

A Harvard Medical School Special Health Report

Living Better, Living Longer

The secrets of healthy aging



In this report:

Extending your life

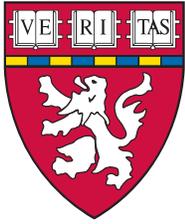
Preserving your independence

The role of diet and exercise

Guarding against osteoporosis, Alzheimer's, and other common health threats

SPECIAL BONUS SECTION

Can we extend healthy human life?



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Jennifer Mitchell, jmitchell@staywell.com

Telephone: 203-975-8854 x 102

Harvard Health Publications

Harvard Medical School

10 Shattuck Street, Suite 602

Boston, MA 02115-6011 U.S.A.

www.health.harvard.edu

LIVING BETTER, LIVING LONGER
SPECIAL HEALTH REPORT

Medical Editor

Anne Fabiny, M.D.

*Assistant Professor of Medicine,
Harvard Medical School*

Chief of Geriatrics, Cambridge Health Alliance

Writer

Francesca Coltrera

Editor

Annamarie Dadoly

Editor, Special Health Reports

Kathleen Cahill Allison

Illustrators

Christopher Bing

Harriet Greenfield

Scott Leighton

Marcia Williams

Art Director

Heather Derocher

Production Editors

Mary Kenda Allen

Christopher Roth

Published by Harvard Medical School

Anthony L. Komaroff, M.D., Editor in Chief

Edward Coburn, Publishing Director

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Harvard Health Publications

10 Shattuck St., 2nd Floor, Boston, MA 02115

617-432-1485 Fax: 617-432-4719

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Harvard Health Publications
HARVARD MEDICAL SCHOOL

Trusted advice for a healthier life

Dear Reader,

If you have selected this publication, I imagine you might be middle-aged or older and are contemplating the coming years. You are probably eager to maintain your health and enjoy your life in the most vibrant, vigorous way possible.

You have plenty of company. Starting in the year 2012, 10,000 people a day will start turning 65. We are aging differently than previous generations, however. Physically and mentally, the health of today's 70-year-old now equals that of a 65-year-old three decades ago. In that period, deaths from heart disease and many cancers have dipped. And while most older adults have at least one chronic health problem, disability has slowly but significantly declined.

Our life expectancy continues to inch upward, a happy trend, although some wonder if we could be doing better, since the United States has been slipping downward in longevity rankings compared with many other countries. Infectious disease and acute illnesses, once the leading causes of death, have given way to chronic ailments and degenerative illnesses—like heart disease and Alzheimer's disease—that people often live with for decades.

How long are *you* likely to live? Will your later years be blessed by healthy aging or marred by a host of illnesses? Certainly, the answers to those questions rest partly with the genes you've inherited. Yet at the turn of the millenium, more than a third of deaths in America were tied to smoking, poor dietary choices, and inactivity.

The pages of this report attest that actions you take today matter. Simple lifestyle choices—what you eat, how active you are, whether you smoke—have an enormous impact on your longevity and quality of life.

What is essential for healthy aging? After years of caring for older adults, my observation is full engagement with life. People who are curious, open, and eager to make connections with the world most enjoy the last decades of their lives. Even in the face of disabilities, these people seem to thrive and find joy despite their challenges. Depressed, anxious, or grumpy people in good health can also live long lives, but take far less pleasure in them. No magic pill, no secret potion can make us long-lived and healthy. But if you bring to your life appreciation and respect, and embrace aging with good humor, grace, vigor, and flexibility, you will—at the very least—be happy to grow old.

Sincerely,

Anne Fabiny, M.D.
Medical Editor

How long do we live?

Nowadays, life expectancy at birth is nearly 78 years in the United States. This is a great leap forward from 1900, when the average newborn couldn't expect to reach age 50. Indeed, in the 20th century the life span of the human species—in developed nations—expanded more than it had in any century since the birth of mankind.

When the numbers are crunched more carefully, though, there are obvious differences between men and women and people of different races. A newborn boy born in 2004 or after can expect to live a bit more than 75 years, while his sister can expect to live to slightly more than 80. Life expectancy measured from birth is more than five years shorter for a black person than a white one, although the gap narrows to less than two years for those who survive to age 65.

If you live to celebrate certain milestones of age, your life expectancy stretches (see Figure 1). In other words, the longer you live, the longer you're likely to live. Because many people who have chronic ailments or engage in behaviors that raise the risk of accidents or illness get cut from the herd much earlier, the oldest old are often remarkably healthy.

Why did life expectancy increase so much in the

Figure 1 Increasing life span



As you grow older, your average life expectancy stretches. For example, while the life expectancy of a newborn in the United States is nearly 78, a 65-year-old can expect to live 19 years longer, and a 75-year-old for another 12 years.

The secrets of centenarians

Each year more Americans drift into the upper age brackets on census forms. According to the 2000 census, there are more than 330,000 people ages 95 and over in the United States, while 85- to 94-year-olds number 3.9 million. Studies of people who reach the century mark note that their health is surprisingly robust despite advanced age. Once decline does set in for these centenarians, death follows fairly quickly. That's an attractive prospect for those who fear a drawn-out loss of health and independence in their waning years.

What's the centenarians' secret? Not surprisingly, genes play a role. A study of Swedish twins ages 80 and older attributed about half of the changes in mental function to genes. Other twin studies suggest genes are responsible for up to 35% of the physiological changes of age and that longevity itself is 25% to 35% inheritable.

But don't start viewing your genetic inheritance with rue or glee. Genetics is only part of the equation. Simple math tells you there's plenty of room left for the role that other factors—such as your diet, exercise routine, and regular exams for illnesses—play in how you age.

20th century in developed nations? Whether individuals develop a particular disease is usually determined by three things: their lifestyle (including diet and exercise), their environment (such as exposure to infectious microbes or toxins), and their genes. Increased life span surely has nothing to do with genes: our genes today are the same as they were a century ago. Instead, changes in lifestyle and environment are responsible.

Changes in the environment—such as better sanitation, the use of antibiotics, and many other improvements in medical care—can claim much of the credit. As for lifestyle, in developed nations, nutritional deficiency diseases largely were eliminated in the last century. Still, not all nutritional changes have been entirely for the better. In the United States, at the turn of the 20th century, most Americans lived on farms or in rural communities. We ate fresh, unprocessed food every day, and we worked hard physically. Today, our diets are less healthful in many ways, and we exercise less. ♥

Can we extend healthy human life?

Even before Juan Ponce de Leon was said to have searched for a fountain of youth, humans have dreamed of ways to conquer aging by preserving vitality and extending life. While there are no natural springs that can wash away the years, anti-aging elixirs aren't only the stuff of dreams and fiction. New scientific discoveries about how cells age may one day lead to the development of substances that can significantly extend life, adding years that are vital and free of disease. And that day may arrive sooner than you think.

We age more rapidly when the trillions of cells that make up our bodies age more rapidly. Recent research has identified new techniques for measuring how fast our cells are aging. Scientists also are coming to understand that the aging of a cell can be powerfully affected by a small handful of natural molecules. Manipulating these molecules can affect how fast a cell ages—and even how fast an animal ages.

These new discoveries are leading some scientists to new speculations about some very old questions: Are humans genetically programmed to die by a certain age? Why do some of us stay healthier and live longer than others? Does

the body have protective mechanisms against aging, and if so, is there a way to amplify them? Where do alterations in the immune system fit into the aging process? And, finally, could various tweaks or outright resetting of the systems that affect how we age lengthen—and improve—our life span?

Why do our cells age?

Each of our cells has a finite life span. Most of the trillions of cells in our bodies today were not with us when we were born. Until we reach adulthood, a lot of the new cells that are formed help us to grow larger. Cells “grow” not by getting bigger, but by dividing in

two—a process called mitosis. Normally, a new cell created during mitosis replicates the original right down to the last jot of genetic information.

Once we reach adulthood, our cells don't need to divide to help our bodies grow bigger—just to replace cells that have died or been damaged. This happens differently in different organs. For example, while liver cells multiply only in response to an injury or similar challenge, skin cells regularly divide, albeit at a pace that slows over time. Some cells may not replicate at all. Scientists used to think that new nerve cells (neurons) did not form in the brain after adulthood, although recent research calls that long-held belief into question.

Half a century ago, scientists found that the number of times a cell can split is finite. For example, the collagen-producing skin cells called fibroblasts typically divide about 50 times in humans. Once a cell reaches this end point, called its Hayflick limit, it enters senescence (a stage in which it no longer divides) and finally dies. The death is

a kind of suicide: when the cell receives certain chemical signals that its time is up, that switches on a genetic program called apoptosis that leads to the cell's death.

Recently, scientists have devised a way of determining how old a cell is. Each time a cell divides, the repeating sequence of DNA bases that make up the tail end of each chromosome—called the telomere—is pared down (see Figure 2). When the length of the telomeres in a cell has been pared down to a critical point, apoptosis is turned on.

Life events appear to influence how rapidly our cells divide and how quickly their telomeres shorten. In one study, the white blood cells of young women who lived with the

stress of caring for a child who was chronically and seriously ill were found to have shorter telomeres than women of the same age who were otherwise similar—but free of the burden of an ill child.

Oxidants and antioxidants. Our cells are assaulted constantly by external and internal forces. External forces—for example, sunlight, atmospheric radiation, medical radiation, and toxic substances such as tobacco and environmental toxins—can enter our body and damage key parts of cells.

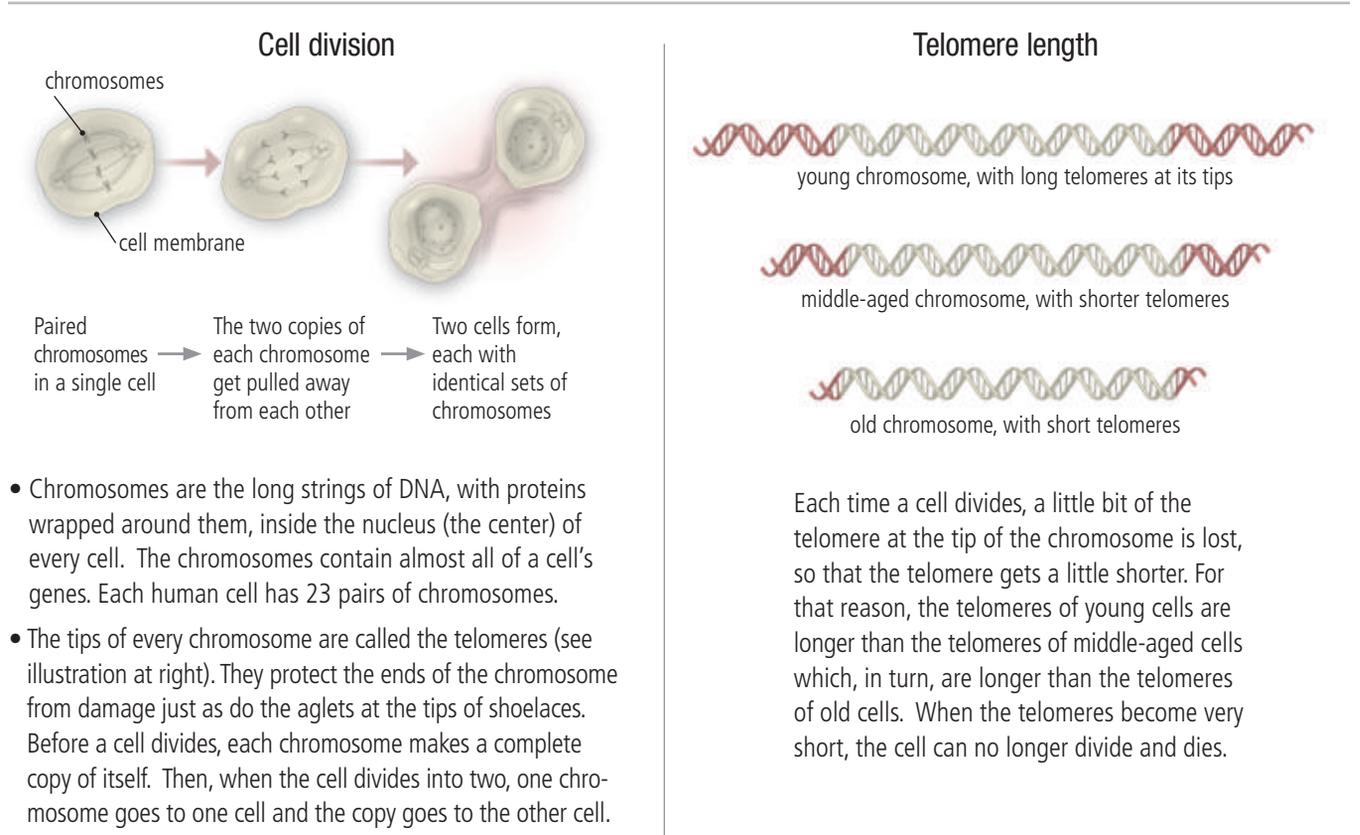
Much more important, however, are internal forces. Perhaps the most significant are unstable oxygen molecules called oxidants or free radicals. Inside every cell are many mitochon-

dria—little “power packs” that use oxygen to generate the energy the cell needs to function and survive (see Figure 3). In doing their jobs, however, mitochondria produce oxidants as a chemical byproduct. These oxidants damage cell membranes, proteins, and even DNA.

Fortunately, our cells are not defenseless against such assaults. They have genes that spring into action against DNA damage, including damage to the DNA that is in mitochondria. The body also produces nutrients and enzymes—known as antioxidants—that help block or repair such damage.

Wear and tear and DNA errors. Alterations and errors in DNA may later repeat and accumulate as cells

Figure 2 The life and death of a cell



- Chromosomes are the long strings of DNA, with proteins wrapped around them, inside the nucleus (the center) of every cell. The chromosomes contain almost all of a cell's genes. Each human cell has 23 pairs of chromosomes.
- The tips of every chromosome are called the telomeres (see illustration at right). They protect the ends of the chromosome from damage just as do the aglets at the tips of shoelaces. Before a cell divides, each chromosome makes a complete copy of itself. Then, when the cell divides into two, one chromosome goes to one cell and the copy goes to the other cell.

split again and again. Certain enzymes fix these problems swiftly by carving out damaged segments of DNA. Still other enzymes replace the damaged segments (see Figure 4).

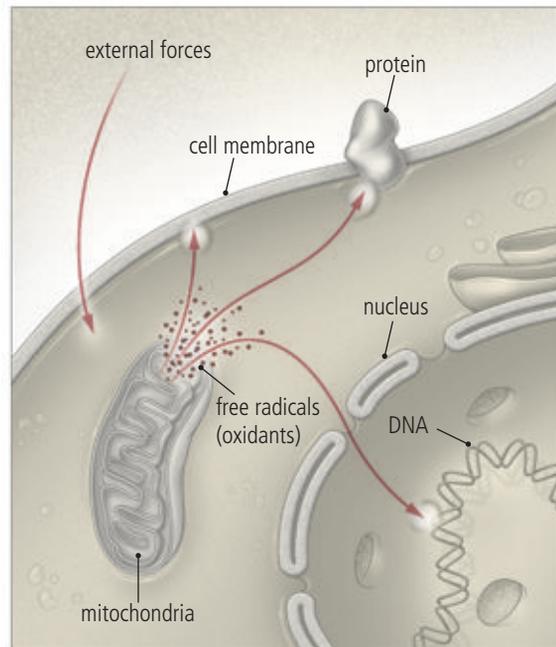
Life span in animals is linked to the ability to swiftly and efficiently repair DNA. Humans have developed better systems for ironing out glitches than mice, for example, and that's one reason our life span is longer.

Advanced glycation end products. Glucose crosslinks, which seem to snowball with age, are another possible culprit in cell decay. Called advanced glycation end products (AGEs), these crosslinks alter proteins by binding them together. Research has linked them to a host of problems, such as clouded vision, hardening of arteries, and stiffening of connective tissue, as well as changes in nerve and kidney function. They may have a role in Alzheimer's disease, too. Special immune system cells called macrophages break down AGEs, which are then filtered out of the blood by the kidneys and eliminated in urine. However, kidney function tends to decline with age and macrophages lose some of their zip, allowing levels of the damaging crosslinks to build up.

Immune system slowdown

Your immune system is a complex network of outposts and sentinels

Figure 3 Mitochondria and oxidants



The mitochondria use oxygen to generate energy. But in doing so, they produce oxidants (also known as free radicals) that damage the cell membrane, proteins, and DNA. External forces—such as environmental toxins, sunlight, and radiation—can also damage cells.

that patrol your body, ready to roust dangerous intruders such as bacteria, viruses, and parasites. The immune system forges two major types of defensive cells: B lymphocytes and T lymphocytes (also known as B cells and T cells). B cells make antibodies, while T cells attack substances they recognize as foreign.

But with age, the immune system weakens, giving a variety of offending organisms an opportunity for a better foothold in the body. While the overall number of T cells does not appear to decline with age, the cells seem to become less effective. T cells produce a group of messengers called interleukins. An age-related dip

in interleukin-2 occurs in humans and some animals. Experiments with older animals show that boosting interleukin-2 can tune up the immune system.

Starting at about age 30, humans also have diminishing levels of dehydroepiandrosterone (DHEA), a hormone that helps regulate the immune system. Studies have tied low DHEA levels in men to certain cancers and cardiovascular disease, among other problems. Canny marketers go much further by suggesting that taking DHEA supplements can help us live longer, lose or gain weight, ward off Alzheimer's disease, and combat AIDS and other infectious diseases; however, none of these claims are backed up by scientific evidence (see "DHEA: Much hype, few answers on safety," page 23).

Can we protect our cells, and ourselves, from aging?

We may have a better understanding today of why we age, but does that allow us to do anything about it? Until very recently, most experts on aging would have said no. Many believed that the aging of cells, and of multicellular organisms like humans, was inevitable. As a result, they believed that there was a limit to how long each species could live. One theory held that the biological life span of any species is roughly six times the stretch between birth and maturity.

Using this formula, the figure most often advanced for humans is 120 years. That's quite close to the span of one well-documented contender for the title of longest-lived person, a French woman believed to be 122 years old when she died in 1997.

But now, some researchers are having second thoughts about a maximum life span, and indeed about the inevitability of aging. You may wonder how anyone could seriously raise this possibility, as nothing may seem more unavoidable than aging and death—not even taxes. Yet some animals do not seem to age. Many cold-water ocean fish, some amphibians, and the American lobster never reach a fixed size. They continue to grow bigger, to be able to reproduce, and to live until something—an accident, a predator, or a disease—kills them.

Clearly, though, this is not the case for humans. Why, then, are some scientists wondering if we might be able to overcome the biological cap on aging? Recent re-

search indicates that while our genes may indeed “program” us for a particular life span by affecting how rapidly our cells age, we may be learning enough about how the “program” works to change it.

Calorie restriction and aging. The first suggestion that the process of aging might not be inevitable—or at least that it could be slowed—emerged about 70 years ago. Scientists discovered that when animals are forced to live on 30% to 40% fewer calories than they would normally consume, something unusual happens: they become resistant to most age-related diseases—cancer, heart disease, diabetes, Alzheimer's disease—and live 30% to 50% longer.

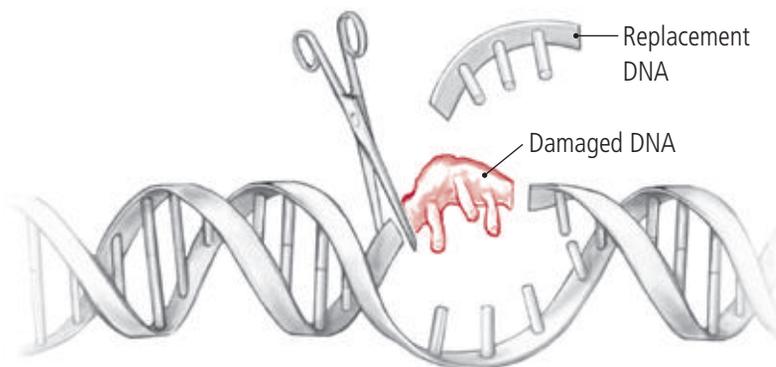
Restricting calories slows aging. But how? What are the underlying genes that preserve vitality and stave off disease when calories are restricted? And what good would it do to know the answer, since very few people are going to willingly reduce their caloric intake by 30% to 40% on a permanent basis? Sci-

entists wanted to understand what genes are turned on by calorie restriction for one simple reason: having figured that out, they might be able to develop medications that turn those genes on just like calorie restriction does. Indeed, that already has happened.

