PRINCIPLES AND LABS

Werner W. K. Hoeger / Second Edition

FOR PHYSICAL FITNESS

AND WELLNESS

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Second Edition

Werner W. K. Hoeger
Boise State University

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In memory of my father.

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Preface

The current American way of life does not provide the human body with sufficient physical activity to maintain adequate health and improve the quality of life. 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.

People in the United States are firm believers in the benefits of physical activity, good nutrition, and positive lifestyle patterns as a means to promote a healthier, happier, and more productive life. Nevertheless, the great majority do not enjoy a better quality of life because they are either led astray by a multi-billion dollar "quick fix — fad" industry, and/or simply do not know how to implement a sound fitness and wellness program that will indeed yield the desired results.

Principles and Labs for Physical Fitness & Wellness contains sixteen chapters and twenty-eight laboratories that serve not only as a guide to implement a complete lifetime fitness program, but also point out the need to go beyond the basic components of fitness to achieve total well-being. In addition to a thorough discussion on physical fitness, including health- and skill-related components of fitness; extensive and up to date information is provided on such topics as nutrition, weight control, exercise and aging, cardiovascular and cancer risk reduction, stress management, prevention of sexually transmitted diseases, and substance abuse control (including tobacco, alcohol, and other psychoactive drugs).

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

Two of the most comprehensive computer software packages available are provided free of charge to the schools that adopt the textbook. Both packages include a fitness & wellness profile, a personalized cardiovascular exercise prescription, a nutrient analysis, and a weekly and monthly exercise log. Software package one also provides a pre- and post-test comparison, including percent change for each fitness and wellness item on the profile. The second software package offers several individual program options for use in different laboratory experiences. Both software packages help provide a more meaningful experience to all participants.

The chapters in the second edition of *Principles and Labs for Physical Fitness & Wellness* have been revised and updated to include new information reported in the literature and at professional health, physical education, and sports-medicine meetings. Some of the most significant changes in this second edition are:

- An introduction to physical fitness versus health fitness, including performance standards for both fitness classifications.
- Inclusion of the latest information available on the association between fitness and all-cause mortality.
- Several changes were made to the nutrition and weight control chapters. These changes include a more thorough description of the macronutrients (carbohydrates, fats, and proteins), new information on bone health (osteoporosis) and iron deficiency, current dietary recommendations by the National Academy of Sciences, an update on the RDA (1989 version), the role of abdominal fat versus gluteal and hip fat in health and disease, and an expanded list of the nutritive value of selected foods (now contained in Appendix A).
- The University of Houston Non-Exercise Test has been added to the chapter on cardiovascular assessment. This protocol is useful as an initial estimate of maximal oxygen uptake. It is also practical for mass screening because the required information is collected through a self-reported method.
- The chapters on cardiovascular exercise and muscular strength prescription have been updated according to new American College

of Sports Medicine (ACSM) guidelines and recent research publications in the field (also see the ACSM position stand on developing and maintaining cardiorespiratory and muscular fitness in Appendix B).

- The coronary heart disease (CHD) risk factor analysis has been revised based on new research information. This includes the even stronger than previously thought relationship between HDL-cholesterol and CHD. The role of other risk factors has also been modified to conform with current research data.
- Additional fitness and wellness items included are information on spiritual well-being, exercise and aging, a new lab experience on cancer (Cancer Prevention: Are You Taking Control?), and the Prevention Index and a lab based on this index. The latter is a nationwide index of the American Public commissioned by *Prevention Magazine* and developed from information collected by Louis Harris and Associates, Inc.
- New color photography and many outstanding new graphs have been added throughout the textbook.

Acknowledgements

Special thanks and infinite love to my wife and children for their encouragement and support with this project. I also wish to thank all of those who so graciously donated their time and efforts to make this work possible. To the many friends and colleagues throughout the country for their contributions; to Charles B. Scheer and Welsh Photography for their efforts; and to Boise State University students, in particular Cherianne Calkins and Neil Edwards, who served as models for many of the photographs in this new edition.

Contents

Labs

Physical Fitness and Wellness

OBJECTIVES

- Define physical fitness and list the components of health-related and skill-related fitness.
- Define wellness and be able to differentiate between physical fitness and wellness.
- 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 risk factors that may interfere with safe exercise participation.
- Learn to assess heart rate and blood pressure.

A widespread interest in health and preventive medicine over the last two decades has led to a tremendous increase in the number of individuals who participate in fitness and wellness programs. From an initial fitness fad in the early 1970s, physical fitness and wellness programs have become a trend that is now very much a part of the American way of life. The increase in the number of participants is primarily attributed to scientific evidence linking regular exercise and positive lifestyle habits to better health, improved quality of life, and total well-being.

Research findings in the last few years have shown that physical inactivity and negative lifestyle habits are a serious threat to the health of the nation. Movement and activity are basic functions needed by the human organism to grow, develop, and maintain health. However, *advances in modern technology have almost completely eliminated the need for physical exertion in almost everyone's daily life.* The automated society in which we live no longer provides the body with sufficient activity to insure adequate health, but rather increases the deterioration rate of the human body.

