WERNER W.K. HOEGER & SHARON A. HOEGER

FITNESS & WELLNESS

THIRD EDITION

Fitness & Wellness

Third Edition

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Preface

More than ever before Americans realize that good health is largely self-controlled and that premature illness and mortality can be prevented through adequate fitness and positive lifestyle habits.

The current American way of life, unfortunately, does not provide the human body with sufficient physical activity to maintain adequate health. Furthermore, many present lifestyle patterns are such a serious threat to our health that they actually increase the deterioration rate of the human body and often lead to premature illness and mortality.

Several major scientific research studies indicate that people who lead an active and healthy lifestyle live longer and enjoy a better quality of life. As a result, the importance of sound fitness and wellness programs has assumed an entirely new dimension. From an initial fitness fad in the early 1970s, healthy lifestyle programs have become a trend that is now very much a part of the American way of life.

Nevertheless, while people in the United States are firm believers in the benefits of exercise and positive lifestyle habits as a means to promote better health, most do not reap these benefits because they do not know how to implement a sound fitness and wellness program that will yield the desired results. Therefore, the information presented in this book has been written with this purpose in mind: to provide you with the necessary guidelines to implement a lifetime exercise and healthy lifestyle program so you can make a constant and deliberate effort to stay healthy and realize your highest potential for well-being.

ENHANCED FEATURES OF THE THIRD EDITION

The chapters in the **third edition** of *Fitness & Wellness* have been revised and updated to include new information reported in the literature and at professional health, physical education, and sportsmedicine meetings. A questionnaire was given to almost all users of the second edition to evaluate the book. The recommendations made proved extremely valuable in the preparation of this new edition. While it was difficult to include all of the suggestions, the great majority were addressed. The most significant changes of the third edition are:

- The book now contains eight chapters instead of seven. Because of the extensiveness of the information on nutrition and weight management, this chapter is divided into two separate chapters. This change allows for greater discussion of these topics.
- Chapter 1 has been extensively revised and now includes a much broader discussion on wellness and the dimensions of wellness, the U.S. Health Objectives for the Year 2000 (objectives that emphasize the need for health promotion and disease prevention, personal responsibility, and health benefits for all people in the United States), an introduction to the motor skill-related components of fitness, essential information on motivation and behavior modification to help students implement a lifetime wellness program, an update on the association between fitness and mortality, the relevance of initiating and adhering to a fitness/wellness program during youth, and the effects of a healthy lifestyle on quality of life and longevity.
- A new abdominal crunch test has been included in Chapter 2. This test replaces the previously used abdominal curl-up test.
- The cardiorespiratory endurance and muscular strength exercise prescriptions in Chapter 3 have been revised to conform with the 1995

Guidelines for Exercise Testing and Prescription by the American College of Sports Medicine (ACSM). This chapter now also contains an introduction to biomechanical principles related to cardiorespiratory activities and muscular strength and endurance activities.

- A new exercise modality: "Aero-belt Exercise" was added to Chapter 4. The significance of motor-skill related fitness and an analysis of the contributions of selected activities to skill-fitness components were also included.
- New information and revisions were made to the nutrition chapter, including extensive information on antioxidants, phytochemicals, new food labels, and daily values.
- The list of food items in Appendix E has been expanded to 479 food items. Most of the new additions to this list are commonly eaten fast-food items.
- A broader discussion of the terms obesity, overweight, recommended weight, and "tolerable" weight is included in the weight loss chapter. Such information helps students make an informed decision as to what constitutes a realistic target weight.
- Based on latest research reports, the importance of physical activity as a major factor, if not the most important one, in prevention of obesity and maintenance of recommended body weight has been enhanced in the weight management chapter.
- Major revisions have been made to the healthy lifestyle chapter (Chapter 7) to incorporate recent advances in this area, in particular as related to cardiovascular diseases and cancer. The section on tension and stress was also enhanced and the material on HIV and AIDS have been expanded.
- Information on exercise clothing; overtraining; guidelines for the prevention of consumer fraud; factors to consider when selecting a health/fitness club; issues related to the selection, purchase, and maintenance of exercise equipment; and reliable sources for health/fitness information have been included in Chapter 8.
- New color photography and outstanding new graphs have been added throughout the book.

