

FOURTH EDITION



# LIFETIME



## *Physical Fitness & Wellness* A PERSONALIZED PROGRAM

WERNER W.K. HOEGER ♦ SHARON A. HOEGER





# **Lifetime Physical Fitness and Wellness**

**A Personalized Program**

**FOURTH EDITION**

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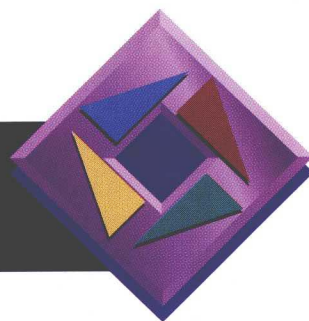
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# Preface



The current American way of life does not provide the human body with sufficient physical exercise to maintain adequate health. Further, 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.

Although people in the United States are firm believers in the benefits of physical activity and positive lifestyle habits as a means to promote better health, most do not reap these benefits because they simply do not know how to implement a sound physical fitness and wellness program that will indeed yield the desired results.

Scientific evidence has clearly shown that improving the quality and most likely the longevity of our lives is a matter of personal choice. The biggest challenge that we are faced with at the end of this century is to teach individuals how to take control of their personal health habits to insure a better, healthier, happier, and more productive life. The information presented in this book has been written with this objective in mind, providing you with the opportunity to initiate your own healthy lifestyle program.

As you work through the different chapters in this book, you will be able to develop and regularly update your own lifetime program to improve the various components of physical fitness and wellness. The emphasis is on teaching you how to take control of your personal health and lifestyle habits, so that you can make a constant and deliberate effort to stay healthy and realize your highest potential for well-being.

## New and Enhanced Features of the Fourth Edition

The chapters in this edition of Lifetime Physical Fitness & Wellness have been revised and updated to conform with advances and recommendations made since the publication of the third edition. The most significant changes in this new edition are:

- ◆ The cardiovascular endurance chapter has been divided into two chapters, one for assessment and one for prescription. A Twelve-Minute Swim Test and an Exercise Readiness Questionnaire have been added to the assessment chapter. The questionnaire helps evaluate students' readiness for exercise based on four categories of evaluation: mastery (self-control), attitude, health, and commitment.  
An entire section on aerobic activity choices has been included in the cardiovascular endurance prescription chapter. This introduction to the most popular forms of aerobic activities will enhance the development and implementation of cardiovascular fitness programs. A Fitness Ratings of Aerobic Activities chart has also been incorporated to this chapter.
- ◆ The U.S. Health Objectives for the Year 2000 are included in Chapter 1. These health objectives clearly emphasize the need for health promotion and disease prevention, personal responsibility, and health benefits for all people in the United States.
- ◆ Grip and Abdominal Crunch Strength Tests and information on anabolic steroids and plyometrics were added to the muscular strength chapter.





- ◆ The Body Mass Index (BMI) has been added to the body composition chapter. Along with the Waist-to-Hip Ratio, these tests are used to screen individuals who might be at higher risk for disease due to high fat content.
- ◆ The nutrition chapter has been completely revised and now contains information on the Food Guide Pyramid, new food labels, the effect of phytochemicals in the prevention of disease, energy (ATP) production, the role of glycogen in the body, carbohydrate loading, and amino acid supplements.
- ◆ 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.
- ◆ Revisions were made to the Cardiovascular Disease Prevention chapter to incorporate recent advances in this area.
- ◆ An enhanced discussion on the development of cancer, the role of the enzyme telomerase in cancer cell division, and the action of phytochemicals in fighting this disease are included in the Cancer Prevention chapter.
- ◆ Enhancements to the stress management chapter include concepts on stress vulnerability and time management.
- ◆ Information on HIV and AIDS has been greatly enhanced in Chapter 13.
- ◆ New color photography and many outstanding new graphs have been added throughout the book.