At the beginning of the twentieth century, the most common health problems in the United States were such infectious diseases as tuberculosis, diphtheria, influenza, kidney disease, polio, and other diseases of infancy. Progress in the field of medicine has allowed for elimination of these diseases. Nevertheless, as the American people started to enjoy the so-called "good life" (sedentary living, alcohol, fatty foods, excessive sweets, tobacco, drugs, etc.), a parallel increase was seen in the incidence of chronic diseases such as hypertension, coronary heart disease, atherosclerosis, strokes, diabetes, cancer, emphysema, and cirrhosis of the liver (see Figure 1.1).

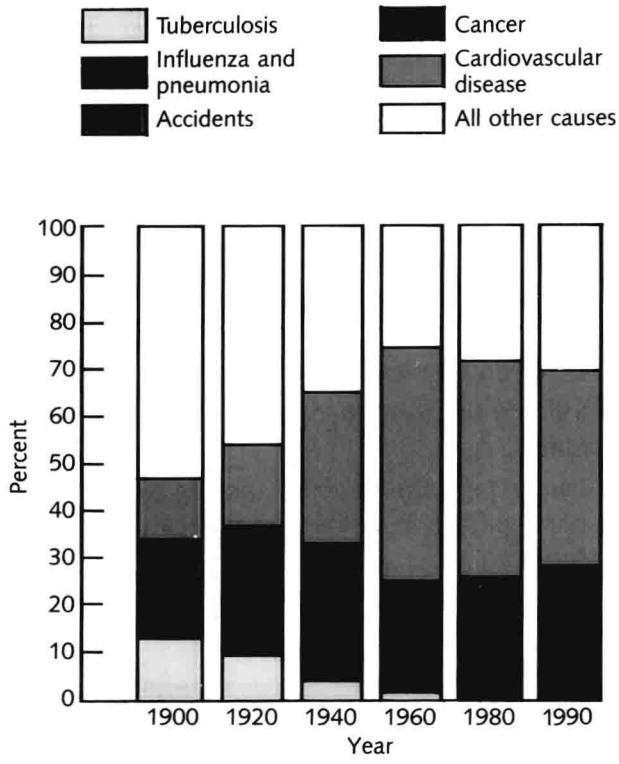
As the incidence of chronic diseases increased, it became clear that prevention was the best medicine. Consequently, a new fitness and wellness trend has gradually developed over the last two decades. People began to realize that good health is largely self-controlled and that the leading causes of premature death and illness in the United States could be prevented through adherence to positive lifestyle habits.

PHYSICAL FITNESS

Over the years, physical fitness has been defined in several ways and has meant different things to different people. Initially, health care practitioners simply defined fitness as the absence of disease. On

FIGURE 1.1

Deaths for Selected Causes as a Percent of All Deaths: United States, Selected Years, 1900 to 1985



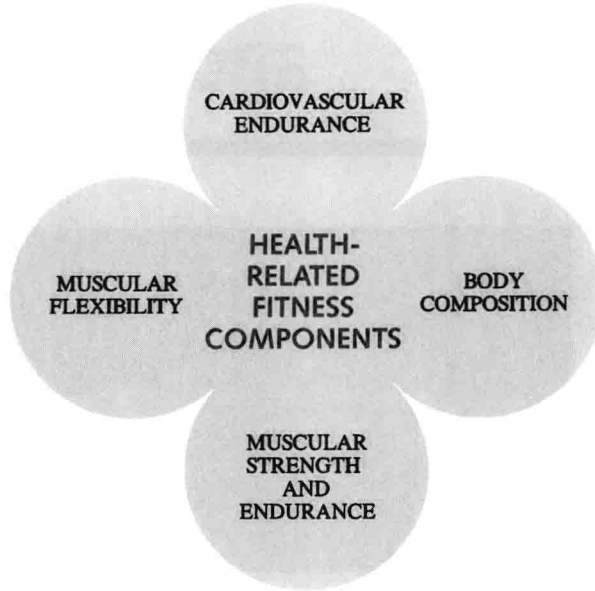
Source: National Center for Health Statistics, Division of Vital Statistics

the other hand, many athletic coaches perceived fitness as the ability to perform certain sports skills. Perhaps the most comprehensive definition has been given by the American Medical Association, which has defined *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 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 developed in the last two decades, it also became clear that no single test was sufficient to assess overall fitness. Rather, a battery of tests was necessary because several specific components have to be established to determine an individual's overall level of fitness. In this regard, most authorities agree that physical fitness can be classified into health-related and motor skill-related fitness. As illustrated in Figure 1.2, from a health point of view, there are four *health-related fitness components: cardiovascular (aerobic) endurance, muscular strength and endurance, muscular flexibility, and body composition. Skill-related fitness components* include *agility, balance, coordination,*