Over the past 15 years, scientists at MIT and Harvard Medical School identified a family of genes called sirtuins that are responsible for the health benefits of calorie restriction. Then they developed compounds called sirtuin-activating compounds (STACs) that turn on the sirtuin genes. The first STAC is called resveratrol, which is found in red wine. Resveratrol can extend the life span of simple animals like yeast, fruit flies, worms, and fish. In late 2006, resveratrol was shown to extend the life span of mice fed a high-calorie, high-fat diet. Not only did resveratrol extend life span in all these animals, but the animals were protected against several diseases of aging and remained physically active and vital until very late in their extended life.

It's easy to see why this research is potentially relevant to humans. Like the mice in these studies, many of us are middle-aged mammals on a high-calorie, high-fat diet. While research results in mice do not always prove true in humans, they often do. Still, we are a long way from knowing whether human life span can be extended, and the added years made vital and active, by such knowledge of the biology of aging.

Figure 4 Repairing damaged DNA



When DNA strands are copied, errors may occur. Certain enzymes can correct these problems: some carve out the damaged segments of DNA, while others replace them. Improving the repair process may lead to gains in life span.

Fighting oxidants. If oxidants damage cells and contribute to cellular aging, it made sense to see if increasing levels of antioxidants might help. Several vitamins are antioxidants—particularly vitamins E, C, and beta carotene (a form of vitamin A). Foods rich in those vitamins seemed to be associated with improved health. That led to the attractive theory that supplements of vitamins E and C and beta carotene might improve health. The evidence so far, however, has been very disappointing.

Yet some clues imply that figuring out other ways of harnessing the body's antioxidant systems might prove valuable. For example, a genetic mutation in worms that triggered an overabundance

of the antioxidant enzymes superoxide dismutase (SOD) and catalase doubled the worms' life span. These two enzymes work in concert to neutralize oxidants and help prevent oxidative damage. Other researchers found the gene that churned out SOD was more active in a group of longer-lived fruit flies than in flies of average life span. Likewise, fruit flies given extra copies of the SOD gene lived longer.

The Daf genes. A series of genes dubbed Daf—decay accelerating factor—in worms has a counterpart in humans that helps manage insulin levels and a growth factor called IGF-1. When researchers deliberately immobilize certain Daf genes in worms, they can live

up to five times longer and continue to be active and capable of reproducing until late in their greatly lengthened lives.

The Indy gene. When researchers introduced any one of five mutations into a single gene dubbed Indy—an acronym inspired by a Monty Python line, "I'm not dead yet"—the flies' life span nearly doubled. Moreover, the long-lived flies stayed frisky and reproduced far longer. When the mutation was reversed, fly life span returned to normal. This research not only identified another gene of possible importance in aging, it also demonstrated that even when engaged in the serious business of discovering and naming new genes, scientists can have a sense of humor. ♥

Extending your life

It's all very well to pile up statistics on average life span and speculate about factors in the aging process and the biological limits of life. Yet what does this tell you about your own life? Not enough. Clearly, more work needs to be done to crack the code of aging. But you don't have to wait until the final answers are in to take steps that may extend and enhance your life right now.

How well you age will help dictate how long you stay alive and how happy you are to do so. Whether or not your family is long-lived, the answers lie less in your genes than in your actions. Do you smoke? Do you eat well or poorly? Do you stay active? Are you a healthy weight? What ailments do you have now and, judging from family background and your current lifestyle, which ones are you likely to get?

10 steps toward a longer, healthier life

1. Don't smoke.
2. Build physical and mental activities into every day.
3. Eat a healthy diet rich in whole grains, vegetables, and fruits, and substitute healthier monounsaturated and polyunsaturated fats for unhealthy saturated fats and trans fats.
4. Take a daily multivitamin, and be sure to get enough calcium and vitamin D.
5. Maintain a healthy weight and body shape.
6. Challenge your mind.
7. Build a strong social network.
8. Protect your sight, hearing, and general health by following preventive care guidelines.
9. Floss, brush, and see a dentist regularly. Poor oral health may have many repercussions, including poor nutrition, unnecessary pain, and possibly even a higher risk of heart disease and stroke.
10. Discuss with your doctor whether you need any medication—perhaps to control high blood pressure, treat osteoporosis, or lower cholesterol—to help you stay healthy.

If your answers seem discouraging, take heart. It's not too late to make changes. A 2007 study in the *American Journal of Medicine* focused on adults who adopted a healthier lifestyle during middle age. The researchers followed 15,700 adults (ages 45 to 64) for a decade and noted that 970 of these people embraced a healthier lifestyle by the sixth year of the study. These individuals ate five or more daily servings of fruits and vegetables, worked out at least two and a half hours per week, didn't smoke, and avoided obesity. Benefits appeared quickly. Just four years later, the group of individuals who made these four changes had a 40% lower rate of death for any reason and 35% fewer cases of heart disease compared with the participants who made fewer of these changes.

No matter what your age or stage of life, you have the power to change many of the variables that influence disability and longevity. In this section, you can learn how.

Smoking: An enemy of longevity

While harm caused by tobacco has been exhaustively detailed, healthy declines in smoking are beginning to stall. The American Cancer Society (ACS) reports that nearly 24% of men and 18% of women continue to smoke. Fortunately, among people 65 and up, the most recent National Report Card on Healthy Aging found more than 90% *don't* currently smoke.

If you want to live a long, healthy life, make sure you're among the nonsmokers. According to the ACS, tobacco will cause roughly 168,000 deaths in 2007. It's responsible for almost a third of all cancer deaths. Extensive research indicates smoking boosts the risk for more than 10 cancers, ranging from lung cancer and bladder cancer to myeloid leukemia. For example, a study published in the *Journal of the National Cancer Institute* found that people who had smoked for at least 20 years significantly increased their risk of dying from colorectal cancer—men by 32% and women by

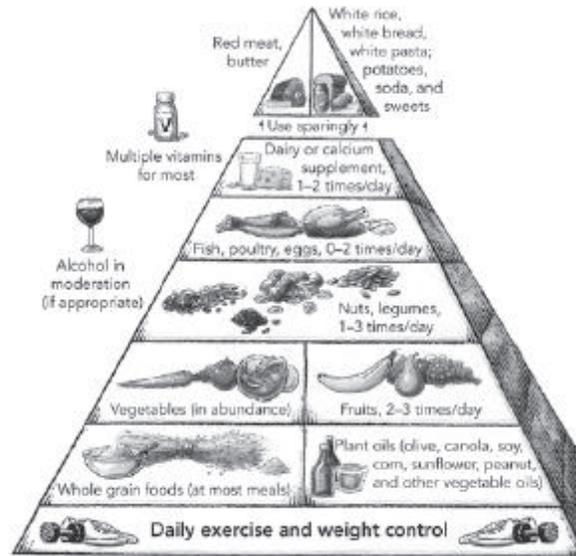
41%—compared with people who had never smoked. Secondhand smoke kills, too, prompting an estimated 37,000 to 40,000 deaths annually in nonsmokers.

Smoking contributes to heart disease, osteoporosis, emphysema, stroke, and even the common cold.

It makes breathing during exercise a whole lot harder and thus can make activity less enticing. It appears to compromise memory, too.

The news does get better. People who quit smoking can repair some, if not all, of the damage done. Af-

Figure 5 Healthy eating recommendations



Fats and sweets	<ul style="list-style-type: none"> • Use olive, soy, corn, sunflower, peanut oils. • Limit saturated fats and avoid trans fats, substituting healthier fats instead. • Limit sweets.
Dairy products	<ul style="list-style-type: none"> • Eat one to two servings per day of low-fat dairy products, or take a daily calcium and vitamin D supplement.
Meat, poultry, fish, eggs, nuts, and legumes	<ul style="list-style-type: none"> • Eat one to three servings of nuts and legumes per day. • Eat up to two servings of fish, poultry, or eggs per day. • Choose vegetable sources of protein, such as nuts and beans, more often than animal sources, such as red meat and dairy products.
Vegetables and fruits	<ul style="list-style-type: none"> • Eat two to three servings of fruit per day. • Eat vegetables in abundance. • Aim for nine servings a day of fruit and vegetables; seek variety.
Bread, cereal, pasta, and rice	<ul style="list-style-type: none"> • Eat whole grains and whole-grain products liberally. • Limit potatoes and refined carbohydrates such as white bread, white rice, and refined-grain pasta.
Alcohol	<ul style="list-style-type: none"> • Use in moderation if you enjoy it, as long as you have no health problems or conditions that would dictate otherwise.
Vitamins	<ul style="list-style-type: none"> • Take a multivitamin daily.

What's a serving?
<p>One serving of dairy products equals</p> <ul style="list-style-type: none"> • 1 cup milk or yogurt • 1 1/2 ounces natural cheese • 2 ounces processed cheese
<p>One serving of vegetables or fruits equals</p> <ul style="list-style-type: none"> • 1 cup raw, leafy vegetables • 1/2 cup other vegetables or fruit, cooked or chopped • 1 medium apple, banana, or orange • 3/4 cup fruit or vegetable juice
<p>One serving of meat, poultry, fish, dry beans, eggs, or nuts equals</p> <ul style="list-style-type: none"> • 2–3 ounces of cooked lean meat, poultry, or fish • 1/2 cup cooked dry beans • 2–3 eggs • 4–6 tablespoons of peanut butter
<p>One serving of bread, cereal, rice, or pasta equals</p> <ul style="list-style-type: none"> • 1 slice of bread • 1 ounce (about 1 cup) ready-to-eat cereal • 1/2 cup cooked cereal, rice, or pasta
<p><i>Adapted from Eat, Drink, and Be Healthy: The Harvard Medical School Guide to Healthy Eating, by Walter C. Willett, M.D., with Patrick J. Skerrett (Simon & Schuster, 2005).</i></p>

ter a smoker quits, the risk of heart disease begins to drop within a few months, and in five years, it matches that of someone who never smoked. Stroke risk drops to equal that of a nonsmoker within two to four years after a smoker quits, according to one study of people ages 34 to 55. The death rate from colorectal cancer also decreases each year after quitting. At any age, quitting progressively cuts your risk of dying from cancer related to smoking, although this drop is most marked in those who quit before age 50. It's worth noting that en route to these healthier end points, you're also likely to suffer fewer colds—nothing to sneeze at.

Diet and aging: Gaining a nutritional edge

Plenty of research suggests that the food you eat can help extend your life and improve your health. Studies reveal that a healthy diet can help you sidestep ailments that plague people more as they age, including heart disease, hypertension, cancer, and cataracts.

But information gleaned from news media, best-selling diet books, and even government sources is often contradictory. And occasionally scientific studies blown out of proportion in the news or in popular diet books make dietary divas or pariahs of certain foods. Will tripling your intake of olive oil or banishing carbohydrate-laden breads from your menu ward off illness? Taken alone, these steps simply can't do enough to help. To reap dietary benefits, you gradually must work in more broad-based changes, such as cutting down on red meat; eating more vegetables, fruits, and whole grains; and striking a healthy balance between calories in and calories out.

Perhaps the easiest way to understand what changes you should be making in your diet is to review the healthy eating recommendations made by Professor Walter C. Willett in *Eat, Drink, and Be Healthy: The Harvard Medical School Guide to Healthy Eating* (see Figure 5).

A closer look at fats

For years, fats were considered antithetical to a healthy diet. All dietary fat was equated with clogged arteries and heart disease. The prevailing wisdom was the less

fat, the better. But an alternate view, held for decades by many leaders in nutrition research, was that the key to health was the type, not the amount, of fat. And indeed, research reveals that not all fats are the same. While some are quite unhealthy, others offer proven health benefits.

Experts agree that saturated fat is a major villain. It boosts your blood level of unhealthy LDL cholesterol and speeds the artery-clogging process called atherosclerosis, raising your risk for heart disease. Some saturated fats are worse than others. The saturated fats found in dairy products (see Table 1), such as butter and whole milk, have the strongest effect on LDL. Beef fat has less of an impact on LDL, and the fats in chocolate and cocoa butter have a still smaller one.

Trans fats also pose health dangers. Research shows that trans fats, also known as partially hydrogenated oils, depress healthy HDL cholesterol, while raising blood levels of LDL, triglycerides, and a substance called lipoprotein A. All of these changes have been linked with heart disease. Trans fats also seem to make platelets—the particles in blood that cause it to clot—stickier than normal, which could conceivably contribute to heart attacks or strokes. In response to health risks, some communities have banned trans fats in restaurants, and many food companies have voluntarily substituted healthier fats in their products.

On the other hand, research suggests that unsaturated fats—that is, monounsaturated fats such as olive oil and polyunsaturated fats such as nut oils and soybean oil—have many benefits. The Nurses' Health Study, after following nearly 86,000 women for 14 years, noted that fewer heart problems occurred among those who ate more unsaturated versus saturated fats. In fact, the researchers estimated that risks for heart-related deaths and heart attacks could be cut by roughly 40% simply by replacing 5% of unhealthy saturated fats with the same amount of healthier unsaturated fats. Further, they estimated that replacing 2% of unhealthy trans fats with the same amount of healthier unsaturated fats could lower the risks by more than 50%.

Omega-3 fats—the polyunsaturated fats found in oily fish such as salmon, sardines, and tuna—are particularly heart-healthy. Numerous studies show

Table 1 Good fats, bad fats

TYPE OF FAT	MAIN SOURCES	STATE AT ROOM TEMPERATURE	EFFECT ON CHOLESTEROL
Monounsaturated fat	Olives and olive oil, canola oil, peanut oil; cashews, almonds, peanuts, and most other nuts; peanut butter; avocados	Liquid	Lowers LDL; raises HDL
Polyunsaturated fat	Corn, soybean, safflower, and cottonseed oils; seeds: legumes; fatty fish	Liquid	Lowers LDL; raises HDL
Saturated fat	Whole milk, butter, cheese, and ice cream; red meat; chocolate; coconuts, coconut milk, palm oil, and coconut oil	Solid	Raises both LDL and HDL
Trans fat	Most margarines; vegetable shortening; foods containing partially hydrogenated vegetable oil; deep-fried chips; many fast foods (such as French fries) and commercial baked goods (such as doughnuts and cookies)	Solid or semisolid	Raises LDL; lowers HDL

Adapted from *Eat, Drink, and Be Healthy: The Harvard Medical School Guide to Healthy Eating*, by Walter C. Willett, M.D., with Patrick J. Skerrett (Simon & Schuster, 2005).

that the omega-3 fats found in fish (specifically eicosapentaenoic acid, also known as EPA, and docosahexaenoic acid, or DHA) can reduce the risk of heart attack, stroke, or sudden cardiac death caused by electrical problems in the heart. An analysis of data from 11 studies tracking more than 222,000 people found the risk of death from coronary artery disease fell as fish consumption increased: eating fish a few times a month reduced risk by 11%, two to four times a week by 23%, and five or more times a week by 38%. In addition, some studies suggest that omega-3 fatty acids may help protect against Alzheimer's disease, and a nationwide study is under way to investigate this further.

The bottom line on fats

- Limit your intake of saturated fats to less than 7% of your total calories and your total fat intake to 20% to 35% of your daily calories.
- Choose monounsaturated and polyunsaturated oils.
- Include foods rich in omega-3 fatty acids, such as salmon, trout, or mackerel, in your diet.
- Check food labels carefully. Although some cities and towns are outlawing unhealthy trans fats in restaurants, they are often used in commercial foods, such as bread and other baked goods. They appear as "partially hydrogenated" or "hydrogenated" vegetable oil or shortening on ingredient lists and as trans fat on Nutrition Facts labels.
- Not all vegetable oils are winners. Coconut, palm, and palm kernel oils are largely saturated fats, as is cocoa butter.

A closer look at vegetables and fruits

Can serving up an abundance of vegetables and fruits contribute to a longer, healthier life? The World Health Organization believes so, as do independent experts. Filling your plate with produce can help protect you against heart disease, stroke, high blood pressure, and some types of cancer (see Table 2).

For example, a multi-study analysis showed that people who ate the largest amounts of fruits and vegetables—about 35 servings a week—reduced their risk of heart attack by 15% over those who ate the least. Another study found a 30% lower risk of stroke in people who ate about 30 servings of fruits and vegetables each week. Broccoli, kale, spinach, citrus fruit and juice, and romaine lettuce were most beneficial.

A landmark blood pressure study—the Dietary Approaches to Stop Hypertension (DASH) study—demonstrated that a diet high in vegetables and fruits can lower blood pressure, particularly when fat intake is limited. A host of studies have also found that plentiful servings of fruits and vegetables can reduce your risk of developing cancer.

Significant research encourages getting nine servings of fruits and vegetables a day. A difficult goal? Perhaps, given the fact that the average American barely gets four daily servings—and that's only if you count starchy French fries and baked potatoes, which some nutritional experts want to permanently exile to the carbohydrate camp. Yet even small changes add up. One extra daily serving of fruits or vegetables could

lower your risk of the most common kind of stroke by 6%, according to data from the Nurses' Health Study and the Health Professionals Follow-up Study.

The bottom line on fruits and vegetables

- Aim for nine servings of fruits and vegetables a day. Doing so can help protect against heart attack, high blood pressure, some cancers, and stroke.
- When filling your plate with fruits and vegetables, choose from a full color palette. Along with eye appeal that can whet your appetite comes a complex interplay of nutrients that far outstrips anything now available as a supplement.

A closer look at carbohydrates

If you weren't among the many people who jumped on the low-carb bandwagon as it passed by, odds are good that half your daily calories come from carbohydrates, the starches or sugars in foods. Plentiful sources include bread, pasta, rice, potatoes, fruits, and vegetables.

Before the low-carb craze, the prevailing wisdom was that all carbohydrates were good, and you should use them to replace fats. Now all carbs are regarded with some suspicion. But as with fats, carbohydrates shouldn't all be painted with the same broad brush. The right carbohydrates—those that are high in nutrients and have a smaller impact on blood sugar—fuel the body and are important to a healthy diet. But eating too many of the wrong types can put you at greater risk for diabetes and heart disease. Clearly, it's wise to choose your carbohydrates judiciously.

Carbohydrates are often described as either simple or complex. Simple carbohydrates are sugars such as sucrose, glucose, fructose, and lactose, or a few of those molecules combined. These are the carbohydrates in such foods as soda, cookies, and fruit. Complex carbohydrates, such as those found in bread, pasta, and potatoes, consist of much longer chains of sugars. Sometimes simple carbohydrates are deemed "bad," while complex carbohydrates are considered "good." But that's an oversimplification.

When you eat carbohydrates, your digestive system breaks them down into simple sugars (generally glucose). The bloodstream carries this glucose to cells,

which use it for energy. When blood sugar levels rise, your body releases the hormone insulin, which promotes the storage of nutrients and directs sugar into cells. Some carbs have a more dramatic effect on blood sugar levels than others. This difference drives the discussion of healthy versus unhealthy carbs.

■ **Glycemic index and load.** The key, say many nutritional experts, is to look at a food's glycemic index or glycemic load. The glycemic index ranks foods according to how fast and how high they raise blood sugar. Items in the index are compared to a reference food—either glucose or white bread—which has the arbitrary glycemic value of 100.

