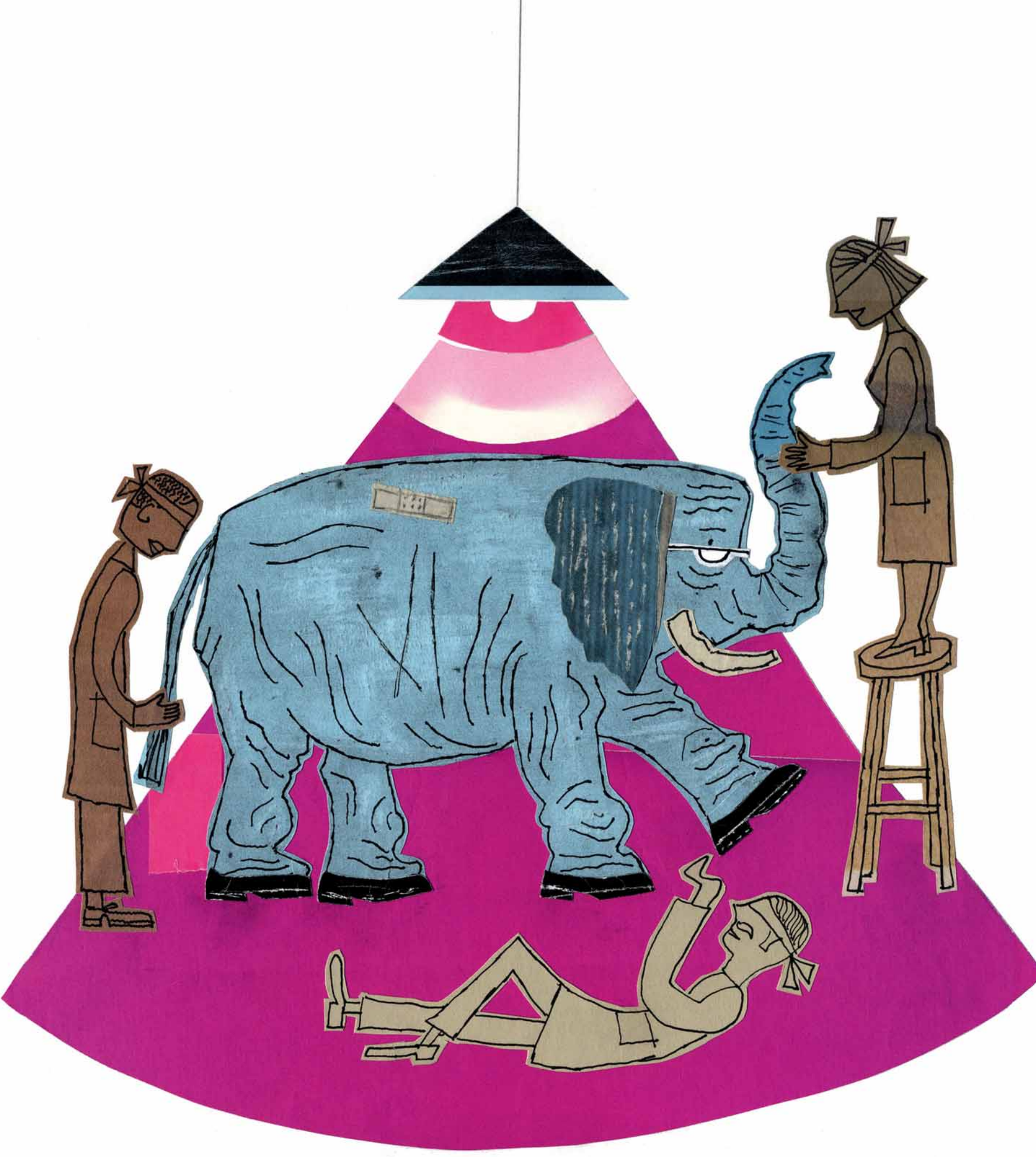

GERIATRICS IS A FIELD BEGGING FOR EXPLORATION AS THE RANKS OF THE ELDERLY SWELL

BY SHARON TREGASKIS

HOW LITTLE WE KNOW

As an undergrad in Boston, Cathy Cheng volunteered as a companion to elderly residents in a local nursing home frequently cited for poor quality of care. By the time she'd earned her bachelor's degree, Cheng was running the program that matched college students with their older neighbors and had doubled the number of young people involved. "I didn't have the privilege of having my grandparents live in the same country as I did," says the 25-year-old, now a fourth-year student at the University of Pittsburgh School of Medicine, "and they all passed away before I turned 21."