FIGURE 1.2

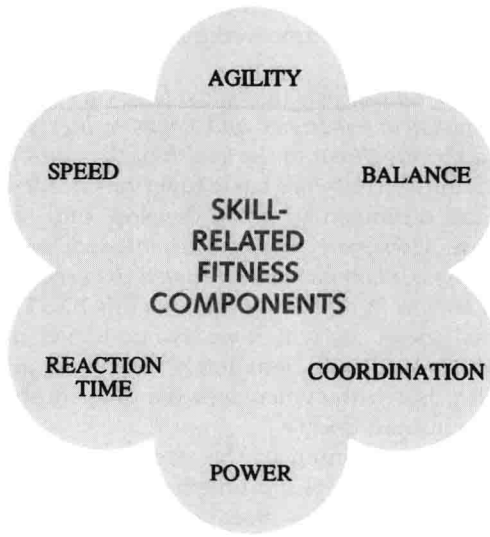
Health-Related Components of Physical Fitness



power, reaction time, and speed (Figure 1.3). The latter are primarily important to achieving success in athletics and may not be as crucial in the development of better health. In terms of preventive medicine, the main emphasis of fitness programs needs to be placed on the health-related components.

FIGURE 1.3

Skill-Related Components of Physical Fitness



Complete fitness, nevertheless, is achieved by engaging in specific programs aimed at improving both health-related and skill-related components.

During the late 1960s and in the 1970s, we began to realize that good fitness was an important factor in the fight against chronic diseases, particularly those of the cardiovascular system. Because of increased participation in fitness programs in the last few years, we have begun to see a reduction in cardiovascular mortality rates. The rate started to decline in about 1963, and by 1982 had dropped by 37 percent. It was estimated that in the year 1983 alone there were 165,000 fewer cardiovascular deaths than expected. This decrease in mortality is attributed to increased fitness and better health care in the country. 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, results indicated that as the amount of weekly physical activity increased, the risk of cardiovascular deaths decreased. The greatest decrease in cardiovascular deaths was observed among alumni who used in excess of 2,000 calories per week through physical activity (Table 1.1).

A major study recently published in the *Journal of the American Medical Association* based on data from 13,344 people followed over an average of eight years substantiated the findings of the Harvard alumni study. The study conducted by Dr. Steven N. Blair and co-researchers at the Institute of Aerobics Research in Dallas, Texas, confirms that the level of cardiovascular fitness is related to all-cause mortality. The results showed a graded and consistent inverse relationship between cardiovascular fitness and mortality, regardless of age and other risk factors (see Figure 1.4). The higher the level of cardiovascular fitness, the greater the delay in mortality. Death-rates from all causes for the least fit (group 1) men were 3.4 times higher than the most fit men. For the least fit women, the death rates were 4.6 times higher than the most fit women. The study also reported a greatly reduced rate of premature death even at moderate fitness levels that can be easily achieved by most adults. Additionally, greater protection is attained when increased fitness levels are combined with reduction in other risk factors such as hypertension, serum cholesterol, cigarette smoking, and excessive body fat.

Another research study conducted in the 1980s showed that a healthy lifestyle contributes to some of the lowest mortality rates ever reported in the literature. Compared with the general white population, a group of 5,231 high priests and 4,631 women (wives) from the Church of Jesus Christ of Latter Day Saints (Mormon Church) had a much lower cancer, cardiovascular, and overall death rate. The healthy lifestyle habits recommended since the year 1833 by the church, also referred to as the "word of wisdom," include abstention from tobacco, alcohol, caffeine, drugs, and adherence to a well-balanced diet. Nutrition recommendations include a diet based on grains, fruits, vegetables, and moderate use 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. The results of the study indicated that men in this study had one-third the death rate for cancer, one-seventh the death rate for cardiovascular disease, and one-fifth the rate of overall mortality. The wives showed about one-half the rate of cancer and overall mortality, and one-third the death rate for cardiovascular disease. Life expectancy for 25-year-old high

TABLE 1.1

Cause-Specific Death Rates[a] per 10,000 Man-Years of Observation Among 16,936 Harvard Alumni, 1962-1978, by Physical Activity Index

