CHAPTER 6. INCREASING LONGEVITY: CAUSES, CONSEQUENCES, AND PROSPECTS
CARDIOVASCULAR DISEASE TRENDS

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1. Introduction

Infectious and cardiovascular diseases (CVD) dominated the health patterns of the 20th century. The emergence of an affluent society, where basic needs for shelter, food, and work are met, underlie these trends. Control of infectious diseases through better living conditions, widespread vaccination, and medical treatment resulted in sharp declines in infant mortality and improved outcomes among adults. At the same time, CVD and cancer emerged to become the leading killers of Americans.

Cardiovascular diseases dramatically increased and became common during the first two-thirds of the century. These diseases, particularly heart attack and stroke, limited the life expectancy of middle-aged and older adults. However, in the last third of the century, improved prevention and treatments led to a decline in age-adjusted CVDs and resulting increases in longevity. This decline in mortality, however, has not eliminated these diseases. Instead, they have been pushed into older age groups where they still take an enormous toll on quality of life and life span. In addition, the advanced technologies to detect and treat CVDs have brought enormous medical costs to society.

In the following, CVD patterns including the magnitude of the problem, disease trends and costs will be discussed. The overwhelming burden of CVDs in America and other industrialized nations suggests that any changes in longevity will strongly influence and be influenced by these conditions.

2. Origins of the Epidemic

Cardiovascular diseases were known in early times among the very wealthy as evidenced by data from the ancient Egypt mummies (Hanke, Lenz, and Finking 2001). However, for the following millennia, the dominant issue for most humans was finding adequate food and safe living conditions. The CVD epidemic began in the 20th century in industrialized countries. It is the direct result of the control of infections and a society with widespread affluence. While genetic influences are debated, the emergence of this epidemic over a few generations suggests that genes are not essential to explaining or preventing these diseases.
The stage for this epidemic was set in the 20th century by the control of infectious diseases. Infectious diseases were the leading killer of both the young and old throughout most of history. In the 20th century, factors such as clean water, clean air, safe food, and widespread vaccinations led directly to dramatic declines in infectious diseases. Diseases such as smallpox were eliminated through vaccination. Similarly, polio, cholera, plague, pertussis, diphtheria, tetanus, and other formerly common infectious diseases are practically unknown in industrialized countries. Broad public health measures had an enormous impact on mortality among infants and children. They also influenced mortality among adults, permitting increased life span. Antibiotics, which were not discovered until the middle of the century, also played a role, particularly in adults. Pneumonia, “the old persons’ friend”, became treatable and declined as a cause of death. The fall of infectious disease gave rise to expression of chronic diseases as people survived childhood into adulthood and lived to older years.

The environmental factors underlying the CVD epidemic are well known and described (American Heart Association 2002; US Department of Health and Human Services 2002). First and foremost were changes in the food supply. Food became available in surplus and excess grain products allowed intensive farm animal feeding. Higher quality meats and dairy products became widely available and inexpensive. Foods that were once the purview of only the wealthy or for special occasions (Dickens “Christmas goose”) were now available to everyone. These foods also were high in calories and fat leading to increased blood lipids, particularly cholesterol. Increasing blood cholesterol in the population is directly related to the epidemic.

At the same time, high blood pressure or hypertension began to rise. Increased weight and decreasing physical activity along with available salt were all directly related to blood pressure. All became more common during the 20th century. Blood pressure is observed to rise with age and over 50% of Americans 65 and older have hypertension which requires treatment. Hypertension is directly related to heart attacks and stroke.

The third factor implicated is cigarette smoking. The advent of machine-made cigarettes that were cheap and widely available changed the smoking habits of Americans. Throughout the first half of the 20th century, rates of cigarette smoking for both men and women increased dramatically. Widespread distribution of cigarettes to the Armed Services during the Second World War (they were included in Army rations along with a chocolate bar) reinforced this habit as common and usual. Addiction to nicotine resulted in life-long smokers. Cigarette smoking is also related to CVD, both in the development of the disease process and the acute event.

Finally, physical activity declined significantly as laborsaving devices and personal transportation became widespread. Today, few people perform significant physical labor during their workday. Even farmers have an array of hydraulic and electric laborsaving devices to do formerly physically active jobs. Physical activity is now a leisure-time pursuit and rarely at a level formerly seen with jobs with hard labor. Among the outcomes of an increasingly sedentary society are obesity, hypertension, and hyperlipidemia.