

HARVARD PUBLIC HEALTH

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The Aging Game

perils and promises of
a graying society



SPECIAL REPORT



MESSAGE FROM THE ACTING DEAN

Maintaining the Momentum

As I begin my new role as Acting Dean of the Faculty of the Harvard T.H. Chan School of Public Health, I feel extraordinarily privileged to be leading an institution with such tremendous momentum behind its work. Much of this forward movement derives from the visionary leadership of former Dean Julio Frenk. But even as the President conducts a search for a new dean, we will not let our momentum flag.

The word “momentum” comes from Latin roots meaning “to move,” “a moving force,” “an impelling strength.” Defined in these ways, public health is the embodiment of momentum. Its cumulative research can nudge individuals toward healthy behaviors and choices.

“The word ‘momentum’ comes from Latin roots meaning ‘to move,’ ‘a moving force,’ ‘an impelling strength.’ Defined in these ways, public health is the embodiment of momentum.”

Its data-driven insights can advance policy toward the goal of equitable well-being for all. And public health’s success builds on itself, making it a formidable and trusted force that can guide wise action in times of crisis.

Our cover story on the aging society reflects the School’s growing body of research—from basic biology to social epidemiology to health policy—on a demographic trend that will bring profound changes across the world. The feature on Ellen Agler, MPH ’04, describes how an alumna’s passionate commitment to ending neglected tropical diseases has persuaded individuals, foundations,

and governments to address the issue. Our interviews with Xihong Lin, our new chair of the Department of Biostatistics, and with Barbara Burleigh, professor of immunology and infectious diseases, illustrate how breakthroughs in big data and genomics have generated scientific momentum on both chronic and infectious diseases. And Harvard Chan students’ ongoing response to this spring’s earthquakes in Nepal has spurred a momentum in on-the-ground logistics and public awareness that is aiding the long recovery process.

In every department at the Harvard Chan School, the scientific enterprise carries a momentum that will not be reversed. When the search process for a dean is over,

that trajectory will carry us into a new era of leadership. In the interim, I see my role as centered on the “acting” part of my Acting Dean title—focused on sustaining our momentum to improve the public’s health.

David Hunter, MPH ’85, SD ’88
Acting Dean of the Faculty
Vincent L. Gregory Professor in Cancer Prevention
Harvard T.H. Chan School of Public Health

14 THE AGING GAME: perils and promises of a graying society

SPECIAL REPORT

In the coming decades, there will be more people older than 65 than under 5. This approaching “Silver Tsunami”—in the United States and around the world—raises profound questions about how individuals and societies successfully age. Experts from the Harvard Chan School offer their thoughts on what lies ahead.



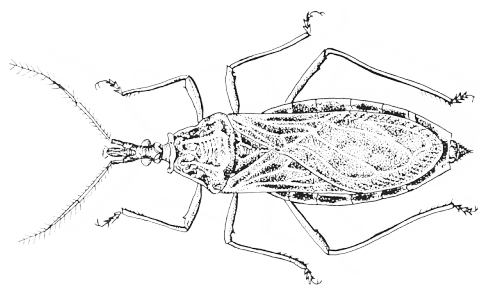
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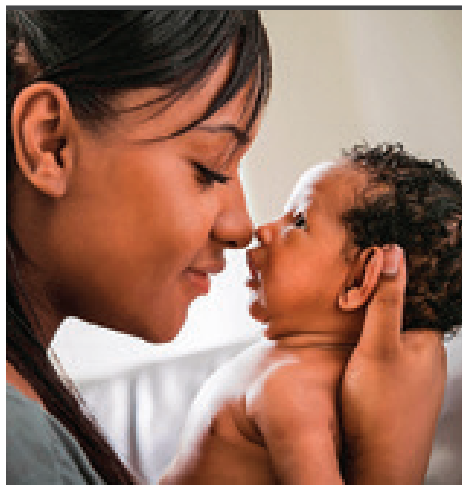
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Paid Maternity Leave Has Lasting Mental Health Benefit

Paid maternity leave following the birth of a first child appears to have positive benefits on women's mental health later in life, according to a new study. Researchers looked at data from women ages 50 years and older from 13 European countries. The researchers found that mothers who had received several months of maternity benefits with full wages were 16.2 percent less likely to be depressed years later than mothers without paid maternity leave. Co-author Lisa Berkman, Thomas D. Cabot Professor of Public Policy and of Epidemiology and director of the Harvard Center for Population and Development Studies, says, "One can imagine that it must feel good for a mother to know that she is financially secure and can take time off and bond with a baby and have a job. The idea that this would have an impact 30 years later is amazing."

To Improve Bicycle Safety, Make Crash Reports More Detailed

Researchers at the Harvard Chan School are calling on police in all states to improve their reporting of crashes involving vehicles and bicycles.

The researchers recommend switching from paper templates to electronic tablets that would include more options to gather bicycle-specific data—such as codes indicating if the bicyclist ran into a driver's open car door. Detailed information about each accident would then be automatically uploaded from the tablet into spreadsheets for later analysis. This systematic data gathering could inform the design of safer bicycle environments and thus encourage more people to cycle, the authors say. In the U.S., the number of commuters who bike to and from work rose about 62 percent from 2000 to 2013.



FDA AXES TRANS FATS



Researchers at the School hailed the U.S. Food and Drug Administration's (FDA's) decision to remove artificial trans fats from the food supply as a lifesaving "victory for public health." The FDA announced on June 16 that partially hydrogenated oils—the primary source of artificial trans fats in processed foods—are no longer "generally recognized as safe" and must be phased out within three years.

