

**NEW YORK TIMES BESTSELLING AUTHOR OF
*THE CHECKLIST MANIFESTO***

Atul Gawande

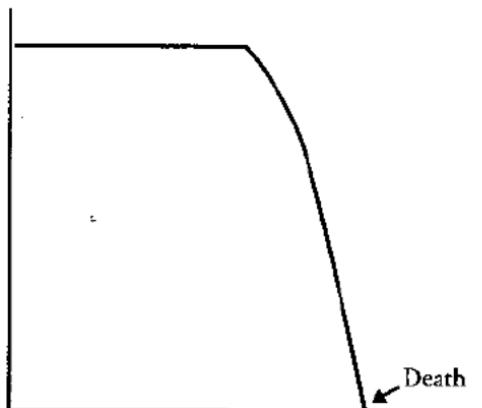


Being Mortal

Medicine and What Matters in the End

2 · *Things Fall Apart*

Medicine and public health have transformed the trajectory of our lives. For all but our most recent history, death was a common, ever-present possibility. It didn't matter whether you were five or fifty. Every day was a roll of the dice. If you plotted the typical course of a person's health, it would look like this:



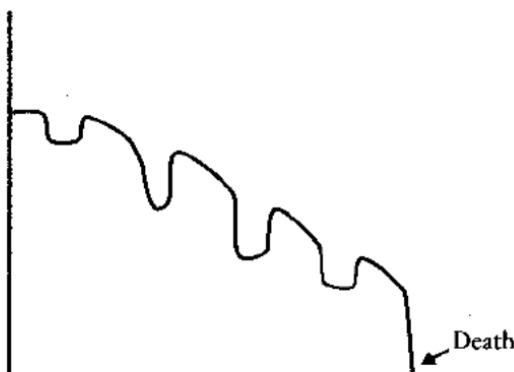
Life and health would putter along nicely, not a problem in the world. Then illness would hit and the bottom would drop out like

a trap door—the way it did for my grandmother Gopikabai Gawande, who'd been perfectly well until the day she was struck by a fatal case of malaria, not even thirty years old, or for Rich Hobson, who had a heart attack on a business trip and then was gone.

Over the years, with medical progress, the bottom has tended to drop out later and later. The advent of sanitation and other public health measures sharply reduced the likelihood of death from infectious disease, especially in early childhood, and clinical advances dramatically reduced the mortality of childbirth and traumatic injuries. By the middle of the twentieth century, just four out of every hundred people in industrialized countries died before the age of thirty. And in the decades since, medicine found ways to cut the mortality of heart attacks, respiratory illnesses, stroke, and numerous other conditions that threaten in adult life. Eventually, of course, we all die of something. But even then, medicine has pushed the fatal moment of many diseases further outward. People with incurable cancers, for instance, can do remarkably well for a long time after diagnosis. They undergo treatment. Symptoms come under control. They resume regular life. They don't feel sick. But the disease, while slowed, continues progressing, like a night brigade taking out perimeter defenses. Eventually, it makes itself known, turning up in the lungs, or in the brain, or in the spine, as it did with Joseph Lazaroff. From there, the decline is often relatively rapid, much as in the past. Death occurs later, but the trajectory remains the same. In a matter of months or weeks, the body becomes overwhelmed. That is why, although the diagnosis may have been present for years, death can still come as a surprise. The road that seemed so straight and steady can still disappear, putting a person on a fast and steep slide down.

The pattern of decline has changed, however, for many chronic illnesses—emphysema, liver disease, and congestive heart failure,

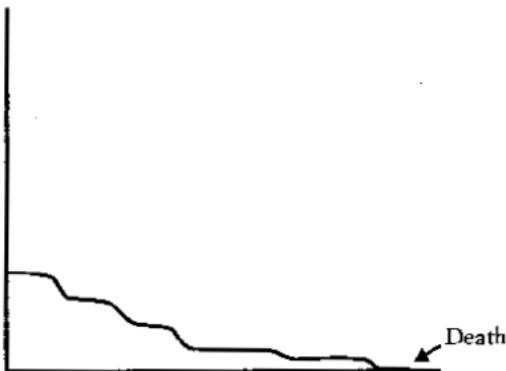
for example. Instead of just delaying the moment of the downward drop, our treatments can stretch the descent out until it ends up looking less like a cliff and more like a hilly road down the mountain:



The road can have vertiginous drops but also long patches of recovered ground: we may not be able to stave off the damage, but we can stave off the death. We have drugs, fluids, surgery, intensive care units to get people through. They enter the hospital looking terrible, and some of what we do can make them look worse. But just when it looks like they've breathed their last, they rally. We make it possible for them to make it home—weaker and more impaired, though. They never return to their previous baseline. As illness progresses and organ damage worsens, a person becomes less able to withstand even minor problems. A simple cold can be fatal. The ultimate course is still downward until there finally comes a time when there is no recovery at all.