SUPPLEMENTS

The following ancillaries are provided free of charge to all qualified *Fitness & Wellness* adopters:

- A **comprehensive computer software package.** This package includes a *Fitness Profile*, a *Personalized Cardiorespiratory Exercise Prescription*, a *Nutrient Analysis*, and a weekly and monthly *Exercise Log*. The fitness profile provides a pre- and post-test comparison, including percent change for each fitness item on the profile. This software package provides a more meaningful experience for all participants.

  A new feature of the third edition is the *Nutrient Analysis Data Base Enhancer* software. This software allows course instructors to add food items to the already existing data base available with the book.
- A **video** containing a detailed explanation of many of the fitness assessment test items used in the book. Instructors can use this video to help familiarize themselves with the proper test protocols for each fitness test. This audio-visual aid contains the following test items: 1.5-Mile Run Test, Muscular Endurance Test, Modified Sit-and-Reach Test, Body Rotation Test, and Skinfold Thickness Test.
- The Physical Fitness and Wellness **Computerized Testbank** with the following options: (a) Over 800 multiple choice questions, (b) capability to add/or edit test questions, (c) previously generated tests can be recalled — creating new exam versions — because multiple-choice answers can be rotated with each new test generated, and (d) capability to generate tests using a LaserJet printer.
- Sixty-four color **overhead transparency acetates,** including some of the book's most important illustrations and tables to facilitate class instruction and help explain key fitness and wellness concepts.
- An **instructor's manual** to aid with implementation of your physical fitness and wellness course.

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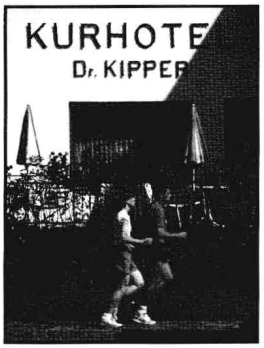

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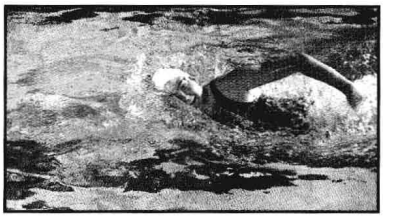

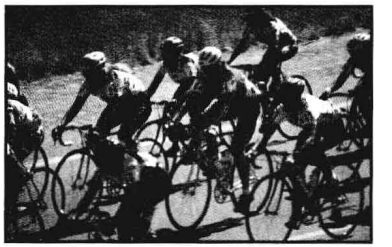

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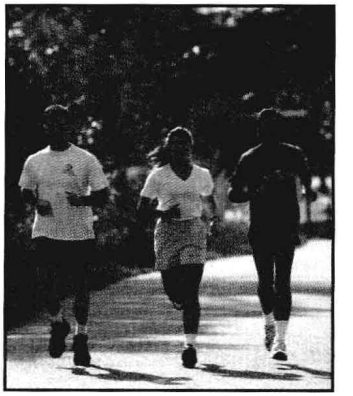


The Importance of Physical Fitness and Wellness

CHAPTER 1

There is no drug in current or prospective use that holds as much promise for sustained health as a lifetime program of physical exercise.[1]

KEY TERMS

Behavior modification
Chronic diseases
Epidemiology
Health-related fitness
Hypokinetic diseases
Locus of control
Motivation
Physical fitness
Skill-related fitness
Wellness

OBJECTIVES

- Understand the importance of physical fitness.
- Understand the wellness concept.
- Define physical fitness and list health-related and skill-related fitness components.
- Learn the benefits of a total fitness and wellness program.
- Learn motivation and behavior modification techniques to enhance compliance with a fitness and wellness program.
- Determine whether medical clearance is required for safe participation in exercise.

