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Pedometers are used to monitor daily physical activity; the recommendation is a minimum of 10,000 steps per day.

maintain, and monitor daily physical activity that involves lower body motion (walking, jogging, running). The use of pedometers most likely will increase in the next few years to help promote and quantify daily physical activity.

Before purchasing a pedometer, be sure to verify its accuracy. Many of the free and low-cost pedometers provided by corporations for promotion and advertisement purposes are inaccurate, so their use is discouraged. Pedometers also tend to lose accuracy at a very slow walking speed (slower than 30 minutes per mile) because the vertical movement of the hip is too small to trigger the spring-mounted lever arm inside the pedometer to properly record the steps taken.

You can obtain a good pedometer for about \$25, and ratings are available online. The most accurate pedometer brands are Walk4Life, Yamax, Kenz, and New Lifestyles. To test the accuracy of a pedometer, follow these steps: Clip the pedometer on the waist directly above the kneecap, reset the pedometer to zero, carefully close the pedometer, walk exactly 50 steps at your normal pace, carefully open the pedometer, and look at the number of steps recorded. A reading within 10 percent of the actual steps taken (45 to 55 steps) is acceptable.

The typical male American takes about 6,000 steps per day, in comparison to women, who take about 5,300 steps. The general recommendation for adults is 10,000 steps per day, and Table 1.2 provides specific activity categories based on the number of daily steps taken.

All daily steps count, but some of your steps should come in bouts of at least 10 minutes, so as to meet the national physical activity recommendation of accumu-

TABLE 1.2

ADULT ACTIVITY LEVELS BASED ON TOTAL NUMBER OF STEPS TAKEN PER DAY

| Steps per Day | Category |
|---------------|---------------------|
| <5,000 | Sedentary lifestyle |
| 5,000–7,499 | Low active |
| 7,500–9,999 | Somewhat active |
| 10,000–12,499 | Active |
| ≥12,500 | Highly active |

SOURCE: C. Tudor-Locke and D. R. Bassett, "How Many Steps/Day Are Enough? Preliminary Pedometer Indices for Public Health," *Sports Medicine* 34:1–8, 2004.

lating 30 minutes of moderate-intensity physical activity in at least three 10-minute sessions 5 days per week. A 10-minute brisk walk (a distance of about 1,200 yards at a 15-minute per mile pace) is approximately 1,300 steps. A 15-minute mile (1,770 yards) walk is about 1,900 steps.¹⁵ Thus, new pedometer brands have an "aerobic steps" function that records steps taken in excess of 60 steps per minute over a 10-minute period of time.

If you do not accumulate the recommended 10,000 daily steps, you can refer to Table 1.3 to determine the additional walking or jogging distance required to reach your goal. For example, if you are 5'8" tall, male, and you typically accumulate 5,200 steps per day, you would need an additional 4,800 daily steps to reach your 10,000-steps goal. You can do so by jogging 3 miles at a 10 minute-per-mile pace (1,602 steps × 3 miles = 4,806 steps) on some days and you can walk 2.5 miles at a 15 minute per mile pace (1,908 steps × 2.5 miles = 4,770 steps) on other days. If you do not find a particular speed (pace) that you typically walk or jog at in Table 1.3, you can estimate the number of steps at that speed using the prediction equations at the bottom of this table.

The first practical application that you can undertake in this course is to determine your current level of daily activity. The log provided in Activity 1.1 will help you do this. Keep a 4-day log of all physical activities that you do daily. On this log, record the time of day, type and duration of the exercise/activity, and, if possible, steps taken while engaged in the activity. The results will indicate how active you are and serve as a basis to monitor changes in the next few months and years.

Wellness

Most people recognize that participating in fitness programs improves their quality of life. At the end of the 20th century, however, we came to realize that physical fitness alone was not always sufficient to lower the risk for disease and ensure better health. For example, individuals who run 3 miles (about 5 km) a day, lift weights regularly, participate in stretching exercises, and watch their body weight might be easily classified as having good or excellent fitness. Offsetting these good habits, however, might

Daily Physical Activity Log

Name: _____ Date: _____

Course: _____ Section: _____ Gender: _____ Age: _____

Date: Day of the Week:

| Time of Day | Exercise/Activity | Duration | Number of Steps | Comments |
|----------------------|----------------------|----------------------|----------------------|----------------------|
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Totals:



Activity category based on steps per day (use Table 1.2, page 10):

Date: Day of the Week:

| Time of Day | Exercise/Activity | Duration | Number of Steps | Comments |
|----------------------|----------------------|----------------------|----------------------|----------------------|
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Totals:



Activity category based on steps per day (use Table 1.2, page 10):

Daily Physical Activity Log (continued)

Date: Day of the Week:

| Time of Day | Exercise/Activity | Duration | Number of Steps | Comments |
|----------------------|----------------------|----------------------|----------------------|----------------------|
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Totals: 

Activity category based on steps per day (use Table 1.2, page 10):

Date: Day of the Week:

| Time of Day | Exercise/Activity | Duration | Number of Steps | Comments |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
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Totals: 

Activity category based on steps per day (use Table 1.2, page 10):

Briefly evaluate your current activity patterns, discuss your feelings about the results, and provide a goal for the weeks ahead.

Table 1.3 Estimated Number of Steps to Walk or Jog/Run a Mile Based on Gender, Height, and Pace

| Height | Pace (min/mile) | | | | | | | |
|--------------|-----------------|-------|-------|-------|---------|-------|-------|-------|
| | Walking | | | | Jogging | | | |
| | 20 | 18 | 16 | 15 | 12 | 10 | 8 | 6 |
| Women | | | | | | | | |
| 5'0" | 2,371 | 2,244 | 2,117 | 2,054 | 1,997 | 1,710 | 1,423 | 1,136 |
| 5'2" | 2,343 | 2,216 | 2,089 | 2,026 | 1,970 | 1,683 | 1,396 | 1,109 |
| 5'4" | 2,315 | 2,188 | 2,061 | 1,998 | 1,943 | 1,656 | 1,369 | 1,082 |
| 5'6" | 2,286 | 2,160 | 2,033 | 1,969 | 1,916 | 1,629 | 1,342 | 1,055 |
| 5'8" | 2,258 | 2,131 | 2,005 | 1,941 | 1,889 | 1,602 | 1,315 | 1,028 |
| 5'10" | 2,230 | 2,103 | 1,976 | 1,913 | 1,862 | 1,575 | 1,288 | 1,001 |
| 6'0" | 2,202 | 2,075 | 1,948 | 1,885 | 1,835 | 1,548 | 1,261 | 974 |
| 6'2" | 2,174 | 2,047 | 1,920 | 1,857 | 1,808 | 1,521 | 1,234 | 947 |
| Men | | | | | | | | |
| 5'2" | 2,310 | 2,183 | 2,056 | 1,993 | 1,970 | 1,683 | 1,396 | 1,109 |
| 5'4" | 2,282 | 2,155 | 2,028 | 1,965 | 1,943 | 1,656 | 1,369 | 1,082 |
| 5'6" | 2,253 | 2,127 | 2,000 | 1,937 | 1,916 | 1,629 | 1,342 | 1,055 |
| 5'8" | 2,225 | 2,098 | 1,872 | 1,908 | 1,889 | 1,602 | 1,315 | 1,028 |
| 5'10" | 2,197 | 2,070 | 1,943 | 1,880 | 1,862 | 1,575 | 1,288 | 1,001 |
| 6'0" | 2,169 | 2,042 | 1,915 | 1,852 | 1,835 | 1,548 | 1,261 | 974 |
| 6'2" | 2,141 | 2,014 | 1,887 | 1,824 | 1,808 | 1,521 | 1,234 | 947 |
| 6'4" | 2,112 | 1,986 | 1,859 | 1,795 | 1,781 | 1,494 | 1,207 | 920 |

Prediction equations (pace in min/mile and height in inches):

Walking

Women: Steps/mile = $1,949 + [(63.4 \times \text{pace}) - (14.1 \times \text{height})]$

Men: Steps/mile = $1,916 + [(63.4 \times \text{pace}) - (14.1 \times \text{height})]$

Running

Women and men: Steps/mile = $1,084 + [(143.6 \times \text{pace}) - (13.5 \times \text{height})]$

SOURCE: Werner W. K. Hoeger et al., "One-Mile Step Count at Walking and Running Speeds." *ACSM's Health & Fitness Journal*, Vol 12(1):14–19, 2008.

be **risk factors**, including high blood pressure, smoking, excessive stress, drinking too much alcohol, and eating too many foods high in saturated fat. These factors place people at risk for cardiovascular disease and other chronic diseases of which they may not be aware.