When she enrolled in medical school, the Chicago native knew her career would one day feature work with an aging population. As a first-year, she joined Geriatric Experiences for Medical Students (GEMS), a Pitt program that pairs medical students with elderly Allegheny County "buddies" and complements their one-on-one visits with debriefing sessions guided by faculty from the Division of Geriatric Medicine. Cheng was paired with a 91-year-old retired pharmacist—and despite the student's growing portfolio of experience with older adults, the relationship was still illuminating.

The drive to isolate problems in research and treatment of the elderly is self-defeating. Consider the parable of the blind people examining an elephant: Each comes away with only a partial understanding of the whole, because each touched only a tusk or the trunk, the ears or the tail.

ILLUSTRATIONS | CATHERINE LAZURE

"He was more on top of the meds than I was and could tell me exactly what each of his prescriptions was for," says Cheng, who had expected to provide her buddy with assistance on both fronts. The man had limited vision, hearing, and mobility. And while his sons visited and read for him, he remained largely independent, living alone in his apartment and preparing his own simple meals using a microwave. "He remained active in his faith and, until his death, served as president of his congregation in Squirrel Hill," says Cheng. "He was a very lucid person."

In the pantheon of medical specialties, geriatric medicine lacks the glamour, adrenaline, or status of such fields as emergency medicine or transplantation. Yet Cheng and her peers are finding that the field more than compensates. Not only is geriatrics ripe with opportunities to make meaningful personal connections with patients, it's also largely unexplored intellectual territory.

Geriatric patients pose unique challenges for physicians, whose early training focuses disproportionately on young adults. Perhaps the most immediate is the necessity to simultaneously treat multiple conditions.

"With old people, you have anywhere from two to 12 concurrently present diseases," says Pitt's Neil Resnick, the Thomas Detre Professor of Geriatric Medicine and chief of the Division of Geriatric Medicine. "That is further confounded and complicated by the fact that there are changes occurring in every organ of the body due to aging. You have to factor in that all of their organ systems have changed with age, and those changes impact the way the [condition] presents, its natural history, and response to treatment."

"Diseases do not occur one at a time in an older person," says the University of Pittsburgh's Stephanie Studenski, director of research for the division and director of Pitt's Claude D. Pepper Older Americans Independence Center.

"You may have diabetes alone in a 25-year-old, but in an 80-year-old, you have arthritis, congestive heart failure, and diabetes. There is extensive literature to suggest that medications and treatments for one condition may be counterproductive for other conditions."

Physicians who haven't already become familiar with the unique needs of an aging patient population don't have a lot of time to come up to speed.

In January, the first of America's 78 million Baby Boomers will mark their 65th birthdays. Nationwide, just 13 percent of the U.S. population has passed that milestone; yet over the next 25 years, almost 75 million people will enter the Medicare rolls. By 2050, Americans over the age of 65 will make up more than 20 percent of the population.

Geriatricians have been saying for decades that their own numbers aren't keeping pace with the tsunami of demand the Boomers will create. (Students who are interested in the field may even be "distracted away" by physician mentors who denigrate it, notes Studenski.) Fewer than 8,000 of this nation's 900,000 physicians are trained geriatricians—one for every 2,500 Americans over the age of 75. As the Boomers age and many current geriatricians anticipate their own retirement, that ratio is only getting worse.

In 2003, just .9 percent of the residents who graduated from U.S. medical schools enrolled in geriatric fellowships. Five years later, that number had dropped to .7 percent. If that trend persists, by 2030—when the youngest Baby Boomers become Medicare-eligible—there will be just one geriatrician for every 4,254 older Americans.

Yet physicians of all stripes—even, perhaps, pediatricians seeing a growing number of grandparent caregivers for their young patients—will have to accommodate the needs of older people. At Pitt, faculty and students have designed a host of programs to ensure that all physicians trained here have had an introduction to the essentials of clinical care and research for elderly patients. "We need to incorporate aging into what health care providers learn as a routine," says Studenski.

