CHAPTER 1

THE U.S. ARMY WAR COLLEGE AND THE ROAD TO EXECUTIVE HEALTH AND FITNESS

John Duncan, Mark A. Vaitkus, and William F. Barko

INTRODUCTION

The pace of an executive's day can match the speed of the information super highway. Many executives rise between 5:00-6:00 a.m., some earlier. Turn on the home computer. Make coffee. Read their e-mail. Read the paper. Shower. Drink Java. Hit the road. Commute times often exceed one hour during which time they are frequently tied up in heavy traffic, on the cell phone, using spare minutes to conduct business on the freeway while finishing the rest of their coffee. Arrive at their office. Peruse their e-mail. Answer calls. Attend a series of meetings throughout the day, continuing to down more coffee, which may be supplemented by an occasional donut or snack. A light lunch follows—maybe even a quick hot dog with chili or a candy bar for sustenance. Then more afternoon meetings and conferences. Call home—"I'll be late." Grab some snack food and keep moving. Now the drive home—traffic is tied up even at 7:00-8:00 p.m. On some days, after arriving home there are the scheduled children's activities—soccer, gymnastics, or any number of sports or club activities. Executives often eat on the run or in the car, or have a big dinner late at home, usually food high in fat content. The fast food consumed throughout the day is invariably high in fat. Once the action of the day has ceased, they may try to decompress and watch some TV, perhaps one of the many college basketball games on the tube. Before they know it, their heads are rolling asleep in their easy chairs. They head for bed, from where a few hours later, the day starts all over again.

Today's senior leaders and executives face the multiple challenges of achieving effective organizational performance while optimizing their own performance by maintaining peak levels of personal health and fitness. However, the intensity of government and corporate life can be overwhelming. We demand faster access to information, quicker decision cycles, increased productivity, and measurable improvements on our watch, often with an implied if not explicit zero-defects result. We are constantly connected to the work realm by computers, pagers, cell phones, and video conferencing. We become impatient with delays in traffic or the Internet, and even gulp down our food as quickly as possible during mealtime. We may live out of our vans and SUVs, or in airport terminals. We can frequently end up doing business every spare waking moment. We actually hope that someday we can find a way to work faster and yearn for a method to maintain the high pace of life on a continuing basis. Our society is continually obsessed with the superman/superwoman model for living. However, this road is paved with significant hazards.

Over the last 18 years, the U.S. Army War College (USAWC) has developed a model for health and fitness maintenance of its senior leaders. The model is integrated into the college's year-long curriculum, which itself focuses on the strategic arts of war and peace. This chapter shares the results of our experience with the health maintenance model, including data summaries as well as scientifically based recommendations for maintaining a high level of health and fitness. Drawing on our experience with senior leaders, we will emphasize the importance of self-discipline in managing the daily stressors and demands of an executive life-style. The present book is not a practitioner's guide or a formula for super-performance, but it is constructed on a foundation of proven success and provides serious food for thought for leaders who want to combine healthy living with a busy, active career.

STEADY PROGRESS BUT STILL A LONG WAY TO GO

With the dawn of the 21st century, we continue to create a society full of fantastic conveniences, instant communications, and creature comforts unimagined just a few decades ago. Yet how many of these advances have led to healthier minds and bodies?

Admittedly, vast arrays of new drugs and medical procedures have exploded on the scene. In addition, the World Wide Web has put an almost infinite variety of scientific data and research findings at the fingertips of the average individual. Although the health care delivery system still has some shortcomings and we have no universal health insurance program, Americans arguably have liberal access to the most advanced medical technology in the world. But are we healthier?

Certainly, our standard of living has never been higher. We are richer and living longer than ever before. Good health, however, is more than simple longevity and per capita income. Are we developing and maintaining our bodies and minds to truly enjoy the fruits of all our achievements? We are not simply discussing old age and retirement here, but healthy

lifestyles that enable us and our subordinates to be as productive as we can be right now.

For the most part, it is taken for granted that with the right medical intervention we can survive everything from heart disease to cancer. Survival rates have indeed surged upward as our medical system (at a significant price!) helps us become more adept at managing disease. Yet what about preventing disease in the first place? The data show we are doing far less well on that front.

- Despite a 56% decline in the death rate from heart disease since 1950, heart attack rates remain high and are projected to go higher along with other forms of cardiovascular disease. [1]
- Over half of Americans do not exercise regularly, and 25% are completely sedentary, this in spite of the swelling, media-driven sales of exercise equipment, shoes, and gear. [2]
- Obesity is at epidemic proportions—the National Institutes of Health now considers 97 million American adults, or more than one out of three, to be over weight. [3] We are eating more than ever as serving sizes continue to balloon. All-you-can-eat buffets continue to rise in popularity.
- It's not just how much we eat, it's what we eat. Fast food and saturated fats make up a growing pro portion of our diets as reflected in the fact that over half of Americans have cholesterol levels above 200. [4]
- Smoking has declined since mid-century, but one out of four people still smokes and rates appear to be rising among young people. [5]
- Stress and its expression in terms of anger, hostility, depression, and violence, both at home and in the work place, continue to be high. It is estimated that 70% of visits to primary care physicians are related to stress and life-style. [6] The biological connection between psychological stress and reduced immune response to infectious disease has been well demonstrated. [7]

Infectious diseases were the leading causes of death in the early 1900s. [8] In early 2000, computers, remote control television, automobiles, and riding lawn mowers are doubtless leading contributors to impaired health and shortened lives. Such labor and timesaving devices have contributed to a life-style of decreased physical activity and increased body weight. The trend toward fatter and less fit individuals is projected to worsen further as the technological improvements converge with an increasing population of older Americans. [9] The health care burden of a sedentary and overweight population could be enormous, threatening the economic stability of the entire health care system.

Physical inactivity and obesity impose both a direct and indirect cost on each person. In economic terms, the medical costs of obesity and physical inactivity together are reported to exceed 94 billion dollars, or 9.4% of national health care expenditures. [10] In human terms, obesity and physical inactivity lead to both a poor quality and quantity of life. The mortality rates for those leading sedentary life-styles are reported to be as much as 60% higher compared to more physically active counterparts. [11] Similarly, mortality rates among the obese are considerably higher than those who maintain an appropriate body weight. Additionally, people who are sedentary and/or obese are admitted to the hospital with greater frequency and are more likely to have frequent pain associated with various chronic diseases, such as arthritis and cardiopulmonary disease. [12]

Any hope for improved prospects for our children is unwarranted. They are on their way to becoming even fatter and more sedentary than we are. Most disturbing is the fact that physical activity or physical education is no longer a part of the curriculum of many elementary and secondary school systems across America. A sedentary and obese life-style could develop into a tragic health situation down the road, since health behaviors adopted early in life are generally maintained throughout adulthood. We are creating a generation of cyberbound health disasters. In fact, research reveals that significant fatty streaks and deposits in the arteries are already detectable by early adolescence in many Americans. [13] As more women enter the work force and America's global economic dominance continues, there are signs that these bad health habits are proliferating both here and abroad.