Even though most people are aware of their unhealthy behaviors, they seem satisfied with life as long as they are free from symptoms of disease or illness. They do not contemplate change until they incur a major health problem. Nevertheless, present lifestyle habits dictate the health and well-being of tomorrow.

Good health no longer is viewed as simply the absence of illness. The notion of good health has evolved considerably in the last few years and continues to change as scientists learn more about lifestyle factors that bring on illness and affect wellness. Furthermore, once the idea took hold that fitness by itself would not always decrease the risk for disease and ensure better health, **health promotion** programs and the **wellness** concept followed.

Wellness implies a constant and deliberate effort to stay healthy and achieve the highest potential for well-being. Wellness requires implementing positive lifestyle habits to change behavior and thereby improve health and quality of life, prolong life, and achieve total well-being. Living a wellness way of life is a personal choice,

but you may need additional support to achieve wellness goals. Thus, health promotion programs have been developed to educate people regarding healthy lifestyles and provide the necessary support to achieve wellness.

For example, you may be prepared to initiate an aerobic exercise program, but if you are not familiar with exercise prescription guidelines or places to exercise safely, or if you lack peer support or flexible scheduling to do so, you may have difficulty accomplishing your goal. Similarly, if you want to quit smoking but do not know how to do it and everyone else around you smokes, the chances for success are limited. To some extent, the environment limits your choices. Hence, the availability of a health promotion program would provide the much-needed support to get started and implement a wellness way of life.

KEY TERMS

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

Health promotion The science and art of enabling people to increase control over their lifestyle to move toward a state of wellness.

Wellness The constant and deliberate effort to stay healthy and achieve the highest potential for well-being. It encompasses seven dimensions—physical, emotional, mental, social, environmental, occupational, and spiritual—and integrates them all into a quality life.

Figure 1.8 Dimensions of wellness.



The Seven Dimensions of Wellness

Wellness has seven dimensions: physical, emotional, mental, social, environmental, occupational, and spiritual (see Figure 1.8). These dimensions are interrelated: One frequently affects the others. For example, a person who is emotionally “down” often has no desire to exercise, study, socialize with friends, or attend church, and he or she may be more susceptible to illness and disease.

The seven dimensions of wellness show how the concept clearly goes beyond the absence of disease. Wellness incorporates factors such as adequate fitness, proper nutrition, stress management, disease prevention, spirituality, not smoking or abusing drugs, personal safety, regular physical examinations, health education, and environmental support.

For a wellness way of life, individuals must be physically fit and manifest no signs of disease, and they also must be free of risk factors for disease (such as hypertension, hyperlipidemia, cigarette smoking, negative stress, faulty nutrition, careless sex). The relationship between adequate fitness and wellness is illustrated in the continuum in Figure 1.9. Even though an individual tested in a fitness center may demonstrate adequate or even excellent fitness, indulging in unhealthy lifestyle behav-

iors will still increase the risk for chronic diseases and diminish the person’s well-being.

Physical Wellness

Physical wellness is the dimension most commonly associated with being healthy. It entails confidence and optimism about one’s ability to protect physical health and take care of health problems.

Physically well individuals are physically active, exercise regularly, eat a well-balanced diet, maintain recommended body weight, get sufficient sleep, practice safe sex, minimize exposure to environmental contaminants, avoid harmful drugs (including tobacco and excessive alcohol), and seek medical care and exams as needed. Physically well people also exhibit good cardiorespiratory endurance, adequate muscular strength and flexibility, proper body composition, and the ability to carry out ordinary and unusual demands of daily life safely and effectively.

Emotional Wellness

Emotional wellness involves the ability to understand your own feelings, accept your limitations, and achieve emotional stability. Furthermore, it implies the ability to express emotions appropriately, adjust to change, cope with stress in a healthy way, and enjoy life despite its occasional disappointments and frustrations.

Emotional wellness brings with it a certain stability, an ability to look both success and failure squarely in the face and keep moving along a predetermined course. When success is evident, the emotionally well person radiates the expected joy and confidence. When failure seems evident, the emotionally well person responds by making the best of circumstances and moving beyond the failure. Wellness enables you to move ahead with optimism and energy instead of spending time and talent worrying about failure. You learn from it, identify ways to avoid it in the future, and then go on with the business at hand.