Most people go to college to learn how to make a living, but a fitness and wellness course will teach you how to live — how to truly live life to its fullest potential. Some people seem to think that success in life is measured by how much money they make. Making a good living will not help you unless you live a wellness lifestyle that will allow you to enjoy what you have.

Everyone would like to enjoy good health and wellness, but most people don't know how to reach this objective. Lifestyle

is the most important factor affecting our personal well-being. Although some people live long because of genetic factors, the quality of life during middle age and the "golden years" is related more often to wise choices initiated during youth and continued throughout life.

During the last three decades the number of people participating in physical fitness programs has increased tremendously. The initial fitness fad in the early 1970s turned into a trend that has become part of the American way of life. The increase in the number of fitness participants is attributed primarily to scientific evidence linking increased physical activity and positive lifestyle habits to better health and improved quality of life.

Unfortunately, the current American way of life does not provide the human body with sufficient physical exercise to maintain adequate health. Furthermore, many lifestyle patterns are such a serious threat to our health that they actually increase the deterioration of the human body. In a few short years lack of wellness leads to a loss of vitality and gusto for life, as well as premature morbidity and mortality.

The "typical" American is not a good role model when cardiorespiratory fitness is concerned. Almost 60% of U.S. adults engage in little or no leisure-time physical activity. In 1994, only 37% of the adults in the United States exercised strenuously three or more days per week.[2] Even though people in the United States believe that a positive lifestyle has a great impact on health and longevity, most do not reap the benefits because they don't know how to implement a fitness and wellness program that will yield the desired results.

Patty Neavill is a typical example of someone who frequently tried to change her life around but was unable to do so because she did not know how to implement a sound exercise and weight control program. At age 24, Patty, a college sophomore, was discouraged with her weight, level of fitness, self-image, and quality of life in general. She had struggled with weight most of her life. Like thousands of other people, she had made many unsuccessful attempts to lose weight. Patty put her fears aside and decided to enroll in a fitness course. As part of the course requirement, she took a battery of fitness tests at the beginning of the semester. Patty's cardiorespiratory fitness and strength ratings were poor, her flexibility classification was average, she weighed more than 200 pounds, and her percent body fat was 41.

Following the initial fitness assessment, Patty met with her course instructor, who prescribed an exercise and nutrition program like the one in this book. Patty fully committed to carry out the prescription. She walked or jogged five times a week, worked out with weights twice a week, and played volleyball or basketball two to four times each week. Her daily caloric intake was set in the range of 1,500 to 1,700 calories. She took care to meet the minimum required servings from the basic food groups each day, which contributed about 1,200 calories to her diet. The remainder of the calories came primarily from complex carbohydrates. At the end of the 16-week semester, Patty's cardiorespiratory fitness, strength, and flexibility ratings had all improved to the good category, she lost 50 pounds, and her percent body fat had dropped to 22.5!

A thank-you note from Patty to the course instructor at the end of the semester read:

> Thank you for making me a new person. I truly appreciate the time you spent with me. Without your kindness and motivation, I would have never made it. It's great to be fit and trim. I've never had this feeling before and I wish everyone could feel like this once in their life.
>
> Thank you,
> Your trim Patty!

Patty never had been taught the principles governing a sound weight loss program. Not only did she need this knowledge, but, like most Americans who never have experienced the process of becoming physically fit, she needed to be in a structured exercise setting to truly feel the joy of fitness.

Of even greater significance, Patty has maintained her aerobic and strength-training programs. A year after ending her calorie-restricted

diet, her weight increased by 10 pounds, but her body fat decreased from 22.5% to 21.2%. As discussed in Chapter 6, the weight increase is related mostly to changes in lean tissue, lost during the weight-reduction phase. Despite only a slight drop in weight during the second year following the calorie-restricted diet, the 2-year follow-up revealed a further decrease in body fat, to 19.5%. Patty understands the new quality of life reaped through a sound fitness program.

LIFESTYLE, HEALTH, AND QUALITY OF LIFE

Many research findings have shown that physical inactivity and negative lifestyle habits pose a serious threat to health. Movement and physical activity are basic functions for which the human organism was created. Now, however, advances in modern technology have all but eliminated the need for physical activity in almost everyone's daily life.