Pitt now requires its third-year med students to take a team-taught course that includes small-group discussions and lectures by faculty from the Divisions of Geriatric Medicine and Geriatric Psychiatry.

Developed by a committee of geriatrics faculty and students aspiring to the field, the two-week course introduces the geriatric syndromes of dementia, falls, and incontinence; addresses geriatric pharmacology; and tackles the ethical issues associated with assessing decision-making capacity. A field trip to a long-term care facility and a case-study project incorporating surgical, medical, psychiatric, and social issues round out the course. Nursing and pharmacy students also take the class. (It was recently expanded, thanks to support from the Jewish Healthcare Foundation of Pittsburgh and the Josiah Macy, Jr. Foundation.)

"We're able to get [students] really thinking about how older people are different from younger adults," says Susan Hardy (MD '96), an assistant professor of medicine. "By the third year, they've mostly seen older adults who are clearly sick. I think it's good for them to see patients in the nursing facility when they're doing well: up and dressed, wearing their makeup, and thrilled to be hosting medical students. We're not—in one week—going to make these students into geriatricians, but we do make them more aware of the special issues associated with dealing with older adults."

"With old people, you have anywhere from two to 12 concurrently present diseases. That is further confounded and complicated by the fact that there are changes occurring in every organ of the body due to aging."

Before enrolling in medical school herself, Studenski trained during the mid '70s as a nurse in Kansas. A patient she encountered during that time continues to shape her approach to geriatric research and care. Flown to the hospital from an outlying rural area, the 97-year-old was agitated and aggressive, swinging her purse so violently it was difficult for staff to approach her. As the woman's delirium eased, Studenski and her colleagues began to learn more about her.

A native of Scandinavia born as that region roiled with unemployment, the patient had emigrated to the United States, crossed the Great Plains in a prairie schooner, and homesteaded ever since. Until the episode that introduced her to Studenski, the woman had lived independently, most recently with her 95-year-old sister.

"I was struck by how easy it was for old people to look like they had no capacity or potential when they get sick and are away from people who know them," says Studenski. "It made me treasure what people have to offer. That can be invisible when they get sick and you don't know who they are."

While medicine often promotes compartmentalization of organ systems, geriatricians learn to think differently. "These systems are all interacting," says Pitt's Stephanie Studenski.

For Hardy, an expert in mobility and recovery from disability among frail older adults, the elderly patients she encountered during her third-year Pitt clerkships—in surgery at the VA Pittsburgh Healthcare System, in geriatric psychiatry, and in the urogynecology clinic—sealed her interest in geriatric medicine. "I just found that I loved taking care of older adults," she says. "They were really interesting and fun to talk to and intellectually challenging because they had lots of problems." And the more she saw as a physician, the more she wanted to know as a researcher.

"I discovered that for so many of the questions I had about how to best care for elderly patients, there weren't answers," says Hardy. "There wasn't a whole lot of evidence about older people. We needed answers about how best to take care of older people, keep them functioning and [enjoying] a high quality of life."

Hardy earned a PhD in investigative medicine at Yale before returning to join the Pitt faculty. She came to the right place: *U.S. News & World Report* places the medical school and UPMC among its top 10 geriatrics sites. And Pitt is the only university with John A. Hartford Centers of Excellence in both geriatric medicine and geriatric psychiatry.

"What's going on underneath that's making the body less capable of self-correcting?"

Every day throughout the summer between her first and second years at Pitt, medical student Cathy Cheng settled into a lab in the Geriatric Continence Research Unit at UPMC Montefiore, turned on her laptop's statistical software, and sifted through the medical histories of 175 women afflicted with urge incontinence. At night many wet their beds or incontinence pads. During their waking hours, the urge to urinate would send them rushing for the toilet with barely enough warning—sometimes once and sometimes a dozen times. "People have this perception of urinary incontinence being a normal part of aging," says Cheng, whose work was funded by a National Institutes of Health training grant. "It's not."