Because the glycemic index doesn't take into account the quantity of carbohydrate in a typical serving, Harvard researchers added the concept of glycemic load to better represent a food's impact. The carbohydrate in a raw carrot, for example, has a glycemic index rating of 131—high enough that you might opt instead for mashed potato, which has a rating of 104. However, those values reflect the effect of eating 50 grams of carbohydrate. That's the equivalent of a pound and a half of carrots. A more typical half-cup serving has only about 4 grams of carbohydrate—much less than the 18 grams of carbohydrate in a half-cup of mashed potato. That difference explains why the glycemic load of a serving of carrots is 11, while that of a serving of potatoes is 20.

Glycemic load is a useful way to measure how foods will affect your blood sugar and insulin levels. Foods with a high glycemic load, such as potatoes and soft drinks, are digested quickly; they can flood your bloodstream with a lot of sugar all at once, provoking a rush of insulin. That quick surge of insulin can

Foods with a high glycemic load	Foods with a low glycemic load
French fries	Barley
Honey	Bran
Pizza	Brown rice
Potatoes	Bulgur wheat
Refined cereals	Lentils
Soft drinks	Oatmeal
Sugar	Whole fruits
White bread	Whole-grain cereals
White rice	Whole-wheat products

Table 2 Health benefits of fruits and vegetables

VEGETABLES AND FRUITS	GOOD SOURCE OF	KNOWN OR POTENTIAL BENEFITS
Broccoli, Brussels sprouts, cabbage, cauliflower, collard greens, kale, kohlrabi, mustard greens, radishes, rutabagas, spinach, turnips, watercress	<ul style="list-style-type: none"> • Cancer-fighting chemicals: isothiocyanates, indoles, thiocyanates, nitriles • Lutein and zeaxanthin, two antioxidant pigments found in dark green leafy vegetables 	<ul style="list-style-type: none"> • Green vegetables—especially folate-rich ones—help protect the heart and guard against colon, rectal, mouth, and throat cancers. • Broccoli and other cruciferous vegetables guard against bladder cancer. • Leafy green vegetables help ward off stomach and lung cancers. • Spinach, kale, and other dark leafy greens protect against cataracts and macular degeneration, a leading cause of blindness in older people. Lutein and zeaxanthin may destroy free radicals that can damage the eye. • Abundant servings of cruciferous vegetables and leafy greens lower the risk for stroke.
Carrots	<ul style="list-style-type: none"> • Beta carotene, which the body converts to vitamin A 	<ul style="list-style-type: none"> • Carrots may help prevent heart disease and guard against cancers of the mouth, throat, lung, and stomach, and possibly also breast cancer (especially in women who have a family history of it).
Asparagus, chives, garlic, leeks, onions, shallots	<ul style="list-style-type: none"> • Sulfur compounds, such as diallyl sulfide and allicin, which may be cancer-fighters 	<ul style="list-style-type: none"> • Onions and garlic may guard against stomach cancer.
Clementines, grapefruits, lemons, limes, oranges, tangerines	<ul style="list-style-type: none"> • Vitamin C • Cancer-fighting compounds limonene and coumarin 	<ul style="list-style-type: none"> • Abundant servings of citrus fruits lower the risk of stroke. • Citrus fruits guard against mouth and throat cancers. • In animal studies, limonene and coumarin have been shown to fight cancer.
Acorn squash, cantaloupes, cucumbers, honeydew melons	<ul style="list-style-type: none"> • Beta carotene, which the body converts to vitamin A 	<ul style="list-style-type: none"> • Beta carotene may help fight heart disease and cancer.
Alfalfa sprouts, beans, peas, soybeans	<ul style="list-style-type: none"> • Fiber • Folate • Protease inhibitors 	<ul style="list-style-type: none"> • Fiber helps prevent constipation, diverticulosis, hemorrhoids, gallstones, obesity, and varicose veins. • Folate and protease inhibitors may help block heart disease and cancer.

Source: *Eat, Drink, and Be Healthy: The Harvard Medical School Guide to Healthy Eating*, by Walter C. Willett, M.D., with Patrick J. Skerrett (Simon & Schuster, 2005).

leave your blood sugar too low after just a few hours. In an effort to keep blood sugar levels constant, your brain sets off hunger signals to encourage you to eat more. On the other hand, foods with a lower glycemic load, such as fruits and whole grains, release glucose in a steadier stream and may curb hunger for a longer time. In this way, these foods may help you control your weight.

Another problem with a steady diet of food with a high glycemic load is that over many years, your body's reaction to insulin could become impaired. In this condition, called insulin resistance, cells become less responsive to insulin and don't take in enough

sugar from the bloodstream. Thus, blood sugar levels stay high longer. For a while, the pancreas produces enough insulin to offset this problem, but eventually symptoms of type 2 diabetes appear. Insulin resistance can lead to other problems, too, such as low HDL cholesterol, high blood pressure, heart disease, and possibly cancer.

Evidence suggests that lean, active people are better able to deal with a high-carbohydrate diet. Muscle cells handle insulin better and take up glucose more efficiently than fat cells. Given that, it makes sense that obesity and inactivity top the list of risk factors for insulin resistance.

The bottom line on carbohydrates

- Choose whole-grain foods over those made with refined grains, such as white bread. Look beyond popular choices like whole oats and brown rice to lesser-known whole grains like barley, bulgur, kasha, and quinoa.
- Limit white potatoes.
- Consider the whole package of vitamins, good fats, and other nutrients delivered before ruling out any foods. A healthy diet is more than the sum of its glycemic load. Although white bread and dark whole-grain bread have the same glycemic load if the whole grains are finely ground, the extra fiber and nutrients make the dark bread a healthier choice.

A closer look at protein

Your body virtually teems with protein—about 10,000 different types. Hormones, enzymes, and even protective antibodies derive from protein. Protein helps build and rebuild hair, skin, muscles, nails, and organs. All these proteins are formed by combinations of smaller building blocks called amino acids. Your body can make 13 amino acids, which are called nonessential because you don't have to make sure your diet includes them. But in order for your body to build all the proteins it needs, it depends on the food you eat to deliver another nine amino acids, called essential amino acids. Dairy products, eggs, fish, poultry, and meat often offer a full complement of the amino acids needed to fulfill our body's requirements, and so are referred to as complete proteins. Vegetable protein tends to be incomplete, which is why you need to mix and match foods—like beans and rice—to get the full range of amino acids.

Calculate your protein needs by your weight—about 7 grams for every 20 pounds. That's 42 grams if you tip the scales at 120, 63 grams if you weigh 180, and so on. Because protein is so abundant in the American diet, most people have no trouble meeting those requirements. For example, a cup of yogurt, 6 ounces of tuna or roasted chicken, a cup of rice, and a serving of broccoli together provide just over 60 grams of protein.

Choosing plant sources of protein helps you bypass the unhealthy fats predominant in animal sources. Therefore, most nutrition experts recommend opting for vegetable sources of protein, such as nuts and

beans, and limiting animal sources, such as red meat or dairy products.

Researchers have found that eating more protein and fewer carbohydrates can raise HDL and lower triglycerides, which in turn should lessen the risk for heart disease. Substituting healthy fats for carbohydrates will accomplish the same end. Keep in mind, though, that eating too much protein might actually rob bone of calcium needed to stave off osteoporosis. According to the Nurses' Health Study, women who ate more than 95 grams of protein a day suffered more broken wrists than those whose protein intake was below 68 grams a day.

One undisputed fact is that grilling or charring meat, poultry, or fish—all of which are protein sources—can cause a buildup of known carcinogens. Cutting off fat, which causes flames to flare on the grill, can help avoid charring; try gently sautéing, steaming, or braising these foods in liquid instead.

The bottom line on protein

- When choosing protein, shy away from foods high in saturated fat. Favor fish, well-trimmed poultry, or vegetable proteins such as beans, nuts, and grains, which tend to be low in saturated fat and high in fiber. If you do eat beef, pick the leanest cuts.
- Remember to eat or build complete proteins. If you choose mainly vegetable proteins, eat a wide variety of vegetables to get the full complement of amino acids over the course of a week.
- Don't char or overcook meat, poultry, or fish.

A closer look at dairy products

Because dairy products are rich in calcium, the primary component of bone, federal dietary guidelines released in 2005 encouraged Americans to consume 3 cups of fat-free or low-fat milk a day.

Dairy products pack a lot of calcium into a small package. One cup of milk, for example, gives you roughly 300 mg of calcium. Depending on your age, that's almost a third or a quarter of the daily recommended amount (see Table 3). Some fortified foods deliver substantial amounts of calcium: a cup of fortified orange juice supplies about 300 mg, and three-quarters of a cup of Whole Grain Total offers 1,000 mg. Few other foods can deliver the same calcium punch.

While it's clear that calcium can help safeguard bones,

Fiber facts

Fiber is another complex carbohydrate. But because your body cannot break it down easily, it passes through your digestive tract pretty much intact. Even so, fiber reduces your risk of heart disease, possibly by lowering levels of C-reactive protein, a key marker of artery-harming inflammation, and intestinal disorders such as constipation, diverticulosis, and hemorrhoids. It also helps prevent plenty of other problems, such as gallstones, obesity, and varicose veins.

Whole grains, fruits, vegetables, legumes, and nuts can help you get part of the recommended 25 to 30 grams of fiber per day, but most people will need to eat a high-fiber cereal, too. Or you can take a supplement that contains psyllium—a water-soluble fiber—such as Metamucil, Perdiem Fiber, or a less expensive store brand. If you do use a supplement, be sure to drink extra water as directed.

just how much protection it offers is a matter of debate. In 2006, the Women's Health Initiative found that calcium and vitamin D supplements improved bone density far less than previously reported and did not significantly protect against hip fractures. The study included 36,000 healthy women, ages 50 to 79. Half the women took 1,000 mg of elemental calcium and 400 international units (IU) of vitamin D a day, while the others received a placebo. After seven years, the supplement takers had, on average, 1% greater bone density at the hip compared with those taking a placebo, a modest but significant increase. The 12% reduction in risk of hip fractures among the women taking supplements was much smaller than researchers had anticipated and not statistically significant. What's more, the supplements did not appear to prevent other types of fractures.

Several factors could account for the unexpected results. First, the vitamin D dose of 400 IU may have been too small. Vitamin D helps the body absorb calcium, and recent research suggests that at least 800 to 1,000 IU is necessary. Also, less than 60% of the women being studied consistently took the prescribed supplement dosages. When the researchers looked only at women who followed the supplement regimen exactly, the reduction in hip fractures jumped to 29%. Additionally, most of the women assigned to the placebo were already getting nearly the recommended daily amount of calcium when the study began. Some experts speculate that calcium and vitamin D supple-

mentation offer a more powerful benefit to women who aren't already getting enough of these nutrients.

Still, it's clear that calcium and vitamin D offer at least a mild benefit, and you need to keep getting enough of each. But you should also engage in other bone-protective strategies, such as doing weight-bearing exercise and avoiding bone weakeners like smoking, drinking heavily, or getting too much vitamin A.

How much calcium is enough? The National Academy of Sciences has established recommended intakes by age (see Table 3). These guidelines are supported by the National Institutes of Health, the National Osteoporosis Foundation, and many osteoporosis experts.

For the sake of heart health, opt for low-fat dairy products. A cup of whole milk provides a whopping 8 grams of saturated fat—about half of the amount an average-sized adult should get each day, according to the American Heart Association. Fat-free or 1% milk is a better choice—there is no saturated fat in a cup of fat-free (or skim) milk, and 2.5 grams of saturated fat in a cup of 1% milk. The calorie difference isn't insignificant either: one cup of whole milk has 150 calories, while a cup of low-fat milk has 100 calories, and a cup of fat-free milk has 80 calories.

Table 3 Getting the calcium you need

Because your body's calcium demands shift with age, you should adjust your calcium intake as necessary.

AGE	NATIONAL ACADEMY OF SCIENCES RECOMMENDED CALCIUM INTAKE
Birth to 6 months	210 mg/day
7 months to 1 year	270 mg/day
1 to 3 years	500 mg/day
4 to 8 years	800 mg/day
9 to 18 years	1,300 mg/day
19 to 50 years	1,000 mg/day
51 years or older	1,200 mg/day
Pregnant or lactating, 14 to 18 years	1,300 mg/day
Pregnant or lactating, 19 to 50 years	1,000 mg/day

Note: Because excessive amounts of calcium can cause problems, it's wise to keep your intake below 2,500 mg a day (the tolerable upper limit set by the National Academy of Sciences).

The bottom line on dairy products and calcium

- Choose reduced-fat or fat-free milks, yogurts, and cheeses. These products make it possible to cut fat and calories without skimping on calcium.
- If you have trouble digesting dairy products, taking a lactase pill or choosing lactose-reduced or lactose-free dairy products can help you avoid unpleasant side effects such as gas, bloating, and diarrhea.
- Try to get your dietary calcium from a variety of different sources, such as calcium-fortified cereals and orange juice, Swiss chard, various beans, salmon, and tofu.
- Consider calcium supplements if you're not getting the amount currently recommended (see Table 3) through diet alone. Supplements are inexpensive and easy to take, and they have few or no calories. Choose supplements paired with vitamin D.
- Spread your calcium intake throughout the day (in about 500-mg doses or less) because your body has a hard time absorbing large amounts of calcium all at once.

A closer look at vitamins

People sometimes develop vitamin deficiencies as they age, either because of a limited diet or trouble absorbing certain vitamins, such as B₁₂. A daily multivitamin is good health insurance. Look for a multivitamin that has at least 400 micrograms (mcg) of folic acid; 1.7 milligrams (mg) of vitamin B₆ (pyridoxine) for men and 1.5 mg for women; 2.4 mcg of vitamin B₁₂ (cobalamin); and 400 IU of vitamin D. Vitamin D₃ (cholecalciferol) is the form most easily absorbed and used by the body, so choose a multivitamin that includes D₃ if possible.

Folic acid, B₆, and B₁₂ may cut the risk of heart disease by lowering blood levels of a known risk factor called homocysteine. It's not yet clear what dosages are most effective. Some experts go as high as 1,000 mcg of folic acid, 6 mg of B₆, and 25 mcg of B₁₂ a day. Since many foods have folic acid added, it's probably not necessary to take that much. Indeed, getting too much folic acid may have worrisome implications. A recent study in the *Journal of the American Medical Association* that included adults with a history of precancerous colon polyps (adenomas) noted that people taking high doses of folic acid for up to six years had more advanced adenomas than did people taking placebo. The upper limits for safety per day are 1,000 mcg of folic acid, 100 mg of B₆, and not known for B₁₂.

Vitamin D helps you absorb calcium and phosphorus, which are essential for strong bones. In test tubes, at least, this vitamin also blocks growth and replication of various cancer cells, including those that attack the breast, ovaries, prostate, and colon. And a recent review of studies found that people with the highest intakes of vitamin D and calcium reduced their risk for diabetes by 18% compared with those with the lowest intakes. Current vitamin D recommendations are 200 IU for people ages 1 to 50, 400 IU for people ages 51 to 70, and 600 IU for people ages 71 and older. However, because there is some evidence that we need more vitamin D than is currently recommended, some experts suggest getting as much as 800 to 1,000 IU of vitamin D per day. Dairy products, fatty fish, and fortified foods like some cereals can help supply this, but keep in mind that the upper limit for safety is 2,000 IU a day. Your body also synthesizes some vitamin D from sunlight, but generally not enough to meet your needs.

Unless your doctor advises otherwise, you probably should choose a multivitamin without iron if you are a postmenopausal woman or a man. The body needs relatively little iron and usually can meet these needs through a healthy diet. One in 200 people has hemochromatosis, a condition brought on by a genetic glitch that allows iron to build up in joints and vital organs. This can cause serious damage if unnoticed.

■ **Can antioxidants help quell cancer and heart disease?** Antioxidants are compounds that block some of the damage done to the body by free radicals (see “Oxidants and antioxidants,” page 4). Different antioxidant vitamins and minerals appear to protect specific parts of cells, such as the cell membrane or its inner workings. According to Harvard nutrition expert Walter Willett, that's why singling out one antioxidant won't provide a full spectrum of protection. He believes it may also help explain why studies that

fastfact

Older adults often have nutritional deficits in calcium; zinc; iron; magnesium; vitamins B₆, B₁₂, D, and E; or folic acid, according to the Baltimore Longitudinal Study of Aging. These nutrients affect your energy, bones, heart, and mood, among other things.

focus on the benefits of single antioxidants often have dispiriting results.

Many experts have long believed vitamin E, vitamin C, and selenium are potentially helpful for preventing heart disease or cancer in the general population. Promising results in certain well-regarded observational studies bolstered this view. Yet this research has largely failed to pan out.

After considering the most rigorous studies of vitamin C, vitamin E, and a third antioxidant, coenzyme Q₁₀, the federal Agency for Healthcare Research and Quality concluded in 2003 that these substances have no significant effect on heart disease. A year later, the American Heart Association (AHA) evaluated 15 large trials in which more than 100,000 participants took antioxidant supplements or a placebo. Their report warned against using antioxidant pills or potions to try to ward off heart attacks or heart disease because there was no evidence that they were helpful.

In addition, American researchers analyzing 14 years of data on colorectal cancer collected from nearly 712,000 men and women found that neither vitamin E nor vitamin C supplements were associated with fewer cancer deaths. However, a 20% decline in deaths from all causes—and, in men, a lower risk for cancer—was associated with one extra daily serving of vitamin C-rich fruits or vegetables, according to a European study of 19,500 people.

Selenium shows some cancer-blocking potential—at least in certain studies. One such study showed that a daily 200-mcg dose of selenium cut the risks of prostate, colon, and lung cancers by about half. A long-term trial dubbed SELECT is under way to look at the effects of selenium and vitamin E on prostate cancer, although answers will not be available for a few years.

A closer look at herbal and nutritional supplements

Although supplements are not regulated for safety or efficacy in the United States, more than half the participants in the long-running Health and Retirement Study reported taking them—two-thirds had done so in the past month. Out-of-pocket costs averaged \$173 annually. That money might be better spent on heaping your plate with fruits and vegetables, which have proven health benefits.

The task of unearthing the truth in spiraling sup-

The bottom line on antioxidants

- Taking antioxidant supplements indiscriminately is not likely to be helpful and may be harmful. High doses of preformed vitamin A, for example, may harm bones. This is especially troubling because people seem to absorb more vitamin A—rather than less—with age. Recent research also has raised some questions about the safety of high-dose vitamin E. Before reaching for supplements, first draw on food sources, which provide a package of nutrients that may prove more valuable than supplements.
- Men at high risk for prostate cancer are most likely to benefit from a selenium supplement. Doses in some studies ranged from 86 to 200 mcg a day, which is considerably higher than the Recommended Dietary Allowance, but within a safe range.
- There is no solid evidence to support taking large doses of vitamin C. A daily intake of 200 to 300 mg of vitamin C is reasonable. Citrus fruits like oranges and grapefruits are a great source.

plement claims has never seemed more difficult. Often, though, carefully conducted studies stick a pin in inflated assertions.

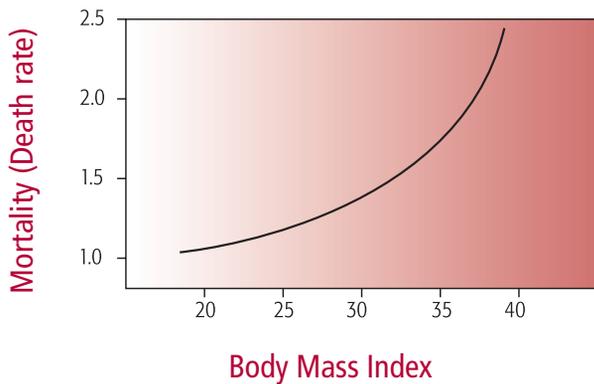
Generally, it's wise to be skeptical regarding the many herbal preparations and other supplements that make health claims or promise to extend life. Many do not even contain the full dose of the active ingredient pledged on the label, and some may actually be harmful, especially when combined with other medications. That's why it's wise to talk to your doctor before taking any herbal or nutritional supplement, as well as other over-the-counter medications. If you're already taking supplements, be sure to tell your doctor about them.

