerous as driving drunk. In a simulated test, driving performance while texting was found to be at least as bad as with blood alcohol levels at or above legal driving limits. In addition to not paying attention to the road and other vehicles, the study found that people tend to increase speed and do not brake as effectively while texting.

Most people do not perceive accidents as a health problem. Even so, accidents affect the total well-being of millions of Americans each year. Accident prevention and personal safety are part of a health-enhancement program aimed at achieving better quality of life. Proper nutrition, exercise, stress management, and abstinence from cigarette smoking are of little help if the person is involved in a disabling or fatal accident as a result of distraction, a single reckless decision, or not wearing a seat belt properly.

Accidents do not just happen. We cause accidents, and we are victims of accidents. Although some factors in life, such as earthquakes, tornadoes, and airplane accidents, are beyond our control, more often than not personal safety and accident prevention are a matter of common sense. Most accidents stem from poor judgment and confused mental states, which occur when we are upset, are not paying attention to the task at hand, or are abusing alcohol or other drugs.

Alcohol abuse is the number-one cause of all U.S. accidents. About half of accidental deaths and suicides in the United States are alcohol related. Furthermore, alcohol intoxication is the nation's leading cause of fatal automobile accidents. Other commonly abused drugs alter feelings and perceptions, generate mental confusion, and impair judgment and coordination, greatly enhancing the risk for accidental **morbidity** and mortality (see Chapter 13).

The underlying causes of death attributable to leading **risk factors** in the United States (Figure 1.5) indicate that most factors are related to lifestyle choices we make. Of the

approximately 2.5 million yearly deaths in the United States, the "big five" factors—tobacco smoking, high blood pressure, overweightness and obesity, physical inactivity, and high blood glucose—are responsible for almost 1.5 million deaths each year.

Lifestyle as a Health Problem

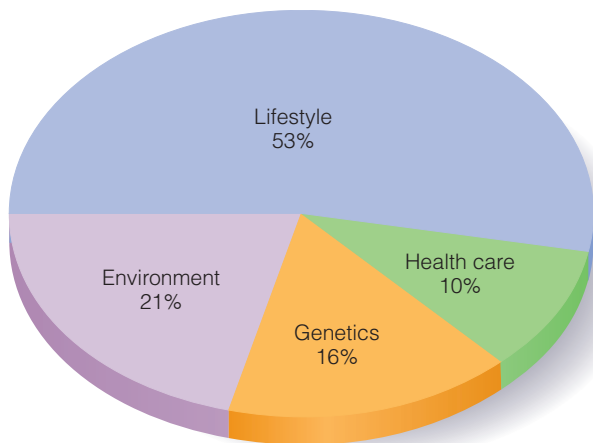
As the incidence of chronic diseases rose, it became obvious that prevention was—and remains—the best medicine. According to the U.S. Surgeon General's office, more than half of the people who die in this country each year die because of what they do. Based on estimates, more than half of disease is lifestyle related, a fifth is attributed to the environment, and a tenth is influenced by the health care the individual receives. Only 16 percent is related to genetic factors (Figure 1.6). Thus, the individual controls as much as 84 percent of his or her vulnerability to disease—and thus quality of life. The same data indicate that 83 percent of deaths before age 65 are preventable. In essence, most people in the United States are threatened by the very lives they lead today.

Because of the unhealthy lifestyles that many young adults lead, their bodies may be middle-aged or older! Many physical education programs do not emphasize the skills necessary for young people to maintain a high level of fitness and health throughout life. The intent of this book is to provide those skills and help prepare you for a lifetime of physical fitness and well-

Morbidity A condition related to or caused by illness or disease.

Risk factors Lifestyle and genetic variables that may lead to disease.

FIGURE 1.6 Estimated impact of the factors that affect health and well-being.



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ness. A healthy lifestyle is self-controlled, and you can learn how to be responsible for your own health and fitness. Healthy choices made today influence health for decades.

Physical Activity and Exercise Defined

Abundant scientific research over the past three decades has established a distinction between physical activity and exercise. **Physical activity** is bodily movement produced by skeletal muscles. It requires energy expenditure and produces progressive health benefits. Physical activity typically requires only a low to moderate intensity of effort. Examples of physical activity include walking to and from work, taking the stairs instead of elevators and escalators, gardening, doing household chores, dancing, and washing the car by hand. Physical inactivity, by contrast, implies a

level of activity that is lower than that required to maintain good health.

Exercise is a type of physical activity that requires planned, structured, and repetitive bodily movement to improve or maintain one or more components of physical fitness. Examples of exercise are walking, running, cycling, aerobics, swimming, and strength training. Exercise is usually viewed as an activity that requires vigorous-intensity effort.

Importance of Increased Physical Activity

The U.S. Surgeon General has stated that poor health as a result of lack of physical activity is a serious public health problem that must be met head-on at once. Regular **moderate physical activity** provides substantial benefits in health and well-being for the vast majority of people who are not physically active. For those who are already moderately active, even greater health benefits can be achieved by increasing the level of physical activity.