Most people do not appear ignorant of key disease and health risk factors. We don't seem to need more educational seminars, videos by fitness gurus, and machines and books emblazoned with the likeness of Suzanne Somers. However, the question remains: why, with all the convincing research results frequently trumpeted by the media, has the impact on the general population been so minimal? Moreover, as indicated above, this trend is affecting the rest of the planet. The World Health Organization reported in 1999 that "heart disease will be the largest single cause of the disease burden globally by 2020." For the most part, we still have not changed our ways, and these life-style patterns are emerging on a global scale.

The message of this book is that we cannot target these issues at the individual level alone, or hope that some magic pill will solve our health problems. *Actions must occur at the organizational and institutional level*s. Unless good health habits are embedded in one's culture, improvement will take place only on a piecemeal, catch-as-catch-can basis.

WHY LEARN FROM ARMY WAR COLLEGE STUDENTS?

Military students who come to the USAWC are selected for their demonstrated leadership skills and potential for strategic leader positions in the future. They are in their early 40s, are married, with an average of three children, have held some 15 different jobs or assignments, and have served in the military about 20 years. From this group will come the general officers of tomorrow. They are both successful products of the American military culture and highly talented instruments for its shaping. These are the men and women who wrote the final chapters of the Cold War, defeated Iraq in Operation Desert Storm, oversaw the greatest reduction of personnel and unit dismantling since World War II, and continue to perform peacekeeping missions in dozens of hotspots around the globe. By any measure, they have accomplished incredible feats of organizational leadership. To meet the challenges they have faced in their 20 or more years of military service, these officer students have developed a set of coping strategies that have enabled them to rise to the top while maintaining their physical health, a stable family life, and a grounded sense of emotional and spiritual well-being and purpose. Chief among these strategies is a commitment to fitness and exercise, emphasized and reinforced by the military institution itself. In this book, we will reveal how this group of leaders achieves its superior health and fitness, what they must do to continue along this track even after retirement, and what civilian institutions can do to help ensure similar outcomes. In these pages are the tested and invaluable lessons that every senior leader of the 21st century should know and act upon.

THE ARMY PHYSICAL FITNESS RESEARCH INSTITUTE

In 1982, the Surgeon General of the U.S. Army directed the establishment of the Army Physical Fitness Research Institute (APFRI) on the grounds of the USAWC in Carlisle, Pennsylvania. Its mission was to develop a comprehensive health and fitness program designed to fit the needs of senior middle-aged officers. A key focus was reducing the risk of cardiovascular disease. Over the years, the APFRI staff designed programs for stopping smoking, lowering blood pressure, cutting down on dietary sugar, fat, and cholesterol, managing stress, and improving body flexibility, strength, and aerobic fitness.

Integral to the APFRI program is a comprehensive health and fitness assessment that students are invited to complete. This assessment includes the following elements:

- Aerobic fitness by treadmill testing
- Body strength testing using progressive weights
- Flexibility testing involving full range of motion
- Body composition testing including multiple measures of body fat percent age and distribution
- Blood pressure measurement
- Blood sugar and serum cholesterol testing
- Anger, hostility, and depression surveys

Measurement of coronary artery calcium employing Electron Beam Computed Tomography (EBCT) was added in 1999. This ultrafast heart scan provides actual pictures of calcified plaque buildup in the coronary arteries. Unlike cholesterol, for example, which is a *risk factor* for heart disease, the EBCT provides a *direct indicator* of the early stages of atherosclerosis.

Although certain measurements have been added, changed, or dropped over the years, there now exists a health and fitness database on over 5,000 officers collected since 1982. It is arguably the largest such database compiled on organizational leaders in the world. The data that follow are taken from this 17-year research effort.

FITNESS PROFILE OF THE ARMY WAR COLLEGE STUDENT

Can you learn anything from the data associated with the health and fitness of our students? Are there clues to support a series of recommendations on how to maintain a healthy life-style? We will let you, the reader, be the judge, but the following information should provide a useful snapshot of a healthy and fit senior leader in any case.

In terms of a person at low risk for coronary heart disease, the snapshot would look like this:

- Blood cholesterol 160 to 199 mg/dl

- HDL (good cholesterol) ³ 45 mg/dl in men or ³ 55 in women

- LDL (bad cholesterol) < 130

- Blood pressure < 120 mm Hg systolic and < 80 mm Hg diastolic
- Nonsmoker
- No diabetes mellitus [14]

Blood Cholesterol Levels . Abnormal blood cholesterol levels are associated with increased risk for early onset of coronary heart disease. Low-density lipoproteins (LDL or bad cholesterol) are significantly lower in our students than in the typical middle-aged population, while high-density lipoproteins (HDL or good cholesterol) are significantly higher. Our population not only has a significantly higher percentage of healthy individuals, but also a significantly lower percentage of individuals with the highest risk or worst scores.

One could argue that these comparisons are unfair since USAWC males comprise a select population. However, based on statistical analysis of our data, we are confident that our USAWC students' health profiles are significantly influenced by their life-style and commitment to a regular exercise program. Moreover, USAWC students do not suffer from diabetes. They are screened for this disease during their military careers. Our research suggests that USAWC students probably have less arterial calcification as indicated by the EBCT test than their age group counterparts. Over 70% have a score of zero, or no measurable calcification.

Cholesterol Levels (High Risk)	USAWC Males (40-45) % of Population	U.S. Middle Agers % of Population
Cholesterol (240)	14	About 25
HDL (<35)	9.9	About 20
LDL (>160)	16	About 25

Smoking . Smoking remains the number one modifiable risk factor for heart disease, stroke, lung cancer, and a host of other deadly maladies. [15] Smokers have a 70% higher risk for cardiovascular disease than nonsmokers do, and those who smoke two or more packs a day run two to three times the risk. [16] Smoking also compounds the risk associated with other risk factors such as being overweight and having high cholesterol. [17] Even among those who have smoked heavily, however, the risk reduction benefits for quitting are immediate and grow over time. [18]

Despite years of government health warnings, the availability of cessation programs, patches, and gums, the reduction of public places that allow smoking, and even confessions from the cigarette industry concerning its dangers, smoking continues to be a national pastime. The latest figures from the Centers for Disease Control and Prevention show that 22.9% of Americans still smoke regularly, a number that rises to 28% of young people aged 20-24. The costs of smoking in terms of health care expenditures and lost worker productivity are staggering and growing.