Watching your weight

A staggering 66% of American adults are overweight or obese, raising their risk of developing health woes such as diabetes, heart disease, stroke, gallstones, and certain cancers, and intensifying the pangs of creaky and arthritic joints. Being overweight boosts the risk of dying from any cause within 10 years by 60% (see Figure 6). Obesity, which doubles that risk, may cause an estimated 300,000 deaths a year.

Age seems to conspire against maintaining a healthy weight. Metabolism slows, making it harder to

Figure 6 Obesity-related mortality



Being overweight or obese dramatically boosts your chances of dying from any cause within 10 years.

burn off calories. Dwindling muscle mass plays into this, too, because muscle burns calories more efficiently than fat does. Opportunities for exercise—which are built into the day for active children, toddler-chasing adults, and anyone whose job is physical—often must be sought as you grow older. Ailments can slow activity, too, making it harder to burn the calories collected during your day. Of course, at any age, having snack foods and super-sized portions on tap doesn't help. Despite these challenges, losing excess weight is worthwhile: it can lower your risk for a host of illnesses, make you feel better and more vital, and help you live a longer, healthier life.

What is a healthy weight? A quick look at a chart (see Table 4) for body mass index (BMI)—a ratio of

height and weight—tells the story: normal weight is defined as a BMI of 19 through 24.9, overweight is from 25 through 29.9, and obesity is a BMI of 30 or higher. Whether you measure extra weight by the BMI or just by stepping on a scale, it helps to understand the following key points about weight.

■ **Waistline woes.** Distribution of fat in your body—that is, whether your shape mimics the proverbial apple or pear—makes a difference (see Figure 7). A National Institutes of Health panel concluded that a woman with a BMI over 25 and a waist size of at least 35 inches has a higher risk for diabetes, hypertension, and cardiovascular disease than a woman of the same weight whose fat is centered further south. A man courts these problems once his BMI is over 25 and his waistline is at least 40 inches. And even these waistlines are a bit generous, according to experts at Harvard School of Public Health.

■ **Genes in play.** Genes appear responsible for about 25% of the risk for obesity in some folks and as much as 70% to 80% in others. “Thrifty” genes, intent on storing fat for lean times, make it harder—though not impossible—to reach or maintain a healthy weight.

■ **Pounds and years.** Data from the Nurses' Health Study and the Health Professionals Follow-up Study show that middle-age spread may not be as benign as once thought. Compared with people who gained no more than 5 pounds between age 20 and midlife, men and women who put on 11 to 22 pounds tripled their risk of diabetes, heart disease, high blood pressure, and gallstones. Thus, staying at a healthy weight

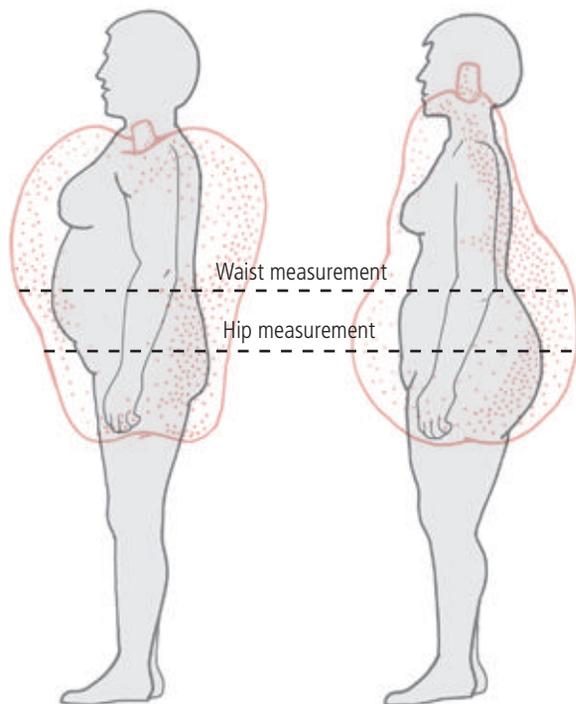
Calorie-restricted diets: Can they add years to your life?

Will a sharp cut in calories extend your life? Apparently it does the job quite nicely if you're a worm, fruit fly, or rodent. Reducing calories by a third while still ensuring proper nourishment has been shown to delay physical maturity and lengthen life span considerably in numerous studies of various species (see page 7). An added bonus for some animals is that calorie restriction appears to slow the onset of many illnesses, including kidney disease and cancer.

Will it work in humans? It's difficult to say. No clinical trials looking at this have been done in humans. Cutting calories so deeply may lead to malnutrition and serious vitamin deficiencies. Few people are willing to stick to

the spartan regimen required to mimic calorie reduction in lab animals while taking human dietary needs into account. Proponents of calorie restriction have long speculated that it slows metabolism, thereby erasing some free-radical damage that would otherwise occur. The life span—doubling mutations in the fruit fly gene dubbed *Indy* appeared to work by creating a metabolic state very similar to that triggered by calorie restriction (see “The *Indy* gene,” page 6). The fortunate flies could continue to eat whatever they liked. If further research ever extends the finding to humans, this could be the jackpot for those of us who lack the fortitude to go it alone.

Figure 7 Apples and pears



The waist-to-hip ratio (WHR) is one way to estimate how much weight a person is carrying around the abdomen versus around the hips. Men and women with a higher WHR (resembling an apple shape) have a higher risk for heart attack and stroke than men and women with a lower WHR (resembling a pear shape).

To determine your WHR:

1. With your abdomen relaxed, measure your waist at its narrowest (usually at the navel).
2. Measure your hips at the widest point (usually at the bony prominence).
3. Divide the waist measurement by the hip measurement:
 $\text{waist measurement} / \text{hip measurement} = \text{WHR}$.

A healthy WHR for women is 0.8 or less (and a waist measurement of 35 inches or less), and a healthy WHR for men is 1.0 or less (and a waist measurement of 40 inches or less).

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that strays no higher than 10 pounds more than you weighed at age 21 is worthwhile.

■ **Small changes.** Losing just a small amount—5% to 15% of your total weight—can make a significant difference in your health. A study of 170 healthy, obese middle-aged to older men pitted diet against aerobic exercise in a nine-month trial investigating coronary artery disease risk factors. Losing roughly 10% of weight netted the dieters significant drops in blood sugar, total cholesterol, triglycerides, insulin levels, and blood pressure, plus a boost in HDL cholesterol. While the men in the aerobic group increased their lung capacity and improved on certain measures, weight loss was clearly preferable for reducing coronary artery disease risk factors. Another study found that weight loss and exercise could help prevent diabetes. The Diabetes Prevention Program looked at 3,234 overweight adults whose high blood sugar levels put them on the path toward diabetes. The people who exercised daily (walking or other moderate activity for 150 minutes a week) and dropped 5% to 7% of their weight were 58% less likely to develop diabetes. Among people 60 or older, these lifestyle changes warded off diabetes in 71%. What's more, high blood sugar levels returned to normal in many people.

■ **Bigger problems.** Sometimes weight is the tip of the iceberg. People who exhibit three of the following problems—obesity (in this case defined as a waistline of 40 or more inches in men or 35 or more inches in women), high triglycerides, low HDL cholesterol, high blood pressure, and insulin resistance—are deemed to have metabolic syndrome. Metabolic syndrome isn't a disease, but a cluster of risk factors. Taken alone, each of these risk factors can boost your chances of developing health problems, but when they act in concert, they are even more powerful. Metabolic syndrome can greatly increase your chances of developing serious conditions, such as heart disease, stroke, and diabetes. Once dubbed syndrome X, this condition affects about one in four American adults, according to the American Heart Association, which considers it as strong a risk as smoking for early heart disease.

■ **Calories in, calories out.** It's simple math. Taking in more calories than you burn off adds extra pounds. Burning off more calories than you take in shaves pounds. But figuring out how many calories you need—and curbing the desire for more— isn't quite so easy. A moderately active person who gets about 30 minutes of exercise a day needs 15 calories of food for

each pound of body weight. To lose a pound a week, you need to lop off about 500 calories a day by becoming more active and eating less.

Clearly, there are many health benefits to maintaining a healthy weight, but as anyone who has ever tried knows, losing weight is easier said than done. Despite vigorous attempts to slim down, most significantly overweight people do not become thin or cannot stay thin. However, trimming 5% to 10% of your starting weight is a realistic goal that bears plenty of health benefits.

Weight loss is hard under any circumstances. Almost every popular diet has worked out ways to restrict calories, whether it cuts carbohydrates or pushes pineapple. But many trendy diets promote question-

able foods at the expense of healthful nutrients. A better approach is to take these steps:

- Eat from the Harvard Healthy Eating Pyramid (see Figure 5, page 9), while reducing the amount of food you take in.
- Limit refined carbohydrates, which spike insulin levels and speed hunger signals. Focus instead on vegetables and whole grains, which are digested slowly.
- Cut down on saturated fats and trans fats, but include moderate amounts of monounsaturated and polyunsaturated fats in your diet. Although fat is calorically dense, these fats have proven health benefits (see “A closer look at fats,” page 10).

Table 4 What’s your body mass index?

HEIGHT	BODY WEIGHT IN POUNDS													
4’10”	91	96	100	105	110	115	119	124	129	134	138	143	167	191
4’11”	94	99	104	109	114	119	124	128	133	138	143	148	173	198
5’0”	97	102	107	112	118	123	128	133	138	143	148	153	179	204
5’1”	100	106	111	116	122	127	132	137	143	148	153	158	185	211
5’2”	104	109	115	120	126	131	136	142	147	153	158	164	191	218
5’3”	107	113	118	124	130	135	141	146	152	158	163	169	197	225
5’4”	110	116	122	128	134	140	145	151	157	163	169	174	204	232
5’5”	114	120	126	132	138	144	150	156	162	168	174	180	210	240
5’6”	118	124	130	136	142	148	155	161	167	173	179	186	216	247
5’7”	121	127	134	140	146	153	159	166	172	178	185	191	223	255
5’8”	125	131	138	144	151	158	164	171	177	184	190	197	230	262
5’9”	128	135	142	149	155	162	169	176	182	189	196	203	236	270
5’10”	132	139	146	153	160	167	174	181	188	195	202	207	243	278
5’11”	136	143	150	157	165	172	179	186	193	200	208	215	250	286
6’0”	140	147	154	162	169	177	184	191	199	206	213	221	258	294
6’1”	144	151	159	166	174	182	189	197	204	212	219	227	265	302
6’2”	148	155	163	171	179	186	194	202	210	218	225	233	272	311
6’3”	152	160	168	176	184	192	200	208	216	224	232	240	279	319
6’4”	156	164	172	180	189	197	205	213	221	230	238	246	287	328
BMI	19	20	21	22	23	24	25	26	27	28	29	30	35	40
	NORMAL						OVERWEIGHT					OBESSE		

To use this table, find your height in the left-hand column. Move across to your weight. The number at the bottom of the column is your BMI.

Staying active

“If there is anything close to a fountain of youth, it is exercise,” says Dr. Anne Fabiny, a geriatrician and assistant professor of medicine at Harvard Medical School. “Given its proven benefits and low side-effect profile, if it were a pill, everyone would be on it!”

Exercise reduces your chances of getting a host of illnesses, keeps bones strong and healthy, helps you maintain your vitality and independence in later years, and improves your mood and mental functioning. In short, it can help you live a longer, healthier life.

Study after study shows that fitness prolongs life. To name just a few examples, researchers reporting in the *Journal of the American Medical Association* found that women who began walking a mile a day after age 65 were about half as likely to have died of heart disease, cancer, or any cause compared with their sedentary counterparts. In the *Archives of Internal Medicine* in 2005, researchers reported that moderate and high activity levels extended total life expectancy and held off cardiovascular disease. They found that moderate activity added 1.3 years of life for men and 1.5 years for women, while high activity levels tacked on 3.7 years of life for men and 3.5 years for women. Even gardening works: another study found that gardeners who set aside more than an hour a week to enjoy that pastime were less likely to die of cardiac arrest than inactive folks.

Other studies have found that it’s never too late to reap the benefits of exercise. A large study of Americans ages 65 and over found that men and women who were at least moderately active gained between 3 and 5.7 years, depending on how often they exercised. And just as importantly, a greater-than-average portion of those years were lived free from disability.

Yet despite the obvious benefits, too few people exercise. According to a national survey, nearly 40% of adults sit most of the day, and 10% are never active. Only 30% report regular leisure-time activity. Worse, it looks like the number of physically active Americans dwindled between 2000 and 2005.

Still, exercise is no fun for many people and an uphill battle for those who suffer painful or disabling disorders. Where winter clamps down and sidewalks ice up, it’s hard to brave the weather for a regular outdoor walk, especially if you worry about falling. So it’s

worth noting that stepping up even so-called lifestyle activities—such as gardening or housecleaning—is beneficial. A *Journal of the American Medical Association* study of 235 sedentary men and women found lifestyle activities to be as effective as structured exercise in boosting cardiovascular fitness and lowering blood pressure over two years. And other studies have found that performing lifestyle tasks—like vacuuming or climbing the stairs—improves functional abilities for older adults, making it easier for them to accomplish everyday tasks now and in the future.

From an overall health perspective, though, if you can include more vigorous exercise in your routine, it pays to do so. Many studies have demonstrated that up to certain limits, the more exercise you get, the better. Health benefits begin kicking in when you expend about 700 calories a week through exercise (which translates into walking about 7 miles a week), but burning 1,000 calories a week (about 10 miles of walking a week) will deliver more substantial health gains. If you can, and want to, push yourself further, you may reap even greater health benefits. A *New England Journal of Medicine* study, which analyzed research conducted on 17,000 Harvard alumni, found that the greatest gains, in terms of longer life and lower risk for disease, come when you expend about 2,000 calories per week with exercise.

Over the course of a week, the most balanced exercise routine—and ultimately the healthiest one—emphasizes a combination of aerobic activity, strength training, and balance and flexibility exercises. Fortunately, many activities have serendipitous overlaps. Tai chi, for example, can improve balance and flexibility and prevent falls. Plus, a *Journal of the American Geriatrics Society* study reports that people who perform it regularly delay the decline in heart and lung function that often accompanies age and concludes that it is a suitable aerobic activity for older adults. Regular strength training—which can boost bone density, strengthen muscles, and burn calories by raising your metabolic rate—has been found to have aerobic benefits, and some strength training exercises improve balance, too. Even the hoeing, weeding, raking, and lifting that goes into gardening delivers aerobic benefits, while strengthening certain muscles and bones.

The many health benefits of exercise

Exercise enhances health in a variety of ways. It does the following:

- lowers blood pressure
- helps the heart pump more efficiently
- lowers LDL cholesterol and triglycerides, and raises HDL cholesterol
- lessens the tendency of blood to form clots
- maintains bone density, or even slightly improves it at some sites, and lowers the risk of osteoporosis
- increases muscle size and strength
- improves the body's response to insulin and lowers the risk of diabetes
- reduces body fat and decreases the likelihood of gaining weight
- reduces anxiety and fights depression
- lowers risks of dementia and cognitive decline and may help delay onset of dementia and cognitive decline in people over 65
- eases sleep complaints
- protects against colon cancer and possibly prostate and breast cancers
- reduces the risk of gallbladder disease.

How much exercise should you get? Aim to get at least 30 minutes of moderately intense physical activity on most—or, better still, all—days of the week, or try to burn 1,000 calories a week through exercise and activity. If you are struggling to maintain a healthy weight or need to lose weight, the 2005 Dietary Guidelines for Americans recommend increasing this to 60 or even 90 minutes a day. You can work out in one daily session or two or three shorter bouts.

Is there an anti-aging substance?

Over the years, estrogen, human growth hormone, and DHEA have all been touted as having some anti-aging properties. Can these substances—or synthetic replicas of them—really help stall aging? And do the benefits ever outweigh the risks? A look at the latest research reveals that none of these substances is a fountain of youth in a bottle.

Women and hormone therapy

Since its popularization in the 1960s and 1970s as a “cure” for menopause and its attendant symptoms, hormone therapy’s popularity has risen and fallen precipitously. For years, experts embraced it as a way to alleviate hot flashes, protect women against heart disease, and shore up weakening bones. More recently, scores of doctors and patients turned away from this treatment after a number of prominent studies revealed that hormone therapy raised risks for breast cancer, heart disease, blood clots, stroke, and dementia.

Conceptually, hormone therapy for women makes sense. Estrogen pumped out by the ovaries during a woman’s reproductive years helps keep her bones strong, heart healthy, and vaginal walls thick and comfortably moist. Body systems as disparate as the skin, hair, liver, and blood respond positively to its influence. So why not replace estrogen as its levels fall in the years leading up to and following menopause? Considerable health benefits were expected from this strategy. And, for a while at least, the overall picture did look very promising.

Some early research found that hormone therapy raised HDL (good) cholesterol and lowered LDL (bad) cholesterol and clotting factors that contribute to heart attacks and strokes. But no one knew whether that good news paid off in fewer actual heart attacks, strokes, or blood clots. Later research found that hormone therapy actually raised the risk of heart attacks and other serious health problems.

One of the largest and most prominent studies was the Women’s Health Initiative (WHI). The WHI enrolled women with an average age of 63 when the study began. Two arms of the study examined the health effects of an estrogen-only regimen and combined hormone therapy (estrogen and progestin) in healthy postmenopausal women.

Both studies came to abrupt ends when serious risks emerged. The women taking the estrogen-progestin combination Prempro experienced mixed results. For every 10,000 women, there were eight additional cases of breast cancer, seven additional heart attacks, eight additional strokes, and 18 additional life-threatening blood clots. On the brighter side, there were five fewer hip fractures and six fewer cases of colon can-

cer. The researchers deemed the negative side effects serious enough to halt the trial and urge the 16,000 women in the study to stop taking the medication. Millions of women taking hormone therapy outside of the study were encouraged to discuss the risks and benefits with their doctors.

In 2003, additional data flowing in from the WHI indicated Prempro did little to improve overall well-being or cognitive function. Worse, it doubled the risk of dementia in women over 65.

The next year, women in the estrogen-only portion of the WHI study were also told to stop taking their Premarin pills because of a 39% increase in stroke risk (12 more strokes per 10,000 women) and a 47% increase in blood clots (six more cases per 10,000 women). As with combined hormone therapy, estrogen alone reduced the risk of hip fractures. But unlike Prempro, Premarin didn't appear to affect heart disease or colon cancer risk in any way, and the women taking it had fewer cases of breast cancer (seven fewer cases of breast cancer per 10,000 women). However, the researchers said the effect of estrogen alone on breast cancer risk is uncertain.

So was this the final chapter on hormone therapy for women? Not really. Some scientists believed different outcomes might result from lower doses, other forms of estrogen and progesterone, or hormone therapy in different populations of women. And, indeed, 2007 WHI data show that women in their 50s who started taking estrogen alone shortly after menopause had less plaque in their arteries after roughly seven years of treatment compared with women taking placebo. Generally, this predicts a lower rate of cardiovascular disease, including heart attack.

What's the bottom line? Hormone therapy reduces the risk of colon cancer and fractures from osteoporosis. But there are other ways to reduce these risks—exercise, for starters, plus bone-saving drugs—that don't invoke hormone therapy's darker side: breast cancer, blood clots, and stroke. Most experts say current evidence argues for taking hormones only for relief of menopausal symptoms and for the shortest time possible if other options to ease common problems like hot flashes and vaginal dryness fail. Stay tuned for further information, of course.

Human growth hormone

When produced naturally by the pituitary gland, growth hormone spurs development of muscles, bones, and the immune system. Over time, it declines in about half of all adults. Can replacing it help people recapture certain aspects of youth? Over a decade ago, exciting news about recombinant human growth hormone (hGH) from a small study of men ages 60 and older suggested that it might. Thrice-weekly shots of hGH made study participants appear younger by some measures. They added lean body mass and lost some fat. Their skin—which had thinned with age—thickened. But when the shots ended, the illusion of youth did too.