Extensive work by Walter Willett, Fredrick John Stare Professor of Epidemiology and Nutrition and chair of the Department of Nutrition, and others has documented the harmful effects of trans fats, including greater risk of type 2 diabetes and heart disease. Their efforts helped bring about the 2006 FDA decision requiring manufacturers to list trans fats on nutrition labels. And now, thanks to the new ruling, Willett says, "Consumers will no longer need to be concerned that this toxic substance may be hiding in their foods."

CLICKING THE WAY TO A HEALTHY HEART



The bad news: Cardiovascular disease (CVD) is a leading cause of death in the U.S. The good news: Adults who remain free of CVD risk factors in middle age have an extremely low chance of developing the disease for the rest of their lives. The new Healthy Heart Score developed by researchers at the School helps individuals identify potential CVD risks in their lifestyle and offers tips for improvement. The no-cost web-based survey—found at <http://hsph.me/heart>—walks users through a series of easy-to-follow questions about their diet, exercise, and smoking habits.

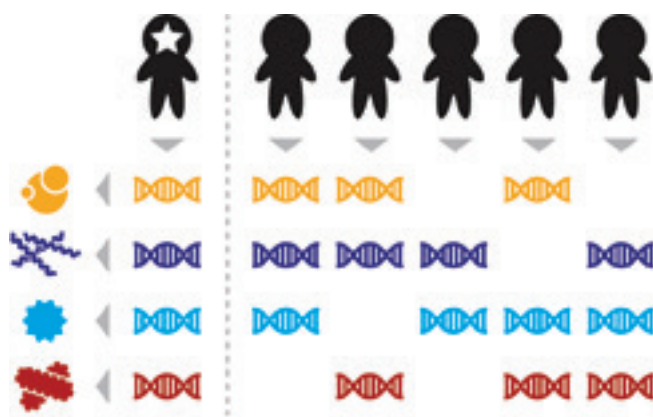
Alcohol's Health Benefits May Vary by Race, Gender—But Imbibing Poses Transient Risk for All

Moderate alcohol consumption may lower risk of premature death, but a new study finds that its potential benefits vary by race and gender. For men, the lowest risk of mortality was among white men who consumed one to two drinks three to seven days per week and among black men who did not drink at all. For women, the lowest risk of mortality was among white women consuming one drink per day three to seven days per week and among black women who consumed one drink on two or fewer days per week. The findings suggest that dietary guidelines on alcohol may need to be tailored based on race, but more research is needed, says Chandra Jackson, research associate in the Department of Epidemiology.

A separate study found that people are 72 percent more likely to suffer a heart attack immediately after drinking compared with other times. Gin, vodka, and whiskey appeared to pose the greatest risk, while beer and wine may pose less risk.

Are Microbiomes the New Fingerprints?

The microbial communities we carry in and on our bodies—known as microbiomes—have the potential to uniquely identify individuals, much like fingerprints, according to research fellow Eric Franzosa. He and his colleagues identified distinguishing features in the microbiomes of 120 people who donated stool, saliva, and skin samples to the Human Microbiome Project. The researchers then developed specific “codes” for each person, which they compared with the codes from microbiome samples collected from the same individuals at follow-up visits and from samples taken from additional people. The results showed that the individuals’ codes remained unique and that a large fraction of the volunteers’ microbial “fingerprints” were stable over a one-year sampling period. The codes constructed from gut samples were particularly stable, with more than 80 percent of individuals identifiable up to a year after the sampling period.



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WHEN CHEFS COOK IT, CHILDREN EAT IT



Schools collaborating with a professionally trained chef to improve the taste of healthy meals significantly increased students' fruit and vegetable selection and consumption, according to a new study. Yet while using "choice architecture" (environmental nudges to promote healthy choices) in school cafeterias improved students' selection of fruits and vegetables, the changes did not increase consumption over the long term. "The results highlight the importance of focusing on the palatability of school meals," says lead author Juliana Cohen, research fellow in the Department of Nutrition, adding that "schools should not abandon healthier foods if they are initially met with resistance by students."



Kids Aren't Drinking Enough Water

More than half of all children and adolescents in the U.S. are not hydrated enough—probably because they're not drinking enough water, Harvard Chan School researchers found in the first national study of its kind. What's more, the researchers found gender and racial gaps in hydration status: Boys were 76 percent more likely than girls to be inadequately hydrated, and black children were 34 percent more likely to be inadequately hydrated than white children. Although excessive dehydration is associated with serious health problems, even mild dehydration can cause issues, including headaches, irritability, poorer physical performance, and reduced cognitive functioning. Nearly a quarter of children in the study did not drink any water at all, and other researchers have found that schools, child care centers, and afterschool programs often have limited free water access.

Healthy Eating Plate Now Available in 19 Languages

The Healthy Eating Plate—a simple, visual meal-planning guide that addresses important deficiencies in the U.S. government's MyPlate nutritional icon—has now been translated into 18 new languages by its developers at the School, giving it the potential to reach more than half the world's population. Like MyPlate, the Healthy Eating Plate is easy to understand—but unlike the government's icon, it provides clear guidance on such topics as the importance of eating more whole grains and avoiding refined grains, and distinguishing between healthy proteins and those that should be limited or avoided. Download the plate at <http://hsph.me/plate-translations>.



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Two Harvard Chan Faculty Receive Prestigious Howard Hughes Medical Institute Investigatorships

Researchers Tobias Walther and Pardis Sabeti were named HHMI investigators in May by the Howard Hughes Medical Institute—a prestigious five-year appointment covering salary, benefits, and research budget.

Walther, professor of genetics and complex diseases, is the first faculty member with a primary appointment at the School to receive the honor. With scientific partner Robert Farese, professor of genetics and complex diseases, Walther has identified more than 200 genes that regulate lipid storage in cells and discovered that there are two classes of lipid droplets: small, static droplets and larger droplets that expand as needed.