## SUPPLEMENTS

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

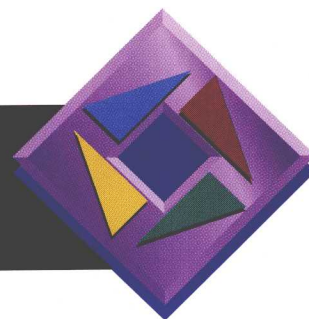
- ◆ One of the most **comprehensive computer software packages** available with any fitness/wellness textbook. The software includes a

*Fitness and Wellness Profile, a Personalized Cardiovascular Exercise Prescription, a Nutrient Analysis, and a weekly and monthly Exercise Log.* This software package helps provide a more meaningful experience to all participants and greatly decreases the workload of course instructors.

A new feature of the fourth edition is the *Nutrient Analysis Data Base Enhancer* software. This software allows 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, Step Test, Astrand-Ryhmung Test, Muscular Strength and Endurance Test, Muscular Endurance Test, Strength-to-Body Weight Ratio Test, Modified Sit-and-Reach Test, Body Rotation Test, Shoulder Rotation Test, Skinfold Thickness Test, and Girth Measurements 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** of the book’s most important illustrations and figures to facilitate class instruction and help explain key fitness and wellness concepts.
- ◆ An **instructor’s manual** to aid with the implementation of your physical fitness and wellness course.

# Acknowledgments



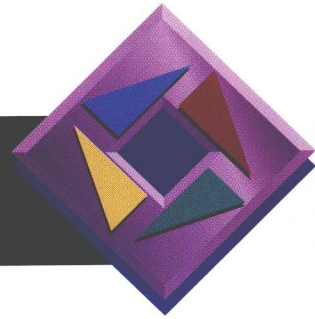
We wish to express our gratitude to colleagues throughout the country who evaluated the third edition of *Lifetime Physical Fitness and Wellness*. The feedback received greatly enhanced the preparation of this edition.

Special thanks to all of the following individuals who helped with the photography in this new edition: Jason Brooks Aberg, Heather Lloyd, Julie

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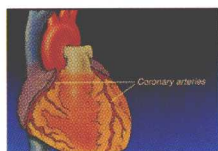
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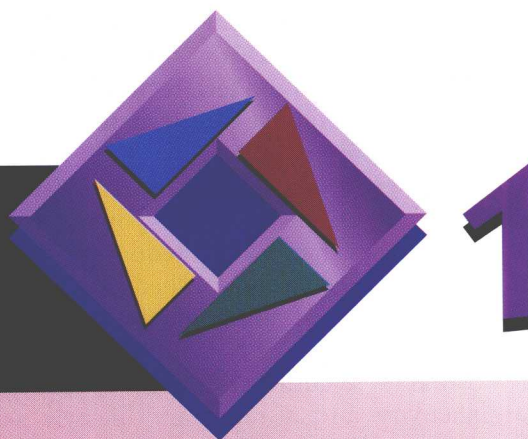
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# Introduction to Lifetime Physical Fitness and Wellness



## Key Concepts

Wellness  
Physical fitness  
Health-related fitness  
Skill-related fitness  
Chronic diseases  
Epidemiology  
Health care costs  
Personalized approach  
Year 2000 Health Objectives

## Objectives

- ◆ Define wellness, list its dimensions, and identify components of wellness.
- ◆ Define physical fitness and list health-related and skill-related fitness components.
- ◆ Learn the differences between physical fitness and wellness.
- ◆ Differentiate health standards and physical fitness standards.
- ◆ Identify the major health problems in the United States.
- ◆ Understand the benefits and the significance of participating in a lifetime fitness and wellness program.
- ◆ Identify lifestyle factors that enhance health and longevity.
- ◆ Recognize risk factors that may interfere with safe exercise participation.







Movement and physical activity are basic functions for which the human organism was created. Advances in modern technology, however, have nearly eliminated the need for physical activity in almost everyone's daily life. Physical activity is no longer a natural part of our existence. We now live in an automated society, one in which 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.