More recently, a randomized, placebo-controlled study published in the *Journal of the American Medical Association* in 2002 found that growth hormone injections given with or without sex steroids for healthy men and women ages 65 to 88 similarly boosted lean body mass and pared down fat. Muscle strength also rose marginally and cardiovascular endurance improved in men who received growth hormone plus a sex steroid, though the same results were not observed in women.

Despite the initial promise of synthetic growth hormone, further research showed that generally the injectable version merely built muscle—not muscle strength. What's more, studies have noted that growth hormone can have harmful side effects in older people, such as raising blood pressure and worsening arthritis. It has been associated with the development of various cancers, too. In the 2002 study, which lasted 26 weeks, adverse effects like carpal tunnel symptoms, joint pain, edema, and changes in glucose tolerance and diabetes symptoms led researchers to conclude that the use of growth hormone was a double-edged sword best kept within the confines of research studies.

DHEA: Much hype, few answers on safety

The adrenal glands, which sit atop each kidney, make the steroid hormone dehydroepiandrosterone (DHEA) from cholesterol. The body may then convert DHEA to estrogen and testosterone, although how much of these hormones it will make varies from person to person. Starting around the mid-20s, production of DHEA reaches its peak and slowly drops off. Not content to let

this happen, DHEA supplement makers have hawked their products as a way to beef up muscles, tune up the immune system, and ward off aging, heart disease, cancer, and diabetes, among many other ailments. Think twice, though, before you rush out to buy a bottle.

No large, well-controlled trials have proved any of these claims, and experts worry about possible side effects of artificially raising DHEA levels over the long term. In one French study, boosting DHEA for a year did have some beneficial effects on bone, skin, and sex drive among women—but not men—over 70. And higher blood levels of DHEA seemed to lower risk for cardiovascular death among men but not women, according to data from a population study of nearly 2,000 people. Other research suggests DHEA makes platelets less sticky, thereby making blood clots less likely to form. A more recent trial, published in 2006 in the *New England Journal of Medicine*, compared DHEA against placebo in men and women ages 60 and older. The men took 75 mg of DHEA plus 5 mg of testosterone daily, and the women took 50 mg of DHEA daily. Two years later, no differences were noted in aerobic capacity, insulin sensitivity, muscle strength, or quality of life among participants. Those receiving the drugs did have slight increases in bone density in the upper thigh bone for men and in the wrist for women.

Many questions about the long-term safety of taking DHEA supplements remain unanswered. Some research shows DHEA can damage the liver. By augmenting levels of testosterone and estrogen, DHEA supplements might fuel prostate or breast cancer in some people. Women may find, too, that boosting testosterone encourages acne and facial hair growth, and some who are still menstruating will find their periods stop.

The National Institute on Aging warns against taking DHEA and other unproven supplements until further research clarifies their uses and potentially dangerous side effects.

An ounce of prevention

An ounce of prevention is far better than a dose of drugs or treatments aimed at managing health problems once they occur. However, major trials of preven-

Table 5 Recommended vaccinations

Herpes zoster (shingles) vaccine	Once annually for people ages 60 and over, people with chronic illness, and health care workers (unless there are contraindications).
Influenza vaccine	Once annually for people ages 65 and over and people with chronic illness.
Pneumococcal pneumonia vaccine	At least once after age 65. People who have the vaccine before age 65 should get a booster dose six years later.
Tetanus-diphtheria vaccine	After primary series is given (usually in childhood), a booster shot every 10 years.

tive care strategies have often excluded older people. That means that the recommendations for screening and other health strategies may owe more to expert opinion than hard data.

It's worth noting that experts often disagree on when to start and how long to continue certain preventive care strategies. The potential benefits of screening tests and procedures decline as you get older. Eventually, the risk of dying from other causes outweighs the odds that lowering the risk of a single disease could appreciably lengthen your life expectancy. Possible harm done by invasive screening tests, follow-up tests, and treatment for certain illnesses often grows, too.

For example, prostate cancer screening is controversial. This cancer, which is often slow-growing, is very common among older men. Many men live with it for years with no discernible effect on their health. Screening for prostate cancer currently results in a high rate of false positives and complications after treatment. The U.S. Preventive Services Task Force says that evidence isn't sufficient to recommend for or against routine screening with a prostate-specific antigen (PSA) test or digital rectal examination for prostate cancer in men.

Your own health care provider can best help you tailor the recommendations in Tables 5 and 6 based on an assessment of your goals of care, personal health history, age, and estimated life expectancy. He or she should take into account your wishes for treatment should you turn out to have a particular disease, how onerous specific preventive care strategies are, and the likelihood that early detection would help extend or enhance your life. ♥

Table 6 Prevention guidelines

TEST OR EXAM	RECOMMENDATION
Breast cancer	
Breast self-exam	There's not enough evidence to prove that this is a valuable screening tool. However, monthly exams give women the opportunity to note and report lumps or other suspicious changes in a breast, and many doctors recommend monthly self-exams because they are simple to do.
Breast exam by clinician	If your mother or sister had breast cancer before menopause, annually after age 35. Otherwise, annually after age 40.
Mammogram	If your mother or sister had breast cancer before menopause, once between ages 35 and 40. For others, every one to two years for women ages 40 and older.
Cervical cancer	
Pelvic exam and Pap smear	Every one to three years beginning at age 21, or within three years of the onset of sexual activity (whichever is first). Annually if your doctor determines your risk for cervical cancer is high.
Colon cancer	
Testing stool for blood	If you have a parent, brother, or sister with colorectal cancer or inflammatory bowel disease, every year after age 40. Otherwise, every year beginning at age 50.
Sigmoidoscopy (this test usually isn't necessary if colonoscopy is performed)	If you have a parent, brother, or sister with colorectal cancer or inflammatory bowel disease, every one to three years starting at age 40. Otherwise, every five years starting at age 50.
Colonoscopy	At least once around age 40 if you have any of the following: <ul style="list-style-type: none"> • more than one first-degree relative with colorectal cancer • close relatives with familial polyposis or intestinal polyps • ulcerative colitis for more than 10 years • previous intestinal polyps. Otherwise, every 10 years starting at age 50.
Diabetes	
Fasting blood sugar test	Every three years beginning at age 45. Testing may begin earlier and be carried out more frequently (every two to three years) if you are at increased risk (including if you have had gestational diabetes, have high blood pressure, are obese, or have a parent, brother, or sister with diabetes).
Foot care	
Foot exam	Diabetics need regular podiatry services. Periodic foot exams and removal or care of bunions, corns, and other causes of discomfort can encourage activity and help in stability and balance.
Hearing problems	
Hearing test	Every few years if you have been regularly exposed to loud noises; otherwise, every few years after age 65.

continued on page 26

Table 6 Prevention guidelines, continued

TEST OR EXAM	RECOMMENDATION
Heart disease	
Blood pressure measurement	Check at every exam and at least every one to two years.
Fasting lipid profile (measures total cholesterol, LDL, HDL, and triglycerides)	Every five years starting at age 20 if you have risk factors for atherosclerosis, such as smoking, diabetes, family history of heart disease, high blood pressure, or high cholesterol. For all men ages 35 and older and women ages 45 and older, every one to three years until age 65.
Highly sensitive C-reactive protein (hs-CRP) test	A panel of AHA and CDC experts recommends this new test to detect levels of C-reactive protein (CRP) in the blood for people at intermediate risk for heart disease (see page 31). Your doctor can help you determine if you are a candidate for this blood test. A short online questionnaire on the AHA's Web site can also help you gauge your risk: http://www.americanheart.org/presenter.jhtml?identifier=3003499 . Someone whose score indicates a 10% to 20% risk for heart attack in the next 10 years would be at intermediate risk.
Electrocardiogram (ECG)	After age 40, every one to three years if you are at high risk for coronary artery disease or are about to start a vigorous exercise program.
Osteoporosis	
Bone density test	Every two years in women over age 60 who are at high risk for osteoporosis. Every two to three years in all women over age 65. In addition, men and women who are at high risk for osteoporosis and have taken glucocorticoid medications for at least two months should consider screening, as should people who have suffered nontraumatic fractures.
Prostate cancer	
Rectal exam	Experts disagree. Some say this is not of proven value as a screening test; others recommend an annual digital rectal exam for all men ages 50 and over.
Prostate-specific antigen (PSA) test	Experts disagree. Some recommend a PSA test annually beginning at age 50, or age 45 if you are at high risk for prostate cancer (have a family history of prostate cancer or are African American)—so discuss this with your doctor.
Skin cancer	
Skin exam	Regular self-exam to note any suspicious changes, and periodic yearly exam by your doctor at check-ups. If you're at high risk, a specialist should do the exam.
Thyroid disease	
Thyroid-stimulating hormone (TSH) test	Experts disagree. Some recommend that women over age 60 have this test every few years. Others, such as the American Thyroid Association, recommend that all adults have a TSH blood test every five years beginning at age 35.
Tooth decay and gum disease	
Dental exam	Every six to 12 months.
Vision problems	
Comprehensive eye exam	Every three to five years for people under age 40 with healthy vision; every two to four years between ages 40 and 65; every year after age 65. People at higher risk for eye disease—such as anyone with a family history of eye problems, a personal history of an eye injury, or African Americans over age 40—may need more frequent exams. If you have diabetes, you should have a yearly eye exam. Once you reach 65, an ophthalmologist (a medical doctor trained in diagnosis and treatment of eye diseases) should perform the exam.

Living well: Staying quick-witted, social, and sexual

The longest life might mean surprisingly little if merely time, not joy, is totaled up. At every age, it pays to search out ways to enhance your life. While good health is essential, staying quick-witted, maintaining loving bonds with others, and enjoying a satisfying sex life count, too.

Staying mentally sharp

If you hope to live a long life, it pays to ensure that you stay sharp enough to enjoy it. And scientists are learning that a healthy mind relies on a healthy body. Elevated blood pressure and cholesterol, diabetes, excess weight, smoking, and a sedentary lifestyle all contribute to cognitive declines, according to a 2007 Centers for Disease Control and Prevention report on aging and health. Thus, working to stay healthy helps you stay sharp.

Researchers have found that the time needed to process information grows longer as you age—2,040 milliseconds longer in one study that asked older and younger people to find gaps in a circle. Generally speaking, tests of memory, learning, and intelligence done with different age groups suggest there is only a slight decline in mental acuity over time. So you can teach an old dog new tricks. It simply may take a bit more time and effort.

However, problems that become more common with age can compromise your mental abilities. Hearing loss or poor vision can bar vital input and make it difficult to learn and remember information. Medications can affect concentration, initiate memory loss, or change the levels of key brain chemicals. Imaging studies suggest that hypertension actually causes small strokes that damage the brain. Not surprisingly, people with high blood pressure are more prone to memory impairment than those with normal blood pressure. Other problems—such as heart bypass surgery, dementia, strokes, trouble sleeping, and depression—can all affect intellectual functions, too.

Thankfully, you can do plenty to fight back, including the following.

■ **Challenge your mind.** Staying mentally active appears to help ward off memory loss. Engaging in challenging board games, reading, working crossword puzzles, playing a musical instrument, and acquiring new skills may keep your mind fit. Such activities seem to expand the web of neuronal connections in the brain and help keep neurons nimble and alive.

■ **Challenge your body.** Just like cells anywhere else in the body, brain cells crave a steady diet of oxygen. Physically active people lower their risk for developing dementia and are more likely to stay mentally active, as two studies illustrate. A six-year study of more than 1,700 men and women over 65, published in 2006 in the *Annals of Internal Medicine*, found a 38% lower risk of Alzheimer's—seven fewer cases per 1,000 people—among those who exercised at least three times weekly versus those who did less. In another study, published in the *Journal of the American Medical Association*, researchers tested nearly 19,000 women ages 70 to 81. Those who engaged in regular physical activity scored higher on tests of attention, recall, and other markers of cognitive function and exhibited less mental decline than more sedentary peers. Vigorous exercise wasn't necessary—walking at an easy pace for at least 1.5 hours a week was nearly as effective as more active pursuits.

■ **Get your rest.** Too little sleep can affect memory. Six hours may be the minimum needed, although researchers testing college students found those who had eight hours were better able to learn new skills. Interestingly, some experts believe sleep inhibits stress hormones.

■ **Limit stress.** Researchers speculate that consistently high levels of stress hormones, such as cortisol, may impair nerve cells in the hippocampus, which oversees certain types of learning and recall. In a randomized study, healthy adults were given a daily dose of cortisol for four days—either a low dose that mimicked

the amount released under everyday stress or a high dose. Those who had higher doses recalled fewer details of texts read to them each day. Their memory impairment was reversible once the cortisol wore off. Meditating, performing yoga or tai chi, or regularly using other stress-reduction techniques helps ease stress.

■ **Watch your weight.** Staying within a normal weight range lowers your risk for illnesses such as diabetes, hypertension, and stroke, which can compromise memory to varying degrees.

■ **Check with your doctor.** Are you getting annual check-ups for hearing and sight? Are there any factors—such as medications, vitamin deficiencies, or chronic conditions—that could be better managed to help you stay as mentally sharp as possible? Discuss these issues with your doctor.

Staying connected

Close relationships are surely among the great pleasures of life. A warm friendship, a loving connection with a relative or partner, and other social ties keep you engaged, smoothing some of the inevitable bumps and easing the losses that come with time. Productive tasks—whether you are a paid worker or volunteer or simply enjoy an activity like gardening—forge links between you and the world.

Yet the power of any social network goes well beyond that. Research suggests that staying connected might help you live longer. A long-term study of more than 2,700 American men and women ages 65 and older published in the *British Medical Journal* noted that social and productive activities that do little to enhance fitness still play a role in longevity. People who were least likely to attend church, travel, or seek out other social activities were 20% more likely to die from all causes than those who socialized the most. Those who engaged least often in productive activities, such as work, shopping, or gardening, were 35% more likely to die than those who engaged in these kinds of activities most.

Other studies suggest the ties that bind might even help ward off dementia and keep you mentally sharp. Researchers reporting in the *Annals of Internal Medicine* looked at 2,800 people ages 65 and old-

er who were living in the community. After assessing how socially engaged these men and women were, the researchers followed them for up to 12 years. Fewer social ties added up to a higher likelihood of cognitive impairment and higher mortality, too. Of course, mental impairment may factor into whether a person seeks out or sustains social ties, so disengagement may be an early sign of more serious problems to come (see “Alzheimer’s disease,” page 36).

Enhancing your sexuality

In a society firmly skewed toward the young, sexuality among older people is often dismissed or even ridiculed. Yet pleasurable sexual activity—such as caresses, intercourse, and masturbation—continues far longer in life than many young people think. One study of people ages 80 to 102 found that 83% of men and 30% of women indulged in intimacies other than intercourse.

The sexual act people tend to engage in less often as the years add up is intercourse, for some of the reasons discussed below. A 2004 AARP survey on sexuality among 1,682 adults ages 45 and older illustrates this. The survey found that among individuals with partners, 59% of men and 54% of women in the youngest age bracket surveyed (45–49) had intercourse at least once a week. Over age 70, the number dropped to 34%. Of course, the popularization of drugs like Viagra, Cialis, and Levitra may change this for some folks.

If you enjoyed sex in your younger years, there is no reason you shouldn’t keep treading that path, although it’s certainly true that you may need to leap some barriers as you grow older.

Among men, for example, erectile dysfunction affects about 25% of 65-year-olds, and, according to some studies, more than half of those over age 75 are impotent. The problem is often tied to illnesses such as hypertension and atherosclerosis, which affect blood vessels, or diabetes, which can affect both nerves and blood vessels. Medications or treatments for hypertension, depression, prostate cancer, or benign prostatic hyperplasia can play a role. Psychological issues such as depression or changes in self-image may dampen

sex drive. Much more rarely, a marked dip in sex drive may be due to low testosterone levels. It's also worth noting that one Harvard study found men who invest 30 minutes a day in exercise are 40% less likely to develop erectile dysfunction than sedentary men.

Among women, one common reason for hesitance about intercourse and other intimate acts is a lack of desire. Hallmarks of aging such as hormone declines and lifestyle and relationship transitions can all affect a person's sex drive. So too can illness. Painful inter-

The latest on Viagra, Levitra, and Cialis

When sildenafil (Viagra) swept the nation in the late 1990s, it ushered the discussion of midlife and later-life sexuality out of the closet. Overnight, impotence was renamed erectile dysfunction, or more politely, ED. Soon similar drugs were bobbing in its wake. The little blue pill and competitors like vardenafil (Levitra) and tadalafil (Cialis), which were approved by the FDA in 2003, became superstars. Savvy marketers have turned them into household names; tune in to a football game, and you'll find that commercials for these medications are as ubiquitous as ads for beer or cars.

All three medications work in much the same way. By relaxing smooth muscle cells, the drugs widen blood vessels, primarily in the penis, but also in other parts of the body. For many men, this clears the way for an erection, given desire and sexual stimulation.

The three medications have similar success rates. In all, about 70% of men respond well to the drugs, but the rates vary according to what is causing the erectile dysfunction. Men with impotence of no identifiable physical cause fare best, while the drugs are less effective for men who have diabetes or who have had prostate cancer surgery.

The three rivals also have similar side effects, which are uncommon and mild when the drugs are used properly. The most common problem is headache. Other possible reactions include flushing, nasal congestion, indigestion, urinary tract infections, and diarrhea. A small number of men who take Cialis have backaches, while a few Viagra and Levitra users have reported vision problems, typically a temporary blue tinge or haze.

A very small number of people using Viagra, Levitra, or Cialis have reported vision loss. However, it's not clear that there is a cause-and-effect relationship between these medications and NAION (nonarteritic anterior ischemic optic neuropathy), a condition that can lead to blindness. While the concern isn't great enough to prevent men who need these medications from using them, it serves as a reminder that all men over 50 need regular eye care and that anyone using erectile dysfunction pills should remain alert for possible side effects.

While these drugs are safe for men with healthy hearts, men with cardiovascular disease should take special precautions, and some cannot use them at all. If you have had a recent stroke or heart attack or if you have low or high blood pres-

sure, heart failure, unstable angina, or heart arrhythmia, talk to your doctor about whether these drugs are safe for you. If you are taking medication containing nitrates (such as nitroglycerine for angina), you should avoid Viagra, Levitra, and Cialis. Mixing any of these medications with a nitrate can cause blood pressure to drop to dangerously low levels. In addition, men taking alpha blockers (medications used to treat high blood pressure and benign prostatic hyperplasia) should not take Levitra or Cialis, but they may be able to use Viagra with caution.

While Viagra, Levitra, and Cialis are quite similar, there are some differences. Starting dosages differ for each, and while you should take Viagra on an empty stomach, you can take Cialis or Levitra with or without food.

These medications may take effect in as little as 15 to 20 minutes or up to an hour. Viagra and Levitra last for about four to five hours, but Cialis stays active in the body for up to 36 hours. (Of course, this doesn't add up to a day-long erection. Just as with Viagra and Levitra, it simply makes an erection possible if desire and sexual arousal are present.)

Despite their impressive results, these medications have some drawbacks. Since they can take up to an hour to work, you'll need to plan accordingly. Also, they are relatively expensive, costing about \$10 to \$14 a pill. Some insurance plans do not cover this expense; others allow for only a few pills a month.

Men who cannot take Viagra, Levitra, or Cialis—or for whom they fail to work—do have other choices. A vacuum pump, available without prescription at drugstores, can produce satisfactory erections with few side effects. The prescription drug alprostadil, which widens the arteries leading to the penis, also works for some men. An injection in the penis or a soft pellet placed in the urethra is necessary to deliver this drug.

Before you consider any drug for erectile dysfunction, have a frank talk with your physician. It's possible that the underlying reason for your impotence can be successfully treated without a drug. Medication, for example, is at fault about 25% of the time. Psychotherapy or couples counseling may help ease emotional hurdles. Your doctor also can advise you about the safety of the available options given your health and any medications you may be taking.

course, called dyspareunia, is another common problem. As estrogen levels dip because of menopause, vaginal tissues may become uncomfortably dry and thin. A partner's technique, vaginal irritation, the fear of spilling urine during sex, or a woman's own frame of mind or changes in self-image may also be factors.