Back in the early 1980s, officers at the USAWC looked very much like their civilian counterparts—an average of 30% smoked. Today that figure is less than 4% for men and 0% for women. This steep and steady decline over the last two decades is a testament to the health education effort in the military that was *institutionally reinforced* by the continuous projection of the ideal image of the non-smoking officer—healthy, strong, and successful. Without a military leadership determined to maintain and realize this ideal, it is doubtful whether such a remarkable life-style change could have been achieved, regardless of the individual level of motivation to kick the habit. Education and socioeconomic status also affect this outcome, since smoking rates are still high in the enlisted ranks, but the power of institutionally linking career success and tobacco avoidance, at least informally, should not be underestimated.

Weight and Body Fat. Obesity is the second leading cause of preventable death in the United States, and has been linked to such conditions as high blood pressure, diabetes, high cholesterol, gallbladder disease, osteoarthritis, respiratory problems, and breast, prostate, and colon cancers. [19] Its role in many of these conditions also helps account for its association with an increased risk for cardiovascular disease and death. [20]

Unfortunately, the percentage of overweight Americans has gone up substantially since 1980, rising from about 25% to 35% of the population. [21] Although the measure used to calculate these numbers (Body Mass Index or BMI) is the subject of much debate, a recently published study in the *New England Journal of Medicine* that followed more than a million U.S. adults from 1982 to 1996 showed convincingly that those at the upper end of the BMI scale had a substantially higher risk

of death from all causes than those in the middle BMI range. [22] The difference was most visible among those who had never smoked and had no prior history of disease.

"Overweight" is defined as having a BMI greater than or equal to 27.8 kg/m 2 for men and 27.3 kg/m 2 for women. [23] By this definition, about 36% of U.S. men and 41% of women in their 40s are overweight; the percentages at the USAWC are 22.5% and 7.2% respectively. Unlike the figures associated with smoking, the BMI numbers have not been declining at the

USAWC, and there is some indication they might be rising as in the civilian population. Still, the relatively healthy lifestyle of these officers, especially with respect to aerobic and strength training, which helps reduce body fat, is reflected here, especially for women. The fact that a concerted institutional effort to reduce body weight in accordance with the BMI has not yet occurred (as it did for smoking) probably accounts for the finding that the differences, particularly for men, are not even greater.

The real culprit, at least for heart disease, may be abdominal body fat instead of simple body fat. [24] Thus, in addition to BMI standards, the National Heart, Lung, and Blood Institute emphasizes that waist size should not be over 40 inches for males and 35 inches for females. [25] Based on these criteria, USAWC officers do very well, with less than 2% of men and 4% of women falling over the cutoff. However, with regard to such indicators as waist-to-hip ratio, 7.which has not been found to be superior to simple waist measurement in predicting disease, and other proposed indicators, standards change depending on the study. [26] But even if we agree with Dr. T. S. Han and his associates that a waist over 37 inches for men and 32 inches for women is a safer cutoff in terms of heart disease risk, the proportions of USAWC officers who require slimming down are still less than 16% and 12% of men and women, respectively. [27]

While there is work to do among USAWC students to reduce weight and abdominal body fat, they definitely have a better starting point than their civilian counterparts. Obesity is due to a relatively high caloric intake that is not matched with appropriate energy expenditure from physical activity. For both groups, the basic prescription is the same—better diet and smaller serving sizes. And even among the fairly fit, more exercise helps.

"Bad genes" is a poor excuse to do nothing. Pima Indians living in Arizona have among the highest prevalence rates of obesity and type II diabetes in the world; yet, Pima Indians living in Mexico have markedly lower body weights and diabetes rates.[28] Similarly, twin studies have reported one twin can be of normal weight while the other twin is obese.[29] These data show it is possible for identical twins to share the same genetic make-up, but to have different body weights. Thus, there is little doubt that diet and physical activity habits can exert a major role in preventing weight-related diseases despite genetic influence.

Recent dietary studies report weight losses as small as 5–10% of body weight often produce the same health benefits as more substantial weight loss.[30] Even a five to ten pound weight loss has been shown to significantly lower resting blood pressure and cholesterol levels.[31] Thus even a very modest weight loss is vastly better than no loss at all.

Physical Activit y. Many leaders spend 14-16 hours a day meeting an agenda considered important, but they often forget a critical element—their bodies need exercise. We often delay it because "it is not related to the mission at hand." However, scientific studies continue to demonstrate the importance of regular exercise in sustaining a healthy life-style. The American College of Sports Medicine (ACSM) recommends an exercise program that develops aerobic capacity, flexibility, and strength, as follows:

· Aerobics—20-60 minutes of continuous aerobic exercise on most days. This can be as simple as a brisk walk or a continuous activity in which you break a sweat.

· Flexibility—static stretches with a focus on lower back and thighs, minimum of three times a week. Generally a daily stretching routine is desirable.

· Strength—up to 10 separate exercises that train the major muscle groups; start with one set then progress to two sets of 8–12 repetitions each until the point of fatigue. [32]

The message is clear—"get exercise or die early." Many best-seller books have been based on a variation of the ACSM model. The Surgeon General's 1996 report, *Physical Activity and Health,* unequivocally declares that lack of exercise is detrimental to health. The report goes 8.on to explain, "For optimal health, people of all ages should be physically active on most days because the early onset of heart disease and other medical problems correlates with the lack of physical activity."[33] This simply means the more you exercise, the better your health. Those that get more exercise seem to have a

lower incidence of disease and death that flowfrom heart disease and a number of cancers.

There is sufficient epidemiological evidence to suggest that if sedentary people begin exercising on a regular basis, the risk of developing heart disease will be lowered by approximately 50%.[34] Thus, the question isn't whether regular exercise reduces the risk of heart disease, but the intensity that is required to confer this protective benefit. Research from the 1970s and 1980s suggested that the pathway to good health was vigorous exercise.[35] However, a study published by John Duncan and associates in the early 1990s reported that women who walked 3 miles per day, 5 days a week, at a strolling pace (20-minute miles) achieved health benefits similar to those of women walking the same frequency and distance, but at a more vigorous aerobic pace (12-minute miles).[36] These results suggested for the first time that an increase in intensity may not be required to improve cardiovascular risk. Since then, other studies have reported similar results.