Emotional wellness also involves happiness—an emotional anchor that gives meaning and joy to life. Happiness is a long-term state of mind that permeates the various facets of life and influences our outlook. Although there is no simple recipe for creating happiness, researchers agree that happy people are usually participants in some category of a supportive family unit in which they

Figure 1.9 Wellness continuum.



feel loved. Healthy, happy people enjoy friends, work hard at something fulfilling, get plenty of exercise, and enjoy play and leisure time. They know how to laugh, and they laugh often. They give of themselves freely to others and seem to have found deep meaning in life.

An attitude of true happiness signals freedom from the tension and depression that many people endure. Emotionally well people are obviously subject to the same kinds of depression and unhappiness that occasionally plague us all, but the difference lies in the ability to bounce back. Well people take minor setbacks in stride and have the ability to enjoy life despite it all. They don't waste energy or time recounting the situation, wondering how they could have changed it, or dwelling on the past.

Mental Wellness

Mental wellness, also referred to as intellectual wellness, implies that you can apply the things you have learned, create opportunities to learn more, and engage your mind in lively interaction with the world around you. When you are mentally well, you are not intimidated by facts and figures with which you are unfamiliar, but you embrace the chance to learn something new. Your confidence and enthusiasm enable you to approach any learning situation with eagerness that leads to success.

Mental wellness brings with it vision and promise. More than anything else, mentally well people are open-minded and accepting of others. Instead of being threatened by people who are different from themselves, they show respect and curiosity without feeling they have to conform. They are faithful to their own ideas and philosophies and allow others the same privilege. Their self-confidence guarantees that they can take their place among others in the world without having to give up part of themselves and without requiring others to do the same.

Social Wellness

Social wellness, with its accompanying positive self-image, endows you with the ease and confidence to be outgoing, friendly, and affectionate toward others. Social wellness involves a concern for oneself and also an interest in humanity and the environment as a whole.

One of the hallmarks of social wellness is the ability to relate to others and to reach out to other people, both within one's family and outside it. Similar to emotional wellness, it involves being comfortable with your emotions and thus helps you understand and accept the emotions of others. Your own balance and sense of self allow you to extend respect and tolerance to others. Healthy people are honest and loyal. This dimension of wellness leads to the ability to maintain close relationships with other people.

Environmental Wellness

Environmental wellness refers to the effect that our surroundings have on our well-being. Our planet is a delicate **ecosystem**, and its health depends on the continu-

ous recycling of its elements. Environmental wellness implies a lifestyle that maximizes harmony with the earth and taking action to protect the world around us.

Environmental threats include air pollution, chemicals, ultraviolet radiation in the sunlight, water and food contamination, secondhand smoke, noise, inadequate shelter, unsatisfactory work conditions, lack of personal safety, and unhealthy relationships. Health is affected negatively when we live in a polluted, toxic, unkind, and unsafe environment.

Unfortunately, a national survey of first-year college students showed that less than 20 percent were concerned about the health of the environment.¹⁶ To enjoy environmental wellness, we are responsible for educating and protecting ourselves against environmental hazards and also protecting the environment so that we, our children, and future generations can enjoy a safe and clean environment.

Steps that you can take to live an environmentally conscious life include: Conserve energy (walk or ride, do not drive unless absolutely necessary, turn off lights and computers when not in use); do not litter and politely ask others not to do it either; recycle as much as possible (paper, glass, cans, plastics, cardboard); conserve paper; conserve water (take shorter showers, don't let the water run while brushing your teeth); do not pollute the air, water, or earth if you can avoid doing so; do not smoke; plant trees and keep plants and shrubs alive; evaluate purchases and conveniences based on their environmental impact; donate old clothes to Goodwill; and enjoy, appreciate, and spend time outdoors in natural settings.

Occupational Wellness

Occupational wellness is not tied to high salary, prestigious position, or extravagant working conditions. Any job can bring occupational wellness if it provides rewards that are important to the individual. To one person, salary might be the most important factor, whereas another might place much greater value on creativity.

KEY TERMS

Physical wellness Good physical fitness and confidence in your personal ability to take care of health problems.

Emotional wellness The ability to understand your own feelings, accept your limitations, and achieve emotional stability.

Mental wellness A state in which your mind is engaged in lively interaction with the world around you.

Social wellness The ability to relate well to others, both within and outside the family unit.