Opportunity also counts at any age. Privacy is sometimes an issue if older children have returned home to roost or a parent is sharing a child's home or lives in a nursing home. Your partner's interest, health, and ability matter, too. And, of course, not everyone has a partner.

So what can you do to enhance or revive your sexual life? Here are some tips:

- Explore what brings you pleasure with or without a partner.
- Try to open up with your partner about pleasures, desire, and possible roadblocks to sexual activity. Simple changes in venue or timing, or just admitting that loss of libido or a crimp in ability doesn't equal a loss of love, may make a difference.
- Be willing to try new intimacies when old ones pale or, worse, if they bring on pain or seem more a chore than a joy.
- Consider whether you can be more affectionate and warm outside of the bedroom. Over time, small gestures sometimes change moods and minds.

Be open with your doctor about barriers that might be affecting your interest and abilities. Often, a solution can be found. It may mean changing medications or adding one (see “The latest on Viagra, Levitra, and Cialis,” page 29), identifying the underlying cause of discomfort or loss of interest, considering different techniques and toys, or adding a water-based personal lubricant or an estrogen cream or ring to treat vaginal dryness. ♥

► Aging well: It's in your control

A healthy and happy life. Is it a matter of fate? Or is it in your grasp? Research suggests that people have a great deal of control over aging successfully.

One study, conducted by Harvard researchers, followed 237 college students and 332 inner-city youths for 60 years. Ultimately, researchers identified seven factors at least partially under an individual's control that can help determine how well a person will age—if they are adhered to before age 50. Successful aging predictors are avoiding alcohol abuse, refraining from smoking, having a stable marriage, exercising regularly, maintaining a healthy weight, developing good coping mechanisms, and pursuing education.

While the researchers noted several uncontrollable factors, such as social class, longevity of ancestors, and family cohesion, they pointed out that these factors had little effect by age 70.

Sidestepping some common conditions

Once you reach a certain age, a short list of what ails you may seem very long indeed. We've winnowed down that potentially lengthy list to a handful of key health concerns that have enormous impact on older people. Some of these troubles may respond well to changes in lifestyle or medications and the strategies outlined below. Your doctor can offer advice tailored to your needs.

Heart disease

The top slot in the U.S. mortality sweepstakes has gone to heart disease every year since 1921. The American Heart Association estimates that 1.2 million coronary attacks occur in the United States each year. Their most recent statistics show that over 450,000 people die in a single year from heart disease. Yet heart disease can often be prevented. And the good news is that death rates from it dropped 33% between 1994 and 2004.

The loose term “heart disease” usually describes coronary artery disease (CAD). If you develop CAD, the vessels that feed oxygen-rich blood to your heart become narrow enough in some places to reduce or entirely interrupt blood flow. Like all muscles, the muscle that forms your heart (the myocardium) needs a steady supply of blood and oxygen to stay healthy. Interrupted blood flow, known as ischemia, can gravely damage it. Transient ischemia causes the chest pain called angina. Longer-lasting ischemia causes a myocardial infarction, or heart attack, that kills off muscle cells.

CAD is also one of many conditions that can trigger abnormal heart rhythms (or arrhythmias) that cause palpitations, fainting, and sometimes sudden death. CAD is also linked to heart failure, which occurs when the heart cannot pump enough blood. Shortness of breath, tiredness, and fluid accumulation in the body are signs of heart failure.

The good news about heart disease is that it can be prevented or, in some instances, slowed or re-

versed. Some factors that heighten your risk for heart disease—age, sex, and family history—are out of your control, but others are within your power to change. Taking the following steps can significantly cut your risk of having a heart attack and lower your overall risk for coronary artery disease.

■ **Know your risk.** Knowing your risk for heart disease is crucial to understanding what you need to do to reduce that risk. Be sure to get all the necessary screening tests, such as regular blood pressure and cholesterol checks (see Table 7). It's also worthwhile to take a few minutes to fill out a quick, simple online questionnaire that can estimate your risk for having a heart attack in the next 10 years. The questionnaire was developed based on information from the renowned Framingham Heart Study and is available on the AHA Web site. You can find it at www.americanheart.org/presenter.jhtml?identifier=3003499. If your risk is estimated at 10% to 20%, talk to your doctor about whether you should have a blood test to measure C-reactive protein, an inflammatory marker found in the blood. Elevated CRP levels have been linked to an increased risk for heart disease and sudden death. The test may be useful in helping a doctor select the best course of treatment.

■ **Don't smoke.** Smoking accounts for 20% of all deaths from CAD, while exposure to secondhand

► What's your risk?

Want to know what your risk is for heart disease, stroke, diabetes, cancer, and osteoporosis? The Harvard School of Public Health offers a personalized online tool that can tell you how great your risk is for developing these common illnesses. It takes just a few minutes to fill out the questionnaire, and with a click of your mouse, you'll get an estimate of your risk. Better still, you'll receive personalized advice on how to prevent these disorders. You'll find this tool at www.yourdiseaserisk.harvard.edu.

smoke results in an estimated 37,000 to 40,000 cardiovascular deaths a year.

■ **Eat a healthy diet and choose fats wisely.** This can help keep blood fats—such as triglycerides and various forms of cholesterol—in balance (see “Diet and aging: Gaining a nutritional edge,” page 10). Considerable evidence favors including a daily source of omega-3 fatty acids (found in fish, flaxseeds, walnuts, and cano-

la oil) to reduce your risk of heart disease. Nuts may help, too. According to data from the Nurses’ Health Study, women who ate more than five ounces of nuts a week significantly lowered their risk of coronary artery disease compared with women who ate less than an ounce of nuts a month or none at all.

■ **Exercise regularly.** It will help you lose weight, control blood pressure, and balance cholesterol levels

Table 7 Keeping your cholesterol and blood pressure in check

Total cholesterol level		Total cholesterol category
Less than 200 mg/dL		Desirable
200–239 mg/dL		Borderline high
240 mg/dL or above		High
LDL cholesterol level		LDL cholesterol category
Less than 100 mg/dL		Optimal
100–129 mg/dL		Near optimal/above optimal
130–159 mg/dL		Borderline high
160–189 mg/dL		High
190 mg/dL or above		Very high
HDL cholesterol level		HDL cholesterol category
Less than 40 mg/dL		Low (representing major heart disease risk)
40–59 mg/dL		Better (the more HDL, the better)
60 mg/dL or above		High (heart-protective)
Triglyceride level		Triglyceride category
Less than 150 mg/dL		Normal
150–199 mg/dL		Borderline high
200–499 mg/dL		High
500 mg/dL or above		Very high
Blood pressure		Blood pressure category
Systolic (mm Hg)	Diastolic (mm Hg)	
Less than 120 and	Less than 80	Normal
120–139 or	80–89	Prehypertension
140–159 or	90–99	Hypertension, Stage I
160 or higher or	100 or higher	Hypertension, Stage II
Low-density lipoprotein (LDL) —the “bad” cholesterol. The higher the level of LDL cholesterol, the greater the risk for coronary artery disease and heart attack.		
High-density lipoprotein (HDL) —the “good” cholesterol. Higher levels of HDL cholesterol offer some protection against heart disease.		
Triglycerides —the major storage form of fat. High triglyceride levels are linked with a higher risk for heart disease.		

(see “Staying active,” page 21). Another largely unrecognized benefit of exercise is reduction of a blood-clotting factor called fibrinogen. Excessive levels of fibrinogen have recently been identified as a cardiac risk factor.

■ **Control your cholesterol and blood lipids.** Keep your cholesterol and blood lipids within healthy ranges (see Table 7). Optimal levels vary depending on medical issues, so speak to your doctor about this. If changes in diet and exercise aren’t enough to do the trick, speak with your doctor about cholesterol-lowering drugs.

■ **Control your blood pressure.** High blood pressure raises your risk of coronary artery disease and stroke. Lifestyle changes may be all you need to keep your blood pressure at healthy levels, although often medication is necessary, too. Lower goals for healthy blood pressure are set for people with certain ailments, such as diabetes or kidney disease. Eat a healthy diet that stresses fruits, vegetables, and whole grains and downplays salt and alcohol. Maintain a healthy weight. Get 30 minutes of aerobic exercise most days of the week. Engaging in stress reduction programs may also help. High blood pressure may be the biggest preventable killer in the United States. Yet only 72% of the 72 million people with hypertension are aware they have it—and only about a third of those with high blood

pressure have the problem under control, according to the American Heart Association.

■ **Ask your doctor about B vitamins.** Folic acid, B₆, and B₁₂ appear to play a role in heart health. The Nurses’ Health Study found folic acid and B₆ nearly halved the risk of heart attack or death from heart disease among women who consumed the most of this duo from food and supplements compared with those who consumed the least. And a small, randomized trial of elderly people who first took riboflavin (B₂) for several weeks found that low-dose vitamin B₆ supplementation for three months effectively lowered homocysteine levels, possibly helping ward off heart disease and stroke. (Research connects high levels of homocysteine with a threefold risk for heart attack in men and suggests even modestly elevated levels may promote atherosclerosis in men and women.) A multivitamin and foods such as lentils and other legumes, nuts, and vegetables as well as fortified breads and cereals can fulfill daily recommendations of 400 mcg of folic acid, 1.5 to 1.7 milligrams (mg) of B₆, and 2.4 micrograms (mcg) of B₁₂.

Preventing a second attack

If you’ve already had a heart attack or have other key signs of heart disease, speak with your doctor about the right approach for you. Experts believe you can cut your

An aspirin a day?

Blood clots and inflammation of the arteries contribute to heart disease. Aspirin helps prevent heart attacks and some strokes by making platelets less sticky and thus less likely to form clots. The drug’s anti-inflammatory powers may also be beneficial. That’s why doctors prescribe a 325-mg adult-strength tablet every other day or an 81-mg baby aspirin daily for people with heart disease.

When taken within 24 hours after symptoms of a heart attack appear, aspirin also significantly cuts the rate of subsequent nonfatal heart attacks, stroke, and vascular death during the next five weeks.

Studies have clashed over whether aspirin is safe and effective for preventing initial bouts with heart disease, especially in people who have few risk factors. The higher your risk for heart disease, though, the more likely it is that your doctor will recommend it. Guidelines for women issued by the American Heart Association in 2004 reflect this. Based on a woman’s risk for

a heart attack within 10 years, aspirin may be recommended. Generally, high-risk women and those already diagnosed with heart disease should take it, while intermediate-risk women should weigh this strategy with their doctors depending on whether their blood pressure is under control and the benefits potentially outweigh the side effects. For low-risk women, side effects seem to outweigh benefits.

While aspirin appears to decrease the risk of ischemic strokes—the most common kind—a multi-study analysis showed that daily doses totaling 75 to 413 mg raised the risk for hemorrhagic stroke. Over all, that still adds up to a decline in the total number of strokes.

Before taking aspirin regularly, discuss with your doctor whether there are any risks—such as high blood pressure, high risk for hemorrhagic stroke, bleeding problems, an ulcer, or potentially dangerous drug interactions—that might outweigh its benefits for you.

Four risk factors to focus on

Cardiovascular disease—which encompasses high blood pressure, coronary artery disease, and stroke—affects an estimated 79.4 million Americans. According to the most recent available statistics from the American Heart Association, it took 871,500 lives in 2004 (that’s one out of 2.8 deaths). That year, 32% of cardiovascular disease deaths were considered premature, occurring before age 75.

Because stroke, heart disease, and high blood pressure are linked, the same healthy habits help reduce your likelihood of experiencing any of these serious health problems.

If you need some motivation, a look at these numbers may inspire you to make some changes. After following nearly 8,000 men and women for 111,000 person-years, Framingham Heart Study researchers identified four optimal risk factors:

- blood pressure below 120/80 millimeters of mercury (mm Hg)
- total cholesterol under 180 milligrams per deciliter (mg/dL)
- no diabetes
- no smoking.

Stage 1 hypertension or borderline cholesterol (see Table 7) elevated risk, while Stage 2 hypertension, high cholesterol, diabetes, or smoking represented major risks.

The lifetime risk for cardiovascular disease among those with optimal risk factors at age 50 was 5% for men and 8% for women. Adding two or more major risk factors at that age pushed it up to 69% for men and 50% for women. And, comparing those two groups again, optimal risk factors extended median life expectancy at least 10 years.

risk of future heart attacks by coupling the seven main strategies already discussed with other measures, such as aspirin (see “An aspirin a day?” on page 33), cholesterol-lowering drugs such as statins (which have few side effects and some surprising benefits, such as reducing the risk of strokes and possibly building bone mass), and other medications, such as beta blockers and ACE inhibitors. In addition, keep taking vitamin B. A 2002 Swiss study showed that angioplasty patients who took vitamin B pills (including folic acid, B₆, and B₁₂) after the procedure had a lower risk for death, heart attack, or another artery-opening procedure.

Still under study

Some promising heart-protective strategies require further confirmation. These include the following:

- Increasing intake of garlic, which has a modest effect on cholesterol.
- Taking supplements of chromium, a trace metal found to boost HDL levels significantly.
- Cutting down on dietary simple sugars. Over time, frequent surges and dips in blood sugar can raise your risk of developing insulin resistance. Sometimes the next step is diabetes, which is a major risk factor for heart disease. Studies have shown that people with diabetes—even those with no history of heart problems—face about the same risk for future heart complications as people who have already suffered a heart attack.
- Reducing LDL to very low levels. If you have coronary disease, some research suggests that dropping LDL to 75 milligrams per deciliter (mg/dL)—quite a dip from the currently recommended 100 mg/dL—may pay off. Until new trials fully explore this, however, the jury is out on whether long-term risks could outweigh the benefits.

It can be dangerous to mix anticlotting agents, such as certain heart medicines and aspirin or perhaps even garlic, without medical oversight. That’s why it’s important to discuss with your health care provider which strategies are likely to work best for you and to consult with him or her before taking any over-the-counter supplements.

Stroke

One American every minute: that’s the number of people felled by stroke. Not only are strokes the third leading cause of death in America, killing more than 150,000 people each year, but they also contribute enormously to serious, long-term disability. Data from the Framingham Heart Study show that 31% of stroke survivors need help caring for themselves and 20% cannot walk unassisted. Seven years after a stroke, more than 70% are unable to work at their previous level of ability.

Rapid diagnosis and brain-sparing treatments like the clot-busting enzyme tissue-plasminogen activator (tPA) combined with rehabilitative advances prom-

ise to help limit disability. But taking steps to prevent stroke—not smoking, exercising regularly, and controlling blood pressure, blood sugars, and weight—will serve you even better.

Strokes bear a close resemblance to heart attacks. In fact, atherosclerosis is largely responsible for the roughly 80% of strokes that are ischemic, which is why prevention strategies for strokes and heart disease overlap in many ways. Ischemic strokes occur when the flow of blood to the brain is blocked, usually by a blood clot. The clot may break off from a plaque in a major artery that feeds oxygenated blood to the brain, or it may travel through the bloodstream to the brain from a more distant spot in the body.

Hemorrhagic strokes—which make up nearly all of the remaining 20% of strokes—occur when a blood vessel in the brain ruptures. Blood pooling at the site of the rupture compresses vital vessels, ultimately cutting off blood flow to other parts of the brain.

A so-called mini-stroke, or transient ischemic attack (TIA), occurs when blood flow to the brain is temporarily disrupted. While TIAs look and feel like actual strokes, their symptoms disappear within a day and don't leave lasting damage. They should be considered a prelude to more serious drama, though. Once you have had a TIA, you are 9.5 times more likely to have a stroke than someone your age and sex who has not had a TIA. It may be possible to predict the likelihood of a full-blown ischemic stroke occurring within seven days of a TIA by calculating a risk score based on age, blood pressure, and clinical features and duration of the transient attack, according to researchers reporting in *Lancet*. If so, treatments designed to head off larger problems could be applied. Further work on such a scoring system is necessary, however.

Any kind of stroke is an emergency. Every minute ticking by strips away an estimated two million brain cells. The faster you get help, the less damage the stroke is likely to do. Don't delay. Call for emergency medical assistance if you notice any of the warning signs in yourself or in someone else (at right). Clot-busting drugs work best if you are diagnosed and treated within three hours of your first symptoms. Of course, other types of therapy may be more appropriate depending on the type of stroke.

Spotting the warning signs of two leading killers

Seek help quickly—every moment counts when a person is having a heart attack or stroke. Call emergency medical services, usually by dialing 911.

Heart attack

Remember, most heart attacks start out slowly, with only mild discomfort. The American Heart Association lists these warning signs:

- chest discomfort, pressure, fullness, squeezing, or pain that lasts longer than a few minutes or goes away and returns
- upper body pain or discomfort radiating to the jaw, shoulders, neck, one or both arms, back, or stomach
- shortness of breath
- lightheadedness, sweating, or nausea.

If you suspect that someone has suffered cardiac arrest—that is, the person is unresponsive when shaken and isn't breathing normally (no breath when the head is tilted up and you check for at least five seconds)—ask someone to call 911 and begin CPR immediately. If there is an automated external defibrillator (AED) nearby, use it right away. An AED is a device that uses an electric shock to reset an erratic heart rhythm, if necessary.

In 2005, the American Heart Association changed the way CPR is performed. If you haven't taken a CPR class recently, consider signing up for training, which the American Heart Association offers in many communities.

Stroke

The American Stroke Association's warning signs:

- sudden numbness or weakness in face, arm, or leg, especially on one side of the body
- sudden confusion, trouble speaking or understanding
- sudden trouble seeing with one or both eyes
- sudden trouble walking, dizziness, loss of balance or coordination
- sudden, severe headache without known cause.

If you suspect someone has had a stroke, use the acronym FAST:

Face. Ask them to smile. Is one side drooping?

Arms. Ask them to lift both arms. Does one drift back down?

Speech. Ask them to repeat a simple sentence. Is it slurred or incomplete?

Time. If one or more stroke signs are present, act fast. Call 911 and get the person to the nearest emergency department, preferably at a stroke center.

Reducing your risk

Because the same factors that set a course for heart disease often trigger strokes, prevention strategies overlap. In addition to making the changes outlined under “Heart disease,” page 31, take these steps:

- Get screened periodically for high blood pressure, heart disease, cholesterol levels, and diabetes, all of which can affect your risk of stroke. If you are diagnosed with heart disease, your doctor may prescribe medication to prevent blood clots or reduce cholesterol. Try to carefully control blood sugar if you have diabetes. It hasn't yet been proved to prevent atherosclerosis—which diabetes fuels—but it certainly can't hurt.
- Aggressively work to keep blood pressure within a healthy range. Blood pressure—especially systolic pressure (the top number), which has been linked directly to stroke—tends to creep up with age and excess pounds. A healthy diet that stresses eating lots of fruits, vegetables, and whole grains while cutting back on salt and alcohol can help. Engaging in exercise and relaxation techniques regularly can be a boon, too. In many cases, medication is necessary as well, and certainly it can pay off. One well-known study, the Systolic Hypertension in the Elderly Program (SHEP), noted a 36% reduction in strokes among people who controlled high blood pressure with medications.
- Choose dietary fats wisely (see “Diet and aging: Gaining a nutritional edge,” page 10). A daily source of omega-3 fatty acids (found in fish, flaxseeds, walnuts, and canola oil) may help reduce your risk of stroke and arrhythmias, which can contribute to blood clots that trigger strokes.
- Don't smoke. Smoking significantly increases your risk for stroke.

Alzheimer's disease

In 2007, an estimated 5.1 million Americans—4.9 million of them over 65—will suffer from the degenerative brain disorder known as Alzheimer's disease, according to the Alzheimer's Association. Risk steadily increases with age: it affects one in eight Americans over age 65 and nearly half of those over age 85.