Other recent developments regarding the appropriate exercise prescription focus on the quantity of exercise required. Previous studies associated health benefits with continuous type exercise for the full 30 minutes or more of the workout. Recent data show that intermittent or shorter bouts of activity of at least 10 minutes, with an accumulation of at least 30 minutes or more per day, yield similar health improvements.[37]

In addition, accumulating minutes of exercise throughout the day may be more convenient for some people. Indeed, a recent study has shown better compliance in adopting and maintaining an active way of life among those who accumulated the minutes at their convenience throughout the day.[38] This type of exercise workout plan seems well-suited for those who lack time to exercise 30 minutes or more in a single session.

Aerobic Exercise. Results from almost all major scientific studies demonstrate that exercise assumes a role in both the primary and secondary prevention of heart disease, improves mental health, and is associated with a decreased risk of contracting cancer. However, "the slacking off of physical activity is becoming a worldwide phenomenon."[39] The Surgeon General, the American Heart Association, and the American College of Sports Medicine each recently published papers emphasizing the importance of exercise—to cite a few of the many available reports.

At the USAWC we have tested over 5,000 students for aerobic fitness using a maximal stress treadmill test. This test measures aerobic capacity and is nationally normed in such a way that we can compare the aerobic health of the senior military leaders with other middle-aged adults. Regarding aerobic health, our average male USAWC students are between the 80th and 85th percentiles on the scale encompassing all U.S. males. Numerous studies show a correlation between aerobic fitness on one hand, and lower cholesterol and reduced risk for diabetes and early onset of coronary heart disease on the other—thereby implying a link between aerobic fitness and decreased age-based deaths. The results for our 9.women are equally significant. Though our sample size consists of only 145 women, their aerobic fitness demonstrates a close match with male profiles. These female leaders are robust and athletic, obviously having adopted a personal health and fitness ethic.

Inherent in the military culture, whether Army, Navy, Marine, or Air Force, is the requirement to pass periodic fitness tests. These tests measure both aerobic fitness (running test) and strength-endurance (at a minimum, sit-ups and push-ups). Military careers depend on maintaining a good level of physical fitness. These criteria alone establish an expectation different from that prevailing in the corporate world. Yet, being "fit to fight" may also provide long-term health benefits. Those early morning physical training sessions may increase the tendency to maintain a lifetime commitment to personal fitness.

Evidence that being more physically active leads to healthier outcomes is simply too persuasive to ignore, yet less than 10% of physicians advise and encourage their patients regarding appropriate dietary or physical activity guidelines. Communities, schools, and other public agencies can play an important role in developing and implementing effective life-style programs, but currently they have a long way to go. Any organization, however, can benefit from incorporating fitness as part of its culture. At this stage in the evolution of

American health, it remains counterintuitive to assume that a business will invest a significant percentage of its income on health insurance without making a corresponding investment in the best bargain for health—fitness programs. Indeed, The American Heart Association's statement on exercise as it relates to employers and community groups recommends such programs.

Employers can make available appropriate space for walking indoors, set aside time during lunch to walk, or offer exercise incentives (financial or cost sharing with employee benefits). Signs can be strategically placed at stairwells encouraging their use and inducements can be extended for employees to park in remote lots and walk to the office. There is increased evidence that work site programs with a comprehensive approach to employee health, including prevention or cessation of

smoking, dietary intervention, and exercise, whether on site or nearby (e.g. schools, parks, malls), are not only effective in modifying coronary risk factors but also help reduce absenteeism, accidents, health care costs, hospital admissions, and days of rehabilitation.[40] An investment in a comprehensive fitness program is thus not only an organizational lifesaver but also good business.

Strength . In 1991, William Evans and Irwin Rosenberg published *Biomarkers: The 10 Keys to Prolonging Vitality.* In the book, these two Tufts University experts discuss ways to preserve personal vitality and "postpone entry in the disability zone."[41] Their recommendations emphasize the necessity of regular strength training as part of a personal fitness program. Most of the popular news media stress aerobic fitness—running, biking, swimming, etc.—but Evans and Rosenberg present a convincing argument for middle agers to make strength the prime component of an exercise program. More recently, Dr. Kenneth Cooper, internationally noted expert on health and fitness, reemphasized the importance of strength training in a comprehensive health and fitness program. He also noted the need to increase strength training as one progresses through middle age and into the later years. Controlled research studies demonstrate the importance of continued strength training through life. It is never too late to start, even for people 80 years and older. The numerous benefits of an integrated strength program will:

- Increase metabolism and therefore burn more calories
- Reduce body fat and in crease body leanness
- Increase aerobic capacity, reducing that winded feeling
- Trigger muscles to use more insulin, reducing risk for adult onset of diabetes
- Maintain higher level of HDL (good cholesterol), which is associated with reduced risk for heart disease. [42]

Most importantly, a regular strength training regiment will help reduce the loss of muscle mass as we age. A comprehensive program of aerobic, flexibility, and strength maintenance provides us the opportunity to be as young as we can be for as long as possible. As you age you will need far less assistance in your daily activities than those who lead sedentary lives. It is critical to begin a regular strength program now. It will provide benefits for a lifetime.

USAWC students have shown significant improvements in strength since 1983. As with improvements in reduced smoking habits, the students have increased average strength in almost all years. From 1995 to 1999, the students averaged within the 75-80th percentile of national norms as reported by the American College of Sports Medicine. This means that most male students can lift their weight in a one-repetition maximal lift, while most women can lift over 65% of their weight. Why such excellent performance from middle-age senior leaders whose schedules are as hectic as those of American corporate leaders? We think they have responded positively to recent information on the importance of strength training and integrated it into their personal exercise programs.

That level of commitment may appear intimidating to non-exercisers. For this reason, many people may avoid health clubs or weight rooms. The equipment looks complicated to work with and many of the people who regularly use such facilities appear fitter than the average person. It is important to avoid allowing such perceptions to deter one from adopting a consistent weight-lifting routine. A number of strength-building exercises can be performed in your home that involve little or no equipment. In order to make a difference in your overall health, it is important to design a program that will work specifically for you.