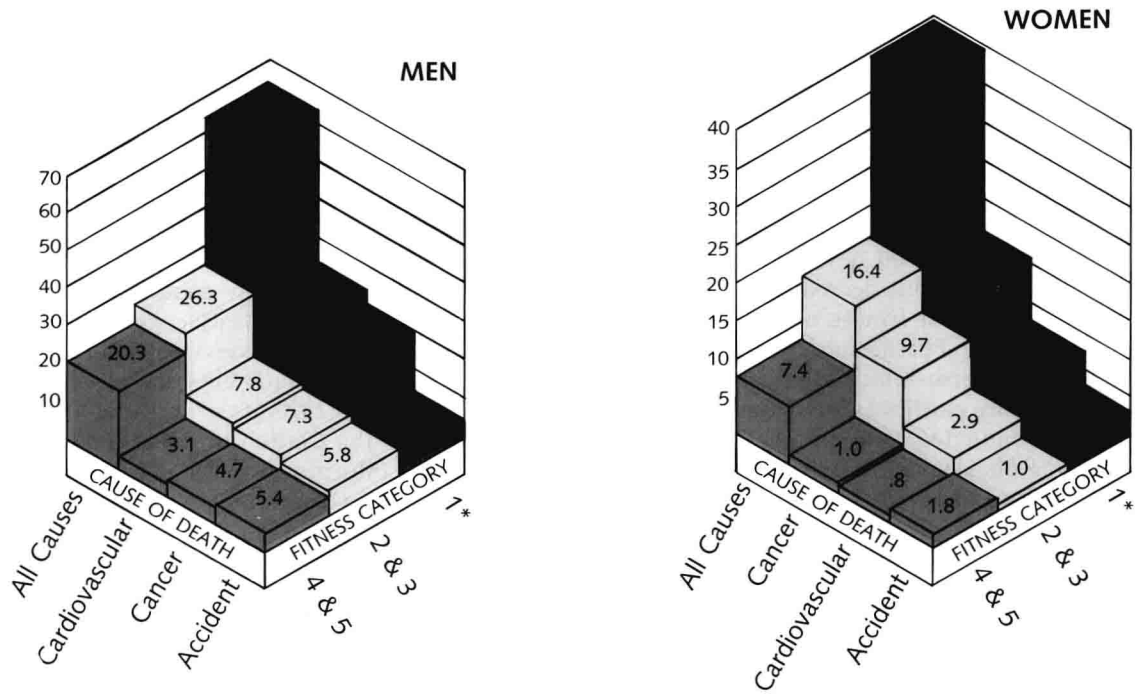
Cause of Death (n = 1,413)	% of Total Deaths	Physical Activity Index, Kcal/week		
		<500	500-1,999	2,000+
Cardiovascular Diseases	45.3	39.5	30.8	21.4
Cancer	31.6	25.7	19.2	19.0
Accidents	5.5	3.6	3.9	3.0
Suicides	4.8	5.1	3.2	2.9
Respiratory Diseases	4.3	6.0	3.2	1.5

From Paffenbarger, R. S., R. T. Hyde, A. L. Wing, and C. H. Steinmetz. "A Natural History of Athleticism and Cardiovascular Health." *JAMA* 252(4): 491-495, 1984. Copyright 1985, American Medical Association.

[a]Adjusted for differences in age, cigarette smoking, and hypertension.

FIGURE 1.4

Age-Adjusted Cause-Specific Death Rates per 10,000 Person-Years of Follow-up (1970 to 1985) by Physical Fitness Groups in Men and Women in the Aerobics Center Longitudinal Study in Dallas, Texas.*



*Least fit group = 1, most fit group = 5

Based on data from Blair, S. N., 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. JAMA 262:2395-2401, 1989.

priests and their wives, 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.

FITNESS STANDARDS: HEALTH vs PHYSICAL FITNESS

A meaningful debate has recently developed to determine recommended fitness standards for the nation. For instance, cardiovascular endurance is measured in terms of the maximal amount of oxygen that the body is able to utilize per minute of physical activity (see Chapter 4). Maximal oxygen uptake is commonly expressed in milliliters of oxygen per kilogram of body weight per minute (ml/kg/min). Individual values can range from about 10 ml/kg/min in cardiac patients to approximately 70 to 85 ml/kg/min in world class runners and cross-country skiers. Although we recognize that high values (70s and 80s) are crucial for success in elite athletic events, *the debate now focusses on determining sound age- and gender-related fitness standards for the general population. Two trends have begun to develop in this regard: a health fitness standard and a physical fitness standard.*

The proposed health fitness standards are based on epidemiological data linking minimum fitness values to health and disease prevention. For instance, according to the results of the research study presented in Figure 1.4, the data seems to indicate that maximal oxygen uptake values of 35 and 32.5 ml/kg/min for men and women respectively may be sufficient to significantly decrease the risk for all-cause mortality. Although greater improvements in fitness yield a slightly lower risk of premature death, the largest drop is seen between the lowest fit (group 1) and the moderately fit groups (2 and

3). Therefore, the 35 and 32.5 ml/kg/min values could be selected as the health fitness standards.

Physical fitness standards are usually set higher than the health fitness norms. Many experts feel that people who meet the criteria of "good" physical fitness should not only be able to perform moderate to vigorous amounts of physical activity without undue fatigue, but that they should also maintain this capability throughout life. In this context, physically fit people of all ages will have the freedom to enjoy most of life's daily and recreational activities to their fullest potential. Current health fitness standards may not be enough to achieve these objectives.

Sound physical fitness provides the individual with a degree of independence throughout life that many people in the United States no longer enjoy. While not with the same intensity, there is no real reason why most people should not be able to carry out in later years similar activities to those conducted in their youth. A person does not have to be an elite athlete, but activities such as changing a tire, chopping wood, climbing several flights of stairs, playing a vigorous game of basketball, mountain biking, playing soccer with grandchildren, walking several miles around a lake, and hiking through a national park, require more than the current "average fitness" level of the American people. For the purposes of this book, therefore, the reader will notice that the fitness standards for cardiovascular endurance, strength, flexibility, and body composition (Chapters 4, 6, 7, and 9 respectively) provide both a health fitness and a physical fitness standard.