The trajectory that medical progress has made possible for many people, though, follows neither of these two patterns. Instead, increasingly large numbers of us get to live out a full life span and die of old age. Old age is not a diagnosis. There is

always some final proximate cause that gets written down on the death certificate—respiratory failure, cardiac arrest. But in truth no single disease leads to the end; the culprit is just the accumulated crumbling of one's bodily systems while medicine carries out its maintenance measures and patch jobs. We reduce the blood pressure here, beat back the osteoporosis there, control this disease, track that one, replace a failed joint, valve, piston, watch the central processing unit gradually give out. The curve of life becomes a long, slow fade:



The progress of medicine and public health has been an incredible boon—people get to live longer, healthier, more productive lives than ever before. Yet traveling along these altered paths, we regard living in the downhill stretches with a kind of embarrassment. We need help, often for long periods of time, and regard that as a weakness rather than as the new normal and expected state of affairs. We're always trotting out some story of a ninety-seven-year-old who runs marathons, as if such cases were not miracles of biological luck but reasonable expectations for all. Then, when our bodies fail to live up to this fantasy, we feel as if we somehow have something to apologize for.

Those of us in medicine don't help, for we often regard the patient on the downhill as uninteresting unless he or she has a discrete problem we can fix. In a sense, the advances of modern medicine have given us two revolutions: we've undergone a biological transformation of the course of our lives and also a cultural transformation of how we think about that course.

THE STORY OF aging is the story of our parts. Consider the teeth. The hardest substance in the human body is the white enamel of the teeth. With age, it nonetheless wears away, allowing the softer, darker layers underneath to show through. Meanwhile, the blood supply to the pulp and the roots of the teeth atrophies, and the flow of saliva diminishes; the gums tend to become inflamed and pull away from the teeth, exposing the base, making them unstable and elongating their appearance, especially the lower ones. Experts say they can gauge a person's age to within five years from the examination of a single tooth—if the person has any teeth left to examine.

Scrupulous dental care can help avert tooth loss, but growing old gets in the way. Arthritis, tremors, and small strokes, for example, make it difficult to brush and floss, and because nerves become less sensitive with age, people may not realize that they have cavity and gum problems until it's too late. In the course of a normal lifetime, the muscles of the jaw lose about 40 percent of their mass and the bones of the mandible lose about 20 percent, becoming porous and weak. The ability to chew declines, and people shift to softer foods, which are generally higher in fermentable carbohydrates and more likely to cause cavities. By the age of sixty, people in an industrialized country like the United States have lost, on average, a third of their teeth. After eighty-five, almost 40 percent have no teeth at all.

Even as our bones and teeth soften, the rest of our body hardens. Blood vessels, joints, the muscle and valves of the heart, and even the lungs pick up substantial deposits of calcium and turn stiff. Under a microscope, the vessels and soft tissues display the same form of calcium that you find in bone. When you reach inside an elderly patient during surgery, the aorta and other major vessels can feel crunchy under your fingers. Research has found that loss of bone density may be an even better predictor of death from atherosclerotic disease than cholesterol levels. As we age, it's as if the calcium seeps out of our skeletons and into our tissues.

To maintain the same volume of blood flow through our narrowed and stiffened blood vessels, the heart has to generate increased pressure. As a result, more than half of us develop hypertension by the age of sixty-five. The heart becomes thicker-walled from having to pump against the pressure, and less able to respond to the demands of exertion. The peak output of the heart therefore decreases steadily from the age of thirty. People become gradually less able to run as far or as fast as they used to or to climb a flight of stairs without becoming short of breath.

As the heart muscle thickens, muscle elsewhere thins. Around age forty, one begins to lose muscle mass and power. By age eighty, one has lost between a quarter and a half of one's muscle weight.

You can see all these processes play out just in the hand: 40 percent of the muscle mass of the hand is in the thenar muscles, the muscles of the thumb, and if you look carefully at the palm of an older person, at the base of the thumb, you will notice that the musculature is not bulging but flat. In a plain X-ray, you will see speckles of calcification in the arteries and translucency of the bones, which, from age fifty, lose their density at a rate of nearly 1 percent per year. The hand has twenty-nine joints, each of which is prone to destruction from osteoarthritis, and this will give the

joint surfaces a ragged, worn appearance. The joint space collapses. You can see bone touching bone. What the person feels is swelling around the joints, reduced range of motion of the wrist, diminished grip, and pain. The hand also has forty-eight named nerve branches. Deterioration of the cutaneous mechanoreceptors in the pads of the fingers produces loss of sensitivity to touch. Loss of motor neurons produces loss of dexterity. Handwriting degrades. Hand speed and vibration sense decline. Using a standard mobile phone, with its tiny buttons and touch screen display, becomes increasingly unmanageable.

This is normal. Although the processes can be slowed—diet and physical activity can make a difference—they cannot be stopped. Our functional lung capacity decreases. Our bowels slow down. Our glands stop functioning. Even our brains shrink: at the age of thirty, the brain is a three-pound organ that barely fits inside the skull; by our seventies, gray-matter loss leaves almost an inch of spare room. That's why elderly people like my grandfather are so much more prone to cerebral bleeding after a blow to the head—the brain actually rattles around inside. The earliest portions to shrink are generally the frontal lobes, which govern judgment and planning, and the hippocampus, where memory is organized. As a consequence, memory and the ability to gather and weigh multiple ideas—to multitask—peaks in midlife and then gradually declines. Processing speeds start decreasing well before age forty (which may be why mathematicians and physicists commonly do their best work in their youth). By age eighty-five, working memory and judgment are sufficiently impaired that 40 percent of us have textbook dementia.

WHY WE AGE is the subject of vigorous debate. The classical view is that aging happens because of random wear and tear.