Stress. The experience of stress is a normal part of everyday life. In order to adapt to a perceived threat or challenge, the mind and body react by producing adrenaline and cortisol surges, increasing blood pressure, blood flow, and heart and respiration rates. In this manner, humans prepare to deal with the stressor either by fighting or evading it. Some stress, or "good stress," is healthy and enables us to perform at our best when the situation demands it, thus effectively dispatching the stressor. On the other hand, "bad stress" ensues when the stressors become continuous and overwhelming, thus eventually leading to a chronic stress response that can harm the immune system.

In his study of successful aging, Dr. Kenneth Cooper refers to bad stress and its effects as "energy sappers" that drain away youth.[43] Whether due to time pressures, financial problems, health worries, constant travel, family difficulties, or information overload, the effects of this type of stress on the body and mind pose health problems. Cooper reports that chronic stress has been linked with hypertension, high blood sugar, high cholesterol, excessive abdominal fat, and blockages in the carotid arteries, as well as reduction of cancer-fighting cells. Chronic stress may also be reflected through such psychological outcomes as anger, anxiety, and depression. Although scientists stop short of saying that stress actually *causes* heart disease and other illness, its role as a contributing factor continues to be convincing.

Potentially destructive stress appears especially acute on the job. The National Institute for Occupational Safety and Health at the Centers for Disease Control and Prevention says that 40% of workers rate their jobs as "very or extremely stressful." A 5-year study by the Families and Work Institute shows that 30% of working Americans often or very often feel

"burned out" by their jobs. With downsizing and increasing numbers of worldwide missions, the military is hardly immune to workplace stress. Indeed, recent Department of Defense surveys reveal that over 38% of military personnel experience "a great deal" or "fairly large amount" of stress at work.

In contrast, merely 22% of USAWC officers report "sometimes or often" experiencing "too much stress" at work, though admittedly they may well have experienced higher stress levels at their previous assignments. A better indicator of how well they *deal with stress* arises from psychological measures such as the State-Trait Anger Expression Inventory (STAXI), which shows that during most years the percentage of officers falling above the 80th percentile on their anger expression scores is below that of the U.S. adult population, that is, between 14% and 17% compared to the national level of 20%.[44] Average anger expression scores have also been lower among USAWC officers compared with civilian adults every year except one. Concerning additional psychological measures of distress, such as the Center for Epidemiological Studies Depression Scale (CESD), our officers also possess lower scores than the general public, with less than 10% reporting symptoms that might indicate a current state of depression.[45] In addition, 92% are "mostly or totally satisfied" with their lives.

There is nothing magical about what helps reduce stress and its deleterious effects. Exercise, social support, and a strong spiritual belief system have been shown in numerous studies to relieve signs of stress, whether they be anger, anxiety, hostility, or depression-related.[46] Our data show similar associations. For example, even though these officers as a whole show a high level of aerobic fitness, those who are *the most fit* are less likely to report being depressed, feeling worried, or having too much work stress and are more likely to report greater life satisfaction.

USAWC officers also benefit from the fact that 94% have someone to turn to when they need support. Most can also rely on their spiritual beliefs and religious group participation to help them cope with life's stressors. Over 72% say they experience the presence of the Divine or God in their lives, more than two-thirds say their religious beliefs are "what really lie behind my whole approach to life," and about half are at least weekly churchgoers. Only 6% never attend church or other religious meetings. Our findings show that the more religious the officer, the less likely that officer is to experience hostility, anger, and depression. Officers who come to the USAWC are hardly super humans. In fact, 25% say they never or seldom find time to relax. The good news, however, is that for those who are feeling stressed out, angry, or depressed, there are *institutional* programs available to help, just as there are for improving strength, flexibility, and diet. As we shall see in later chapters, these programs really work.

PRIMARY PREVENTION OF HEART DISEASE

Primary prevention of heart disease involves identifying the persons at high risk for developing heart disease or someone who is likely to suffer a heart attack, or require bypass or angioplasty surgical procedures. Remarkable advancements are now available for the prevention of heart disease. The American Heart Association recently published recommendations for the identification and treatment of individuals at high risk of developing heart disease.[47]

The recommended strategies included blending state-of-the-art imaging modalities to identify high risk individuals for heart disease with new laboratory markers to determine overall risk. Much attention has focused on new laboratory markers of heart disease, including C-reactive protein, plasma homocysteine, lipoprotein (a) [Lp(a)], fibrinogen, and small dense LDL particles. These laboratory markers measured from blood samples provide new and exciting information regarding the potential process involved in the development of heart disease.

The latest data suggest that both genetics and the inflammatory process may play an important role in the development of atherosclerosis.[48] Furthermore, recent studies have shown the ability of these new blood markers to predict future coronary events, adding substantial predictive value to current cholesterol testing alone.[49] Most exciting is the fact that most if not all of these markers can be changed in a healthy direction by diet, vitamin supplementation, physical activity, or currently available medications.

Thus, the American Heart Association recommends first identifying those at high risk with newer imaging modalities, such as Electron Beam Computed Tomography (see Chapter 3). The second step is to measure traditional heart disease risk factors, such as total cholesterol, LDL, HDL, triglycerides, diabetes, smoking, and blood pressure, along with newer heart disease markers from the blood, including Lp(a), homocysteine, fibrinogen, and C-reactive protein. The third step is to evaluate these data to determine risk category.

For those in the moderate to high-risk groups, the final step is to develop aggressive preventive strategies, including blood pressure control, cholesterol lowering, smoking cessation, dietary restructuring to lower body weight and intake of saturated fat, initiation of a physical activity program, and selection of appropriate vitamin supplements. The recommendations should be adopted only in consultation with and participation of your personal physician. Specifically, the

risk of developing heart disease may be minimized by following these 12 life-style recommendations:

- Stop smoking.
- Make sure resting blood pres sure is nor mal and con trolled (less than 140/90).
- Lower total cholesterol to less than 200 (with weight loss, low fat diet, physical activity, and medication, if necessary).
- Lower LDL cholesterol to less than 100.
- Lower body weight to within 10-15% of appropriate body weight for height.
- Take 400 to 800 mg vitamin E daily.
- Take 500 to 1000 mg vitamin C daily.
- Lower homocysteine levels through increased folate in take and vitamin B6 and B12.
- Get at least 30 minutes of physical activity 5 days per week (start slow with 5-10 minutesof walking and gradually increase duration each week until exercise lasts 30 minutes or more).
- Talk to doctor about taking non-steroidal anti-inflammatory medication if C-reactive protein is elevated.
- Take lipid lowering medication if total cholesterol, LDL, triglycerides, or Lp(a) are elevated.
- For postmenopausal women, talk to doctor about taking estrogen replacements.