“It is fantastic to have our work and the potential for future discovery recognized by HHMI,” Walther says. “The opportunity associated with this appointment will allow Bob [Farese] and me to push forward in elucidating mechanisms of lipid storage and homeostasis.” That research could offer



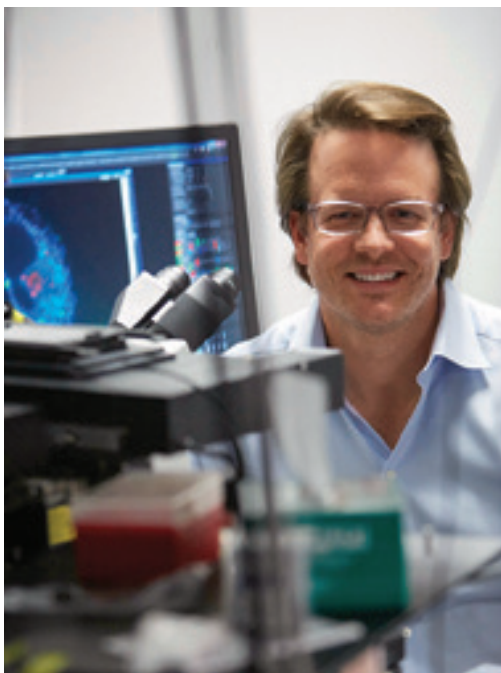
Pardis Sabeti, associate professor of immunology and infectious diseases

insights into health problems such as obesity, diabetes, and heart disease.

Sabeti, associate professor in the Department of Immunology and Infectious Diseases, uses the evolutionary record embedded in the human genome to glean insights into the fundamental biology and transmission of infectious diseases. Last year, the Sabeti lab tracked key genetic mutations in the Ebola virus during its epidemic spread in West Africa.

HHMI encourages its investigators to push their research fields into new areas of inquiry. By employing scientists as HHMI investigators—rather than awarding them research grants—the Institute is guided by the principle of “people, not projects.” HHMI investigators have the freedom to explore and, if necessary, to change direction in their research. And they have support to follow their ideas through to fruition—even if that process takes many years.

“Scientific discovery requires original thinking and creativity,” HHMI President Robert Tjian said in the award announcement. “We don’t know this for certain, but the ideas that emerge from these labs might one day change the world.”



Tobias Walther, professor of genetics and complex diseases



Xihong Lin develops statistical and computational methods to analyze the flood of information now available from the human genome, the environment, and the clinic. Her work has been applied to a wide range of chronic conditions, from lung cancer to neurodevelopment to sleep apnea.

IT'S DATA FIRST, HYPOTHESES SECOND

XIHONG LIN

CHAIR, DEPARTMENT OF
BIostatISTICS

HENRY PICKERING WALCOTT
PROFESSOR OF BIostatISTICS

Q: What can biostatisticians do today that they couldn't 10 years ago?

A: Today, there are three terms to describe the massive amount of data that biostatisticians analyze: the genome, the exposome, and the phenome—all of which add up to the “omics” revolution. The genome is our genetic information,

gathered from whole-genome sequencing. The exposome refers to all the substances and experiences that we are exposed to. And the phenome is every possible disease outcome, including whatever appears in a person's electronic medical record. Biostatisticians try to find the needle in those haystacks, teasing out signal from noise, to understand what causes specific diseases, by accounting for random errors.

In the old days, we used a candidate-gene approach to study genetic susceptibility for diseases. This means we looked at one spot of the human genome at a time. A few years ago, we looked at millions of locations across the genome simultaneously—but this only covered about 10 percent of the genome. Now, whole-genome sequencing allows us to study 3 billion base pairs.

In the old days, we measured one exposure at a time—for example, one type of particulate matter in air pollution, or heavy metal exposures such as mercury. Now we can simultaneously measure a spectrum of exposures in the environment in a person's blood or body tissue and through satellite data. Exposures include things like chemical contaminants, nutrition intake, and even social exposures, such as personal interactions and communication networks. And instead of looking at a few endpoints, we study a spectrum of disease-related outcomes using smartphones, electronic medical records, and the Medicare database.

Traditional epidemiological and environmental studies are hypothesis-driven. We could only peer at the puzzle one tiny corner at a time—a gene or vitamin D intake, for example, is associated with lung cancer. Now we can generate new hypotheses directly from the data, matching pieces across this huge puzzle to identify multiple causes of disease, treatment targets, and prevention strategies. It's a really different way of doing research. And it requires an open mind, curiosity, and creativity.

David Hunter, Dean for Academic Affairs at Harvard T.H. Chan School of Public Health since 2009 and Vincent L. Gregory Professor in Cancer Prevention, has been named acting dean of the faculty for the School. He will serve until a successor is found for Julio Frenk, who, after leading the School more than six years, left in mid-August to become President of the University of Miami.

In a letter to the Harvard Chan School community on May 19, Harvard University President Drew Faust called Hunter “a deeply experienced and much-admired faculty member who has played an essential role in the School’s recent accomplishments.”



Meet the Acting Dean

David Hunter, Dean for Academic Affairs at the School since 2009 and Vincent L. Gregory Professor in Cancer Prevention, will serve at the helm of the School until a new dean is named.

“I am looking forward to serving as Acting Dean, maintaining the momentum in our teaching and research programs at the School, and working with our department chairs and faculty to build on the progress that Dean Julio Frenk has made over the past six years,” said Hunter.

As Dean for Academic Affairs, Hunter oversees the major academic operations of the School, including the teaching programs, Academic Affairs—which includes Faculty Affairs, Student Affairs, and Diversity and Inclusion—and research strategy and development.