THE WELLNESS CONCEPT

Although there is a definite improvement in the quality of life and an increase in longevity for individuals who participate in fitness programs, in the 1980s it became obvious that just improving the basic health-related components of fitness was not always sufficient to decrease the risk for disease and insure better health. For example, an individual who is running three miles per day, lifting weights regularly, participating in stretching exercises, and watching his/her body weight can easily be classified in the good or excellent category for each one of the fitness components. If this same individual, however, suffers from high blood pressure, smokes, is under constant stress, consumes excessive alcohol, and/or eats too many fatty foods, he/she is probably developing several risk factors for cardiovascular disease and may not be aware of it. A risk factor is defined as an asymptomatic state produced by a negative health behavior that may lead to disease.

One of the best examples that good fitness is not always a risk-free guarantee for 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 fifty-two years old. He had been running between sixty and eighty miles per week and had felt that anyone in his type of condition could not die from heart disease. At age thirty-six, Jim Fixx smoked two packs of cigarettes per day, weighed about 215 pounds, did not engage in regular cardiovascular exercise, and had a family history of heart disease. His father had experienced a first heart attack at age thirty-five and later died at age forty-three. Perhaps in an effort to decrease his risk of heart disease, Fixx began to increase his fitness level. He started to jog, lost fifty pounds, and quit cigarette smoking. Nevertheless, on several occasions Fixx declined to have an exercise electrocardiogram (ECG) test done, which would have most likely revealed his cardiovascular problem. This unfortunate death is a good example that exercise programs by themselves will not make high-risk people immune to heart disease, other than possibly delaying the onset of a serious or fatal problem.

Once it became clear that good fitness by itself would not always decrease the risk for disease and insure better health, a new "wellness" concept developed in the 1980s. *Wellness* has been defined as *the constant and deliberate effort to stay healthy and achieve the highest potential for well-being*. The term "wellness" implies an all-inclusive umbrella composed of a variety of activities aimed at helping individuals recognize components of lifestyle that are detrimental to their health, and then implement positive programs to change behavior so as to improve health, quality of life, and achieve total well-being.

This new concept goes well beyond absence of disease and optimal fitness. *Wellness incorporates* such aspects as *adequate fitness, proper nutrition, stress management, disease prevention, spirituality, smoking cessation, personal safety, substance abuse control, regular physical examinations, health education, and environmental support* (Figure 1.5). Not only must the individual be physically fit and manifest no signs of disease, but there must also be an absence of risk factors for disease (hypertension, hyperlipidemia, cigarette smoking, negative stress, faulty nutrition, etc.). The relationship between adequate fitness and wellness is illustrated in the wellness continuum in Figure 1.6. While an individual tested in a fitness center may demonstrate adequate fitness on all health-related components, indulgence in other unhealthy lifestyle behaviors will still cause an increase in risk for chronic diseases and decrease the person's well-being.

FIGURE 1.5

Wellness Components

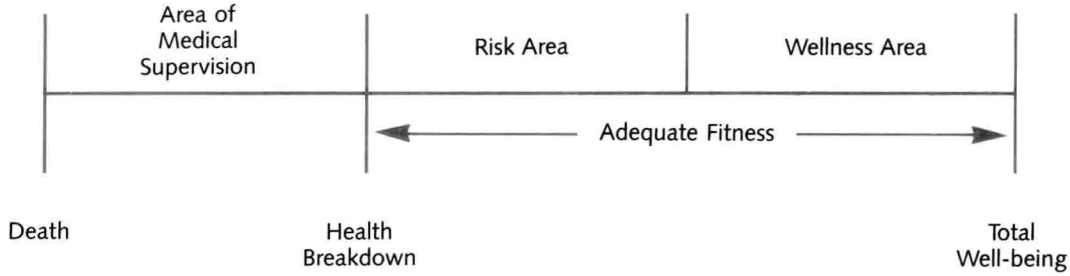
MAJOR HEALTH PROBLEMS IN THE UNITED STATES

The most prominent health problems in the United States today are basically lifestyle related (see Table 1.2). According to some research, *over 50 percent of all disease is self-controlled, 64 percent of the factors contributing to mortality are caused by lifestyle (48 percent) and environmental (16 percent) factors, and 83 percent of deaths prior to the age of sixty-five are preventable.* Most Americans are threatened by the very lives they lead today.

Current statistics indicate that *approximately 70 percent of all deaths in the United States are caused by cardiovascular disease and cancer. Close to 80 percent of these deaths could be prevented through a healthy lifestyle program.* Accidents are the third

FIGURE 1.6

Wellness Continuum



leading cause of death. While not all accidents are preventable, many are. A significant amount of fatal accidents are related to drug abuse and lack of use of seat belts. The fourth cause of death, chronic and obstructive pulmonary disease, is largely related to tobacco use.