At the Army Physical Fitness Research Institute, almost all students volunteer to complete the comprehensive health assessment. After a staff member provides comprehensive feedback of results, many agree to change their habits, begin a new exercise program, and maintain a healthy dietary routine. Despite the idyllic setting of Carlisle Barracks with its excellent facilities, a multi-disciplinary staff, and a supportive culture, however, there are some who do not change. Why? Many excuses for not establishing a consistent program are voiced:

- I do not have time.
- I feel ok, why change?
- It will not affect my bottom line.
- I have other priorities now.
- I know I need to change my life style but I am not ready yet.
- I do not feel comfortable in these modern gym facilities.
- I do not want to look stupid trying to figure out the equipment.

These psychological roadblocks can be overcome with determination and support from family and friends. Too many initiate a diet and/or exercise program only to find themselves back to square one following 3 or more months. Why do people who are informed about the health benefits of regular physical activity and proper diet often fail? The answer may be that they plan to fail rather than fail to plan. For example, many initiate an exercise program at too high an intensity and then succumb to an injury, which derails their entire program.

Others may have unreasonable goals and expectations, such as losing 10 or more pounds per week, or getting in shape in 2 weeks. Still others may not consider obstacles in their life-styles, which prevent successful adoption and maintenance of an active way of life. For example, do you overlook time and place opportunities for working out?

Are you a self-starter or do you need a coach or buddy to provide companionship and accountability? The general guidelines listed below may help you in planning and implementing your program:

- Write down the reasons why you desire to initiate a physical activity program.
- Find a physical activity you like and feel safe doing.
- Choose an activity you can easily access or in corporate into your daily life-style on a regular basis, an activity which does not require specific clothing, facilities, or excessive time and monetary investments.
- Start slow. Set realistic goals initially. Walk for 5 minutes daily for the first week, then add 2 minutes per week until 30 minutes or two 15-minute routines are achieved; lose half a pound per week while on a calorie-reducing diet.
- Set reasonable long-term goals (i.e. walk for 30 minutes or more; lose 5-10% of bodyweight).
- If you miss a few days, just pick it up again. Do not use a periodic lapse as an excuse to quit or allow other demands of life to distract you.
- Vary or cycle the physical activities you enjoy on a weekly or monthly basis to prevent boredom or staleness.
- Keep daily diet/exercise records.
- Walk every opportunity you can. Take your spouse and children with you. Park your car farther away from your office and take the stairs in stead of the elevator.
- Do strength training. It is especially important for your future mobility and quality of life. For example, do more lifting of common household items.
- Find a partner, friend, coach, trainer, or family member to hold you accountable.
- Be a problem solver; analyze the barriers which prevent you from be coming a regular exerciser.
- Buy a dog to take with you on runs; people feel guiltier not exercising Fido than they do not exercising themselves.
- Make physical activity visible in your world; put activity or diet-related information on the refrigerator or place your gym bag at the end of your bed where you can see it in the morning.
- Do not use weather as an excuse. All seasons can provide an enjoyable backdrop for exercise. Simply dress as necessary.
- Reward your self weekly when you accomplish that week’s goal. Go to a movie or out to eat¾ low fat/calorie, of course!)
- Check with your health care provider before implementing a formal program.
- Think Active! Be Active! Recognize the need to balance the use of labor-saving de vices and sedentary activities (watching TV, use of the computer) with activities that involve higher levels of physical activity. Walk or bicycle to the local convenience store instead of driving, walk on the walkway in air ports instead of using moving side walks.

PUTTING IT ALL TOGETHER

Although each of the health and fitness indicators discussed above is important in its own right, they are not independent of one another. Based on our observations and analyses, we propose the model in Figure 1 as a way of understanding how the various components of physical and mental well-being fit together, at least with respect to heart disease. As the model shows, the additive effects of aerobic fitness, strength, good nutrition, social support, and spirituality work to attack the destructive combination of excessive body fat, stress, smoking, cholesterol, high blood pressure and blood sugar, and heart disease.

The model is important because these strong statistical correlations are being found in a group that is generally healthy, disease free, and well above average in physical fitness. Thus, in the general population the payoffs for increasing such behaviors as aerobic and strength training should be even more dramatic.

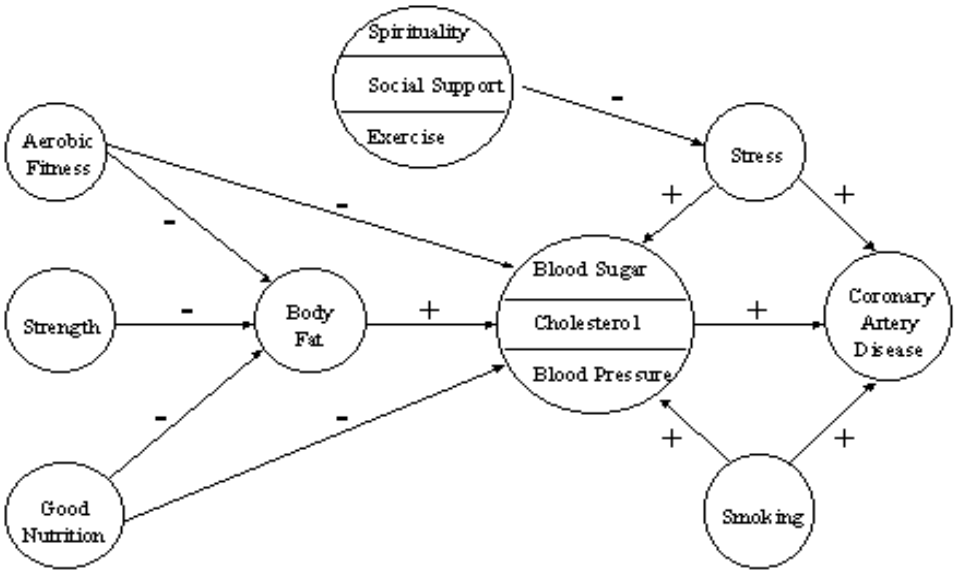

Figure 1. Relation Between Fitness Factors and Heart Disease (minus sign indicates power to reduce; plus sign indicates power to increase).