Hunter’s research interests center on the etiology of cancer—particularly breast, colorectal, and prostate cancers. His work focuses on genetic susceptibility to these cancers and on gene-environment interactions. He is an investigator on the Nurses’ Health Study, a long-running cohort of 121,000 U.S. women, and was project director for the Nurses’ Health Study II, a cohort of 116,000 women followed since 1989.

As for Hunter’s teaching contributions, he directed the Genetic Epidemiology and Statistical Genetics concentration in the Department of Epidemiology. From 1999 to 2005, he was director of the Quantitative Methods

Concentration of the Master of Public Health degree. He was lead instructor for Managing Epidemiologic Data, Studies in Molecular Epidemiology, and Molecular Epidemiology of Cancer. In the fall, he will be teaching a HarvardX course, Readings in Global Health, based on a global health series he co-edited in the *New England Journal of Medicine* with former Dean Harvey Fineberg.

A 1982 graduate in medicine of the University of Sydney, Australia, Hunter earned an MPH in 1985 and an SD in 1988 from the Harvard Chan School. He continued on at Harvard with appointments both at the Harvard Chan School and at Harvard Medical School, where he is currently professor of medicine. Since the mid-1990s, he has held a succession of leadership positions at the Harvard Chan School.

President Faust has convened a 13-member advisory group of the Harvard Chan School’s senior faculty, including several who have joint or primary appointments in other parts of the University, to aid in the search for a permanent dean. Faust and Provost Alan Garber also will solicit advice from Harvard Chan faculty, students, staff, and alumni. 🌐

CAMPAIGN UPDATE

New Award Established to Recognize Staff

Receiving appreciation for one's job performance is always meaningful, especially when it comes from a supervisor. Imagine, then, Sarah Wood's reaction when she learned that her longtime supervisor, former School dean and University provost Harvey Fineberg, AB '67, MD '72, MPP '72, PhD '80, had contributed \$100,000 to the Harvard Chan School to endow the Sarah K. Wood Award for Outstanding Staff Performance in her honor. "I am very humbled," she says. "I adore Harvey and his wife, Mary Wilson, for thinking of this award. I am proud that my name is on it so other people can be recognized." The annual award honors a staff member who demonstrates the qualities of dedication, competence, positive attitude, initiative, and ability to mentor, encourage, and inspire others, in addition to a demonstrated commitment to the School and its mission—all qualities that Wood displayed during her 21 years as Fineberg's trusted associate. She hopes the Award will encourage faculty members and others to really get to know the staff who work with them.

Now president of the Gordon and Betty Moore Foundation, Fineberg today still has the opportunity to interact with Wood through the China Medical Board, where he is a trustee and she serves as executive administrator to the president. "Faculty and students at the Harvard Chan School rightly garner many awards," observes Fineberg. "Mary and I wanted to help the School recognize outstanding staff as well, and we could think of no more fitting way to do this than to establish a staff award in the name of our dear friend and exemplary colleague, Sarah Wood."



Award Recipient Barbara Heil (left) with Sarah Wood and Harvey Fineberg



GRANT FUNDS RESEARCH TO IDENTIFY HEALTH

Some 9 million Americans are eligible for both Medicare and Medicaid. These patients tend to be older, have lower incomes, and have more health problems than individuals who qualify for just one of the federal programs. Although care for "dually eligible" patients is costly, complex, and often fragmented and poorly coordinated, great potential exists for new models of care delivery—including a robust integration of clinical and social services—that will bring better health outcomes and greater consumer satisfaction, while also possibly lowering costs and reaping savings that could be reinvested in prevention and early detection.

To advance research into high-performing health care delivery models, the Peterson Center on Healthcare recently announced a grant of nearly \$3 million to three institutions, including the Harvard T.H. Chan School of Public Health, that will

Fong Clow Doctoral Fellowship Fund

The path from a rice field in China—where Fong Clow, SM '86, SD '89, worked during the Cultural Revolution—to Harvard University was not a common one. But thanks to some prior medical training, a rare gift for mathematics, and an even rarer World Bank scholarship that allowed her to choose anywhere in the world to pursue her studies, Clow found her way to the Department of Biostatistics at the Harvard T.H. Chan School of Public Health (then the Harvard School of Public Health) in 1984.

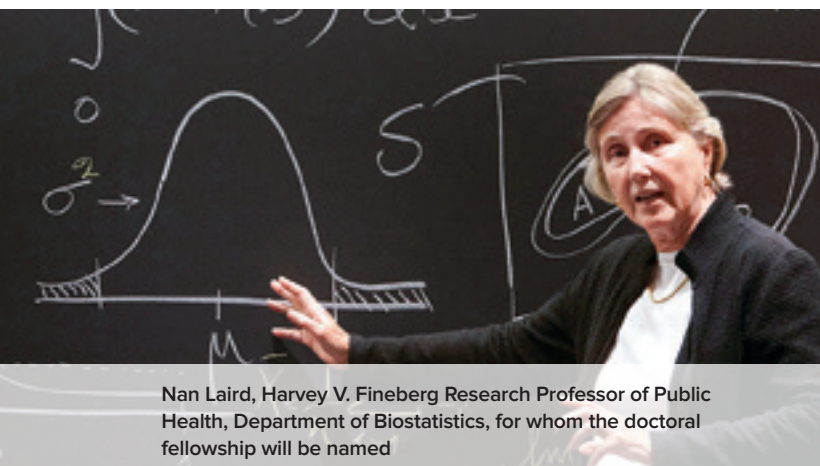
Learning English and adjusting to life in Boston were challenges early on. But with the generosity and practical help from many at the School—especially from her thesis adviser, Nan Laird, Harvey V. Fineberg Research Professor of Public Health—she flourished. It was to honor Laird on the occasion of her retirement that Clow and her husband, Eric Clow, established the Fong Clow Doctoral Fellowship Fund in the Department of Biostatistics, through a \$1 million charitable remainder trust that will provide an endowment for doctoral fellows in that department.