When a person has Alzheimer's, the simplest tasks

of independent living—recalling the words for everyday items, walking around the neighborhood, cooking, or even eating a meal—gradually become insurmountable because of ebbing memory and impaired thought processes. Marked personality changes, such as social withdrawal, apathy, anxiety, or hostility, often appear. Over the course of years, the disease so encroaches on vital brain and body functions that eventually death occurs. Researchers following people ages 60 and older reported that the median survival time after diagnosis was 4.2 years for men and 5.7 years for women.

Scientists have not pinned down exactly what causes Alzheimer's disease. Research on brain tissue shows that, as the disease progresses, neurons (nerve cells) in areas of the brain responsible for memory and various mental functions die off in droves. Amyloid plaques—odd deposits of a sticky, starchlike protein (called beta-amyloid) surrounded by debris from degenerating neurons—clog the gaps between many of the remaining neurons, and tightly twisted protein-fiber tangles build up within neurons. Declines also occur in levels of certain neurotransmitters—the chemicals that pass lightning-quick impulses across the gaps between neighboring nerves. One of these neurotransmitters is acetylcholine, which is essential for memory and learning. By the time someone with Alzheimer's dies, 90% of this neurotransmitter may be gone from the cortex of the brain.

Free radicals, which are known to damage nerve cells, may contribute to the neural death count. Researchers have also identified a few mutated genes that trigger certain types of Alzheimer's. Thus far, though, family history seems to exert heavy influence only over the variant of the disease that strikes early, between ages 30 and 60. Finally, growing evidence suggests a possible link between Alzheimer's disease and atherosclerosis; some experts speculate that reduced blood flow to the brain because of narrowed arteries could prompt production of more beta-amyloid and thus of the clogging plaques.

Therapies now used

Sadly, current therapies cannot halt or prevent Alzheimer's, although some can slow its progression. The following therapies are now used to treat Alzheimer's or are being considered for the treatment or potential prevention of this disease.

- Drugs called cholinesterase inhibitors are used to treat mild to moderate Alzheimer's. These include donepezil (Aricept), galantamine (Razadyne), and rivastigmine (Exelon). A medication called tacrine (Cognex) was once used as well, but doctors prescribe it only rarely today because of side effects such as liver damage. All of these medications aim to improve memory by preventing the breakdown of acetylcholine. If one drug fails to help, some patients find that they respond better to another.
- The drug memantine (Namenda) may be helpful for moderate to severe Alzheimer's disease. It is thought to work by regulating glutamate. Excessive amounts of this brain chemical may trigger brain cell death.
- Selegiline (Eldepryl), an antioxidant first approved for treating Parkinson's disease, raises the levels of certain neurotransmitters and may slow symptom progression.
- Some experts have speculated that NSAIDs (non-steroidal anti-inflammatory drugs) might help prevent Alzheimer's disease by blocking inflammatory processes that may contribute to the development of the disease. Observational studies, plus one randomized trial of a single NSAID, backed this theory. But early results from the randomized multisite ADAPT trial, which compared the NSAIDs naproxen and celecoxib with placebo in men and women ages 70 and older, suggest it isn't true. The trial began in 2001 and was halted three years later when a different study showed celecoxib significantly boosted cardiovascular risk. Nonetheless, researchers reporting on ADAPT in *Neurology* in 2007 noted the possibility that additional years of follow-up on participants who received the NSAIDs during the trial may paint a different picture.
- Vitamin E may help slow the progress of symptoms. Studies looking at vitamin E have been mixed, but until further studies are done, it's reasonable to speculate that a diet rich in vitamin E may help delay or prevent the development of Alzheimer's. So include foods such as wheat germ, vegetable oils, whole grains, and leafy green vegetables in your diet.
- Ginkgo biloba, a Chinese herbal remedy that has antioxidant and anti-inflammatory properties, is being studied. However, research on its effectiveness is inconclusive. A 2002 Cochrane Collaboration review of the clinical trials studying ginkgo biloba's effects

▶ Just a memory lapse? Or worse?

Can't find your keys? Missed an appointment? Racking your brain for a word that's on the tip of your tongue? Relax. You probably don't have Alzheimer's disease. If you did, more global changes in your personality or capability for abstract thought, judgment, language, recognition, or complex tasks would be present. And the problems would be progressive. You might not notice them, but others around you would.

When you're stressed, tired, sick, distracted, or just juggling too many tasks that demand attention, you're much more likely to be forgetful. And research suggests that neurological changes that add up with time contribute to what's often called age-related memory loss. Whether this is inevitable is a matter for debate.

Some scientists speculate age-related changes are tied to sinking levels of certain neurotransmitters as the years go by. Others point to the loss in brain cells known to occur with age. However, recent leaps in brain-imaging techniques suggest that the hippocampus (an area crucial to learning and memorizing new things) and the cerebral cortex (an area that coordinates cognitive skills and memory storage and retrieval) do not shrink significantly over time. Another possible culprit in age-related memory loss is the 15% to 20% reduction in blood flow to nerve cells in the brain that occurs between ages 30 and 70.

Certainly, memory lapses can be annoying and embarrassing. Yet unlike lapses brought on by Alzheimer's disease and other causes of dementia, they are neither progressive nor disabling. You may hesitate before deciding where to make a left turn on the way home or occasionally forget the kettle is on until you hear a whistle. That's a bit different, though, from the experiences of someone who has a dementing illness. For example, a man might stop bathing despite prodding from his wife or other family members. A woman might require a phone call every day from a family member reminding her to take her medications.

If you are concerned about memory lapses, speak to your doctor. He or she should check your responses to simple neurological tests and do a thorough physical exam to determine whether an illness, depression, or medication could be at fault. If necessary, you may be referred to specialists for a more sophisticated battery of tests.

on people with dementia and other cognitive difficulties found promising results. People who took doses of less than 200 mg a day showed improvements in cognition, activities of daily living, and mood compared with people who took a placebo. However, the researchers concluded that many of the earliest studies were poorly done and the better studies had inconsistent findings. A larger trial is needed

to establish ginkgo biloba's effectiveness in treating Alzheimer's disease and other forms of dementia. It is wise to note that ginkgo raises the risk of bleeding problems, especially when combined with other drugs and supplements that affect clotting, such as heart medications, aspirin, and substantial doses of vitamin E.

- Additional medications are used to handle depression, anxiety, and severe agitation or psychotic behavior in Alzheimer's patients.

Research is fluid, and new information flows in constantly. Sometimes, treatments that appear to have great potential are demoted as more is learned. Hormone therapy is one example of this. In 2003, the Women's Health Initiative trial indicated that taking Prempro, a drug combining estrogen and progestin, did little to improve overall well-being or cognitive function. Worse, it doubled the risk of dementia in women over 65.

Work continues on a vaccine designed to help block plaque formation in the brain. Several experimental vaccines, designed to clear amyloid plaques from the brain, are under development. With luck, one or more of these, or perhaps an entirely new line of research, will prove fruitful.

Osteoporosis

Each year osteoporosis is to blame for more than 1.5 million broken bones, typically hip, spine, and wrist bones. These breaks can exact a hefty toll. In the United States, the health care costs of osteoporotic frac-

tures are estimated at \$18 billion a year. The personal toll is high, too.

For some, a broken bone may mean only temporary discomfort, but for others—particularly for older adults—it's more severe. The result may be long-lasting pain, deformity, loss of function, a lower quality of life, and even complications such as pneumonia or blood clots. Hip fractures are usually the most serious breaks of all, often making the once-simple activities of daily living impossible, leading to isolation and loss of independence, and in some cases requiring long-term nursing-home care.

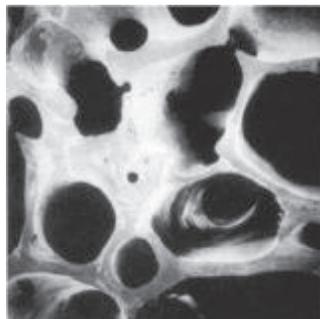
Hip fractures prompted twice as many hospitalizations in women than in men in 2004. Don't be fooled into thinking men are immune, though—1,113 women were hospitalized for hip fractures versus 558 men in every 100,000.

Weak, brittle bones (see Figure 8) that are more apt to break needn't be part of your future. While osteoporosis was once considered an inevitable part of aging, this is no longer the case thanks to advances in our understanding of bone health.

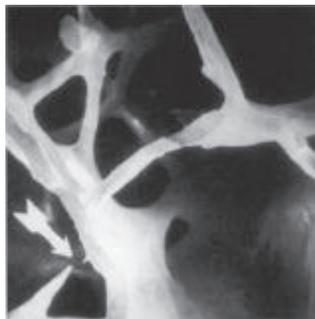
Bone is constantly being built and broken down. This living tissue is a repository of minerals that the body uses, particularly calcium, and these elements are continuously being lent out and replaced. During childhood and early adulthood, bone formation outpaces bone demolition, and the typical adult reaches peak bone mass by age 30. Bone mass usually remains level until men are in their 50s and women reach menopause; then bone is broken down at a higher rate than it is built. While you can't completely stem the tide, there is much you can do to slow bone loss, preserve bone strength, and protect against breaks. You'll find that taking the following steps can improve the health of your bones whether or not you've already been diagnosed with osteoporosis.

■ **Get enough calcium and vitamin D.** If you don't supply your body with enough calcium, it will raid stores in bones, weakening them. According to current government guidelines, adults ages 19 to 50 should get about 1,000 mg of calcium a day, while those ages 51 and over should get 1,200 mg a day. Vitamin D plays a crucial role in helping your body absorb and use calcium. A 2003 study found that vitamin D supplement-

Figure 8 A look at osteoporotic bone



Normal bone of a 75-year-old.



Bone from a 47-year-old with osteoporosis.

tation increased calcium absorption by 65%. The daily recommendations set by the Institute of Medicine are 200 international units (IU) for people ages 1 to 50, 400 IU for people ages 51 to 70, and 600 IU for people ages 71 and older. However, many experts feel these levels are too low to be effective. Recently the National Osteoporosis Foundation increased its vitamin D recommendations to 400 to 800 IU for people ages 1 to 49 and 800 to 1,000 IU for people ages 50 and older. These higher levels are more in keeping with what many medical experts currently suggest.

■ **Exercise regularly.** Try to get at least 30 minutes of exercise a day. Any exercise that involves working against gravity, such as running, walking, or climbing stairs, can help strengthen bone. Strength-training exercises are a good choice, too. Numerous studies have found that strength training—which involves exercising with free weights, machines, or resistance supplied by the body—can slow bone loss and perhaps even build bone. In addition, strength training can enhance strength and stability, which may help you avoid falls.

■ **Avoid smoking and too much alcohol.** Both decrease bone mass, and heavy drinking can also make you more apt to fall.

■ **Talk to your doctor about your risk for osteoporosis.** A number of factors can put you at greater risk for developing osteoporosis, including your body type, family history, ethnicity, and gender. Medications and medical conditions can also affect bone strength. Your doctor can help you determine your risk factors and develop a plan of action.

■ **Consider having a bone density evaluation.** Bone density tests can help detect osteoporosis early—before you break a bone. Too often, though, people who would benefit from these tests don't get them. According to a 2004 report from the Surgeon General on bone health, health care professionals often fail to identify and treat people who are at high risk for osteoporosis. The National Osteoporosis Foundation recommends testing for all women ages 65 and older, as well as any postmenopausal women who are at high risk for osteoporosis. In addition, anyone who takes glucocorticoids (medications that lead to bone loss), has a medical condition that places him or her at high risk for osteoporosis, or

has a history of falls or broken bones as an adult should consider getting screened.

■ **Discuss medications with your doctor.** A number of medications can effectively prevent and treat osteoporosis. Options include alendronate (Fosamax), risedronate (Actonel), ibandronate (Boniva), and raloxifene (Evista). Alendronate and risedronate are available as daily or weekly tablets, while ibandronate is taken just once a month. In 2007, a once-a-year

10 ways to prevent falls

While falls are the leading cause of deaths from injury among older adults, consequences such as fractures, head trauma, and lasting fear that plays a role in isolation and reduced mobility are common, too. Men are more likely to die from falls; women are more likely to sustain serious, nonfatal injuries. Falls can stem from a host of factors, some health-related and some environmental, such as failing vision or hearing; impaired muscle strength, coordination, and reflexes; dizziness (sometimes caused by medications); bad lighting; wet floors; and obstacles in pathways. Here are some ways to protect yourself against dangerous falls:

1. Clear your floors of clutter and any items that could trip you up, including wires, cords, and throw rugs.
2. Make sure that stairways, entrances, and walkways are well lit, and install nightlights in your bedroom and bathroom. Light sensors, which automatically go on in response to movement, are an excellent option, too.
3. Clean up spills immediately.
4. Wear rubber-soled shoes for better traction. Avoid walking around in socks or bare feet.
5. Limit your intake of alcohol.
6. Keep items that you use often in easy-to-reach cabinets. Also, consider using reaching and grasping tools to get at difficult-to-reach items.
7. Add grab bars to your tub, and use nonskid mats on bathroom floors.
8. Talk to your doctor about whether any medications you are taking can cause dizziness or impair balance.
9. Perform exercises such as tai chi, balance training, or strength training that can improve your balance, coordination, and muscle strength.
10. Have your eyes checked regularly.

injection—zoledronic acid (Reclast)—became available, but only for treatment, not prevention. Teriparatide (Forteo), a synthetic version of parathyroid hormone, and calcitonin (Miacalcin, Calcimar) are also approved for treatment only. Hormone therapy was once widely prescribed for osteoporosis, but most doctors no longer recommend it for treating bone loss because of harmful side effects (see “Women and hormone therapy,” page 22). Your doctor can help you determine whether you need a medication, and, if so, which one is right for you.

■ **Prevent falls.** The treatment and prevention of osteoporosis is aimed at a single goal: to prevent fractures. And one of the biggest causes of breaks, as you might suspect, is falling. Making a few simple changes can help you safeguard your bones (see “10 ways to prevent falls,” page 39).

Vision problems

Read the fine print. That’s great advice at any age. But by the time you reach your mid-40s, you’ll probably need reading glasses or longer arms to follow through. The flexible, crystalline lens of the eye, which changes shape to allow you to focus on nearby or distant objects, becomes less elastic and accommodating as you get older. Presbyopia—the inability to focus at close range that typically occurs during the mid-40s—may have been the first age-linked change you noticed. Fortunately for all of us, off-the-rack reading glasses, available in styles ranging from elegant to funky, can be purchased at drugstores as well as eyewear shops.

Time affects your eyes in many other ways less easily remedied. Night vision often declines. Tears are fewer and lubricate less effectively, leading to dry eyes or a sticky mucus buildup. Muscles propping the eyelids up begin to droop. Wear and tear on the clear, gelatinous vitreous humor that fills the eyeball can cause specks of collagen called floaters to appear. Generally, this is harmless, although showers of floaters or flashing lights can herald a tear in the retina that requires immediate intervention.

Reading glasses, prescriptions for increasingly sophisticated corrective eyewear, and a bit of extra care—such as frequent use of artificial tears to avoid

irritation—can solve many of these problems. Reporting vision changes and having regular eye exams (see “Sight savers,” at right) can help you ward off or limit the damage caused by more serious problems, such as cataracts, glaucoma, or age-related macular degeneration.

Cataracts

Roughly 50% of people ages 65 to 74 and 70% of those ages 75 or older have cataracts, clouded lenses that distort or block light before it reaches the retina. The result is blurred or lost vision. Cataracts occur when changes in the eye make the lens less resilient and increasingly opaque. Genetic predisposition, injuries, certain medications, health problems such as diabetes, alcohol, and smoking boost your risk of developing cataracts. So does long-term exposure to ultraviolet (UV) B rays from the sun. Fortunately, microsurgery and ultrasound techniques combined with lens implants can restore or improve vision for 98% of people with cataracts.

Glaucoma

Glaucoma typically occurs when an abnormal buildup of the fluid in the eye (called aqueous humor) places increasing pressure on the optic nerve and other delicate structures, damaging them. Glaucoma often has no symptoms in its early stages and easily can go unnoticed unless special exams are done, so be sure to have comprehensive eye exams regularly. When glaucoma isn’t treated, it can cause blindness; in fact, it’s the second leading cause of blindness. A variety of eye drops, ointments, and pills are used to relieve eye pressure and stop the progression of glaucoma. Different types of laser or conventional surgery to enhance fluid drainage may be done and, sometimes, repeated periodically. If other methods fail, some of the cells that secrete aqueous humor can be destroyed.

Age-related macular degeneration (AMD)

The nerve cells, fibers, cones, and rods in your retina react to light bouncing off objects. They relay visual messages about the light to your brain by sending signals along the optic nerve. A tiny part of the retina called the macula gives you sharp central vision. Age-

related macular degeneration, or AMD, blurs and impairs vision, occasionally to the point of blindness.

Nine out of 10 people with AMD have the dry, or atrophic, form of this disease, which thins retinal tissue and causes light-sensitive cells to decay. Although it cannot currently be treated, dry AMD generally progresses slowly through early, intermediate, and advanced stages. Wet AMD, which is always considered advanced, is caused by the sudden growth of abnormal blood vessels behind the macula. When caught early, this may be slowed with laser surgery or other treatments.

Researchers have investigated numerous approaches for both types of AMD, including supplements such as lutein and the soy extract genistein, medications, surgery, and transplants of healthy cells into an affected retina. Thus far, most treatments have proved fairly disappointing.

Vitamin supplements seem promising, however. In 2001, a clinical trial of more than 4,700 participants ages 55 to 80 called the Age-Related Eye Disease Study (AREDS) found that high doses of antioxidant vitamins and zinc reduce the risk of developing advanced AMD by 25% when taken by people with intermediate AMD or advanced AMD in one eye. While the nutrients (500 mg vitamin C, 400 IU vitamin E, 15 mg beta carotene, 80 mg zinc, and 2 mg copper) didn't restore lost vision or cure AMD, they did effectively slow its march with fairly few reported side effects. The supplements had no effect on early AMD.

A follow-up study of 4,000 participants called AREDS2 is being launched. It will explore whether adding lutein and zeaxanthin plus omega-3 fatty acids to the other nutrients can further slow the progression of AMD. Before trying these or other supplements, speak with your doctor about whether they are likely to be safe and effective for you. High-dose supplements might interact with medications that you take, combine with multivitamins to deliver unsafe doses of certain nutrients, or cause harm in other ways if not overseen by a doctor.

Several new approaches to managing wet AMD are being studied. A photodynamic drug called verteporfin (Visudyne) has slowed retinal damage from certain types of wet AMD with modest success. After being injected into a person's arm, the drug circulates

Sight savers

The following steps can help you protect your vision.

