

Aging in the Twenty-First Century

Aging and Age-Related Changes

Aging can make your skin sag, your pants bag, your joints hurt, your blood pressure rise, and your risk of disease increase, and that's just for starters. Because old age is often portrayed as an inevitable, steady decline in physical and mental abilities, many of us worry about the possibility of increasingly long periods of frailty. Perhaps the greatest fear that comes with having another birthday is the terror of dementia—everyone's shared nightmare about massive cognitive failure and the eventual loss of self-identity. But longer lives have, for the most part, been accompanied by better lives, and contrary to public perception, fully 60 percent of people over 80 years of age live independently in the community.¹

The dramatically changed distribution of age in our population as a whole raises important questions about the nature and quality of life in the twenty-first century. At the time most current social policies were put into place, American life was far different from what it is today. Not only was life expectancy shorter, but divorce rates were low, serial marriage was unusual, and the average number of children born to each woman was double what it is today. Influenza, pneumonia, and tuberculosis were the leading causes of death, and life expectancy after retirement was relatively short.²

Today, life for older adults presents a very different picture.

Demographics

Just as the overall demography of our society is changing, the demographics of aging are also changing dramatically. Both the number and the proportion of older people, relative to the rest of the population, are increasing, and the aging of the “baby boomers,” born between 1946 and 1964, will accelerate this growth. The population age 85 and older is growing rapidly.³

For much of human history the average life expectancy at birth was less than 30 years. By 1900, the average was 48 years in the United States; then in the twentieth century, nearly 30 more years were added.⁴ Today life expectancy has risen roughly 60 percent—adding nearly 19 years to our lives. Overall it is now 77 years of age in the United States—80 years on average for women and 74 years for men. By 2030, an estimated 20 percent—one in five Americans—will be 65 or older.⁵ Mortality rates may continue to decline, particularly for those in higher age groups, which could add as much as 24 years to the remaining life expectancy of 65-year-olds by the end of the twenty-first century.⁶ Minority elderly will increase far more quickly than the general population.

Declining infant mortality, longer lives, and falling fertility rates are the three primary factors responsible for our aging society. Over the last century, 43 million Americans have celebrated their sixtieth birthdays, thanks to strides in medicine, and each day about 5,000 Americans turn 65. Over the next 30 years, the number of older Americans is expected to double, growing by over 35 million people. By the year 2030, the population of those 60 and older will more than double to 85 million, while the number of those 85 and older will triple to 8 million.⁷

But the often overlooked good news is that due to cultural changes and biomedical advances, many Americans are not only living longer, but coming to old age healthier and better educated than ever before in history.⁸ Over the last century, 43 million Americans have celebrated their 60th birthdays due to the strides in medicine, and each day about 5,000 Americans turn 65!

Just as important is new evidence of links among health, socioeconomic status, and mental sharpness in later life, underscoring the potential to modify aging outcomes.⁹ Seniors are an ever-growing segment of the U.S. population. As we improve health outcomes for elders, the extra years offer opportunities for leisure activities, second careers, and volunteer service; however, many older adults, including three million who are 85 and older, are still at risk of losing their independence. The effects of the aging population will be most strongly felt between 2010 and 2030, when one in every five Americans will be 65 or older. There will also be 2 million fewer 25- to 40-year-olds in 15 years, a drop of 4 percent.^{10,11}

Figure 1.1 As we improve health outcomes for elders, the extra years offer opportunities for leisure activities and fun. *Courtesy of The Life Enrichment Center, Shelby, NC.*



Global Aging

Global aging is also occurring at a rate never seen before. The world's population age 65 and older is growing by an unprecedented 800,000 people a month, and has increased from 131 million in 1950 to a record 420 million in 2000. The numbers and proportions of older people are continuing to rise in both developed and developing countries.¹² This means that more people age 65 and older are alive today than ever; the United States ranks thirty-second on a list of countries with high proportions of people age 65 and older.