Physical activity is no longer a natural part of our existence. Today we live in an automated society. Most of the activities that used to require strenuous physical exertion can be accomplished by machines with the simple pull of a handle or push of a button. For instance, if people need to go to a store that is only a couple of blocks away, most drive their automobiles and then spend a couple of minutes driving around the parking lot to find a spot 10 yards closer to the store's entrance. The groceries do not even have to be carried out any more. They usually are taken out in a cart and placed in the vehicle by a youngster working at the store.

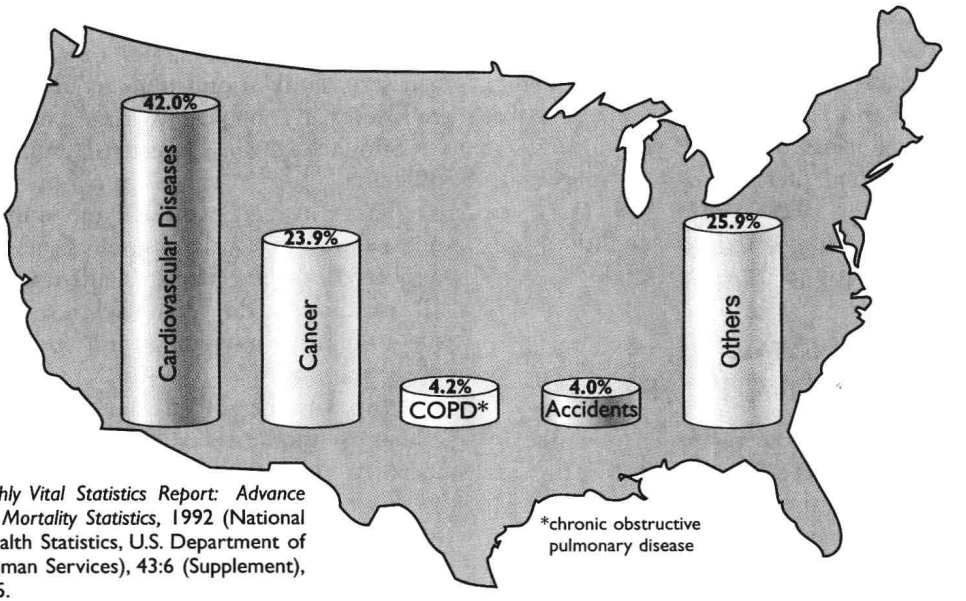
The epitome of physical inactivity: driving around a parking lot for several minutes in search of a parking spot 10 to 20 yards closer to the store's entrance.

Similarly, during a visit to a multi-level shopping mall, nearly everyone chooses to ride the escalators instead of taking the stairs. Automobiles, elevators, escalators, telephones, intercoms, remote controls, electric garage door openers — all are modern-day commodities that minimize the amount of movement and effort required of the human body.

One of the most significant detrimental effects of modern-day technology has been an increase in *chronic conditions related to a lack of physical activity*. These include hypertension, heart disease, chronic low-back pain, and obesity, among others They sometimes are referred to as hypokinetic diseases. "Hypo" means low or little, and "kinetic" implies motion. Lack of adequate physical activity is a fact of modern life that most people can no longer avoid, but to enjoy contemporary commodities and still expect to live life to its fullest, a personalized lifetime exercise program must become a part of daily living.

With the developments in technology, three additional factors have changed our lives significantly and have had a negative effect on human health: nutrition, stress, and environment. Fatty foods, sweets, alcohol, tobacco, excessive stress, and environmental hazards such as wastes, noise, and air pollution have detrimental effects on people.