“The gift is very much in appreciation for the help I received from a lot of people,” says Clow. “It was a generous and supportive environment for me and really helped me excel.” Eric notes that the gift serves two purposes: giving back to the School and



providing some security, independent of other investments, for the couple when they're older. “When you look at who you have running an investment you will rely on for long-term security, having an entity like Harvard that has been around for 400 years provides some reassurance,” says Eric. “You don't get a lot more stable than that.”

Eric and Fong Clow hope this gift can particularly help people facing the hurdles Fong once faced—international students full of promise but lacking the resources to pursue their professional dreams. As Fong says, “This can be a way that a whole succession of people in that situation can benefit in the way that I benefited.”



CARE SOLUTIONS FOR HIGH-NEED PATIENTS

collaborate to identify and validate health care solutions to lower costs and improve quality of care for these high-need patients. The Harvard Chan School received \$686,000 to analyze three years of medical claims data of dually eligible patients with similar health profiles. The aim is to identify differences in how care is provided, calculate how those differences may lead to variations in outcomes and costs, and determine how much of that variation is preventable. According to principal investigator Ashish Jha, MD '97, MPH '04, director of the Harvard Global Health Institute and K.T. Li Professor of International Health at the Harvard Chan School, “If we can understand the patterns of care that allow some patients to achieve better outcomes than others or receive more efficient care, then we can move much closer to identifying the models of care that improve quality and lower costs.”

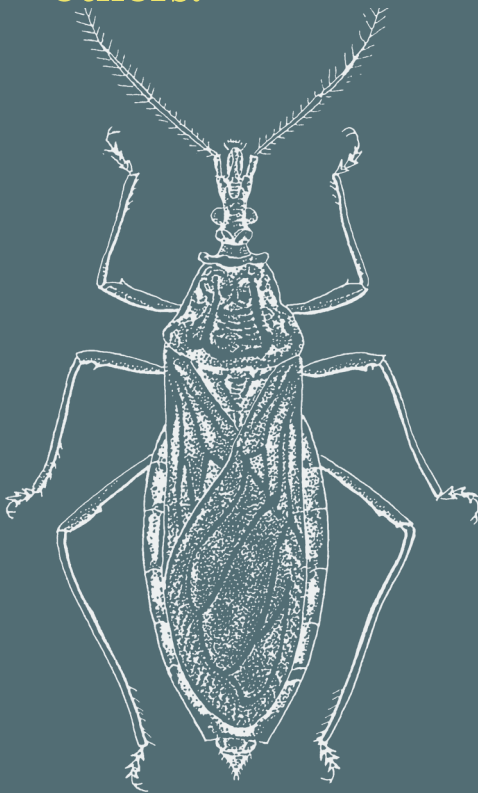
The two other beneficiaries of the grant are the National Academy of Medicine and the Bipartisan Policy Center. “Each [of the three institutions] brings a depth of expertise and know-how that will ultimately benefit people who really need better care and the health system as a whole,” says Jeffrey Selberg, executive director of the Peterson Center on Healthcare.

Q&A

Poverty, Political Unrest—and Global Warming—Encourage Chagas' Disease Spread

Chagas' disease afflicts an estimated 8 million people worldwide, mostly in Latin America—though that figure is believed to be low, due to underdiagnosis. Caused by the parasite *Trypanosoma cruzi*, or *T. cruzi*, the infection is carried in animals and transmitted to humans by the triatomine bug, or kissing bug. While the disease is curable if treatment is started soon after infection, most cases are not caught in the early phases. Up to 30 percent of chronically infected individuals develop cardiac, digestive, or neurological complications, which can be lifelong. *Harvard Public Health* editor Madeline Drexler recently spoke with Barbara Burleigh, professor of immunology and infectious diseases, who has devoted her career to studying Chagas' disease.

Research focuses on why the condition develops in some and not others.



Q: What makes the Chagas' disease parasite so formidable?

A: Unlike the malaria parasite—the main species of which infects humans, and lives only in red blood cells in the asexual stage—the Chagas' disease parasite can infect almost any cell type with a nucleus. It can live in an opossum. It can live in a rat, in a dog. It can live within different cell types in the human body. It's an amazingly adaptable and flexible organism. I think of it as the center fielder in a baseball game: ready for anything.

Q: Today, Chagas' disease is spreading around the world—mostly because of migration. It's been found in Canada, Japan, Australia, and many European countries. In the U.S., the Centers for Disease Control and Prevention estimates about 300,000 cases, across a band of at least 25 states, mainly in the lower half of the country—from California to Texas to Pennsylvania. Cats, raccoons, rodents, and other animals can carry the Chagas' parasite. What is your fear about this spread?

A: Not all kissing bugs are equally good at spreading Chagas' disease. I worry that climate change could expand the range of bugs that are better human vectors—those that leave the parasite on the skin after they bite people. These bugs could start to creep north. Even now in certain areas in the southern United States, 50 percent of the bugs carry the *T. cruzi* parasite and a very high proportion of animals are infected with it.

Luckily, most people in the U.S. live in solidly constructed houses that prevent the bugs from coming in. But there are certain at-risk populations: homeless individuals, for example, in whom it is already happening at a low level. Blood can be screened for Chagas' disease, but there are cases where it has spread through blood transfusion and organ transplantation, and from mother to child, though these instances are rare.

Q: Even in Latin America, where the disease is endemic, doesn't Chagas' disease often lurk unseen?