The newest view holds that aging is more orderly and genetically programmed. Proponents of this view point out that animals of similar species and exposure to wear and tear have markedly different life spans. The Canada goose has a longevity of 23.5 years; the emperor goose only 6.3 years. Perhaps animals are like plants, with lives that are, to a large extent, internally governed. Certain species of bamboo, for instance, form a dense stand that grows and flourishes for a hundred years, flowers all at once, and then dies.

The idea that living things shut down instead of wearing down has received substantial support in recent years. Researchers working with the now famous worm *C. elegans* (twice in one decade, Nobel Prizes went to scientists doing work on the little nematode) were able, by altering a single gene, to produce worms that live more than twice as long and age more slowly. Scientists have since come up with single-gene alterations that increase the life spans of fruit flies, mice, and yeast.

These findings notwithstanding, the preponderance of the evidence is against the idea that our life spans are programmed into us. Remember that for most of our hundred-thousand-year existence—all but the past couple of hundred years—the average life span of human beings has been thirty years or less. (Research suggests that subjects of the Roman Empire had an average life expectancy of twenty-eight years.) The natural course was to die before old age. Indeed, for most of history, death was a risk at every age of life and had no obvious connection with aging, at all. As Montaigne wrote, observing late-sixteenth-century life, “To die of age is a rare, singular, and extraordinary death, and so much less natural than others: it is the last and extremest kind of dying.” So today, with our average life span in much of the world climbing past eighty years, we are already

oddities living well beyond our appointed time. When we study aging what we are trying to understand is not so much a natural process as an unnatural one.

It turns out that inheritance has surprisingly little influence on longevity. James Vaupel, of the Max Planck Institute for Demographic Research, in Rostock, Germany, notes that only 3 percent of how long you'll live, compared with the average, is explained by your parents' longevity; by contrast, up to 90 percent of how tall you are is explained by your parents' height. Even genetically identical twins vary widely in life span: the typical gap is more than fifteen years.

If our genes explain less than we imagined, the classical wear-and-tear model may explain more than we knew. Leonid Gavrilov, a researcher at the University of Chicago, argues that human beings fail the way all complex systems fail: randomly and gradually. As engineers have long recognized, simple devices typically do not age. They function reliably until a critical component fails, and the whole thing dies in an instant. A windup toy, for example, works smoothly until a gear rusts or a spring breaks, and then it doesn't work at all. But complex systems—power plants, say—have to survive and function despite having thousands of critical, potentially fragile components. Engineers therefore design these machines with multiple layers of redundancy: with backup systems, and backup systems for the backup systems. The backups may not be as efficient as the first-line components, but they allow the machine to keep going even as damage accumulates. Gavrilov argues that, within the parameters established by our genes, that's exactly how human beings appear to work. We have an extra kidney, an extra lung, an extra gonad, extra teeth. The DNA in our cells is frequently damaged under routine conditions, but our cells have a number of DNA

repair systems. If a key gene is permanently damaged, there are usually extra copies of the gene nearby. And, if the entire cell dies, other cells can fill in.

Nonetheless, as the defects in a complex system increase, the time comes when just one more defect is enough to impair the whole, resulting in the condition known as frailty. It happens to power plants, cars, and large organizations. And it happens to us: eventually, one too many joints are damaged, one too many arteries calcify. There are no more backups. We wear down until we can't wear down anymore.

It happens in a bewildering array of ways. Hair grows gray, for instance, simply because we run out of the pigment cells that give hair its color. The natural life cycle of the scalp's pigment cells is just a few years. We rely on stem cells under the surface to migrate in and replace them. Gradually, however, the stem-cell reservoir is used up. By the age of fifty, as a result, half of the average person's hairs have gone gray.

Inside skin cells, the mechanisms that clear out waste products slowly break down and the residue coalesces into a clot of gooey yellow-brown pigment known as lipofuscin. These are the age spots we see in skin. When lipofuscin accumulates in sweat glands, the sweat glands cannot function, which helps explain why we become so susceptible to heat stroke and heat exhaustion in old age.

The eyes go for different reasons. The lens is made of crystallin proteins that are tremendously durable, but they change chemically in ways that diminish their elasticity over time—hence the farsightedness that most people develop beginning in their fourth decade. The process also gradually yellows the lens. Even without cataracts (the whitish clouding of the lens that occurs with age, excessive ultraviolet exposure, high cholesterol, diabetes, and cigarette smoking), the amount of light reaching

the retina of a healthy sixty-year-old is one-third that of a twenty-year-old.

I spoke to Felix Silverstone, who for twenty-four years was the senior geriatrician at the Parker Jewish Institute, in New York, and who has published more than a hundred studies on aging. There is, he told me, "no single, common cellular mechanism to the aging process." Our bodies accumulate lipofuscin and oxygen free-radical damage and random DNA mutations and numerous other microcellular problems. The process is gradual and unrelenting.

I asked Silverstone whether gerontologists have discerned any particular, reproducible pathway to aging. "No," he said. "We just fall apart."

THIS IS NOT, to say the least, an appealing prospect. People naturally prefer to avoid the subject of their decrepitude. There have been dozens of bestselling books on aging, but they tend to have titles such as *Younger Next Year*, *The Fountain of Age*, *Ageless*, or—my favorite—*The Sexy Years*. Still, there are costs to averting our eyes from the realities. We put off dealing with the adaptations that we need to make as a society. And we blind ourselves to the opportunities that exist to change the individual experience of aging for the better.