Doctors know that the condition—also called overactive bladder—emerges when the brain's control over the urinary system goes haywire. They don't know what causes it or the mechanisms involved. For many elderly women, biofeedback helps. Unlike drugs, which can interact negatively with pharmaceutical treatments for the other conditions older patients often have, the noninvasive biofeedback approach is side-effect free. During training sessions, electrodes placed on the woman's skin monitor the electrical impulses generated by muscles in her pelvic floor; a display monitor prompts her to contract the muscles, then translates the associated electrical impulses into visual cues.

"I think it's kind of fun for patients—" says Cheng, "seeing whether they're moving the muscles the way they should be."

Over time, a woman can use those visual cues to regain control over the critical muscles of her bladder and the associated synaptic connections. With practice, she can reclaim her continence. And more important, she can resume her social life with confidence. Many women confine themselves to home rather than risk an embarrassing accident in public.

Back in the summer of 2008, Cheng's data collection and analysis supported the efforts of her mentor, geriatrician Stasa Tadic (Res '04, Fel '06), an assistant professor of medicine (who did a geriatric fellowship at Pitt), and Tadic's Pitt collaborators—Geriatric Continence Research Unit codirectors Neil Resnick, PhD engineer Werner Schaefer, and Derek Griffiths, a PhD physicist—to assess what happens in the brain during urge incontinence. A nurse used a catheter to fill and empty each woman's bladder with sterile water as a functional magnetic resonance imaging (fMRI) scanner monitored the volunteer's brain activity.

By tracking the women's brain patterns at the moment when each indicated the urge to urinate, the scientists could monitor which regions are activated by the sensation and confirm the validity of fMRI as an investigative tool to study the mind-bladder connection. In January 2010, *The Journal of Urology* published the group's finding that the most active regions in the women's brains during the experiment were in centers that register sensation, process emotional experiences, and make decisions. The intensity of those activity patterns correlated with the severity of a woman's incontinence as measured by a daily journal and measurements of leaked urine. The group also found that though research subjects without bladder control problems experienced deactivation in certain brain regions while their bladders were filling, those with severe urge incontinence had precisely the opposite experience.

Now copresident of Pitt's student-run Geriatrics Area of Concentration—a four-year certificate program that combines coursework, independent research, and public service—Cheng has remained involved in the Continence Research Unit's work. She and her colleagues are examining how mental health history plays into an older woman's ability to use biofeedback to increase bladder control. One third of women with urge incontinence also suffer from depression. Doctors don't yet know whether the stress of embarrassment and social isolation related to incontinence precipitates a mental health decline or whether depression or some other neurological phenomenon triggers the incontinence.

Yet Cheng and the other researchers were able to determine this: "Having a history of depression predicts how well you do with biofeedback," she says. "Elderly women with a history of depression have a diminished degree of improvement compared to those without a history of depression."

Without a holistic view of the patient's mental and physical well-being, a physician could miss a lot, says the student. "As clinicians we have to ask, 'How are you feeling? How is your mood? Have friends passed away recently?' We have to take the time to figure out their social situation, whether they're having trouble getting to the bathroom. … People are embarrassed, and often they don't volunteer the information because they think it's a normal part of aging."

Physicians stand a far better chance of helping their patients combat urge incontinence when they tackle the problem as more than a physiological phenomenon, says Cheng. "We should treat depression first for the biggest bang for our biofeedback buck."

That approach is sure to get a boost with the July 2010 appointment of psychiatrist Charles Reynolds—longtime director of Pitt's John A. Hartford Center of Excellence in Geriatric Psychiatry and one of the world's leading experts in late-life depression—to head the Institute on Aging, a partnership between UPMC and the University. Founded by Resnick and Pitt professor of psychiatry Richard Schulz seven years ago, the institute integrates teaching, research, and

service in the field of gerontology. It boasts a multidisciplinary network of researchers from 16 undergraduate and professional schools on the Pitt campus and offers seed-grant funding for scientists; a certificate in gerontology for students across campus; and working groups to reduce hospital readmission, enhance access to palliative care, and promote programs in healthy aging.

"It really helps to have multiple areas of competence" to address issues faced by older adults, says Studenski, who serves as the institute's associate director of research. "It's rarely one organ system or problem—they're almost always multifaceted problems that take a team to figure out."