Left, Centers for Disease Control and Prevention / Dr. H. Scott; opposite, Kent Dayton / Harvard Chan

“It’s an amazingly adaptable and flexible organism. I think of it as the center fielder in a baseball game: ready for anything.”

—Barbara Burleigh



A: Yes, Chagas’ disease is often referred to as the “silent killer.” People can carry the parasite for years without knowing, and can therefore transmit it. Also, for someone to be diagnosed with the disease, they must test positive in at least two different tests. This can lead to delays and underdiagnosis.

Another reason for underdiagnosis is that there are different strains of the parasite circulating around. The current tests were developed to identify strains that circulate in the southern cone regions of South America. But in the Andean countries, as well as in Central America all the way through Mexico, a different strain predominates. The overwhelming bias in the field is that the Andean/Mexican strain is not virulent—but I disagree.

The problem is that diagnostic kits are less sensitive for the circulating strains in those areas. Someone who has Chagas’ disease and is dying from

heart complications can actually test negative for the parasite. So there’s an effort now to make more region-specific or strain-specific diagnostic tests.

Q: What’s your big scientific question in regard to Chagas’ disease?

A: How does the Chagas’ disease parasite live inside human host cells and survive? We approach this from the outside in. Often, when scientists study intracellular pathogens, they look past the host cell to focus on the pathogen itself. Our lab looks at the parasite through the lens of the host cell. How does the host cell respond to infection? What does the host cell give to the parasite to help it survive? We use tools from mammalian cell biology, molecular biology, and molecular genetics to tackle this complex problem. Among other things, we have discovered that a balance between sugar and fat metabolism in a mammalian cell seems important for supporting the parasite’s growth.

Q: Could this research lead to better treatments?

A: Yes, I believe so. Our first goal is to understand what the parasite needs to grow and survive in human cells and to use this information to identify possible drug targets in the parasite itself. At the same time, we want to understand whether the “parasite-feeding” pathways we are finding in the host could be targeted to control the parasite infection.

A key mystery to this infection is why it develops in one person and not someone else. Of the individuals infected with Chagas’, roughly 70 percent carry the parasite for life and never develop the disease. Could that figure be pushed to above 95 percent? If so, it forces you to rethink approaches to treatment. Do you need a vaccine or a drug or a therapy that eliminates the parasite? Perhaps not. Maybe what you need is a way to keep the disease from progressing. 🌱

T

he Gray Wave. The Silver Tsunami. The Agequake.

Aging societies have been on the horizon for decades, not just in the United States but also around the world. The driving forces are well-established: falling fertility rates (by far, the most important factor), longer life expectancy, and the maturing of large cohorts such as the baby boomers in the U.S.

But what demographers once thought would be the passage of a single large generation—like the postwar boomers—through the age brackets is now predicted to be a permanent fixture of many developed societies. Age distributions in many countries once formed a pyramid—with billions of young people filling out the bottom and dwindling numbers of older survivors at the apex. Soon, however, this distribution may more nearly resemble a square, with roughly equal numbers of people in each age group.

Imagining what this “new normal” will mean for developed and developing societies alike raises profound questions. How will societies age successfully? Will most people live longer lives but be sicker for more years than in prior generations?

Photograph, Kent Dayton / Harvard Chan; gameboard, Illustrations, Anne Hubbard / Harvard Chan; Shaw Nielsen



How should work be organized when a society has more people over 65 than under 5? As people live longer, when will they want or need to retire because of cognitive or physical aging? Will growing economies slow or even reverse their trajectories as older cohorts leave the workforce?

What can people do to increase the number of years of healthy, joyful senior living? Will people in their 80s, 90s, or older need as much help with aspects of daily living in the future as they did 20 years ago, or will they be more self-sufficient longer? Will “dying with dignity” be possible in a culture driven by technologically advanced health systems and nursing homes focused more on protecting the frail elderly than on empowering them?

This issue of *Harvard Public Health* examines how individuals and societies will navigate the previously uncharted waters of rapidly aging societies. Among the experts interviewed are faculty from the Harvard T. H. Chan School of Public Health, in fields ranging from social epidemiology to health policy to biochemistry. Here are their thoughts on what lies ahead.

continued

Perils and Promises of a Graying Society

SPECIAL REPORT

by Amy Gutman, Boston-based writer,
and Madeline Drexler, editor, Harvard Public Health



1 What Is “Successful Aging”?



The MacArthur Foundation Research Network on an Aging Society has defined successful aging by three criteria: avoidance of disease and disability; maintenance of high cognitive and physical function; and engagement with life.

By these standards, the U.S. has generally done well. As life expectancy has improved overall (though

Health and director of the Harvard Center for Population and Development Studies, this promising trend may have stalled in recent years. “There is evidence from national studies that people who are now in their 30s and 40s may actually be in worse shape than people that age were a generation ago—an increase in diabetes, obesity, and other chronic conditions,” she says.

health but also for the economy. “Nations with swiftly aging populations may find themselves with a growing disease burden on their hands: nearly one-quarter of the world’s burden of disease is attributable to illness in adults aged sixty and over,” notes an article in the Spring 2015 issue of *Daedalus* written by David Bloom, Clarence James

In the future, will people enjoy a “compression of morbidity”—living both longer lives and fewer years in poor health?

some sections of the country have seen declines), more older people have managed to stay healthy or disability-free. This scenario—higher life expectancy and lower incidence of disease and disability—has led to what public health researchers call a “compression of morbidity”: more years spent in good health and fewer lived in poor health.

But according to Lisa Berkman, Thomas D. Cabot Professor of Public Policy and of Epidemiology at the Harvard T.H. Chan School of Public

“This virtuous cycle, where people are living not only longer but healthier, may not continue.”