The available scientific evidence shows that physical inactivity and a sedentary lifestyle seriously threaten our health and hasten the deterioration rate of the human body. Physically active people live longer than their inactive counterparts, even if they start to become active later in life. Current estimates for the United States indicate that more than 250,000 deaths yearly are the result of lack of regular physical activity.<sup>1</sup>

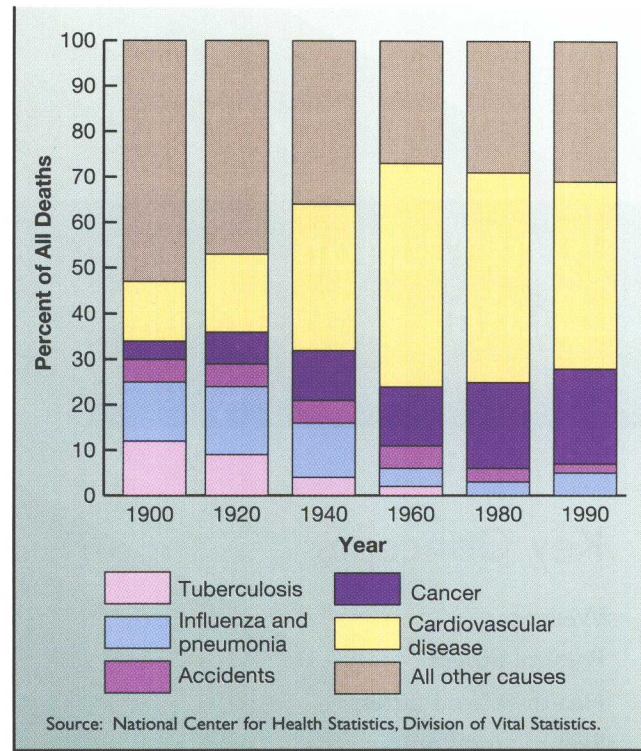


*Physical inactivity and a sedentary lifestyle seriously threaten our health and hasten the deterioration rate of the human body.*

With the advances in technology, three additional factors have changed our lives significantly and have negatively affected human health: nutrition, stress, and environment. Fatty foods, sweets, alcohol, tobacco, excessive stress, and environmental hazards (wastes, noise, air pollution, and the like) have detrimental effects on people.

At the beginning of the 20th century, the most common health problems in the United States were infectious diseases including tuberculosis, diphtheria, influenza, kidney disease, polio, and other diseases of infancy. Progress in the field of medicine largely eliminated these diseases. As the American people started to enjoy the "good life" (sedentary living, alcohol, fatty foods, excessive sweets, tobacco, drugs), however, a parallel increase was seen in chronic diseases such as hypertension, atherosclerosis, coronary disease, strokes, diabetes, cancer, emphysema, and cirrhosis of the liver. (Figure 1.1 illustrates the changing profile over time).

As the incidence of chronic diseases increased, prevention emerged as the best medicine. Consequently, a new fitness and wellness trend gradually took root and grew over the last two and a half



**FIGURE 1.1** ♦ Leading causes of death in the United States.

decades. People began to realize that good health is largely self-controlled and that the leading causes of premature death and illness in the United States could be prevented by adhering to positive lifestyle habits.

## WELLNESS

Most people recognize that participating in a fitness program improves quality of life. In recent years, however, we came to realize 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 which people may develop a certain disease are called *risk factors*.





One of the best examples that good fitness does not always provide a risk-free guarantee of a healthy and productive life was the tragic death in 1984 of Jim Fixx, author of *The Complete Book of Running*. At the time of his death by heart attack, Fixx was 52 years old. He had been running between 60 and 80 miles a week and had believed that people at his high fitness level could not die from heart disease.

At age 36 Jim Fixx smoked two packs of cigarettes per day, weighed about 215 pounds, did not participate in regular cardiovascular exercise, and had a family history of heart disease. His father, having had a first heart attack at age 35, later died at age 43.

Perhaps in an effort to lessen his risk for heart disease, Fixx began to raise his level of fitness. He started to jog, lost 50 pounds, and quit smoking cigarettes.<sup>2</sup> On several occasions, though, Fixx declined to have an exercise electrocardiogram (ECG) (see Chapter 9), which most likely would have revealed his cardiovascular problem. His unfortunate death is a tragic example that exercise programs by themselves will not make high-risk people immune to heart disease, though they may delay the onset of a serious or fatal problem.