In this book, we offer the example of a particular population, which, while not perfect, appears to be moving in the desired direction regarding health maintenance. We argue that this group of senior military leaders owes its good health and fitness to a *combination of personal motivation and institutionalized reinforcement.* In addition to improving and maintaining their own health, *these senior leaders have a critical role to play in institutionalizing good health among their workers and followers.* In fact, this role is just as important a responsibility as developing those savvy business habits and effective organizational practices that maximize subordinate morale and productivity.

Our model serves as a partial guideline for the other book chapters. Details related to the importance of a healthy heart, nutrition strategies, coping with life and stress, exercise, and sleep will be discussed. See this book not as a tool used by the authors for profit, but as a guide for you to maintain a high quality of life.

ENDNOTES

1. See R. A. Hahn, G. W. Heath, and M. H. Chang, "Cardiovascular Disease Risk Factors and Preventive Practices Among Adults—United States, 1994: A Behavioral Risk Factor Atlas," *Morbidity and Mortality Weekly Report (hereinafter referred to as MMWR*), December 11, 1998, pp. 35-69. Updated statistics may be found in the *MMWR* of August 6, 1999. See the American Heart Association's comment on the *MMWR* statistics under *AHA News Releases* , "Figures on Diseases of the Heart Don't Tell the Whole Story," August 6, 1999, at www.americanheart.org. Also see Daniel Levy and Thomas Thom's 1998 editorial, "Death Rates from Coronary Disease Progress and a Puzzling Paradox," on how heart attack rates have not declined along with mortality rates, in *The New England Journal of Medicin*e, Vol. 339, No. 13, 1998, pp. 915-916.

2. U.S. Department of Health and Human Services, *Physical Activity and Health: A Report of the Surgeon Genera*l, Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, 1996, pp. 3-8.

3. National Heart, Lung, and Blood Institute, *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults* , Bethesda, MD: National Institutes of Health, 1998.

4. National Center for Health Statistic*s, National Health and Nutrition Examination Survey III (NHANES III): 1988-199*4, Hyattsville, MD: NCHS, unpublished data available at www.cdc.gov/nchswww/data/hvs.pdf .

5. Centers for Disease Control and Prevention, "State-Specific Prevalence of Current Cigarette and Cigar Smoking Among Adults—United States, 1998," *MMW*R, November 19, 1999, pp. 1034-1039. Also, H. Wechsler et al., "Increased Levels of Cigarette Use Among College Students," *JAM*A, Vol. 280, No. 19, 1998, pp.

1673-1678.

6. J. L. Boone and J. F. Christensen, "Stress and Disease," in *Behavioral Medicine in Primary Car*e, M. Feldman and J. F. Christiansen, eds., Stamford, CT: Appleton and Lange, 1997, pp. 265-276.

7. R. Glaser et al., "Stress-Induced Immunomodulation," *JAMA*, Vol. 281, No. 24, 1999, pp. 2268-2270.

8. "Decline in Deaths from Heart Disease and Stroke United States, 1900-1999," *MMW*R, Vol. 48, 1999, pp. 649-656.

9. K. M. Flegal et al., "Overweight and Obesity in the United States: Prevalence and Trends, 1960-1996," *International Journal of Obesity,* Vol. 22, 1998, pp. 39-47.

10. S. M. Grundy et al., "Physical Activity in the Prevention and Treatment of Obesity and Its Comorbidities," *Medicine and Science in Sports and Exercis*e, Vol. 31, 1999, pp. S502-S508.

11. S. N. Blair and S. Brodney, "Effects of Physical Inactivity and Obesity on Morbidity and Mortality: Current Evidence and Research Issues," *Medicine and Science in Sports and Exercise,* Vol. 31, 1999, pp. S646-S662.

12. A. Rissanen and M. Fogelholm, "Physical Activity in Prevention and Treatment of Other Morbid Conditions and Improvements Associated with Obesity: Current Evidence and Research Issues," *Medicine and Science in Sports and Exercise,* Vol. 31, 1999, pp. S635-S645.

13. P. W. F. Wilson and B. F. Culleton, "Epidemiology of Cardiovascular Disease in the United States," *American Journal of Kidney Diseases,* Vol. 32, No. 5, 1998, pp. S56-S65. For a study showing the importance of risk factors such as cholesterol and smoking in predicting artery deposits in those as young as age 15, see H. C. McGill et al., "Effects of Serum Lipoproteins and Smoking on Atherosclerosis in Young Men and Women," *Arteriosclerosis, Thrombosis, and Vascular Biolog*y, Vol. 17, 1997, pp. 95-106.

14. These categories were derived from the Framingham Heart Study. See P. W. F. Wilson et al., "Prediction of Coronary Heart Disease Using Risk Factor Categories," *Circulatio*n, Vol. 97, 1998, pp. 1837-1847.

15. See the 1999 report from the Centers for Disease Control and Prevention's Office on Smoking and Health, "Targeting Tobacco Use: The Nation's Leading Cause of Death," available at www.cdc.gov/tobacco. Also, see G. Howard, L. E. Wagenknecht, and G.L. Burke, "Cigarette Smoking and Progression of Atherosclerosis," *JAM*A, Vol. 279, 1998, pp. 119-124; J. M. McGinnis and W.H. Foege, "Actual Causes of Death in the United States," *JAMA,* Vol. 270, 1993, pp. 2207-2212; and R. Shinton and G. Beevers, "Meta-analysis of Relation between Cigarette Smoking and Stroke," *British Medical Journa*l, Vol. 298, 1989, pp. 789-794.

16. See endnote 1.

17. H. C. McGill, "Smoking and the Pathogenesis of Atherosclerosis," in J. N. Diana, ed., *Tobacco Smoking and Atherosclerosis* , New York: Plenum Press, 1990, pp. 9-16.

18. W. B. Kannel and R. B. D'Agostino, "Risk Reduction After Quitting Smoking," *Quality of Life and Cardiovascular Car*e, Vol. 1, 1989, pp. 84-85.

19. See endnote 4.

20. W. B. Kannel and P. W. F. Wilson, "An Update on Coronary Risk Factors," *Medical Clinics of North America,* Vol. 79,

No. 5, 1995, pp. 951-971. This update relies heavily on data drawn from H. B. Hubert et al., "Obesity As an Independent Risk Factor for Cardiovascular Disease: A 26-Year Follow-up of Participants in the Framingham Heart Study," *Circulatio*n, Vol. 67, 1983, pp. 968-977.

21. National Center for Health Statistics, *Health in the United States 1996-199*7, Hyattsville, MD: U.S. Public Health Service, 1997, p. 192.