Moreover, says Berkman, there are substantial social and economic gaps in healthy life expectancy, with those who are poorer or who have less education facing much worse outcomes. And racial and ethnic disparities in healthy aging reflect a historical legacy of disadvantage.

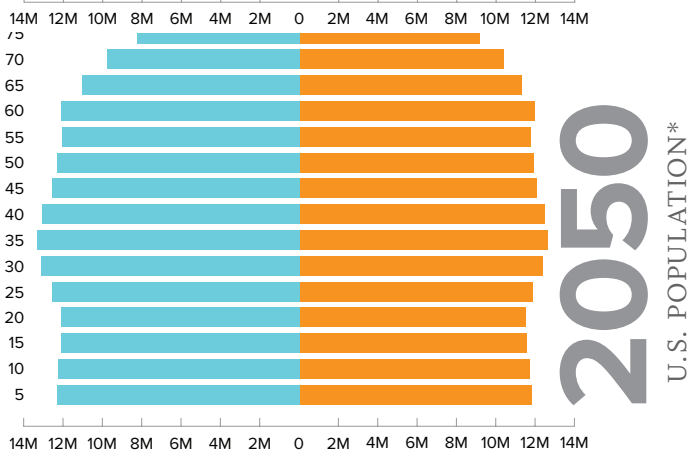
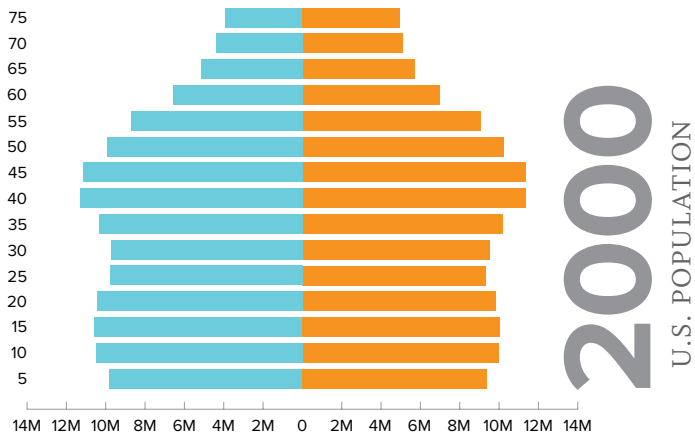
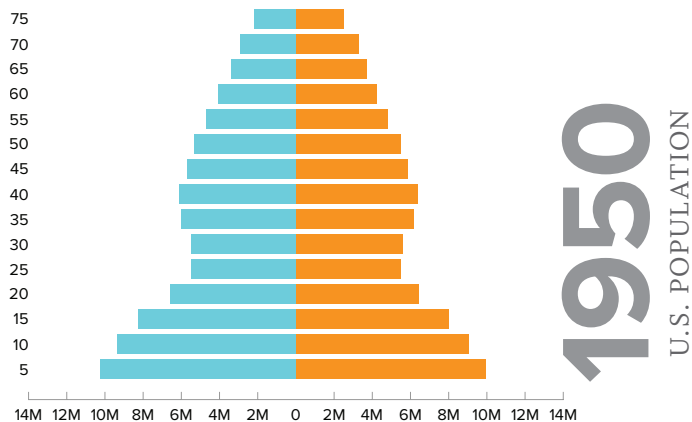
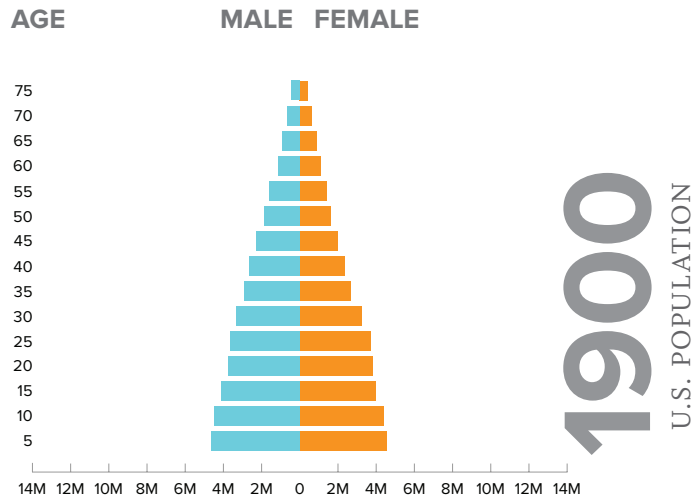
WILL AGING SLOW THE ECONOMY?

An older population with chronic diseases bodes ill not only for public

Gamble Professor of Economics and Demography in the Harvard Chan Department of Global Health and Population; David Canning, Richard Saltonstall Professor of Population Sciences and professor of economics and international health; and research assistant Alyssa Lubet. “In turn, the majority (nearly 70 percent) of the older-adult disease burden is due to noncommunicable diseases (NCDs) such as heart disease, cancer, chronic respiratory disease, musculoskeletal conditions, and mental

continued on page 18

Or will those extra years be spent paying the price of unhealthy lifestyles—in poor health due to heart disease, diabetes, and other chronic conditions?



THIS IS NO DEMOGRAPHIC GLITCH

“Originally, we thought the aging society would look like the boa constrictor in *The Little Prince*,” says Harvard Chan’s Lisa Berkman. “The boa constrictor swallows an animal, and you see the animal move all the way through the snake. But that’s not how this demographic shift is going to happen. The structure will probably be with us forever.”

At the beginning of the 20th century, the distribution of the U.S. population looked like a pyramid. Only 4.1 percent of the population was age 65 and older; today, that figure is 14 percent, and the classic pyramid is morphing. By 2050, the senior cohort will rise to more than 20 percent, and the age structure in the U.S. and all other developed nations will have at least as many people alive at older ages as at younger ages. The global number of people ages 100 and older will likely more than double by 2030, with projections of nearly 3.4 million by 2050.