Good health, therefore, no longer is 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. These dimensions are interrelated; one fre-

quently affects the others. For example, a person who is 'emotionally down' often has no desire to exercise, study, socialize with friends, or attend church.

In looking at the five dimensions of wellness (Figure 1.2), 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 (see Figure 1.3).

For a wellness way of life, individuals not only must be physically fit and manifest no signs of disease, but they also must have no risk factors for disease (such as hypertension, abnormal cholesterol levels, cigarette smoking, negative stress, faulty nutrition, careless sex). The relationship between adequate fitness and wellness is illustrated in the wellness continuum in Figure 1.4 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.



FIGURE 1.2 ♦ Dimensions of wellness.





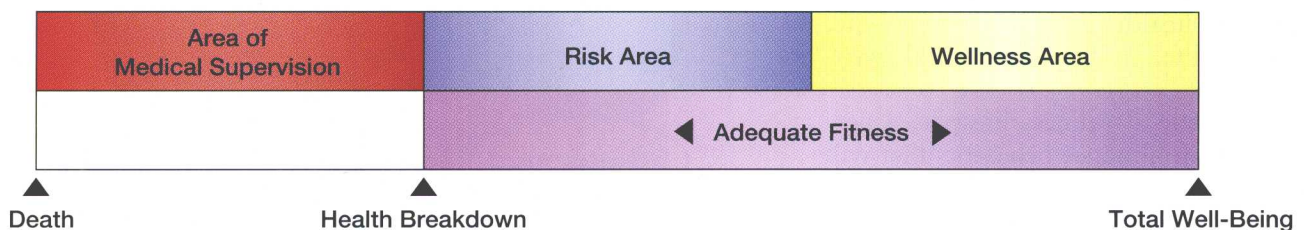
**FIGURE 1.3** ♦ Wellness components.

## PHYSICAL FITNESS

Physical fitness has been defined in several ways and has meant different things to different people. Initially, health care practitioners defined fitness simply as the absence of disease. Many athletic coaches perceived fitness as the ability to perform certain sports skills. Perhaps the most comprehensive definition of physical fitness is that of the American Medical Association, which has defined physical fitness as *the general capacity to adapt and*

*respond favorably to physical effort.* Individuals are physically fit when they can 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.

As the fitness concept grew during the 1970s, it became clear that no single test was sufficient to assess overall fitness. A battery of tests was necessary because several specific components have to be established to determine an individual's overall level of fitness.

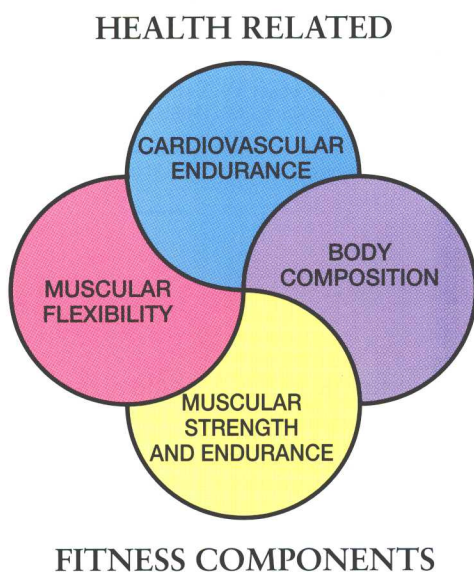


**FIGURE 1.4** ♦ Wellness continuum.





Physical fitness can be classified into health-related and motor skill-related fitness. The four *health-related fitness components* are: cardiovascular (aerobic) endurance, muscular strength and endurance, muscular flexibility, and body composition, as depicted in Figure 1.5. The motor skill-related components of fitness are more important in athletics. In addition to the four components just mentioned, motor skill-related fitness includes agility, balance, coordination, power, reaction time, and speed. Although these components are important in achieving success in athletics, they are not crucial for developing better health. In terms of preventive medicine, the main emphasis of fitness programs should be placed on the health-related components. That is the focus of this book.