22. E. E. Calle et al., "Body-Mass Index and Mortality in a Prospective Cohort of U.S. Adults," *The New England Journal of Medicine,* Vol. 341, No. 15, 1999, pp. 1097-1105.

23. See R. J. Kuczmarski et al., "Increasing Prevalence of Overweight Among U.S. Adults," *JAM*A, Vol. 272, No. 3, 1994, pp. 205-211; and R. J. Kuczmarski, "Varying Body Mass Index Cutoff Points to Describe Overweight Prevalence Among U.S. Adults," *Obesity Research,* Vol. 5, 1997, pp. 542-548. Some argue that the "overweight" label should be applied to those with BMIs as low as 25.

24. R. F. Gillum, "The Association of Body Fat Distribution with Hypertension, Hypertensive Heart Disease, Coronary Heart Disease, Diabetes, and Cardiovascular Risk Factors in Men and Women Aged 18-79 Years," *Journal of Chronic Diseases,* Vol. 40, 1987, pp. 421-428.

25. See endnote 3.

26. W. C. Willett, W. H. Dietz, and G. A. Colditz, "Guidelines for Healthy Weight," *The New England Journal of Medicin*e, Vol. 341, No. 6, 1999, pp. 427-434.

27. T. S. Han et al., "Waist Circumference Action Levels in the Identification of Cardiovascular Risk Factors," *British Medical Journa*l, Vol. 311, 1995, pp. 1401-1405.

28. C. S. Fox, J. Exparza, and M. Nicholson, "Is a Low Leptin Concentration, or Low Resting Metabolic Rate, or Both the Expression of the 'Thrifty Genotype'? Results from the Mexican Pima Indians," *American Journal of Clinical Nutritio*n, Vol. 68, 1998, pp. 1053-1057.

29. T. Ronnemaa, M. Koskenvuo, and J. Mamiemi, "Glucose Metabolism in Identical Twins Discordant for Obesity: The Critical Role of Visceral Fat,*" Journal of Endocrinological Metabolis*m, Vol. 82, 1997, pp. 383-387.

30. P. M. Gordon et al., "The Quantity and Quality of Physical Activity Among Those Trying to Lose Weight," *American Journal of Preventative Medicin*e, Vol. 18, 2000, pp. 83-86.

31. Z. X. He, L. J. Appel, and J. Charleston, "Long-term Effects of Weight Loss and Dietary Sodium Reduction on Incidence of Hypertension," *Hypertensio*n, Vol. 35, 2000, pp. 544-549.

19.3*2. American College of Sports Medicine's Guidelines for Exercise Testing and Prescription,* 5 th ed., Williams and Wilkins, 1995, pp.162-176.

33. See endnote 2.

34. W. L. Haskell, "Physical Activity, Sport, and Health: Toward the Next Century," *Research Quarterly for Exercise and Spor*t, Vol. 67, 1996, pp. S37-S47.

35. K. H. Cooper et al., "Physical Fitness Levels Versus Selected Coronary Risk Factors: A Cross Sectional Study," *JAM*A, Vol. 236, 1976, pp. 166-169.

36. J. J. Duncan, N. F. Gordon, and C. B. Scott, "Walking for Health and Fitness: How Much Is Enough," *Journal of the American Medical Association* , Vol. 266, 1991, pp. 3295-3299.

37. A. L. Dunn et al., "Comparison of a Lifestyle and Structured Interventions to Increase Physical Activity and Cardiorespiratory Fitness: A Randomized Trial," *Journal of the American Medical Associatio*n, Vol. 281, 1999, pp. 327-334.

38. B. H. Marcus et al., "Physical Activity Behavioral Change: Issues in Adoption and Maintenance," *Health Psychology*, Vol. 19, 2000, pp. S32-S41.

39. International Federation of Sports Medicine, *Physical Activity for Health: Joint Position Statement on Public Policy from the International Federation of Sports Medicine and the World Health Organization,* St. Moritz, Switzerland: Federation International Medicine Sportive, February 1999.

4*0. Statement on Exercise: Benefits and Recommendations for Physical Activity Programs for All Americans.* The statement was approved by the American Heart Association Science Advisory and Coordinating Committee on June 20, 1996. It was also published in *Circulatio*n, Vol. 94, 1996, pp. 857-862.

41. W. Evans and I. H. Rosenberg, *Biomarkers: The 10 Keys to Prolonging Vitalit*y, New York: Simon and Schuster, 1992, p. 27.

42. Recommendations on strength training were adapted from Evans and Rosenberg (see endnote 41*).*

43. K. H. Cooper, *Regaining the Power of Youth at Any Ag*e, Nashville, TN: Thomas Nelson, 1998.

44. C. D. Spielberger, *State-Trait Anger Expression Inventory: Professional Manual* , Odessa, FL: Psychological Assessment Resources, 1996.

45. L. S. Radloff, "The CES-D Scale: A Self-Report Depression Scale for Research in the General Population," *Applied Psychological Measurement*, Vol. 1, 1977, pp. 385-401. See also J. K. Myers and M. M. Weissman, "Use of a Self-Report Symptoms Scale to Detect Depression in a Community Sample," *American Journal of Psychiatr*y, Vol. 137, No. 9, 1980, pp. 1081-1084.

46. For example, see K. H. Cooper, *It's Better to Believ*e, Nashville, TN: Thomas Nelson, 1995; N. Lin, A. Dean, and W. Ensel, eds., *Social Support, Life Events, and Depressio*n, Orlando, FL: Academic Press, 1986; H. M. Benson, *Beyond the Relaxation Response* , New York: Times Books, 1984; and National Institute of Mental Health, *Depression Can Break Your Hea*rt, NIH Publication No. 99-4592, Bethesda, MD: National Institutes of Health, 1999, available at www.nimh.nih.gov/publicat .

47. S. C. Smith, P. Greenland, and S. M. Grundy, "AHA Conference Proceedings: Prevention Conference V: Beyond Secondary Prevention: Identifying the High Risk Patient for Primary Prevention: Executive Summary," *Circulation* , Vol. 101, 2000, pp. 111-116.

48. D. A. Morrow and P. M. Ridker, "C-Reactive Protein, Inflammation, and Coronary Risk," *Medical Clinics of North Americ*a, Vol. 84, 2000, pp. 149-161.

49. P. M. Ridker, R. J. Glynn, and C. H. Hennekens, "C-Reactive Protein Adds to the Predictive Value of Total and HDL Cholesterol in Determining Risk of First Myocardial Infarction," *Circulation* , Vol. 97, 1998, pp. 2007-2011.