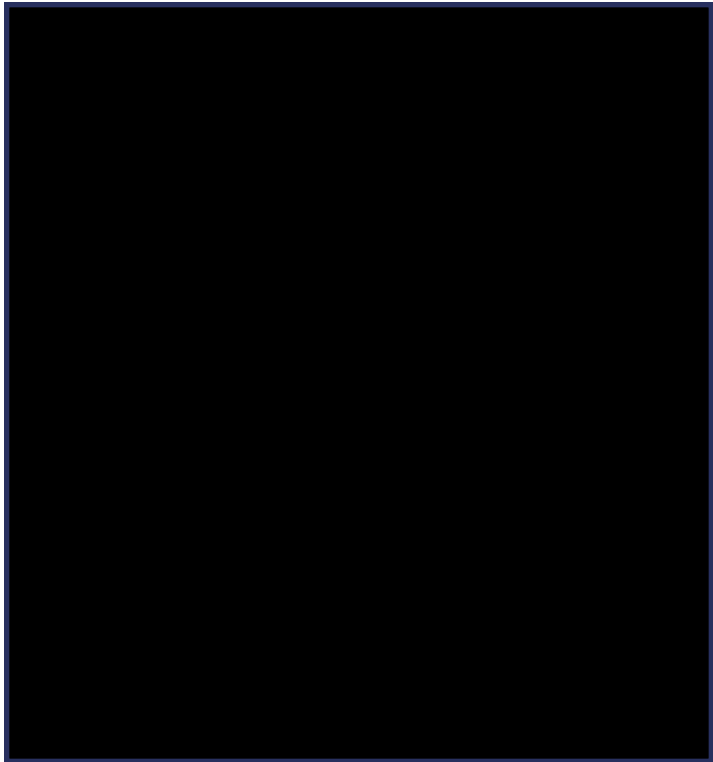
Environmental wellness The capability to live in a clean and safe environment that is not detrimental to health.

Ecosystem A community of organisms interacting with each other in an environment.

Occupational wellness The ability to perform your job skillfully and effectively under conditions that provide personal and team satisfaction and adequately reward each individual.

Those who are occupationally well have their own “ideal” job, which allows them to thrive.

People with occupational wellness face demands on the job, but they also have some say over demands placed on them. Any job has routine demands, but in occupational wellness, routine demands are mixed with new, unpredictable challenges that keep a job exciting. Occupationally well people are able to maximize their skills, and they have the opportunity to broaden their existing skills or gain new ones. Their occupation offers the opportunity for advancement and recognition for achievement. Occupational wellness encourages collaboration and interaction among coworkers, which fosters a sense of teamwork and support.



CRITICAL THINKING

Now that you understand the seven dimensions of wellness, rank them in order of importance to you and explain your rationale in doing so.

Wellness, Fitness, and Longevity

During the second half of the 20th century, scientists began to realize the importance of good fitness and improved lifestyle in the fight against chronic diseases, particularly those of the cardiovascular system. Because of more participation in wellness programs, cardiovascular mortality rates dropped. The decline began in about 1963, and between 1960 and 2000 the incidence of cardiovascular disease dropped by 26 percent, according to national vital statistics from the Centers for Disease Control and Prevention. This decrease is credited to higher levels of wellness and better health care in the United States. More than half of the decline is attributed specifically to improved diet and reduction in smoking.

Furthermore, several studies showed an inverse relationship between physical activity and premature mortality rates. The first major study in this area was conducted in the 1980s among 16,936 Harvard alumni, and the results linked physical activity habits and mortality rates.¹⁹ As the amount of weekly physical activity increased, the risk for cardiovascular deaths decreased. The largest decrease in cardiovascular deaths was observed among alumni who used more than 2,000 calories per week through physical activity.