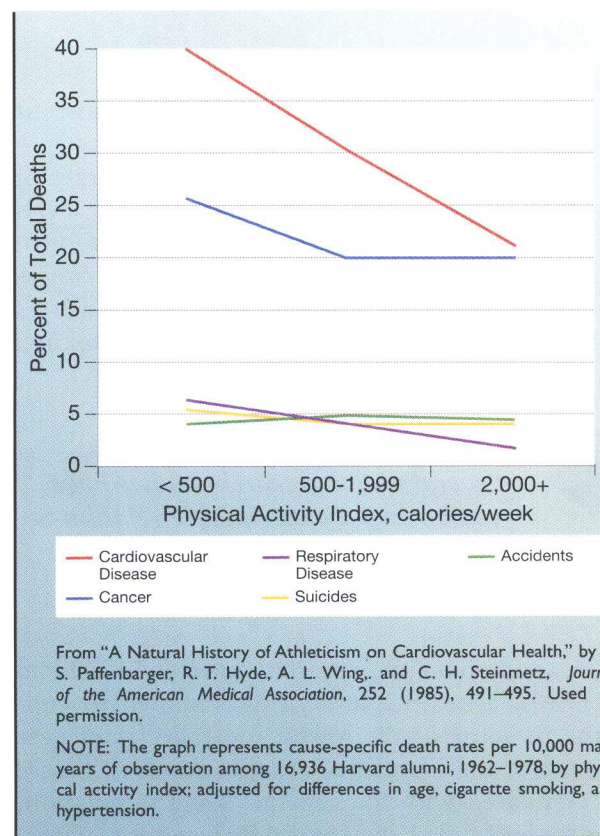
**FIGURE 1.5** ◆

## THE WELLNESS APPROACH

During the late 1960s and in the 1970s, we began to realize that good fitness is important in the fight against chronic diseases, particularly those of the cardiovascular system. Because of more participation in fitness programs in the last few years, cardiovascular mortality rates have dropped. The rate started to decline in about 1963, and between 1970 and 1988 heart disease had dropped by 34%. This decrease is credited to higher levels of wellness and better health care in the country. More than half of the decline is attributed to better diet and fewer people smoking.

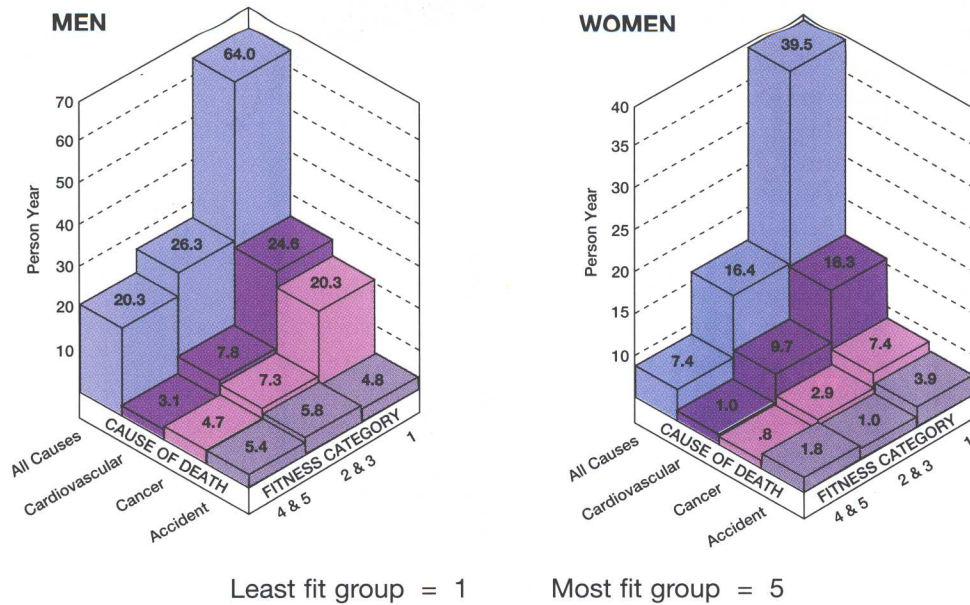
Furthermore, several studies have shown an inverse relationship between exercise and premature cardiovascular mortality rates. In a study conducted among 16,936 Harvard alumni linking physical activity habits and mortality rates,<sup>3</sup> as the amount of weekly physical activity increased, the risk of cardiovascular deaths decreased. The largest drop in cardiovascular deaths was observed among alumni who used up more than 2,000 calories per week through physical activity. Figure 1.6 graphically illustrates the study results.