As medical progress has extended our lives, the result has been what's called the "rectangularization" of survival. Throughout most of human history, a society's population formed a sort of pyramid: young children represented the largest portion—the base—and each successively older cohort represented a smaller and smaller group. In 1950, children under the age of five were 11 percent of the US population, adults aged forty-five to forty-nine were 6 percent, and those over eighty were 1 percent. Today,

we have as many fifty-year-olds as five-year-olds. In thirty years, there will be as many people over eighty as there are under five. The same pattern is emerging throughout the industrialized world.

Few societies have come to grips with the new demography. We cling to the notion of retirement at sixty-five—a reasonable notion when those over sixty-five were a tiny percentage of the population but increasingly untenable as they approach 20 percent. People are putting aside less in savings for old age now than they have at any time since the Great Depression. More than half of the very old now live without a spouse and we have fewer children than ever before, yet we give virtually no thought to how we will live out our later years alone.

Equally worrying, and far less recognized, medicine has been slow to confront the very changes that it has been responsible for—or to apply the knowledge we have about how to make old age better. Although the elderly population is growing rapidly, the number of certified geriatricians the medical profession has put in practice has actually fallen in the United States by 25 percent between 1996 and 2010. Applications to training programs in adult primary care medicine have plummeted, while fields like plastic surgery and radiology receive applications in record numbers. Partly, this has to do with money— incomes in geriatrics and adult primary care are among the lowest in medicine. And partly, whether we admit it or not, a lot of doctors don't like taking care of the elderly.

"Mainstream doctors are turned off by geriatrics, and that's because they do not have the faculties to cope with the Old Crock," Felix Silverstone, the geriatrician, explained to me. "The Old Crock is deaf. The Old Crock has poor vision. The Old Crock's memory might be somewhat impaired. With the Old Crock, you have to slow down, because he asks you to repeat what you are saying or asking. And the Old Crock doesn't just

have a chief complaint—the Old Crock has fifteen chief complaints. How in the world are you going to cope with all of them? You're overwhelmed. Besides, he's had a number of these things for fifty years or so. You're not going to cure something he's had for fifty years. He has high blood pressure. He has diabetes. He has arthritis. There's nothing glamorous about taking care of any of those things."

There is, however, a skill to it, a developed body of professional expertise. One may nor be able to fix such problems, but one can manage them. And until I visited my hospital's geriatrics clinic and saw the work that the clinicians there do, I did not fully grasp the nature of the expertise involved, or how important it could be for all of us.

THE GERIATRICS CLINIC—OR, as my hospital calls it, the Center for Older Adult Health (even in a clinic geared to people eighty years or older, patients view words like "geriatrics" or just "elderly" askance)—is only one floor below my surgery clinic. I passed by it almost every day for years, and I can't remember ever giving it a moment's thought. One morning, however, I wandered downstairs and, with the permission of the patients, sat in on a few visits with Juergen Bludau, the chief geriatrician.

"What brings you here today?" the doctor asked Jean Gavrilles, his first patient of the morning. She was eighty-five years old, with short, frizzy white hair, oval glasses, a lavender knit shirt, and a sweet, ready smile. Small but sturdy in appearance, she had come in walking steadily, her purse and coat clutched under one arm, her daughter trailing behind her, no support required beyond her mauve orthopedic shoes. She said that her internist had recommended that she come.

About anything in particular? the doctor asked.

The answer, it seemed, was yes and no. The first thing she mentioned was a lower-back pain that she'd had for months, which shot down her leg and sometimes made it difficult to get out of bed or up from a chair. She also had bad arthritis, and she showed us her fingers, which were swollen at the knuckles and bent out to the sides with what's called a swan-neck deformity. She'd had both knees replaced a decade earlier. She had high blood pressure, "from stress," she said, before handing Bludau her list of medications. She had glaucoma and needed to have eye exams every four months. She never used to have "bathroom problems," but lately, she admitted, she'd started wearing a pad. She'd also had surgery for colon cancer and, by the way, she now had a lung nodule that the radiology report said could be a metastasis—a biopsy was recommended.

Bludau asked her to tell him about her life, and it reminded me of the life Alice lived when I first met her at my in-laws'. Gavrilis said that she lived alone, except for her Yorkshire terrier, in a single-family house in the West Roxbury section of Boston. Her husband died of lung cancer twenty-three years ago. She did not drive. She had a son living in the area who did her shopping once a week and checked on her each day—"just to see if I'm still alive," she joked. Another son and two daughters lived farther away, but they helped as well. Otherwise, she took care of herself quite capably. She did her own cooking and cleaning. She managed her medicines and her bills.

"I have a system," she said.

She had a high school education, and during World War II she'd worked as a riveter at the Charlestown Navy Yard. She also worked for a time at the Jordan Marsh department store in downtown Boston. But that was a long time ago. She stuck to home now, with her yard and her terrier and her family when they visited.

The doctor asked her about her day in great detail. She usually woke around five or six o'clock, she said—she didn't seem to need much sleep anymore. She would get out of bed as the back pain allowed, take a shower, and get dressed. Downstairs, she'd take her medicines, feed the dog, and eat breakfast. Bludau asked what she had for breakfast that day. Cereal and a banana, she said. She hated bananas, but she'd heard they were good for her potassium, so she was afraid to stop. After breakfast, she'd take her dog for a little walk in the yard. She did chores—laundry, cleaning, and the like. In the late morning, she took a break to watch *The Price Is Right*. At lunchtime, she had a sandwich and orange juice. If the weather was nice, she'd sit out in the yard afterward. She'd loved working in her garden, but she could no longer do that. The afternoons were slow. She might do some more chores. She might nap or talk on the phone. Eventually, she would make dinner—a salad and maybe a baked potato or a scrambled egg. At night, she watched the Red Sox or the Patriots or college basketball—she loved sports. She usually went to bed at about midnight.