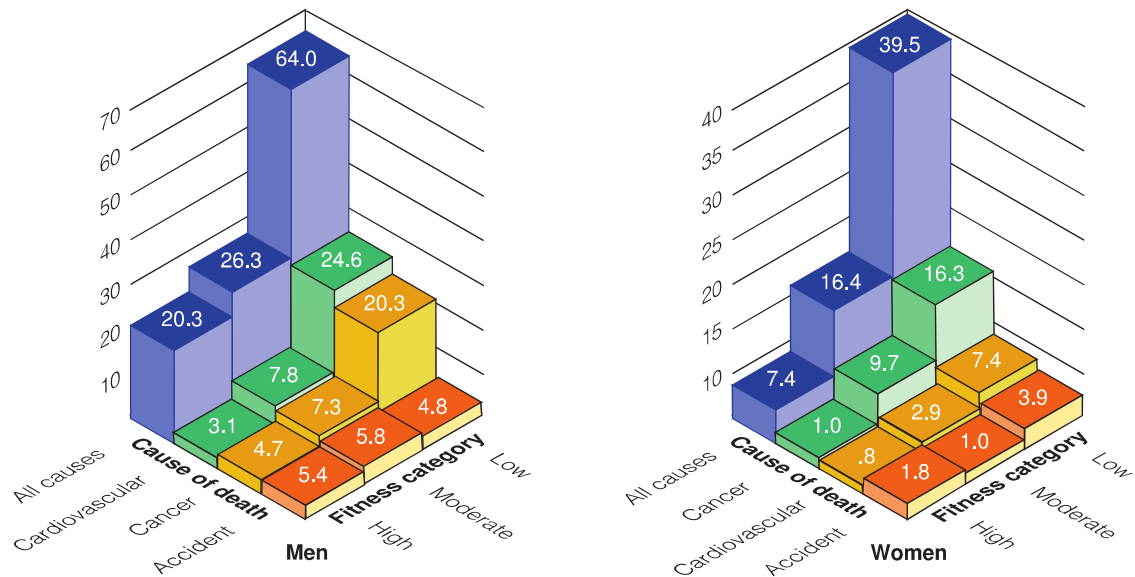
A landmark study subsequently conducted at the Aerobics Research Institute in Dallas upheld the findings



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Altruism enhances health and well-being.

Figure 1.10 Death rates by physical fitness groups.



Numbers on top of the bars are all-cause death rates per 10,000 person-years of follow-up for each cell; 1 person-year indicates one person who was followed up 1 year later. SOURCE: Based on data from S. N. Blair, H. W. Kohl III, R. S. Paffenbarger, Jr., D. G. Clark, K. H. Cooper, and L. W. Gibbons, "Physical Fitness and All-Cause Mortality: A Prospective Study of Healthy Men and Women," *Journal of the American Medical Association* 262 (1989): 2395–2401.

of the Harvard alumni study.²⁰ Based on data from 13,344 people followed over an average of 8 years, the study revealed a graded and consistent inverse relationship between physical activity levels and mortality, regardless of age and other risk factors. As illustrated in Figure 1.10, the higher the level of physical activity, the longer the lifespan.

The death rate during the 8-year study from all causes for the low-fit men was 3.4 times higher than that of the high-fit men. For the low-fit women, the death rate was 4.6 times higher than that of high-fit women. A most significant finding of this landmark study was the large drop in all-cause, cardiovascular, and cancer mortality when individuals went from low fitness to moderate fitness; a clear indication that moderate-intensity physical activity, achievable by most adults, does provide considerable health benefits and extends life. The data also revealed that the participants attained more protection by combining higher fitness levels with reduction in other risk factors such as hypertension, serum cholesterol, cigarette smoking, and excessive body fat.

A 5-year follow-up research study on fitness and mortality found a substantial (44 percent) reduction in mortality risk when people abandoned a **sedentary** lifestyle and became moderately fit.²¹ The lowest death rate was found in people who were fit at the start of the study and remained fit; and the highest death rate was found in men who were unfit at the beginning of the study and remained unfit. The results of these studies indicate that fitness improves wellness, quality of life, and longevity.

While it is clear that moderate-intensity exercise does provide substantial health benefits, research data also show a dose-response relationship between physical activity and health. That is, greater health and fitness benefits occur at higher duration and/or intensity of physical activity. **Vigorous activity** and longer duration are preferable to the extent of one's capabilities because they are most clearly associated with better health and longer life.

Vigorous-intensity exercise seems to provide the best benefits.²² As compared with prolonged moderate-intensity activity, vigorous-intensity exercise has been shown to provide the best improvements in aerobic capacity, coronary heart disease risk reduction, and overall cardiovascular health.²³

KEY TERMS

Spiritual wellness The sense that life is meaningful, that life has purpose, and that some power brings all humanity together; the ethics, values, and morals that guide you and give meaning and direction to life.