Italy has replaced Sweden as the world's oldest country, with 18 percent of Italians having celebrated at least a sixty-fifth birthday. By 2030, Italy and Japan are predicted to have the greatest percentage of older people, 28 percent, and they are on target to have more citizens over 80 than under 20 in the next 50 years.¹³ More than one-third of the world's oldest people (80 and above) live in three countries: China (11.5 million), the United States (9.2 million), and India (6.2 million).¹⁴

Aging, Diversity, and Health

There is great variability in health and the quality of people's later years, influenced by such things as access to medical care, behavioral patterns, educational background, and working conditions. Most people are healthy most of their lives, but advanced age is associated with poorer health. Not only are older people more likely than the young to develop diseases that require healthcare interventions, but they are also more likely to suffer concurrent chronic conditions such as arthritis, Parkinson's disease, and diabetes, which require ongoing management. People are living longer than they once did after the onset of illness, but they are not necessarily healthier. Better treatment of chronic diseases such as heart disease means that individuals may live long enough to develop age-related conditions such as arthritis and diabetes.¹⁵ Prevalence of chronic diseases among adults age 70 and older varies by race and ethnicity. Members of ethnic minority groups are at disproportionate risk of developing disabling disease. For example, nearly 60 percent of elderly African Americans report high blood pressure, and a growing share of both African Americans and Hispanics report problems with diabetes.

As our society ages, the ranks of the elderly are becoming more diverse. In 2000, 16 percent of those 65 and over identified themselves as being from one of the four minority populations (American Indian/Alaska native, Asian/Pacific Islander, African American, or Hispanic). It is projected that by mid-century over one-third (36 percent) of all older Americans will come from these groups.¹⁶ Older people of color not only have higher rates of chronic



Figure 1.2 Ethnic minority groups are at a disproportionate risk of developing disabling diseases such as high blood pressure and diabetes. *Courtesy George G. Glenner Alzheimer's Day Care Centers, Inc., San Diego, CA.*

Figure 1.3 Following the old-fashioned advice of eating right, staying active, and getting plenty of rest can go a long way toward keeping not only our bodies but our brains healthy as we age. Courtesy of Francis E. Parker Memorial Home, Piscataway, NJ. Landscape Architect: DirtWorks PC, New York, NY.



diseases (such as diabetes, hypertension, and cancer) but also shorter life expectancies.¹⁷

New technologies offer impressive new ways to extend and improve life in old age. Medications and procedures that could not have been imagined a few years ago have radically changed the way some diseases are treated and have limited the threat they pose.¹⁸ While heart disease remains the number one cause of death in the United States, patients have a much greater chance of surviving a heart attack and receiving treatment to control heart disease because of new procedures and approaches to cardiac surgery, and new medications. Laser and ultrasonic technology have also led to new, less invasive surgical techniques.¹⁹

The old cliché, “feeling old is a state of mind,” may just be true. Experts say that only about 30 percent of the symptoms of physical aging can be traced to our genes; the rest is up to us. Some of the body and mind changes normally associated with aging may be the result of treatable health conditions or a lifetime of poor health habits.²⁰ Along with a few insights from aging research, following the old-fashioned advice of “eating right, staying active, and getting plenty of rest” can go a long way toward keeping not only our bodies but our brains healthy as we age.

Most of us would like to live our lives to the fullest every day—to maintain our day-to-day activities and enjoy the things that bring us pleasure, no matter what our age. We don't want to be crippled by health problems or overly dependent on others. Living well in old age is more important than just living to old age. And there is good news. The National Institute on Aging confirms that older people today are living longer and that the rate of disability among older persons is declining at an accelerated pace. There is a lot we can do to improve our quality of life, no matter how old we are.

Age-Related Changes

If you are living with a chronic health condition, you are not alone. Estimates are that one in four Americans lives with more than one illness and that half (125 million people) suffer from at least one chronic condition. Chronic conditions are growing more common as people live longer, and while these diseases are among the most common and costly health problems, they are also among the most preventable. Many chronic diseases can be controlled with exercise, diet, and medication. While we continue to search for ways to prevent and cure diseases, we also need to manage them better so people can live better lives.

Chronic, by definition, means long-lasting or recurring. Examples of common chronic health conditions include arthritis, cancer, diabetes, Alzheimer's disease, depression, and heart disease.²¹ As baby boomers age and people live longer, the number of people who are most vulnerable to and most affected by chronic conditions will increase. Currently, chronic conditions are the major cause of illness, disability, and death in the United States.²² Although chronic diseases are becoming more prevalent in the older population, disability rates for older Americans have been declining in recent years.²³

No one is immune to chronic conditions, but the type of chronic conditions that are most common varies considerably with age. Age is one of the risk factors for chronic conditions that cannot be modified. Risk factors related to behavior and environmental conditions, however, can be modified. This underscores the importance of promoting healthy behaviors, creating safe and healthy environments, and promoting access to appropriate healthcare services. The time is right to find out what we can do to promote a healthy population now and in the future.