Bludau asked her to sit on the examining table. As she struggled to climb up, her balance teetering on the step, the doctor held her arm. He checked her blood pressure, which was normal. He examined her eyes and ears and had her open her mouth. He listened to her heart and lungs briskly, with his stethoscope. He began to slow down only when he looked at her hands. The nails were neatly trimmed.

"Who cuts your nails?" he asked.

"I do," Gavrilles replied.

I tried to think what could be accomplished in this visit. She was in good condition for her age, but she faced everything from advancing arthritis and incontinence to what might be metastatic colon cancer. It seemed to me that, with just a forty-minute

visit, Bludau needed to triage by zeroing in on either the most potentially life-threatening problem (the possible metastasis) or the problem that bothered her the most (the back pain). But this was evidently not what he thought. He asked almost nothing about either issue. Instead, he spent much of the exam looking at her feet.

"Is that really necessary?" she asked, when he instructed her to take off her shoes and socks.

"Yes," he said. After she'd left, he told me, "You must always examine the feet." He described a bow-tied gentleman who seemed dapper and fit, until his feet revealed the truth: he couldn't bend down to reach them, and they turned out not to have been cleaned in weeks, suggesting neglect and real danger.

Gavrilles had difficulty taking her shoes off, and, after watching her struggle a bit, Bludau leaned in to help. When he got her socks off, he took her feet in his hands, one at a time. He inspected them inch by inch—the soles, the toes, the web spaces. Then he helped her get her socks and shoes back on and gave her and her daughter his assessment.

She was doing impressively well, he said. She was mentally sharp and physically strong. The danger for her was losing what she had. The single most serious threat she faced was not the lung nodule or the back pain. It was falling. Each year, about 350,000 Americans fall and break a hip. Of those, 40 percent end up in a nursing home, and 20 percent are never able to walk again. The three primary risk factors for falling are poor balance, taking more than four prescription medications, and muscle weakness. Elderly people without these risk factors have a 12 percent chance of falling in a year. Those with all three risk factors have almost a 100 percent chance. Jean Gavrilles had at least two. Her balance was poor. Though she didn't need a walker, he had noticed her splay-footed gait as she came in. Her feet were

swollen. The toenails were unclipped. There were sores between the toes. And the balls of her feet had thick, rounded calluses.

She was also on five medications. Each was undoubtedly useful, but together the usual side effects would include dizziness. In addition, one of the blood pressure medications was a diuretic, and she seemed to drink few liquids, risking dehydration and a worsening of the dizziness. Her tongue was bone-dry when Bludau examined it.

She did not have significant muscle weakness, and that was good. When she got out of her chair, he said, he noted that she had not used her arms to push herself up. She simply stood up—a sign of well-preserved muscle strength. From the details of the day she described, however, she did not seem to be eating nearly enough calories to maintain that strength. Bludau asked her whether her weight had changed recently. She admitted that she had lost about seven pounds in the previous six months.

The job of any doctor, Bludau later told me, is to support quality of life, by which he meant two things: as much freedom from the ravages of disease as possible and the retention of enough function for active engagement in the world. Most doctors treat disease and figure that the rest will take care of itself. And if it doesn't—if a patient is becoming infirm and heading toward a nursing home—well, that isn't really a *medical* problem, is it?

To a geriatrician, though, it *is* a medical problem. People can't stop the aging of their bodies and minds, but there are ways to make it more manageable and to avert at least some of the worst effects. So Bludau referred Gavrilles to a podiatrist, whom he wanted her to visit once every four weeks, for better care of her feet. He didn't see medications that he could eliminate, but he switched her diuretic to a blood pressure medicine that wouldn't cause dehydration. He recommended that she eat a snack during the day, get all the low-calorie and low-cholesterol

food out of the house, and see whether family or friends could join her for more meals. "Eating alone is not very stimulating," he said. And he asked her to see him again in three months, so that he could make sure the plan was working.

Almost a year later, I checked in with Gavrilles and her daughter. She'd turned eighty-six. She was eating better and had even gained a pound or two. She still lived comfortably and independently in her own home. And she had not had a single fall.

ALICE BEGAN FALLING long before I met Juergen Bludau or Jean Gavrilles and grasped the possibilities that might have been. Neither I nor anyone else in the family understood that her falls were a loud alarm bell or that a few simple changes might have preserved, for at least some time longer, her independence and the life she wanted. Her doctors never understood this either. Matters just kept getting worse.

Next came not a fall but a car accident. Backing her Chevy Impala out of her driveway, she shot across the street, over the curb, and through a yard, and could not stop the car until it ended up in some bushes against her neighbor's house. The family speculated that she'd stomped on the accelerator instead of the brake. Alice insisted the accelerator had got stuck. She thought of herself as a good driver and hated the idea that anyone would think that the problem was her age.

The body's decline creeps like a vine. Day to day, the changes can be imperceptible. You adapt. Then something happens that finally makes it clear that things are no longer the same. The falls didn't do it. The car accident didn't do it. Instead, it was a scam that did.