A major study published in the *Journal of the American Medical Association*, based on data from 13,344 people followed over an average of 8 years, substantiated the findings of the Harvard alumni study.<sup>4</sup> Conducted by Dr. Steven N. Blair and co-researchers at the Institute of Aerobics Research in Dallas, Texas, study results confirm that the level of cardiovascular fitness is related to mortality from all causes. As shown in Figure 1.7, the higher the level of cardiovascular fitness, the longer the lifespan. Death rate from all causes for the least fit (group 1) men was 3.4 times higher than for the most fit men. For the least fit women, the death



**FIGURE 1.6** ◆ Death rates among Harvard alumni 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), 2395-2401.

NOTE: Age-adjusted cause-specific death rates per 10,000 person-years of follow-up (1970-1985) by physical fitness groups in men and women in the Aerobics Center longitudinal study in Dallas, Texas. Fitness group 1 is the least fit group, fitness group 5 is the most fit group (one person-year indicates one person followed up 1 year later).

**FIGURE 1.7** ♦ Death rates by physical fitness groups.

rate was 4.6 times higher than for the most fit women.

This study also reported a much lower rate of premature death, even at moderate fitness levels that most adults can achieve easily. People are protected even more when they combine higher fitness levels with reduction in other risk factors such as hypertension, serum cholesterol, cigarette smoking, and excessive body fat.



*Several major research studies have established a clear inverse relationship between exercise and premature cardiovascular mortality.*

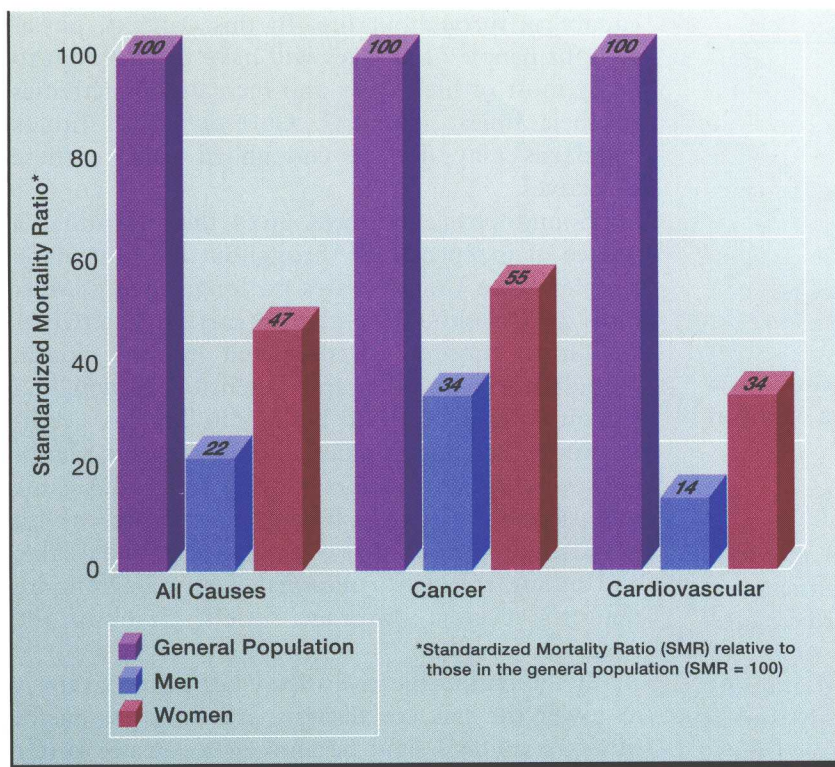
In another major research study conducted in the 1980s, a healthy lifestyle was shown to contribute to some of the lowest mortality rates ever reported in the literature.<sup>5</sup> As illustrated in Figure 1.8, compared with the general White population, this group of 5,231 men and 4,631 women (wives) had much lower cancer, cardiovascular, and overall death rates.