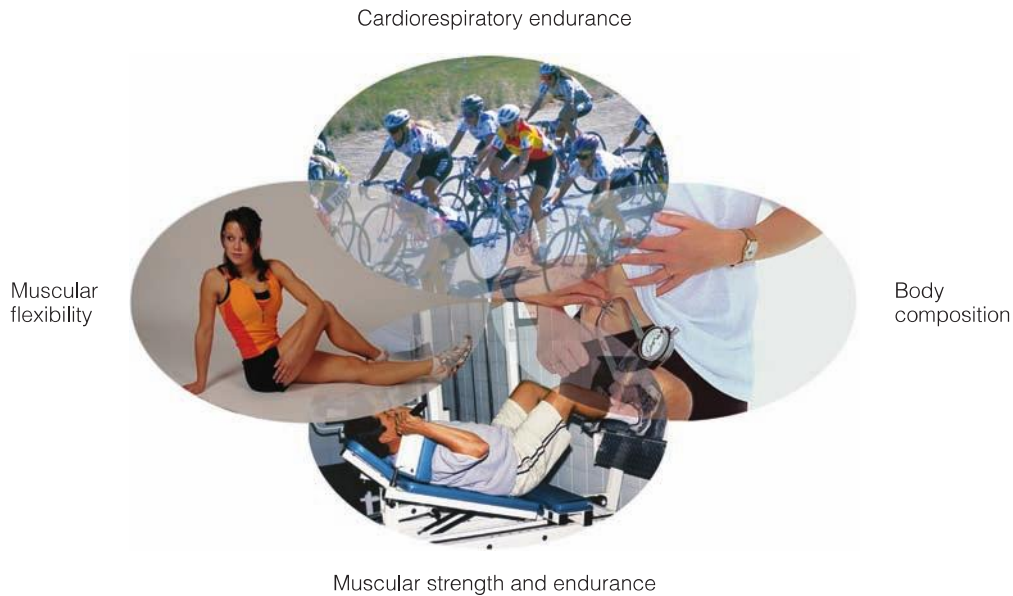
Prayer Sincere and humble communication with a higher power.

Altruism Unselfish concern for the welfare of others.

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

Vigorous activity Any exercise that requires an MET level equal to or greater than 6 METs (21 mL/kg/min). 1 MET is the energy expenditure at rest, 3.5 mL/kg/min, and METs are defined as multiples of this resting metabolic rate (examples of activities that require a 6-MET level include aerobics, walking uphill at 3.5 mph, cycling at 10 to 12 mph, playing doubles in tennis, and vigorous strength training).

Figure 1.11 Health-related components of physical fitness.



Photos © Fitness & Wellness, Inc.

A recent comprehensive review of research studies found a lower rate of heart disease in vigorous-intensity exercisers as compared with those who exercised at moderate intensity.²⁴ While no differences were found in weight loss between the two groups, greater improvements are seen in cardiovascular risk factors in the vigorous-intensity groups, including aerobic fitness, blood pressure, and blood glucose control.

A word of caution, however, is in order. Vigorous exercise should be reserved for healthy individuals who have been cleared to do so (see Activity 1.3) and who have been participating regularly in at least moderate-intensity activities.

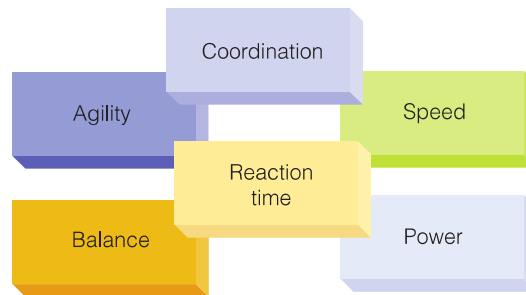
Since the release of the aforementioned landmark studies, scientific research continues on the benefits of regular physical activity and exercise. Almost universally, the results confirm the benefits of physical activity and exercise on health, longevity, and quality of life. The benefits are so impressive that researchers and sports medicine leaders state that *if the benefits of exercise could be packaged in a pill, it would be the most widely prescribed medication throughout the world today.*

Types of Physical Fitness

As the fitness concept grew at the end of the last century, it became clear that several specific components contribute to an individual's overall level of fitness. **Physical fitness** is classified into health-related and skill-related fitness.

1. **Health-related fitness** is related to the ability to perform activities of daily living without undue fa-

Figure 1.12 Motor-skill-related components of physical fitness.