The most prominent causes of death in the United States today are lifestyle-related (see Figure 1.1). Current statistics indicate that approximately 66% of all deaths in the United States are caused by cardiovascular disease and cancer.[3] Nearly 80% of these deaths could be prevented by adhering to a healthy lifestyle. The third cause of death, chronic and obstructive pulmonary disease (COPD), is related largely to tobacco use. Accidents comprise the fourth leading cause of death. Even though not all accidents are preventable, many are. Fatal accidents



Source: *Monthly Vital Statistics Report: Advance Report of Final Mortality Statistics*, 1992 (National Center for Health Statistics, U.S. Department of Health and Human Services), 43:6 (Supplement), March 22, 1995.

FIGURE 1.1 ✤ Leading causes of death in the United States, 1992.

often are related to abusing drugs and not wearing seat belts.

As the incidence of chronic diseases — *illnesses that develop and last over a long time* — increased, it became obvious that prevention was the best medicine. Estimates indicate that 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% is related to genetic factors.[4] Thus, the individual controls 84% of disease and quality of life. Further, according to estimates, 83% of deaths before age 65 are preventable. In essence, most Americans are threatened by the very lives they lead today.

Ideally, healthy lifestyle habits should be taught and reinforced in early youth. Unfortunately, many young people are in such poor physical condition that they will add to national health concerns in years to come. Surveys conducted during the past decade have raised public concern regarding the fitness level of American youth. As compared to the 1960s and 1970s, cardiorespiratory endurance and upper body strength have decreased and body fat has increased. These findings suggest that current physical education programs are not promoting lifetime fitness and wellness adequately.

Although the incidence of cardiovascular disease has declined remarkably in the last two decades, concern over youth fitness has led Dr. Kenneth Cooper, Director of the Aerobics Research Institute in Dallas, Texas to state: "It's discouraging and I am afraid that as these kids grow up, we will see all the gains made against heart disease in the last twenty years wiped out in the next twenty years."[5] Even 5- and 6-year-old children already have coronary heart disease risk factors such as high blood pressure, excessive body fat, and low fitness.[6]

Because of the unhealthy lifestyles that many young adults lead, physically they may be middle-aged or older! Healthy choices made today influence health a decade or two later. Many physical education programs do not emphasize the necessary skills for our youth to maintain a high level of fitness and health throughout life. That is the intent of this book — to provide the

skills and help to prepare you for a lifetime of physical fitness and wellness. A healthy lifestyle is self-controlled, and people need to be taught how to be responsible for their own health and fitness.

WELLNESS

After the initial fitness boom swept across the country in the 1970s, it became clear that improving physical fitness alone was not always enough to lower the risk for disease and ensure better health. For example, individuals who run 3 miles a day, lift weights regularly, participate in stretching exercises, and watch their body weight can be classified readily as having good or excellent fitness. If these same people, however, have high blood pressure, smoke, are under constant stress, consume too much alcohol, and eat too many fatty foods, they are at risk for cardiovascular disease and may not be aware of it. The characteristics that predict the development of a certain disease are called *risk factors*.

Good health is no longer viewed as simply the absence of illness. The notion of good health has evolved notably in the last few years and continues to change as scientists learn more about lifestyle factors that bring on illness and affect wellness. Once the idea took hold that fitness by itself would not always decrease the risk for disease and ensure better health, the wellness concept developed in the 1980s.

Wellness is defined as *the constant and deliberate effort to stay healthy and achieve the highest potential for well-being*. Wellness is an all-inclusive umbrella covering a variety of health-related factors. Wellness living requires the implementation of positive programs to change behavior and thereby improve health and quality of life, prolong life, and achieve total well-being.

To enjoy a wellness lifestyle, a person needs to practice behaviors that will lead to positive outcomes in five dimensions of wellness: physical, emotional, intellectual, social, and spiritual (Figure 1.2). 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.

FIGURE 1.2 ✤ The dimensions of wellness.

In looking at the five dimensions of wellness, high-level wellness clearly goes beyond the absence of disease and optimal fitness. Wellness incorporates components such as fitness, proper nutrition, stress management, disease prevention, social support, self-worth, nurturance (sense of being needed), spirituality, smoking cessation, personal safety, substance control, regular physical examinations, health education, and environmental support.