Not long after the car accident, Alice hired two men to perform tree and yard work. They set a reasonable price with her

but clearly saw her as a mark. When they finished the job, they told her that she owed nearly a thousand dollars. She balked. She was very careful and organized about money. But they got angry and threatening, and, cornered, she wrote the check. She was shaken but also embarrassed and told no one about it, hoping she could put it behind her. A day later, the men returned late in the evening and demanded she pay more. She argued with them, but in the end she wrote that check, too. The ultimate total was more than seven thousand dollars. Again, she wasn't going to say anything. Neighbors, however, heard the raised voices at Alice's doorstep and called the police.

The men were gone by the time the police arrived. A policeman took a statement from Alice and promised to investigate further. She still didn't want to tell the family about what had happened. But she knew this was trouble and after a while finally told my father-in-law, Jim.

He spoke to the neighbors who'd reported the crime. They mentioned that they had become worried for her. She no longer seemed safe living on her own. There was this incident and the Impala in the bushes. There was also what they observed of how difficult managing matters as ordinary as getting her trash to the curb had become.

The police caught the scam artists and arrested them for grand larceny. The men were convicted and sentenced to prison, which should have been satisfying for Alice. But instead the whole process kept the events, and the reminders of her growing vulnerability, alive and lingering when she would have dearly loved to have set them behind her.

Soon after the scammers were caught, Jim suggested that he and Alice go together to look at retirement homes. It was just to see what they were like, he said. But they both knew where this was going.

DECLINE REMAINS OUR fate; death will someday come. But until that last backup system inside each of us fails, medical care can influence whether the path is steep and precipitate or more gradual, allowing longer preservation of the abilities that matter most in your life. Most of us in medicine don't think about this. We're good at addressing specific, individual problems: colon cancer, high blood pressure, arthritic knees. Give us a disease, and we can do something about it. But give us an elderly woman with high blood pressure, arthritic⁵ knees, and various other ailments besides—an elderly woman at risk of losing the life she enjoys—and we hardly know what to do and often only make matters worse.

Several years ago, researchers at the University of Minnesota identified 568 men and women over the age of seventy who were living independently but were at high risk of becoming disabled because of chronic health problems, recent illness, or cognitive changes. With their permission, the researchers randomly assigned half of them to see a team of geriatric nurses and doctors—a team dedicated to the art and science of managing old age. The others were asked to see their usual physician, who was notified of their high-risk status. Within eighteen months, 10 percent of the patients in both groups had died. But the patients who had seen a geriatrics team were a quarter less likely to become disabled and half as likely to develop depression. They were 40 percent less likely to require home health services.

These were stunning results. If scientists came up with a device—call it an automatic defrailer—that wouldn't extend your life but would slash the likelihood you'd end up in a nursing home or miserable with depression, we'd be clamoring for it. We wouldn't care if doctors had to open up your chest and plug

the thing into your heart. We'd have pink-ribbon campaigns to get one for every person over seventy-five. Congress would be holding hearings demanding to know why forty-year-olds couldn't get them installed. Medical students would be jockeying to become defrailer specialists, and Wall Street would be bidding up company stock prices.

Instead, it was just geriatrics. The geriatric teams weren't doing lung biopsies or back surgery or insertion of automatic defrainers. What they did was to simplify medications. They saw that arthritis was controlled. They made sure toenails were trimmed and meals were square. They looked for worrisome signs of isolation and had a social worker check that the patient's home was safe.

How do we reward this kind of work? Chad Boult, the geriatrician who was the lead investigator of the University of Minnesota study, can tell you. A few months after he published the results, demonstrating how much better people's lives were with specialized geriatric care, the university closed the division of geriatrics.

"The university said that it simply could not sustain the financial losses," Boult said from Baltimore, where he had moved to join the Johns Hopkins Bloomberg School of Public Health. On average, in Boult's study, the geriatric services cost the hospital \$1,350 more per person than the savings they produced, and Medicare, the insurer for the elderly, does not cover that cost. It's a strange double standard. No one insists that a \$25,000 pacemaker or a coronary-artery stent save money for insurers. It just has to *maybe* do people some good. Meanwhile, the twenty-plus members of the proven geriatrics team at the University of Minnesota had to find new jobs. Scores of medical centers across the country have shrunk or closed their geriatrics units. Many of Boult's colleagues no longer advertise their geriatric

training for fear that they'll get too many elderly patients. "Economically, it has become too difficult," Boult said.

But the dismal finances of geriatrics are only a symptom of a deeper reality: people have not insisted on a change in priorities. We all like new medical gizmos and demand that policy makers ensure they are paid for. We want doctors who promise to fix things. But geriatricians? Who clamors for geriatricians? What geriatricians do—bolster our resilience in old age, our capacity to weather what comes—is both difficult and unappealingly limited. It requires attention to the body and its alterations. It requires vigilance over nutrition, medications, and living situations. And it requires each of us to contemplate the unfixables in our life, the decline we will unavoidably face, in order to make the small changes necessary to reshape it. When the prevailing fantasy is that we can be ageless, the geriatrician's uncomfortable demand is that we accept we are not.

FOR FELIX SILVERSTONE, managing aging and its distressing realities was the work of a lifetime. He was a national leader in geriatrics for five decades. But when I met him he was himself eighty-seven years old. He could feel his own mind and body wearing down, and much of what he spent his career studying was no longer at a remove from him.

Felix had been fortunate. He didn't have to stop working, even after he suffered a heart attack in his sixties that cost him half his heart function; nor was he stopped by a near cardiac arrest at the age of seventy-nine.