- tigue and is conducive to a low risk for premature **hypokinetic diseases**. The health-related fitness components are cardiorespiratory (aerobic) endurance, muscular strength and endurance, muscular flexibility, and body composition (Figure 1.11).
2. **Skill-related fitness** components consist of agility, balance, coordination, reaction time, speed, and power (Figure 1.12). These components are related primarily to successful sports and motor skill performance. Although participating in skill-related activities contributes to physical fitness, in terms of general health promotion and wellness, the main

CRITICAL THINKING

What role do the four health-related components of physical fitness play in your life? ● Rank them in order of importance to you and explain the rationale you used.



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Good health-related fitness and skill-related fitness are required to participate in highly skilled activities.

emphasis of physical fitness programs should be on the health-related components. That is the focus of this book.

Fitness Standards: Health Versus Physical Fitness

A meaningful debate regarding age- and gender-related fitness standards has resulted in two standards: health fitness (also referred to as criterion-referenced) and physical fitness. Following are definitions of both. The assessment of health-related fitness is presented in Chapters 4, 6, 7, and 8; where appropriate, physical fitness standards are included for comparison.

Health Fitness Standards

The **health fitness standards** proposed here are based on data linking minimum fitness values to disease prevention and health. Attaining the health fitness standard requires only moderate physical activity. For example, a 2-mile walk in less than 30 minutes, five or six times per week, seems to be sufficient to achieve the health-fitness standard for cardiorespiratory endurance.

As illustrated in Figure 1.13, significant health benefits can be reaped with such a program, although fitness improvements (expressed in terms of oxygen uptake or VO_{2max} —explained next and in Chapter 6) are not as notable. These benefits include reduction in blood lipids, lower blood pressure, stress release, less risk for diabetes, and lower risk for chronic diseases and premature mortality.

More specifically, improvements in the **metabolic profile** (measured by insulin sensitivity, glucose tolerance, and improved cholesterol levels) can be notable despite little or no weight loss or improvement in aerobic capacity. Metabolic fitness can be attained through an active lifestyle and moderate-intensity physical activity.

An assessment of health-related fitness uses **cardiorespiratory endurance**, measured in terms of the maximal amount of oxygen the body is able to utilize per minute of physical activity (maximal oxygen uptake, or VO_{2max})—essentially, a measure of how efficiently the heart, lungs, and muscles can operate during aerobic exercise (see Chapter 6). VO_{2max} is commonly expressed in milliliters (mL) of oxygen (volume of oxygen) per kilogram (kg) of body weight per minute (mL/kg/min). Individual values can range from about 10 mL/kg/min in cardiac patients to more than 80 mL/kg/min in world-class runners, cyclists, and cross-country skiers.

Research data from the study presented in Figure 1.10 reported that achieving VO_{2max} values of 35 and 32.5 mL/kg/min for men and women, respectively, may be sufficient to lower the risk for all-cause mortality significantly. Although greater improvements in fitness yield a lower risk for premature death, the largest drop is seen between the least fit and the moderately fit. Therefore, the 35 and 32.5 mL/kg/min values could be selected as the health fitness standards.

Physical Fitness Standards

Physical fitness standards are set higher than the health fitness standards and require a more intense exercise program. Physically fit people of all ages have the freedom to enjoy most of life's daily and recreational activi-

KEY TERMS

Physical fitness The ability to meet the ordinary as well as the unusual demands of daily life safely and effectively without being overly fatigued and still have energy left for leisure and recreational activities.

Health-related fitness Fitness programs that are prescribed to improve the individual's overall health.

Hypokinetic diseases "Hypo" denotes "lack of"; therefore, illnesses related to lack of physical activity.

Skill-related fitness Fitness components important for success in skillful activities and athletic events; encompasses agility, balance, coordination, power, reaction time, and speed.

Health fitness standards The lowest fitness requirements for maintaining good health, decreasing the risk for chronic diseases, and lowering the incidence of muscular-skeletal injuries.

Metabolic profile A measurement of plasma insulin, glucose, lipid, and lipoprotein levels to assess risk for diabetes and cardiovascular disease.

Cardiorespiratory endurance The ability of the lungs, heart, and blood vessels to deliver adequate amounts of oxygen to the cells to meet the demands of prolonged physical activity.

Physical fitness standards A fitness level that allows a person to sustain moderate-to-vigorous physical activity without undue fatigue and the ability to closely maintain this level throughout life.