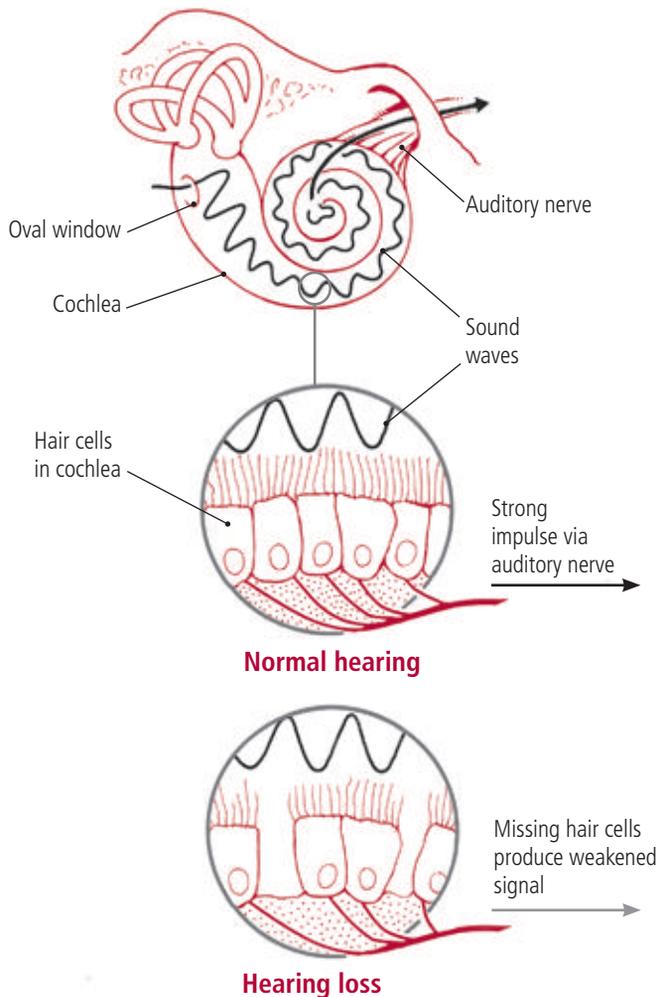
- Report *any* vision changes or eye problems to your health care provider and have regular, comprehensive eye exams. An estimated 40% to 50% of all blindness can be avoided or treated, mainly through regular visits to a vision specialist. To find out how often you should schedule an exam, see the screening guidelines on page 25.
- Wear broad-brimmed hats and sunglasses approved by the American National Standards Institute (ANSI). ANSI rates sunglasses as cosmetic, general-purpose, or special-purpose depending on how much and what type of UV light they block. Unless your eye doctor recommends otherwise, choose only those that block 99% to 100% of UVA and UVB light. UVB light is thought to cause cataracts, and some evidence suggests that blue light from the sun precipitates age-related macular degeneration (AMD), too. Lenses with a red, orange, or amber tint may protect against blue light best.
- Don't smoke. It raises your risk of cataracts and AMD—not to mention cancer and other health problems.
- Eat your fruits and veggies. Some researchers believe inadequate amounts of certain nutrients, such as zinc and the antioxidant vitamins E and C, may increase vulnerability to AMD and cataracts. Up your antioxidant intake by eating dark green, leafy vegetables, which contain pigments important to the eye called lutein and zeaxanthin; carrots, which are a good source of the vitamin A precursor beta carotene; and fresh fruits, which supply vitamin C. Take a daily multivitamin for insurance.

through the body and is picked up by abnormal blood vessels in the eye. Brief exposure to a laser light shone into the eye activates the drug. In addition, injections into the eye of anti-VEGF medication, which blocks a growth factor that speeds abnormal blood vessel growth, may help slow vision loss or possibly even improve sight. A third new drug, ranibizumab (Lucentis), also shows promise in decreasing vessel formation in wet AMD. In two recent studies, vision improved for about one-third of those treated with ranibizumab.

Hearing loss

Jackhammers. Snow blowers. Blow dryers. Lawn mowers. Loud music spilling out from earphones.

Figure 9 Age-related changes in hearing



Age-related hearing loss usually results from damage to the tiny hair cells of the cochlea. Age and cumulative exposure to loud noise gradually damage these hair cells and ultimately cause cell death. This leaves fewer cells to respond to sounds leading to hearing loss.

© Harriet Greenfield

These and plenty of other modern-age inventions barrage our ears with harmful high-decibel noise. Illnesses such as Ménière's disease and benign or malignant tumors can also affect hearing. So can deterioration of cells within the ear that accumulates with age (see Figure 9). Small wonder that approximately 33% of Americans ages 65 to 74 and 47% of those older have some form of hearing loss.

Hearing loss makes daily tasks and social interactions more difficult, paving the way for other troubles (see "Staying connected," page 28). If you suspect a

hearing problem—perhaps people seem to be mumbling a lot or you have trouble understanding others in noisy places—have your hearing checked. A thorough hearing evaluation helps sort out the cause, type, and location of hearing loss. You may be referred to a doctor who specializes in diagnosing and treating hearing disorders, such as an otolaryngologist or otologist, or an audiologist, a health professional who specializes in testing people for hearing loss, diagnosing certain ear disorders, and fitting hearing aids.

Although hearing loss that's related to noise damage and age comes on gradually, other kinds of hearing loss occur suddenly. There are two basic types of hearing loss, sensorineural and conductive. Many people have a combination, especially as they age; this is called mixed hearing loss. Knowing which type of hearing loss you have is the first step in determining which treatment is right for you.

Sensorineural hearing loss results from harm to cells in the ear—sensory cells that receive sound waves, or nerve cells that transmit messages to the brain. Loud noises, toxins, head injuries, and aging may all have a hand in this condition, which is usually permanent. Hearing loss that is strictly due to aging, called presbycusis, is the most common type of sensory hearing loss. It appears when sensitive hair cells in the inner ear that pick up sound waves die off over time. Usually, cells that capture soft, high-pitched sounds deteriorate first.

Conductive hearing loss occurs when sound waves passing through the outer or middle ear are blocked, perhaps by earwax, a cyst, abnormal bone growth, or swelling or fluid from an ear infection. These hearing problems can often be treated with medication, surgery, or simple removal of the blockage.

Hearing aids and listening devices

For the majority of adults whose hearing loss is age-related or otherwise permanent, the only way to improve hearing is with a hearing aid. Be aware that although hearing aids help many people, they do have some limitations. A hearing aid's job is mainly to increase volume. This means sounds will be louder, but not necessarily clearer. Also, it takes time to get used to wearing a hearing aid—usually at least four to six

Tips for protecting your hearing

- If you expect to be exposed to loud noises, wear earplugs or earmuffs or both. Each can shave off 15 to 30 decibels. Earplugs muffle low-pitched noises; earmuffs are better for high-pitched ones.
- Turn down the volume, and don't use the stereo to drown out other loud noises. Some portable CD or tape players can crank out 126 decibels, which is comparable to a jackhammer or chainsaw and loud enough to damage your ears.
- If you are hearing-impaired, get yearly hearing tests.
- Be careful cleaning your ears. Avoid using cotton-tipped swabs. If you do use them, do not push them deeper than the opening of the ear canal to avoid packing earwax into the canal.
- Quit smoking and avoid secondhand smoke. Evidence from animal studies suggests smoking is toxic to hair cells. And while some studies have not found a connection, one study showed that current cigarette smokers were 70% more likely to have hearing loss than nonsmokers.

weeks—and you may need to return for adjustments more than once.

There are many different types of hearing aids available, from old-style aids looped behind the ear to the tiniest custom-made models tucked out of sight in the ear canal. A surgically implanted bone-conducting hearing aid, which harnesses vibration to help sidestep annoying feedback, is an option for people who can't normally wear hearing aids.

Circuitry in hearing aids has changed vastly, too. Conventional analog hearing aids are controlled manually—that is, you change the volume and a few other settings. Programmable hearing aids have automatic volume control and a series of programs customized to your needs that amplify sounds only within a certain range, such as voices. You can switch between these programs as necessary. Digital hearing aids, which are also programmed, use tiny microchips to automatically adjust myriad aspects of sound in order to enhance speech clarity, cut down background noise, and vary volume.

Even with a hearing aid, some people have trouble hearing in particular situations. For example, they may still find voices on the telephone too soft to hear. They may sleep through an ordinary alarm clock. Watching TV can be problematic if the person who is hearing impaired wants the TV far louder than the other people in the room. Assistive listening devices, or ALDs, are designed to solve problems like these. They can help sweep aside background noises so that the sig-

nal you wish to hear—be it a TV show, your brother's voice on a telephone, or the speaker at your place of worship—comes in more clearly.

A variety of ALDs are available. One device amplifies the telephone ring; another amplifies the voice of the person on the other end of the phone. Others, like special smoke detectors, doorbells, alarms, and telephones, set off flashing lights or vibrations to alert you to their ring. There's even a multidirectional microphone that looks something like a micro-sized tape recorder to help people hear conversations better in noisy rooms. To use it, you point the microphone in the direction of the person who's speaking to you or have the speaker attach a small microphone to his or her collar. ALDs can be used with or without a hearing aid, but they generally aren't covered by health insurance. However, they are usually considerably less expensive than hearing aids, costing a few hundred dollars at most. If you are having difficulty hearing in particular situations, an audiologist can probably recommend a helpful ALD.

Promising lines of research into hearing loss may one day make regeneration of hair cells in the inner ear—which is known to occur in birds—possible in humans. Or perhaps the breakdown of sensory cells could be staved off. Some evidence suggests that antioxidants delivered directly to the inner ear might prevent destruction by loud noises. However, no evidence shows that taking antioxidant supplements makes a difference to hearing. ♥

Planning for the future

Most older people remain independent well into later life. Odds are good that you will, too, especially if you take care of yourself. But it's hard to know with certainty what the future will bring for anyone. Clarifying your wishes on prolonging life through medical care may be as important as the steps you take to stay healthy and vital. And at some point, you or someone you love might need help with one or more basic activities of daily life.

The time to start planning for these contingencies is now. If you're a healthy person in your 50s or early 60s, that may sound like odd advice. But it's good to know a bit about available options before you need to seek them out for yourself or someone else. Hurried decisions made on the heels of an emergency such as a broken hip, stroke, or heart attack may not suit you as well as those carefully considered in advance.

Understanding advance care directives

You can help ensure your health care wishes are known and respected through advance care directives. These directives address how aggressively you want doctors to pursue life-sustaining measures on your behalf or whether your quality of life or comfort should be paramount concerns. Two common advance directives are

- a living will, which states your wishes for medical care if you become mentally or physically unable to make these decisions yourself
- a durable power of attorney for health care or health care proxy, which lets you name a person who will advocate for your wishes.

State laws on advance directives vary. Check with a lawyer or your state attorney general's office to be sure you comply with the law, and if you spend substantial time in different states, remember that guidelines may differ. A local hospital, hospice, or seniors'

organization may have staff who can help you prepare an advance directive.

When preparing your advance directive, keep in mind that your wishes can't be followed if no one knows what they are. Taking the following steps will help.

- Make sure the person named in your health care proxy knows what your wishes are, because he or she will be making decisions for you if you are unable to do so yourself.
- Talk with your doctor to make sure that your wishes are understood and can be followed. Discuss them with your family, too.
- Your lawyer and a family member should know where a copy of any advance directive is located. Keep a second copy in a safe place, and ask your doctor to put another in your permanent medical record. Also, keep a copy in an easily accessible spot in case an emergency occurs and ambulance personnel need to access it.
- Anyone named as your agent in a health care proxy should have a copy of that document and know your goals for medical care.
- Keep a card in your wallet stating that you have an advance directive, noting where it is, and naming your health care agent, if any.
- Revisit your advance care directive periodically with your doctor as changes occur in your life and health. It may help to know that if you have a change of heart at any point while under medical care, your spoken wishes override any written wishes.

It's impossible to know the exact circumstances under which advance care directives will be invoked, what range of medical options will be available, and how your own feelings might change in the face of reality. Before you throw up your hands in dismay, consider this: mulling over your wishes for end-of-life health care can help you sort out your overall values. That's the first step in communicating them to loved ones. Perhaps more than one discussion is needed.

Just as important, though, is cultivating a relationship with your doctor and being willing to talk about death and dying when the prospect of death is no longer academic.

Planning for long-range care

Very often, home is the best starting place for long-range care. Before you consider other alternatives, apply some energy and funds to bolstering independence there. First, identify your most likely needs during the coming years with your doctor, who may be able to link you up with local services. The Eldercare Locator can also assist you (see “Resources,” page 48). Family and friends may help meet some needs or come up with solutions, too. In some locales, naturally occurring retirement communities have arisen to ensure that seniors get essential services while remaining in their own communities and homes.

■ **Adapt your home.** Stairs, baths, and kitchens present plenty of obstacles for elders. Bathrooms usually can be fitted with such items as walk-in showers, grab bars, nonskid mats, and higher toilet seats. Ramps, elevators, and other devices can help you handle stairs. Keep often-needed items in the handiest cabinets, and use grasping tools to get things that are out of reach rather than climbing on chairs or ladders.

■ **Prevent falls.** The tips in “10 ways to prevent falls” on page 39 can help keep you upright.

■ **Look into NORCs.** One way to make staying at home safer and more comfortable is to link up with a naturally occurring retirement community (NORC). These neighborhoods and housing complexes aren’t developed specifically to serve seniors—and, in fact, tend to host a mix of ages—but because they have a range of coordinated care and support available, they are senior-friendly. In 2000, United Jewish Communities launched a National NORCs Aging In Place Initiative designed to test the waters at more than 40 projects in 25 states. One example, the nonprofit Beacon Hill Village in Boston, offers an unusually broad variety of helpful options, ranging from grocery shopping and home repairs to preventive health care and home health aides, all for a yearly membership fee plus discounted fees per service. Many other com-

munities—Chicago, Minneapolis, Los Angeles, and Washington, D.C., among them—have received grants from the U.S. Administration on Aging to fund local NORCs. Your local agency on aging may have information on what is available in your area.

■ **Seek helping hands.** Shopping for groceries and other essentials can be accomplished over the phone and via the Internet these days. Meal preparation, transportation, home repair, housecleaning, and help with financial tasks such as paying bills might be hired out if you can afford it, shared among friends and family, or obtained through elder services offered in your community or through long-term care insurance.

■ **Plan for emergencies.** Who can check in on you regularly? Who can you call in an emergency? What would happen if you fell and couldn’t reach the phone? Keep emergency numbers near each phone or on speed dial. Carry a cell phone or consider investing in a Lifeline or another type of personal alarm system, if necessary. (It’s now possible to get cell phones with large buttons and bright screens, by the way.) Look into companionship services or phone checks from a local agency on aging or religious group (see “Resources,” page 48).

Considering long-term care facilities

When staying at home is not possible, other options abound. Long-term care options range from subsidized senior housing to assisted living communities to nursing homes. It’s wise to consider these before a need arises if only to look at affordability, waiting lists, insurance coverage, and the range of services offered.

Choosing long-term care facilities is a daunting task, so it’s usually best to break it down into manageable steps. A social worker or geriatric care manager (see “Resources,” page 48) may be able to offer valuable assistance throughout the process. Also, consider the following tips:

- Gather information about facilities in your desired locale from friends, your doctor, social workers, and resources such as the Eldercare Locator or your local agency on aging.
- Weed out facilities that clearly don’t offer the range of services you are searching for or meet your religious

or cultural needs, as well as any that have a poor reputation. Online tools at the Centers for Medicare and Medicaid Services (www.cms.hhs.gov) allow you to compare nursing homes. Remember that location is important, too, since frequent visits from family and friends make a big difference in quality of life and quality of care.

- Work up a list of questions to ask at the most appealing facilities. Cost, range of services, and payment methods are three basic questions. Also ask such questions as how many people live there, what sort of problems brought them there, and how your needs would be met.
- Consider payment issues. Long-term care is costly, and most private insurance, Medicare, and “medi-gap” policies do not cover assisted living or long-term care—or even services in your home beyond the short term. Check with your state’s health insurance information program if you have questions about financing nursing-home care.
- Visit the places that make your short list. Talk with staff, residents, and family members of residents, if possible, and have a meal or two. After a formal visit, drop in at different times of the day. How are people treated? How much privacy do they have? What are the residents and activities like?
- Be sure you understand the legal and financial ramifications of a contract with a long-term care facility. It’s wise to have a lawyer check and explain the contract before you sign anything. ♥

Resources

Organizations

American Dietetic Association

120 S. Riverside Plaza, Suite 2000
Chicago, IL 60606
800-877-1600 (toll-free)
www.eatright.org

The Web site of this nonprofit organization features extensive nutrition news and information, plus a dietitian locator.

American Heart Association American Stroke Association

7272 Greenville Ave.
Dallas, TX 75231
AHA: 800-242-8721 (toll-free)
ASA: 888-478-7653 (toll-free)
www.americanheart.org
www.strokeassociation.org

These organizations have consumer hotlines that handle questions on heart health and stroke. They also offer free or low-cost publications, posters, and audiovisual materials.

Eldercare Locator

800-677-1116 (toll-free)
www.eldercare.gov

A service of the U.S. Administration on Aging, the Eldercare Locator can help you find local resources ranging from in-home care, meal assistance, and housing alternatives to home repair and legal assistance. The locator also lists state and local agencies on aging.

National Association of Professional Geriatric Care Managers

1604 N. Country Club Road
Tucson, AZ 85716
520-881-8008
www.caremanager.org

This nonprofit organization can link you to private geriatric care managers, who can help you sort through options for care, gain access to services, and even oversee home services. Care managers can be especially helpful for long-distance caregivers.

National Heart, Lung, and Blood Institute NHLBI Health Information Center

P.O. Box 30105
Bethesda, MD 20824
301-592-8573
www.nhlbi.nih.gov

This government organization, part of the National Institutes of Health, offers free publications on heart disease, blood pressure, cholesterol, obesity, exercise, weight loss, and cardiovascular conditions.

National Institute on Aging

Building 31, Room 5C27
31 Center Drive, MSC 2292
Bethesda, MD 20892
800-222-2225 (toll-free)
www.nia.nih.gov

This arm of the National Institutes of Health supports research on aging, illness, and special problems of older people. Its free publications cover a broad variety of topics on aging.

Books

Eat, Drink, and Be Healthy: The Harvard Medical School Guide to Healthy Eating

Walter C. Willett, M.D., with Patrick J. Skerrett
(Simon & Schuster, 2005, 352 pages)

Provides state-of-the-art information about the links between diet and health. An extensive selection of recipes helps readers put the latest nutrition findings into practice.

Healthy Women, Healthy Lives: A Guide to Preventing Disease, from the Landmark Nurses' Health Study

Susan E. Hankinson, R.N., Sc.D., Graham A. Colditz, M.D., JoAnn E. Manson, M.D., and Frank E. Speizer, M.D.
(Free Press, 2002, 576 pages)

Provides women with information from the long-running Nurses' Health Study—as well as data from other significant women's health research—so they can achieve and maintain good health throughout their lives.

Glossary

advance care directive: A document that describes your wishes and goals for health care if you become unable to express them yourself.

age-related macular degeneration (AMD): A potentially blinding condition that destroys a tiny part of the retina called the macula, which is responsible for sharp central vision.

antioxidants: Synthetic or natural substances that help block the damage done by free radicals.

cataract: A clouded lens in the eye that distorts or blocks light before it reaches the retina, causing blurred or lost vision.

cell senescence: The end stage in the life of a cell during which replication ceases.

coronary artery disease: A condition in which one or more of the arteries feeding the heart become narrow enough to reduce or entirely interrupt blood flow. Often called heart disease.

free radicals: Unstable oxygen molecules that can damage cell membranes, proteins, and even DNA. Also called oxidants.

glaucoma: A condition in which an abnormal buildup of the fluid in the eye (aqueous humor) or disruption of its natural flow places increasing pressure on the optic nerve and other delicate structures.

high-density lipoprotein (HDL): So-called good cholesterol, which circulates in your blood and ferries potentially damaging low-density lipoprotein to the liver to be broken down and eliminated from the body.

ischemia: A temporary or longer-lasting interruption in blood flow that can be the trigger for angina, heart attacks, and many strokes.

low-density lipoprotein (LDL): So-called bad cholesterol, which circulates in your blood and can build up on blood vessel walls.

monounsaturated fats: Liquid at room temperature, monounsaturated fats include olive oil, peanut oil, and canola oil and are also found in cashews, peanuts, many other nuts, and avocados.

oxidants: Unstable oxygen molecules that can damage cell membranes, proteins, and DNA. Also called free radicals.

polyunsaturated fats: Liquid at room temperature, polyunsaturated fats include corn and soybean oils and are also found in seeds, legumes, whole grains, and fatty fish, such as salmon and tuna.

presbycusis: Hearing loss that occurs when sensitive hair cells in the inner ear that pick up sound waves die off over time.

presbyopia: An inability to focus at close range that typically occurs in people in their 40s as the flexible lens of the eye becomes less elastic.

saturated fat: Solid at room temperature, saturated fats are found in meat, dairy products, and certain vegetable oils, such as palm and coconut oils.

trans fats: Processed fats that are solid at room temperature and include partially hydrogenated or hydrogenated vegetable oils and shortening. Often used in commercial baked goods.

triglycerides: A blood fat that can raise the risk for heart disease when elevated.



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