In her own efforts to predict falls—a central element of Studenski's investigation of balance, mobility, and functional independence—the professor has collaborated with epidemiologists, statisticians, physical therapists, and radiologists, among others. "I'm the 21st-century equivalent of the Jewish matchmaker," she says. "Building teams is a big part of my life."

As faculty advisor to the Geriatrics Area of Concentration, Studenski also helps students wrap their minds around how basic physiology actually changes with the aging process.

"The ability to self-correct becomes creakier and more full of failures," she says. "Things don't work as well as they used to."

While medicine often promotes compartmentalization of organ systems—I'm a nephrologist, you're a cardiologist, she's a neurologist—geriatricians learn to think differently. "You can't just have separate boxes for kidney, heart, and brain," says Studenski. "These systems are all interacting, self-correcting each other. You don't want to make the heart better and the kidney worse, but that happens all the time in medicine."

For geriatric patients, whose organ systems are less resilient to such insults, the risk can be significant. Studenski notes that doctors and scientists need to move beyond diseases and start asking, "What's going on underneath that's making the body less capable of self-correcting?"

Ultimately, she says, the very way investigators think about the elderly needs an overhaul. "I'm particularly excited about developing scientific processes that thrive on interactions among [biological] systems and processes," she says. "It makes the science really exciting and relevant."

Consider the parable of the blind people examining an elephant: Each comes away with only a partial understanding of the whole because each touched only a tusk or the trunk, the ears or the tail. As the poet John Godfrey Saxe noted, *each was partly in the right/ And all were in the wrong!*

"The drive to isolate problems is self-defeating," Studenski says. Yet in the past 50 years, medical research has hinged on an experimental method that divides and conquers, investigating heart disease only in research subjects without confounding diagnoses; depression or dementia only among people without simultaneous physiological problems; incontinence only in patients who have no other complaint. The resulting insights often have limited relevance among older adults.

But generating the insights most desperately needed by clinicians treating older patients isn't easy. For example, because of high rates of death and disability, doctors who study the elderly are likely to find it difficult to keep a stable pool of study participants; that can lead to big data gaps. "In the geriatric population, a large number [of participants] may cease to be able to come to the clinic," says Hardy. "Researchers may not be aware of what a problem it's going to be, or they're too aware of what a problem it's going to be and so they don't study them for fear of losing track of them." (There are ways of designing studies to get around such issues, Studenski and Hardy note in a 2009 article for the *Journal of the American Geriatrics Society*.)

And yet, no matter how much research geriatricians do, or how well they do it, some mysteries will almost certainly remain. Studenski's father died just a few years ago, at the age of 93. Despite his longevity, he took a contrarian approach to healthy living.

"[He] hated fruits and vegetables, smoked, was totally sedentary, and hated exercise," recalls his daughter, who has invested significant effort in developing and testing an exercise program for postmenopausal women based on the video game DanceDance Revolution (she had tech support from "digital natives," as her medical students' age group is known by demographers).

"There's something about will power and determination that influences how people deal with late life," says Studenski. "[My father] was a very resilient man; you don't get to see that so much in young people. Until you hit the rough parts of the road, you don't know how you'll deal with them." ■

A NEW KIND OF LOVELINESS

What do we do
with leftover cake?

We have some next day
for breakfast—
that's what we do—

...and for lunch too
and the next day the same
until none remains

We've consumed
each crumb

View to a Dream

The view out the window is new
the old plum tree half dead,
once a thing of beauty
with white blossoms in spring,
cut down yesterday,
down to the stump

Now, behind the garage
above the roof, we see the oak
with orange-reddish leaves
which reminds us:
beyond beauty lost,
a new kind of loveliness.

Dorothy Holley, who loved wild hats, colorful socks, gardening, and the taste of ripe raspberries, began writing in earnest in her 80s. That's when she published her four books of poetry, offering us "delicious morsels of a full, observant life," as one reviewer noted. Holley—a great-grandmother to three, grandmother to eight, and a mother to five, including Pitt professor of medicine Beth Piraino (Res '80, Fel '82)—died on June 6 this year at the age of 87 of complications from a broken hip. These poems appeared in her last book, *Dream Quartet* (© 2009). —*Erica Lloyd*