MOST COMMON CHRONIC CONDITIONS AGE 75+

- Arthritis
 - Hypertension
 - Hearing Impairments
 - Heart Disease
 - Cataracts
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The chronic conditions most common among older adults require more care and are more disabling than conditions in younger age groups, and those that also involve chronic pain present a significant obstacle to maintaining mobility, function, and independence. The continued growth in the number of older people will probably cause an increase in the number of people most affected by chronic conditions.²⁵

Arthritis

Arthritis is inflammation of a joint—any joint—due to such varied causes as injury, infection, a chemical imbalance in the blood, or a malfunctioning immune system. One in three U.S. adults is affected by arthritis—an increase of more than 60 percent over estimates from five years ago. This puts the number of adults with chronic arthritis symptoms at 70 million.²⁶ It is the most common chronic condition in older adults. In 1995, about 58 percent of persons age 70 or older reported having arthritis.²⁷ There are many forms of arthritis, but the most common are osteoarthritis (OA) and rheumatoid arthritis.

Osteoarthritis, the most common form, is caused by an injury or simply by wear and tear to the joints, affecting hips, knees, neck, and lower back. The joint pain or stiffness is usually worst when awakening in the morning, then improves quickly. More than 20 million Americans are affected by osteoarthritis, which is the leading cause of disability in this country. Preliminary findings from a 24-month trial with older adults with lower-extremity OA found use of a multiple-component intervention to be helpful, and such treatments may hold promise as a public health strategy for older adults.²⁸

Almost every adult over 40 has some degree of osteoarthritis, particularly in joints that are repeatedly stressed—and obesity makes it worse, especially on weight-bearing joints. While there is no way to prevent or cure it, there are many things that will minimize the severity and slow its progress.

TO CONTROL SYMPTOMS OF OSTEOARTHRITIS

- **Lose weight**
 - **Exercise**—stretching, strength training, aerobic walking, swimming
 - **Modify the environment**
 - **Chairs**—Make sure chairs have arm supports and backrests. Avoid low seats that are hard to get out of.
 - **Bathtub**—Apply no-slip finish to the tub or shower. Install grab bars for assistance in getting in and out of the tub or shower.
 - **Toilet**—Install an elevated toilet seat.
 - **Flooring**—Avoid slippery surfaces and loose throw rugs. Wall-to-wall carpet is safer.
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Hypertension

The rate of hypertension for people 65 and older has increased since the 1990s. Nationally, over half (53%) of the population age 65 and older had hypertension in 2001. Data regarding the extent to which different conditions affect the population are of great value in planning disease prevention activities and anticipating the healthcare needs of the older population.²⁹

Hearing Impairment

Hearing loss affects 38 million Americans; almost two-thirds of those affected are over the age of 55. While there are many possible causes of hearing loss, including trauma, repeated exposure to loud noises, side effects of medications, inherited abnormalities, and certain viral or bacterial infections, the most common cause is simply getting older.³⁰

Age-related hearing loss, also called presbycusis, may itself have a number of causes, including an inherited vulnerability, natural aging processes that affect hearing, or the cumulative effect of a lifetime's exposure to noise.

The onset of hearing loss may be very gradual, sometimes occurring over a 25- to 30-year period, and many people are not aware of it until someone else brings it to their attention. Because this is a chronic problem that affects most older adults, and because the environment can be modified substantially to increase the opportunity for hearing, I have included a chapter dedicated to the acoustic environment.

Vision Impairment

One in six adults age 45 and older is affected by some type of vision problem, and the risk of vision loss increases with age. Normal changes in the aging eye include losing focus, especially on near tasks; trouble driving at night; and difficulty reading or doing detailed work in low light. Vitamin deficiencies and side effects of medication are culprits, but the most common causes of vision loss in older adults are age-related macular degeneration, glaucoma, and cataracts. Infection or damage to the vision area of the brain due to stroke, head injury, or a brain tumor can also cause problems.

The ability to see can be enhanced substantially with environmental improvements, and there is evidence that some types of vision loss may be prevented or minimized with lifestyle changes. This book includes two chapters dedicated to environmental changes in lighting and daylighting.