The most prevalent degenerative diseases in the United States are those of the cardiovascular system. As shown in Table 1.2, close to half of all deaths in this country are attributed to heart and blood vessel disease. According to the 1987 estimates by the American Heart Association, 66.89 million Americans were afflicted by diseases of the cardiovascular system, including nearly 61 million suffering from hypertension and almost 5 million affected by coronary heart disease. Many of these individuals often suffer from more than one type of cardiovascular disease. Additionally, the 1987 estimated cost of heart and blood vessel disease exceeded $94.5 billion. Heart attacks alone cost American industry approximately 132 million workdays annually, including $15 billion in lost productivity because of physical and emotional disability.

It must also be noted that more than 1.5 million people suffer heart attacks each year, with over half a million of them dying as a consequence of the attack. About 50 percent of the time, the first symptom of coronary heart disease is the heart attack itself, and 40 percent of the people who suffer a first heart attack die within the first twenty-four hours. In one out of every five cardiovascular deaths, sudden death is the initial symptom. About half of those who die are men in their most productive years — between the ages of forty and sixty-five. Furthermore, the American Heart Association estimates that over $700 million a year is spent in replacing employees suffering heart attacks. Oddly enough, most coronary heart disease risk factors are reversible and preventable and can be controlled by the individual through appropriate lifestyle modifications (see Chapter 12).

The second leading cause of death in the United States is cancer. Unlike cardiovascular disease, the mortality rate for cancer has steadily increased over the last few decades (see Figure 1.1). Even though cancer is not the number one killer, it is certainly the number one health fear of the American people. Cancer is defined as an uncontrolled growth and spread of abnormal cells in the body. Some cells grow into a mass of tissue called a tumor, which can be either benign or malignant. A malignant tumor would be considered a "cancer." If the spread of cells is not controlled, death ensues. Approximately 23 percent of all deaths in the United States are due to cancer. Almost 510,000 people died of this disease in 1990, and an estimated 1,040,000 new cases were expected the same year. The overall medical costs for cancer were estimated to be in excess of $20 billion for 1990. Table 1.3 shows the 1990 estimated new cases and deaths for major sites of cancer, excluding nonmelanoma skin cancer and carcinoma in situ.

Testing procedures for early detection of cancer as well as treatment modalities are continuously changing and improving. In fact, *cancer is now viewed as the most curable of all chronic diseases*. Over 6 million Americans with a history of cancer are now alive, and close to 3 million of them can be considered cured. The American Cancer Society now maintains that *the biggest 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*. The basic recommendations include a diet high in cabbage-family vegetables, high in fiber, high in vitamins A and C, and low in fat. Alcohol and salt-cured, smoked, and nitrite-cured foods should be used in moderation. Cigarette smoking and tobacco use in general should be eliminated, and obesity should be avoided.

TABLE 1.2

Leading Causes of Death in the United States: 1987

Cause	Total Number of Deaths	Percent of Total Deaths
1. Major cardiovascular diseases	963,611	45.4
2. Cancer	476,927	22.5
3. Accidents	95,020	4.5
4. Chronic and obstructive pulmonary disease	78,380	3.7
5. All other causes	509,385	24.0

Source: Advance Report of Final Mortality Statistics, 1987. National Center for Health Statistics. U.S. Department of Health and Human Services.

BENEFITS OF PHYSICAL FITNESS AND WELLNESS PROGRAM PARTICIPATION

A most inspiring story illustrating what fitness can do for a person's health and well-being is that of George Snell from Sandy, Utah. At the age of forty-five, Snell weighed approximately 400 pounds, his blood pressure was 220/180, he was blind because of diabetes that he did not know he had, and his blood glucose level was 487. Snell had determined to do something about his physical and medical condition, so he started a walking/jogging program. After about eight months of conditioning, Snell had lost almost 200 pounds, his eyesight had returned, his glucose level was down to 67, and he

TABLE 1.3

Estimated Deaths and New Cases for Major Sites of Cancer: 1990.

	Estimated New Cases			Estimated Deaths		
	Total	Male	Female	Total	Male	Female
Lung	157,000	102,000	55,000	142,000	92,000	50,000
Colon-Rectum	155,000	76,000	79,000	60,900	30,000	30,900
Breast*	150,900	900	150,000	44,300	300	44,000
Prostate	106,000	106,000	—	30,000	30,000	—
Pancreas	28,100	13,600	14,500	25,000	12,100	12,900
Urinary	73,000	51,000	22,000	20,000	12,600	7,400
Leukemias	27,800	15,700	12,100	18,100	9,800	8,300
Ovary	20,500	—	20,500	12,400	—	12,400
Uterus**	46,500	—	46,500	10,000	—	10,000
Oral	30,500	20,400	10,100	8,350	5,575	2,775
Skin***	27,600	14,800	12,800	8,800	5,700	3,100

*Invasive cancer only
**New cases total over 50,000 if carcinoma in situ is included
***Estimates are over 600,000 if new cases of nonmelanoma are included

Source: From 1990 *Cancer Facts and Figures*. American Cancer Society.

was taken off medication. Two months later, less than ten months after initiating his personal exercise program, he completed his first marathon, a running course of 26.2 miles.