For a wellness way of life, individuals not only must be physically fit and manifest no signs of disease but also must have no risk factors for disease (such as physical inactivity, hypertension, abnormal cholesterol levels, cigarette smoking, negative stress, faulty nutrition, careless sex). Even though an individual tested in a fitness center may demonstrate adequate or even excellent fitness, indulgence in unhealthy lifestyle behaviors still will increase the risk for chronic diseases and decrease the person's well-being. Additional information on wellness and

how to implement a wellness program is discussed in Chapter 7.

Unhealthy behaviors are contributing to the staggering U.S. health care costs. Risk factors for disease carry a heavy price tag (see Table 1.1). About 1 trillion dollars were spent in health care costs alone in 1994. According to estimates,[7] 1% of Americans account for 30% of these costs. Half of the people use up about 97% of the health care dollars.

TABLE 1.1 ✤ Average Annual Health Care Costs for Leading Disease Risk Factors

Risk Factor	Annual Cost
Smoking	$960
Obesity	$401
Excessive alcohol use	$389
High blood pressure	$373
High cholesterol	$370
Not using seat belts	$272

Source: *Journal of Occupational Medicine*, November 1991.

PHYSICAL FITNESS

The American Medical Association defines physical fitness as *the general capacity to adapt and respond favorably to physical effort.* This implies that individuals are physically fit when they can meet both the ordinary and the unusual demands of daily life safely and effectively without being overly fatigued and still have energy left for leisure and recreational activities. Physical fitness can be classified into health-related and motor-skill-related fitness.

Health-Related Fitness

Health-related fitness *has four components* (see Figure 1.3) *cardiorespiratory endurance, muscular strength and endurance, muscular flexibility, and body composition*:

1. *Cardiorespiratory endurance*: the ability of the heart, lungs, and blood vessels to supply

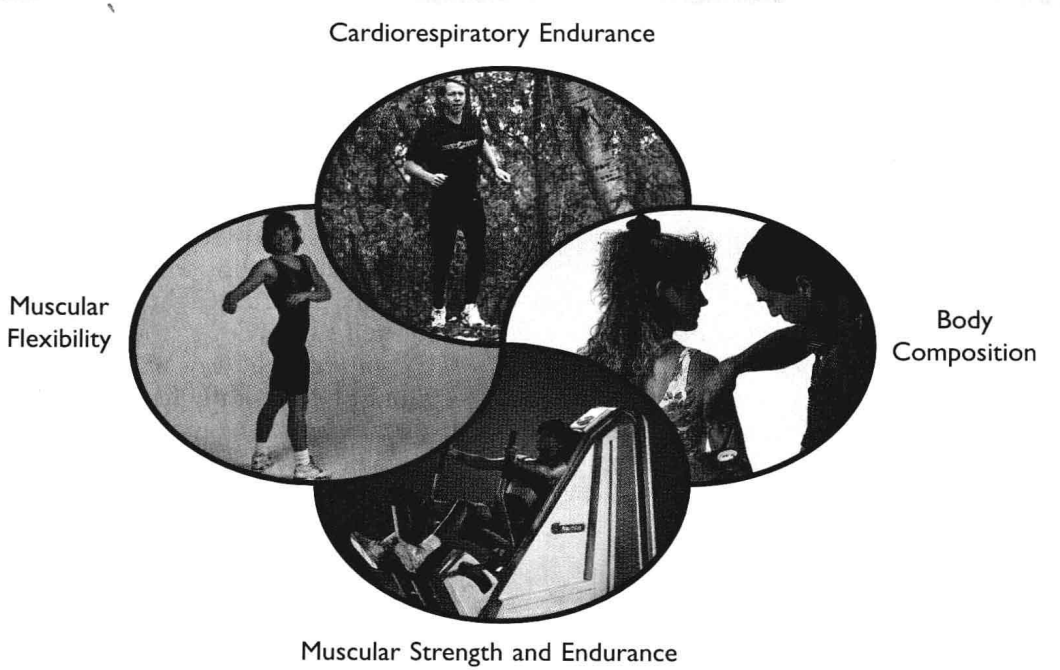


FIGURE 1.3 ✤ Health-related components of physical fitness.

oxygen to the cells to meet the demands of prolonged physical activity (also referred to as aerobic exercise).