Depression

Depression in later life is common, yet some studies show that less than one-fourth of people with depression are accurately diagnosed and adequately treated. The problem may be even worse among the elderly, often because the recognition of depression is complicated by the coexistence of other medical conditions.³¹ While it is true that depression is more common in older people than in the general population, it is not an inevitable part of aging. Nor is it something that we can control at will, or something of which to be ashamed. The hallmarks of depression in old age are its coexistence with medical illness and its association with cognitive impairment. Many chronic medical conditions, such as stroke, heart disease, and cancer, may cause changes in the brain that can make one susceptible to depression. People over 65 are more likely to have one of these conditions, which may contribute to the higher incidence of depression in older people. It is often these very factors that can lead to the failure to diagnose depression.³²

Depression is one of the most treatable health conditions. With so many effective treatments available, there is no reason to allow depression to rob anyone of living with comfort and joy; however, getting the right treatment is critical. Studies have shown that as many as 80 percent of depressed people can find adequate relief with proper treatment. Left untreated, depression wreaks havoc on a person's life, may worsen symptoms of other diseases, and can even be fatal. People who have suffered a stroke or heart attack are more likely to die if they have depression.³³

Mild depression can weaken the immune system in older people, while treating the depression may help them fight disease more effectively. Researchers at Ohio State University College of Medicine say that people 60 and over often have mild depression, and found that the link between depression and a weakened immune system may explain why older adults are at greater risk for cancer and severe infections.³⁴

Diabetes

Approximately 17 million Americans have diabetes, and of these over 7 million are age 65 or older.³⁵ According to the Centers for Disease Control and Prevention the number of cases of diabetes among adults has climbed 49 percent in the last decade, and as it continues to rise each year, it is expected to increase by as much as 56 percent by 2020.³⁶

Recent research published in *The New England Journal of Medicine* (February 7, 2002) shows that diabetes can often be prevented or delayed, even among older adults at high risk for the illness. Results from the disease prevention program led by the National Institutes of Health

(NIH) indicate that simple lifestyle changes can help ward off diabetes, even among older adults. Participants who took a prescription drug reduced their risk by 31 percent. By contrast, those who lost as little as five pounds and took a walk five times a week cut their chances of developing the disease by nearly 60 percent. People age 55 to 60 who exercised and lost weight were able to hold the disease at bay more successfully than any other age group. This counters the myth that only young people can alter the fate of their health.³⁷ Frank Vinicor, director of the CDC Diabetes Program, commented, "The data show that it's never too late for preventive efforts."

Just as exercise and weight loss can help prevent diabetes in the first place, by controlling cholesterol and blood pressure levels, they play a critical role in preventing complications of the disease such as stroke, blindness, kidney failure, and cardiovascular disease. Losing weight helps lower the body's resistance to insulin, and exercise helps remove extra glucose from the blood and can facilitate weight loss.

Older women and American Indians, Latinos, African Americans, and other racial minority groups are at heightened risk for type II diabetes, sometimes called adult-onset diabetes, and its complications. The CDC has partnered with multiple organizations to provide education to diverse groups of older adults about their increased risk for diabetes.³⁸

Osteoporosis

More than 10 million Americans have osteoporosis, which means "porous bone," and 18 million more have lost enough bone, in a condition known as osteopenia, to make them more likely to develop the disease. This is a major health threat for more than 28 million Americans, 80 percent of them women. White and Asian women are most likely to get osteoporosis.³⁹ A woman's risk of hip fracture, the most debilitating side effect, is actually equal to her combined risk of breast, uterine, and ovarian cancer.

Osteoporosis does also affect men, although not with the same frequency as women. This is probably because men have more bone mass than women, and they lose bone more slowly. One out of two women and one in eight men over 50 will have an osteoporosis-related fracture during their lives.⁴⁰ While men have only one-fourth as many hip fractures as women, men over the age of 75 are three times more likely to die after a hip fracture than are women.⁴¹

Bone is living, growing tissue. We can lose bone over many years, but as people age more bone deteriorates and breaks down. Osteoporosis develops when the spaces in the honeycomblike formation inside the bone grow larger because much more of the bone is destroyed than is being replaced. Bone breaks down too quickly and the replacement occurs too slowly, making the bones weaker. Experts do not fully understand how this happens.

Too little exercise and a diet too low in calcium and vitamin D are the major risk factors, while lower hormone levels also contribute to the problem. But osteoporosis is far from being an untreatable consequence of old age. It is preventable, and there is much that we can do to reduce the risk of fracture.