Most people exercise because it helps improve personal appearance and it makes them feel good about themselves. While there are many benefits to be enjoyed as a result of participating in a regular fitness and wellness program, and although there are indications that active people live a longer life (Table 1.1), the greatest benefit of all is that physically fit individuals enjoy a better quality of life (Figure 1.7). These people live life to its fullest potential, with fewer health problems than inactive individuals who may also be indulging in negative lifestyle patterns. Although it is difficult to compile an all-inclusive list of the benefits reaped through fitness and wellness program participation, the following list provides a summary of many of these benefits:

FIGURE 1.7

Regular participation in a lifetime exercise program increases quality of life and longevity.

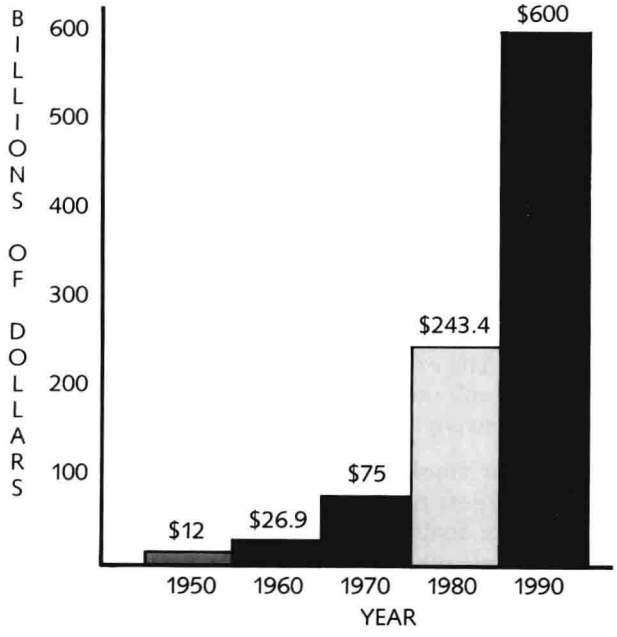
1. Improves and strengthens the cardiovascular system (improved oxygen supply to all parts of the body, including the heart, the muscles, and the brain).
2. Maintains better muscle tone, muscular strength, and endurance.
3. Improves muscular flexibility.
4. Helps maintain recommended body weight.
5. Improves posture and physical appearance.
6. Decreases risk for chronic diseases and illness (coronary heart disease, cancer, strokes, high blood pressure, etc.).
7. Decreases mortality rate from chronic diseases.
8. Decreases risk and mortality rates from accidents.
9. Helps prevent chronic back pain.
10. Relieves tension and helps in coping with stresses of life.
11. Increases levels of energy and job productivity.
12. Increases longevity and slows down the aging process.
13. Improves self-image and morale and aids in fighting depression.

14. Motivates toward positive lifestyle changes (better nutrition, smoking cessation, alcohol and drug abuse control).
15. Decreases recovery time following physical exertion.
16. Speeds up recovery following injury and/or disease.
17. Eases the process of childbearing and childbirth.
18. Regulates and improves overall body functions.
19. Improves physical stamina and helps decrease chronic fatigue.
20. *Improves quality of life; makes people feel better and live a healthier and happier life.*

In addition to the many health benefits, the economical impact of sedentary living has left a strong impression on the nation's economy. As the need for physical exertion steadily decreased in the last century, the nation's health care expenditures dramatically increased. Health care costs in the United States totaled $12 billion in 1950. In 1960 this figure reached $26.9 billion, in 1970 it increased to $75 billion, in 1980 health care costs accounted for $243.4 billion, and in 1990 they soared over $600 billion (Figure 1.8). If this rate of escalation continues, health care expenditures could double every five years. The 1990 figure represents over 10 percent of the gross national product. Experts have also indicated that by the year 2000, health care could consume 17 percent of the gross national product.

FIGURE 1.8

U.S. Health Care Cost Increments since 1950.



There is now strong scientific evidence linking fitness and wellness program participation not only to better health, but also to decreased medical costs and improved job productivity. Most of this research is being conducted and reported by organizations that have already implemented fitness or wellness programs. This is due to the fact that approximately 50 percent of the health care expenditures in the United States are being absorbed by American business and industry. As a result of the recent staggering rise in medical costs, many organizations are beginning to realize that it costs less to keep an employee healthy than to treat him/her once sick. Consequently, health care cost containment, through the implementation of fitness and wellness programs, has become a major issue for many organizations around the country. Let's examine the evidence:

The backache syndrome, usually the result of physical degeneration (inelastic and weak muscles), costs American industry over $1 billion annually in lost productivity and services alone. An additional $250 million is spent in workmen's compensation. The Adolph Coors Company in Golden, Colorado, which offers a wellness program for employees and their families, reported savings of more than $319,000 in 1983 alone through a preventive and rehabilitative back injury program.