2. *Muscular strength and endurance*: the ability of the muscles to generate force.
3. *Muscular flexibility*: the capacity of a joint to move freely through a full range of motion.
4. *Body composition*: the amount of lean body mass and adipose tissue (fat mass) in the human body.

Skill-Related Fitness

The motor skill-related components of fitness are important for successful motor performance in athletic events and in lifetime sports and activities such as basketball, racquetball, golf, hiking, soccer, and water skiing. Good skill-related fitness also enhances overall quality of life by helping people cope more effectively in emergency situations (see Chapter 4). The components of skill-related fitness are agility, balance, coordination, power, reaction time, and speed (see Figure 1.4):

1. *Agility:* the ability to change body position and direction quickly and efficiently. Agility is important in sports such as basketball, soccer, and racquetball, in which the participant must change direction rapidly and at the same time maintain proper body control.
2. *Balance:* the ability to maintain the body in equilibrium. Balance is vital in activities such as gymnastics, diving, ice skating, skiing, and even football and wrestling, in which the athlete attempts to upset the opponent's equilibrium.
3. *Coordination:* integration of the nervous system and the muscular system to produce correct, graceful, and harmonious body movements. This component is important in a wide variety of motor activities such as golf, baseball, karate, soccer, and racquetball, in which hand-eye or foot-eye movements, or both, must be integrated.
4. *Power:* the ability to produce maximum force in the shortest time. The two components of power are *speed* and *force* (strength). An effective combination of these two components allows a person to produce explosive movements such as in jumping, putting the shot, and spiking/throwing/hitting a ball.
5. *Reaction time:* the time required to initiate a response to a given stimulus. Good reaction time is important for starts in track and swimming, to react quickly when playing tennis at the net, and in sports such as ping pong, boxing, and karate.
6. *Speed:* the ability to propel the body or a part of the body rapidly from one point to another. Sprints in track, stealing a base in baseball, soccer, and basketball are examples of activities that require good speed for success.

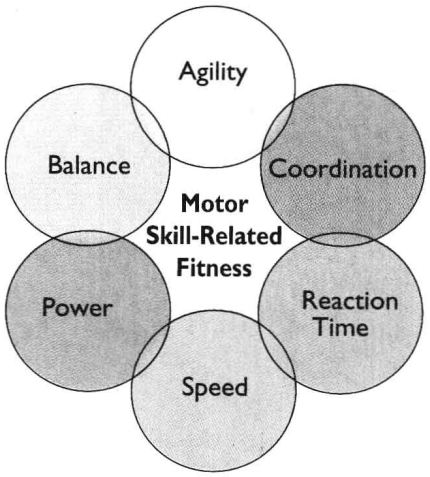


FIGURE 1.4 ✤ Motor-skill components of physical fitness.

In terms of preventive medicine, the main emphasis of fitness programs should be on the health-related components. Although skill-related fitness is crucial for success in sports and athletics, it also contributes to wellness. Improving skill-related fitness not only affords an individual more enjoyment and success in lifetime sports, but regular participation in skill-fitness activities also helps develop health-fitness. Further, total

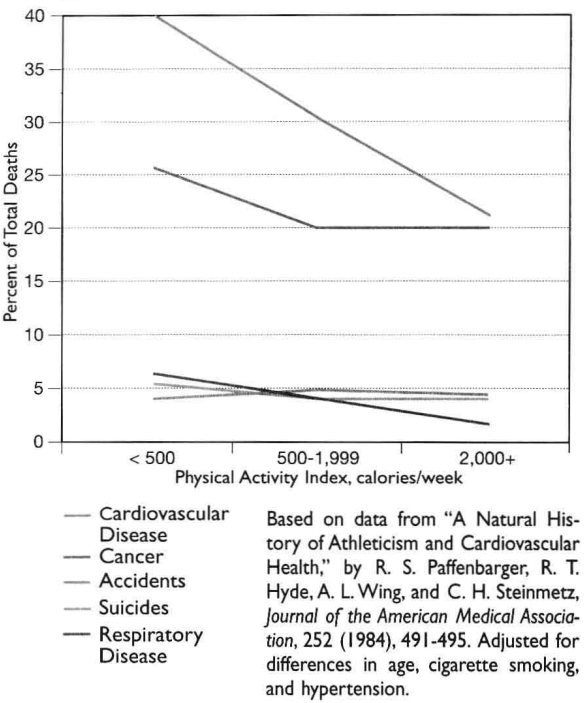
fitness is achieved by taking part in specific programs to improve both health-related and skill-related components.