Among the benefits of regular physical activity and exercise are significantly reduced risks for developing or dying from heart disease, stroke, type 2 diabetes, colon and breast cancers, high blood pressure, osteoporotic fractures, and even dementia and Alzheimer's.⁷ Regular physical activity also is important for the health of muscles, bones, and joints, and it seems to reduce symptoms of depression and anxiety, improve mood, improve memory, and enhance ability to perform daily tasks throughout life. It also can help control health care costs and maintain a high quality of life into old age.

Moderate physical activity has been defined as any activity that requires an energy expenditure of 150 calories per day, or 1,000 calories per week. The general health recommendation is that people strive to accumulate 150 minutes of moderate-intensity physical activity per week (alterna-



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An active lifestyle increases health, quality of life, and longevity.

TABLE 1.1 Physical Activity Recommendations

Benefits	Duration	Intensity	Frequency per Week	Weekly Time
Health	30 min	MI*	≥ 5 times	≥ 150 min
Health and fitness	≥ 20 min	VI*	≥ 3 times	≥ 75 min
Health, fitness, and weight gain prevention	60 min	MI/VI†	5–7 times	≥ 300 min
Health, fitness, and weight regain prevention	60–90 min	MI/VI	5–7 times	≥ 450 min

*MI = moderate intensity, VI = vigorous intensity

†MI/VI = You may use MI, VI, or a combination of the two

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tively 75 minutes of vigorous aerobic activity may be substituted) in addition to two strength-training sessions or activities per week. Physical activity should preferably be divided into 30-minute segments over a minimum of 5 days each week (Table 1.1). Whereas 30 minutes of continuous activity is preferred, on days when time is limited, three activity sessions of at least 10 minutes each still provide substantial health benefits. Examples of moderate physical activity are brisk walking or cycling, playing basketball or volleyball, swimming, water aerobics, fast dancing, pushing a stroller, raking leaves, shoveling snow, washing or waxing a car, washing windows or floors, and even gardening. Light-intensity activities of daily living such as casual walking, self-care, shopping, or activities lasting less than 10 minutes cannot be included as part of the moderate physical activity recommendation.

Although accumulating 30 minutes of moderate- or vigorous-intensity physical activity provide substantial health benefits, new data indicate that most of these benefits may be voided if people spend most of the rest of the day in a sedentary condition. Sitting for long periods of time seems to be an independent risk factor for premature morbidity and mortality. This topic is discussed under the heading “*Sitting Disease: A 21st Century Chronic Disease*” on page 13 in this chapter.

Because of the ever-growing epidemic of obesity in the United States and the world, adults are encouraged to increase physical activity beyond the minimum requirements and adjust caloric intake until they find their personal balance to maintain a healthy weight.⁸ Individuals are also advised that additional physical activity beyond minimum thresholds is necessary for some and can provide additional health benefits for all. This recommendation goes along with evidence indicating that people who maintain healthy weight typically accumulate 1 hour of daily physical activity.⁹

In sum, although health benefits are derived from 30 minutes of physical activity performed on most days of the week, people with a tendency to gain weight need to be physically active for longer, from 60 to as many as 90 minutes daily, to prevent weight gain. This additional activity per day provides additional health benefits, including a lower risk for cardiovascular disease and diabetes.

National Initiatives to Promote Healthy and Active Lifestyles: Federal Guidelines for Physical Activity

Because of the importance of physical activity to our health, the U.S. Department of Health and Human Services issued *Physical Activity Guidelines for Americans*. These guidelines complement the current *Dietary Guidelines for Americans* (Chapter 3, pages 123–124) as well as international recommendations issued by the World Health Organization (WHO)¹⁰ and further substantiate previous recommendations issued by the American College of Sports Medicine (ACSM) and the AHA in 2007,¹¹ and the U.S. Surgeon General in 1996.¹²

The federal guidelines provide science-based guidance on the importance of being physically active to promote health and reduce the risk for chronic diseases. The federal guidelines include the following recommendations:

Adults between 18 and 64 Years of Age

- Adults should do 2 hours and 30 minutes a week of moderate-intensity aerobic (cardiorespiratory) physical activity, 1 hour and 15 minutes (75 minutes) a week of vigorous-intensity aerobic physical activity, or an

Physical activity Bodily movement produced by skeletal muscles, which requires expenditure of energy and produces progressive health benefits. Examples include walking, taking the stairs, dancing, gardening, working in the yard, cleaning the house, shoveling snow, washing the car, and all forms of structured exercise.

Exercise A type of physical activity that requires planned, structured, and repetitive bodily movement with the intent of improving or maintaining one or more components of physical fitness.

Moderate physical activity Activity that uses 150 calories of energy per day, or 1,000 calories per week.