"One evening, sitting at home, I suddenly became aware of palpitations," he told me. "I was just reading, and a few minutes later I became short of breath. A little bit after that, I began to

feel heavy in the chest. I took my pulse, and it was over two hundred."

He is the sort of person who, in the midst of chest pain, would take the opportunity to examine his own pulse.

"My wife and I had a little discussion about whether or not to call an ambulance. We decided to call."

When Felix got to the hospital, the doctors had to shock him to bring his heart back. He'd had ventricular tachycardia, and an automatic defibrillator was implanted in his chest. Within a few weeks, he felt well again, and his doctor cleared him to return to work full time. He stayed in medical practice after the attack, multiple hernia repairs, gallbladder surgery, arthritis that all but ended his avid piano playing, compression fractures of his aging spine that stole three full inches of his five-foot-seven-inch height, and hearing loss.

"I switched to an electronic stethoscope," he said. "They're a nuisance, but they're very good."

Finally, at eighty-two, he had to retire. The problem wasn't his health; it was that of his wife, Bella. They'd been married for more than sixty years. Felix had met Bella when he was an intern and she was a dietitian at Kings County Hospital, in Brooklyn. They brought up two sons in Flatbush. When the boys left home, Bella got her teaching certificate and began working with children who had learning disabilities. In her seventies, however, retinal disease diminished her vision, and she had to stop working. A decade later, she'd become almost completely blind. Felix no longer felt safe leaving her at home alone, and in 2001 he gave up his practice. They moved to Orchard Cove, a retirement community in Canton, Massachusetts, outside Boston, where they could be closer to their sons.

"I didn't think I would survive the change," Felix said. He'd

observed in his patients how difficult the transitions of age were. Examining his last patient, packing up his home, he felt that he was about to die. "I was taking apart my life as well as the house," he recalled. "It was terrible."

We were sitting in a library off Orchard Cove's main lobby. There was light streaming through a picture window, tasteful art on the walls, white upholstered Federal-style armchairs. It was like a nice hotel, only with no one under seventy-five walking around. Felix and Bella had a two-bedroom apartment with forest views and plenty of space. In the living room, Felix had a grand piano and, at his desk, piles of medical journals that he still subscribed to—"for my soul," he said. Theirs was an independent-living unit. It came with housekeeping, linen changes, and dinner each evening. When they needed to, they could upgrade to assisted living, which provides three prepared meals and up to an hour with a personal-care assistant each day.

This was not the average retirement community, but even in an average one rent runs \$32,000 a year. Entry fees are typically \$60,000 to \$120,000 on top of that. Meanwhile, the median income of people eighty and older is only about \$15,000. More than half of the elderly living in long-term-care facilities run through their entire savings and have to go on government assistance—welfare—in order to afford it. Ultimately, the average American spends a year or more of old age disabled and living in a nursing home (at more than five times the yearly cost of independent living), which is a destination Felix was desperately hoping to avoid.

He was trying to note the changes he experienced objectively, like the geriatrician he is. He noticed that his skin had dried out. His sense of smell was diminished. His night vision had become poor, and he tired easily. He had begun to lose teeth. But he took

what measures he could. He used lotion to avoid skin cracks; he protected himself from the heat; he got on an exercise bike three times a week; he saw a dentist twice a year.

He was most concerned about the changes in his brain. "I can't think as clearly as I used to," he said. "I used to be able to read the *New York Times* in half an hour. Now it takes me an hour and a half." Even then, he wasn't sure that he understood as much as he did before, and his memory gave him trouble. "If I go back and look at what I've read, I recognize that I went through it, but sometimes I don't really remember it," he said. "It's a matter of short-term registration. It's hard to get the signal in and have it stay put."

He made use of methods that he once taught his patients. "I try to deliberately focus on what I'm doing, rather than do it automatically," he told me. "I haven't lost the automaticity of action, but I can't rely on it the way I used to. For example, I can't think about something else and get dressed and be sure I've gotten all the way dressed." He recognized that the strategy of trying to be more deliberate didn't always work, and he sometimes told me the same story twice in a conversation. The lines of thought in his mind would fall into well-worn grooves and, however hard he tried to put them onto a new path, sometimes they resisted. Felix's knowledge as a geriatrician forced him to recognize his decline, but it didn't make it easier to accept.

"I get blue occasionally," he said. "I think I have recurring episodes of depression. They are not enough to disable me, but they are . . ." He paused to find the right word. "They are uncomfortable."

What buoyed him, despite his limitations, was having a purpose. It was the same purpose, he said, that sustained him in medicine: to be of service, in some way, to those around him. He had been in Orchard Cove for only a few months before he was

helping to steer a committee to improve the health care services there. He formed a journal-reading club for retired physicians. He even guided a young geriatrician through her first independent research study—a survey of the residents' attitudes toward Do Not Resuscitate orders.

More important was the responsibility that he felt for his children and grandchildren—and most of all for Bella. Her blindness and memory troubles had made her deeply dependent. Without him, she would have been in a nursing home. He helped her dress and administered her medicines. He made her breakfast and lunch. He took her on walks and to doctor's appointments. "She is my purpose now," he said.

Bella didn't always like his way of doing things.

"We argue constantly—we're at each other about a lot of things," Felix said. "But we're also very forgiving."

He did not feel this responsibility to be a burden. With the narrowing of his own life, his ability to look after Bella had become his main source of self-worth.