BENEFITS OF FITNESS AND WELLNESS

The benefits to be enjoyed from participating in a regular fitness and wellness program are many. In addition to a longer life (see Figures 1.5 and 1.6), the greatest benefit of all is that physically fit individuals enjoy a better quality of life. Fit people who lead a positive lifestyle live a better and healthier life. These people live life to its fullest potential and have fewer health problems than inactive individuals who also may indulge in negative lifestyle patterns.

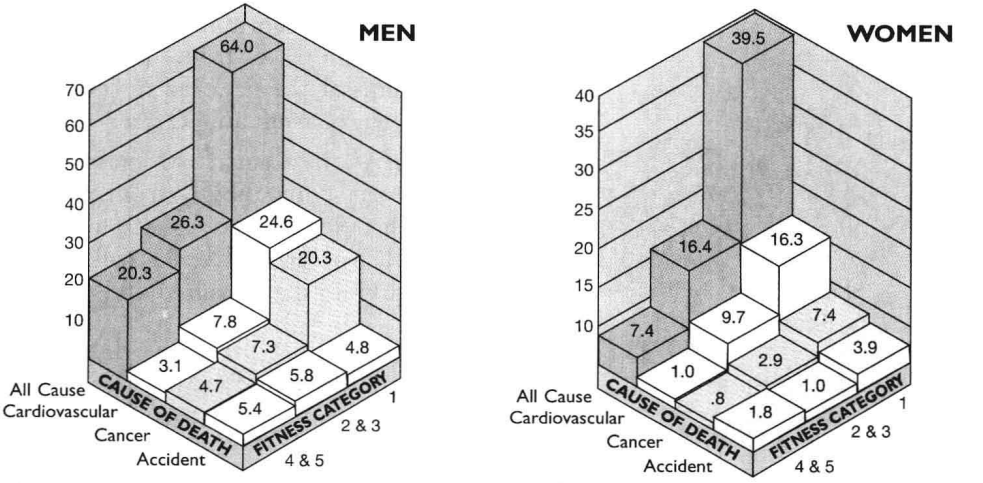
Although compiling an all-inclusive list of the benefits reaped through participation in a fitness and wellness program is difficult, the following list summarizes many of these benefits:

1. Improves and strengthens the cardiorespiratory system (improved oxygen supply to all parts of the body, including the heart, the muscles, and the brain).



Based on data from "A Natural History of Athleticism and Cardiovascular Health," by R. S. Paffenbarger, R. T. Hyde, A. L. Wing, and C. H. Steinmetz, *Journal of the American Medical Association*, 252 (1984), 491-495. Adjusted for differences in age, cigarette smoking, and hypertension.

FIGURE 1.5 ✤ Cause-specific death rates per 10,000 man-years of observation among Harvard alumni, 1962–1978, by physical activity index.



Based on data from "Physical Fitness and All-Cause Mortality: A Prospective Study of Healthy Men and Women," by S. N. Blair, H. W. Kohl III, R. S. Paffenbarger, Jr., D. G. Clark, K. H. Cooper, and L. W. Gibbons, *Journal of the American Medical Association*, 262 (1989), 2406.

FIGURE 1.6 ✤ Age-adjusted cause-specific death rates per 10,000 person-years of follow-up (1970 to 1985) in the Aerobics Center longitudinal study, Dallas, Texas.