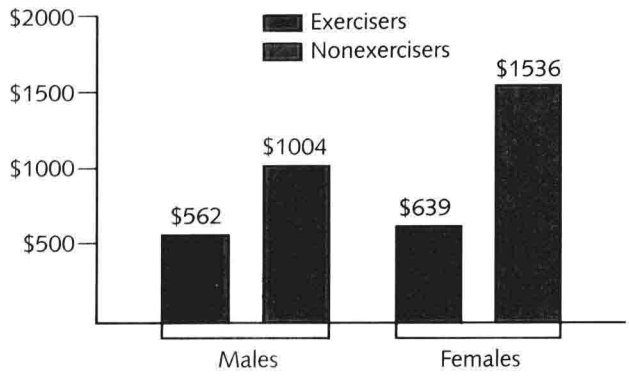
The Prudential Insurance Company of Houston, Texas, released the findings of a study conducted on its 1,386 employees. Those who participated for at least one year in the company's fitness program averaged 3.5 days of disability, as compared to 8.6 days for nonparticipants. A further breakdown by level of fitness showed no disability days for those in the high fitness group, 1.6 days for the good fitness group, and 4.1 disability days for the fair fitness group.

The Mesa Petroleum Company in Amarillo, Texas, has been offering an on-site fitness program since 1979 to its 350 employees and their family members. A 1982 survey showed an average of $434 per person in medical costs for the nonparticipating group in the company, while the participating group averaged only $173 per person per year. This represented a yearly reduction of $200,000 in medical expenses. Sick leave time was also significantly less for the physically active group — twenty-seven hours per year as compared to forty-four for the inactive group.

Data analysis conducted by Tenneco Incorporated in Houston, Texas, in 1982 and 1983 showed a significant reduction in medical care costs for men and women who participated in an exercise program (see Figure 1.9). Annual medical care costs for male and female exercisers were $562 and $639 respectively. For the nonexercising group, the costs

FIGURE 1.9

Annual Medical Care Costs for Tenneco Incorporated, Houston, Texas: 1982-83.



From *"New Fitness Data Verifies: Employees Who Exercise Are Also More Productive."* Athletic Business 8(12):24-30, 1984.

were reported at $1,004 for the men and $1,536 for the women. Sick leave was also reduced in both the men and women participants. Furthermore, a survey of the more than 3,000 employees found that job productivity is related to fitness. The company reported that individuals with high ratings of job performance also rated high in exercise participation.

Strong data is also coming in from Europe. Research in West Germany reported a 68.6 percent reduction in absenteeism by workers with cardiovascular symptoms who participated in a fitness program. The Goodyear Company in Norrkoping, Sweden, indicated a 50 percent reduction in absenteeism following the implementation of a fitness program. Studies in the Soviet Union report increased physical work capacity and motor coordination, lower incidence of disease, shorter illness duration, and fewer relapses among individuals participating in industrial fitness programs. In the Federal Republic of Germany, the law mandates that corporations employing workers with jobs sedentary in nature must provide an in-house facility for physical exercise.

Another reason why some organizations are offering wellness programs to their employees, and one that is overlooked by many because it does not seem to directly affect the bottom line, is simple concern by top management for the physical well-being of the employees. Whether the program helps decrease medical costs is not the primary issue for its implementation. The only reason that really matters to top management is the fact that wellness programs help individuals feel better about themselves and help improve quality of life. Such is the case of Mannington Mills Corporation, which invested $1.8 million in an on-site fitness center. The return on investment is secondary to the company's interest in happier and healthier employees. The center is also open to dependents and retirees. As a result of this program, Mannington Mills feels that the participants, about 50 percent of the 1,600 people eligible, can enjoy life to its fullest potential, and the employees will most likely be more productive simply because of the company's caring attitude.

In addition to the financial and physical benefits described, many corporations are using wellness programs as an incentive to attract, hire, and retain employees. *The information presented in this book, along with a lifetime commitment to a fitness and wellness program, may prove to be extremely valuable to the reader.* Many companies are now taking a hard look at the fitness and health level of potential employees and are seriously using this information in their screening process. As a matter of fact, some organizations refuse to hire smokers and/or overweight individuals. On the other hand, many executives feel that an on-site health promotion program is the best fringe benefit they can enjoy at their corporation. Young executives are also looking for such organizations, not only for the added health benefits, but because an attitude of concern and care is being shown by the head corporate officers.

THE WELLNESS CHALLENGE FOR THE 1990s

Since a better and healthier life is something that every person needs to strive to attain individually, the biggest challenge that we face in the next few years is to teach people how to take control of their personal health habits by practicing positive lifestyle activities that will decrease the risk of illness and help achieve total well-being. With such impressive data available on the benefits of fitness and wellness programs, it is clear that improving the quality and possibly longevity of our lives is a matter of personal choice.

Researchers have indicated that *practicing simple positive lifestyle habits can significantly increase health and longevity.* These are:

1. **Participate in a lifetime exercise program.** Engage in regular exercise three to six times per week. The exercise program should consist of 20 to 30 minutes of aerobic exercise, along with some strengthening and stretching exercises.
2. **Do not smoke cigarettes.** Cigarette smoking is the largest preventable cause of illness and premature death in the United States. When considering all related deaths, smoking is responsible for over 350,000 unnecessary deaths each year.
3. **Eat right.** Eat a good breakfast and two additional well-balanced meals every day. Refrain