"I am exclusively her caregiver," he said. "I am glad to be." And this role had heightened his sense that he must be attentive to the changes in his own capabilities; he would be no good to her if he wasn't honest with himself about his own limitations.

One evening, Felix invited me to dinner. The formal dining hall was restaurant-like, with reserved seating, table service, and jackets required. I was wearing my white hospital coat and had to borrow a navy blazer from the maître d' in order to be seated. Felix, in a brown suit and a stone-colored oxford shirt, gave his arm to Bella, who wore a blue-flowered knee-length dress that he'd picked out for her, and guided her to the table. She was amiable and chatty and had youthful-seeming eyes. But once she'd been seated, she couldn't find the plate in front of her, let alone the menu. Felix ordered for her: wild-rice soup, an omelette,

mashed potatoes, and mashed cauliflower. "No salt," he instructed the waiter; she had high blood pressure. He ordered salmon and mashed potatoes for himself. I had the soup and a London broil.

When the food arrived, Felix told Bella where she could find the different items on her plate by the hands of a clock. He put a fork in her hand. Then he turned to his own meal.

Both made a point of chewing slowly. She was the first to choke. It was the omelette. Her eyes watered. She began to cough. Felix guided her water glass to her mouth. She took a drink and managed to get the omelette down.

"As you get older, the lordosis of your spine tips your head forward," he said to me. "So when you look straight ahead it's like looking up at the ceiling for anyone else. Try to swallow while looking up: you'll choke once in a while. The problem is common in the elderly. Listen." I realized that I could hear someone in the dining room choking on his food every minute or so. Felix turned to Bella. "You have to eat looking down, sweetie," he said.

A couple of bites later, though, he himself was choking. It was the salmon. He began coughing. He turned red. Finally, he was able to cough up the bite. It took a minute for him to catch his breath.

"Didn't follow my own advice," he said.

Felix Silverstone was, without question, up against the debilities of his years. Once, it would have been remarkable simply to have lived to see eighty-seven. Now the remarkable thing was the control he'd maintained over his life. When he started in geriatric practice, it was almost inconceivable that an eighty-seven-year-old with his history of health problems could live independently, care for his disabled wife, and continue to contribute to research.

Partly, he had been lucky. His memory, for example, had not deteriorated badly. But he had also managed his old age well. His goal has been modest: to have as decent a life as medical knowledge and the limits of his body would allow. So he saved and did not retire early and was therefore not in financial straits. He kept his social contacts and avoided isolation. He monitored his bones and teeth and weight. And he made sure to find a doctor who had the geriatric skills to help him hold on to an independent life.

I ASKED CHAD Boult, the geriatrics professor, what could be done to ensure that there are enough geriatricians for the surging elderly population. "Nothing," he said. "It's too late." Creating geriatric specialists takes time, and we already have far too few. In a year, fewer than three hundred doctors will complete geriatrics training in the United States, not nearly enough to replace the geriatricians going into retirement, let alone meet the needs of the next decade. Geriatric psychiatrists, nurses, and social workers are equally needed, and in no better supply. The situation in countries outside the United States appears to be little different. In many, it is worse.

Yet Boult believes that we still have time for another strategy: he would direct geriatricians toward training all primary care doctors and nurses in caring for the very old, instead of providing the care themselves. Even this is a tall order—97 percent of medical students take no course in geriatrics, and the strategy requires that the nation pay geriatric specialists to teach rather than to provide patient care. But if the will is there, Boult estimates that it would be possible to establish courses in every medical school, nursing school, school of social work, and internal-medicine training program within a decade.

"We've got to do something," he said. "Life for older people can be better than it is today."

"I CAN STILL drive, you know," Felix Silverstone said to me after our dinner together. "I'm a very good driver."

He had to run an errand to refill Bella's prescriptions in Stoughton, a few miles away, and I asked if I could come along. He had a ten-year-old gold Toyota Camry with automatic transmission and 39,000 miles on the odometer. It was pristine, inside and out. He backed out of a narrow parking space and zipped out of the garage. His hands did not shake. Taking the streets of Canton at dusk on a new-moon night, he brought the car to an even stop at the red lights, signaled when he was supposed to, took turns without a hitch.

I was, I admit, braced for disaster. The risk of a fatal car crash with a driver who's eighty-five or older is more than three times higher than it is with a teenage driver. The very old are the highest-risk drivers on the road. I thought of Alice's wreck and considered how lucky she was that no child had been in her neighbor's yard. A few months earlier, in Los Angeles, George Weller was convicted of manslaughter after he confused the accelerator with the brake pedal and plowed his Buick into a crowd of shoppers at the Santa Monica Farmers Market. Ten people were killed, and more than sixty were injured. He was eighty-six.

But Felix showed no difficulties. At one point during our drive, poorly marked road construction at an intersection channeled our line of cars almost directly into oncoming traffic. Felix corrected course swiftly, pulling over into the proper lane. There was no saying how much longer he would be able to count on his driving ability. Someday, the hour would come when he would have to give up his keys.

At that moment, though, he wasn't concerned; he was glad simply to be on the road. The evening traffic was thin as he turned onto Route 138. He brought the Camry to a tick over the 45-mile-per-hour speed limit. He had his window rolled down and his elbow on the sash. The air was clear and cool, and we listened to the sound of the wheels on the pavement.

"The night is lovely, isn't it?" he said.