The best ways to prevent weakened bones in later life are a diet rich in calcium and vitamin D and a lifestyle that includes regular weight-bearing exercises. The average American diet falls far below the recommended intake of these nutrients. The body uses vitamin D to absorb calcium, and being out in the sun for a total of 20 minutes every day helps most people's bodies make enough vitamin D. There is much evidence indicating that calcium and vitamin D deficiencies contribute to osteoporosis in elderly individuals.⁴²

In a recent (October 2004) report to the nation, Vice Admiral Richard H. Carmona, MD, the U.S. surgeon general, said that bone health is an often-overlooked aspect of health and warned that by 2020 half of all Americans over the age of 50 will be at risk for fractures related to osteoporosis and low bone mass if no immediate action is taken. He made three simple recommendations:

- Get the recommended amounts of calcium and vitamin D.
- Maintain a healthy weight and be physically active. That means at least 30 minutes of exercise a day for adults, including weight-bearing activities to improve strength and balance.
- Take steps to minimize the risk of falls by removing items that might cause tripping, improve lighting, and get regular exercise to improve balance and coordination.⁴³

Stroke

Stroke is the number one reason that people move into nursing homes and the third leading cause of death in the United States. Yet many strokes can be prevented.

Strokes are much more common in the elderly, but they can strike at any age. Stroke occurs when the supply of blood that constantly nourishes the brain is somehow altered. As a result, brain tissues either are deprived of oxygen and nutrients or drown in blood. A TIA (transient ischemic attack) is a temporary condition that usually lasts less than an hour and leaves no permanent physical or cognitive effects. But TIAs can be powerful predictors of full-blown strokes. Stroke symptoms usually occur suddenly, coming on within seconds or minutes. The symptoms vary depending on the type (ischemic or hemorrhagic) and location of the stroke in the brain. The warning signs of stroke include:

Stroke is the number one reason that people move into nursing homes and the third leading cause of death in the United States.

- Sudden numbness or weakness of the face, arm, or leg, especially on one side of the body
- Sudden confusion, trouble speaking, or difficulty understanding
- Sudden trouble seeing in one or both eyes
- Sudden trouble walking, dizziness, loss of balance, or coordination
- Sudden, severe headache with no known cause

The American Stroke Association

Time is of the essence—call immediately for emergency assistance, because there is no way to tell if the symptoms will fade or persist once they start⁴⁴ and prompt medical treatment can reduce the risk for irreversible complications and permanent disability.

Stroke strikes about 750,000 Americans every year. It is the leading cause of serious disability and the third leading cause of death, killing about 160,000 annually.⁴⁵ Seventy percent of the physical decline that occurs with aging is related to modifiable factors, including smoking, poor nutrition, and physical inactivity. By taking advantage of recommended preventive health and screening services and by making healthy lifestyle changes, Americans can improve their odds for healthy aging.

About 80 percent of strokes are *ischemic*, occurring when the blood flow in an artery leading to the brain is somehow blocked. Deprived of oxygen and nutrients from lack of blood, brain cells begin to die within minutes. Another 20 percent of strokes are *hemorrhagic*, meaning they are caused by a ruptured blood vessel, often related to high blood pressure and smoking.⁴⁶

To reduce stroke risk limit saturated fat and cholesterol intake and exercise regularly. Aerobic exercise reduces risk of stroke in many ways. Exercise can lower blood pressure, increase levels of high-density lipoprotein (HDL) also known as “good” cholesterol, and improve the overall health of blood vessels and the heart. It also helps people lose weight and control diabetes and stress.

Exercise and Better Nutrition

If past trends are any indication, some chronic conditions may become more common in the future. If disease rates rise while the number of older people grows, an increase in the number of people with chronic conditions can be expected. In reviewing the chronic problems and diseases that affect most older adults, in almost every instance better nutrition and exercise are identified as the interventions most likely to bring about improvement.

Using targets set for physical activity, nutrition, weight, pneumonia vaccination, and injuries and deaths due to falls *The State of Aging and Health* report of 2000 found the country was not meeting goals for improving the

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health of older Americans.⁴⁷ This indicates that Americans, though living longer, are not necessarily living in better health during their senior years.⁴⁸

We can improve the odds for healthy aging simply by taking advantage of recommended preventive health services and by making healthy lifestyle changes. In fact, 70 percent of the physical decline that occurs with aging is related to modifiable factors, including smoking, poor nutrition, physical inactivity, and failure to use preventive and screening services.⁴⁹ Research shows that simple behavioral changes can improve the health condition of even the oldest old.⁵⁰

The challenge is to encourage people to reduce preventable health risks, thereby increasing the number of additional *healthy* years they can expect to live. The health risks posed, particularly by lack of physical activity, are inescapable. Designing environmental interventions to support greater physical activity—in both the outside and inside environments, as a way to reduce age-related health risks and health costs, will be addressed in several upcoming chapters.