Healthy lifestyle habits include abstaining from tobacco, alcohol, caffeine, and drugs, and adhering to a well-balanced diet, based on grains, fruits, and vegetables, and moderate consumption of poultry and red meat. The investigators in this study looked at three general health habits among the participants: lifetime abstinence from smoking, regular physical activity, and sleep.

Men in this study had one-third the death rate from cancer, one-seventh the death rate from cardiovascular disease, and one-fifth the rate of overall mortality. The wives had about half the rate of cancer and overall mortality and a third the death rate from cardiovascular disease, as shown in Figure 1.7. With reference to Figure 1.9, life expectancy for 25-year-olds who adhered to the three health habits were 85 and 86 years, respectively, as compared to 74 and 80 for the average U.S. White man and woman.

From this study we can conclude that people who adhere to a lifetime healthy lifestyle indeed will reap healthy rewards. Better health leads to improvement in quality of life. The additional 6 to 11 years of "golden" life are precious to those who maintain a lifetime wellness program.





**FIGURE 1.8** ♦ Effects of a healthy lifestyle on all causes, cancer, and cardiovascular death rates in White men and women.

## HEALTH FITNESS VERSUS PHYSICAL FITNESS STANDARDS

Throughout the discussion of health-related fitness assessment in Chapters 2, 4, 5, and 6, several tests are identified to assess fitness. A meaningful debate

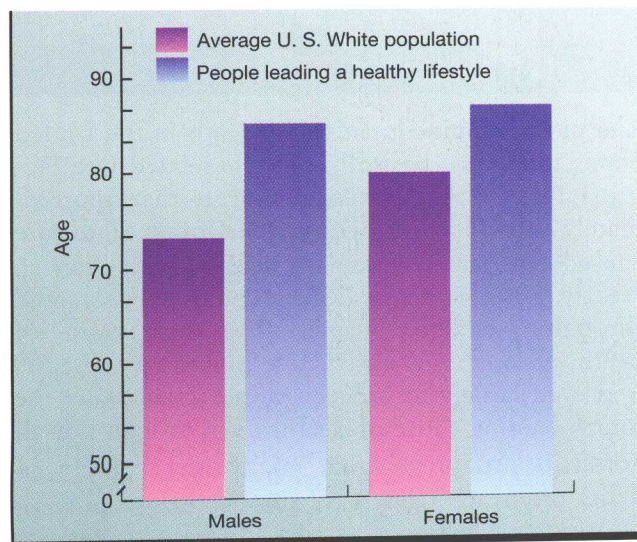
regarding age- and gender-related fitness standards for the general population has resulted in two standards: a health fitness standard and a physical fitness standard.

## Health Fitness Standards

As illustrated in Figure 1.10, although *fitness* improvements (Max  $\text{VO}_2$  — see next page) with a moderate aerobic exercise program are not as notable, significant *health* benefits are reaped with such a program. These benefits are quite striking and only slightly greater health benefits are obtained with a more intense exercise program. Benefits include a reduction in blood lipids, lower blood pressure, lower risk for diabetes, weight loss, stress release, and lower risk for disease and premature mortality.

The health fitness standards proposed here are based on epidemiological\* data linking minimum fitness values to disease prevention and health. These standards seem to be the lowest fitness requirements for maintaining good health, decreasing the risk for chronic diseases, and lowering the incidence of muscular-skeletal injuries.

Attaining the health fitness standards requires only moderate amounts of physical activity. For



**FIGURE 1.9** ♦ Life expectancy for 25-year-olds adhering to a lifetime healthy lifestyle program versus average U.S. White population.