“Never before in history have countries had their population age to this extent and as rapidly,” adds David Bloom, Clarence James Gamble Professor of Economics and Demography in the Harvard Chan Department of Global Health and Population. “These are uncharted waters.”

*estimate



disorders such as Alzheimer's and dementia."

As a result, population aging may slow economic growth, strain existing pension and health care systems, and weigh down younger generations. "One dire prediction," the authors warn, "is that population aging will slow or perhaps even reverse the engines of national economic growth."

ORGANIZING WORK REQUIRES NEW ASSUMPTIONS

"Until now, everybody had been looking at what makes individuals age successfully. But nobody asked: How do societies age successfully?" observes Berkman. "What happens to a country when there are more

people over 65 than there are under 5? The fundamental issues are not how are we going to pay for Social Security or Medicare, although those are not trivial issues. The deeper issues are how should work be organized? What will happen to people with disabilities? How do different life trajectories lead to different health outcomes? In dealing with these issues, you can't reorganize a little bit—you have to reorganize dramatically. To do this well, you have to rethink a lot of assumptions as a society."

DOES AGE NO LONGER MATTER?

One of the fundamental assumptions that may change is that all older people need help. In economics,

the oft-cited Old Age Dependency Ratio—or ratio of individuals ages 65 and older (presumably "dependent") to those ages 18–65 (in the labor force)—bears this out. But in 2014, Dana Goldman of the University of Southern California and colleagues published in the *Journal of Gerontology* a study of older Americans that contradicts this model. The researchers found that among individuals ages 85 and older, 28 percent had excellent or very good self-reported health and 56 percent reported no health-based limitations in work or housework. As the study's authors ask, "When does age no longer matter?"

2 Sowing Healthy Habits

Don't smoke. Exercise regularly. Eat a healthy diet filled with plenty of fruits and vegetables, replace saturated fats with plant oils, and limit sugar-sweetened beverages. Drink moderate amounts of alcohol.

Those are the pillars of healthy aging, according to Walter Willett, Fredrick John Stare Professor of Epidemiology and Nutrition and chair of the Department of Nutrition at the Harvard Chan School. And a moun-

tain of public health research backs up his advice—including the Nurses' Health Study (NHS), established in 1976 by the Harvard Chan School's Frank Speizer, now professor of environmental science, with funding from the National Institutes of Health. This ongoing investigation, which began with some 121,000 middle-aged women, "shows the flip side of the coin," explains Willett—revealing not only the conditions that elevate the

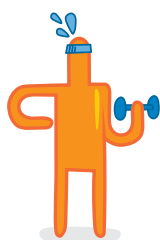
risk for disease but also those that help prevent potentially fatal conditions, from breast cancer and atherosclerosis to diabetes and dementia.

The Nurses' Health Study defines healthy aging as survival past age 70 without any major chronic diseases or major impairments in memory, mental health, or physical abilities. In 2011, all of the women in the original NHS were 65 or older. Here are the study's key findings about their healthy aging:



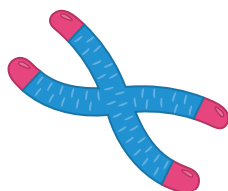
BODY MASS INDEX (BMI)

Of the women who survived until at least age 70, those who had a higher BMI at midlife were less likely to survive to a healthy old age. Obese women (with BMI of 30 or greater) had an 80 percent lower chance of healthy survival compared with their leaner counterparts (with BMI between 18.5 and 22.9). And the more weight a woman gained from age 18 until midlife, the lower her chance for healthy survival after age 70.



PHYSICAL ACTIVITY

Higher physical activity levels at midlife predicted healthier survival. Better yet, the chance of healthy aging markedly improved even at modest activity levels: Women who jogged or cycled about five hours per week almost doubled their chance of healthy aging. Two or more hours per week of brisk walking also upped the chances of a healthy old age. Perhaps most encouraging: Regardless of whether a woman was lean or overweight, being physically active increased her odds of optimal health.



MEDITERRANEAN DIET AND TELOMERES

The Mediterranean diet appeared to increase telomere length, a key biomarker of aging. Likened to the plastic tips on the ends of shoelaces, telomeres are stretches of DNA at the ends of chromosomes that protect genetic data. Shorter telomeres are associated with decreased life expectancy and increased rates of age-related chronic diseases.



FLAVONOIDS AT MIDLIFE

A midlife diet rich in flavonoids improved the odds of healthy aging. Bioactive compounds in plant foods, flavonoids have been linked to lower risks of fatal or nonfatal cardiovascular disease, hypertension, stroke, cancer, diabetes, and neurodegenerative diseases. High-flavonoid foods include oranges, berries, onions, and apples.



VITAMIN D AND COGNITION

Among women ages 60 to 70, lower levels of vitamin D in the blood were associated with significantly worse cognitive function—such as memorization of words and numbers. The finding bolsters the theory that vitamin D, which is critically important for bone and muscle health and the prevention of falls, may also play a role in brain function.

3

Rethinking Work



When Social Security was established in 1935, most other government benefits kicked in at age 65. To put that in context, life expectancy for American men at the time was only about 60 years. Today, however, according to the Social Security Administration, men who retire at age 65 can expect to live for an additional 19 years; women, an additional 21 years. Should retirement therefore be postponed?

part because people hold onto their health or lose it at vastly different rates—and government policies must acknowledge this heterogeneity. According to Berkman, certain segments of the population—such as people whose health has been worn down by physically arduous jobs—need the option to take an early path to retirement. And as David Bloom notes, people who are more educated and who earn more tend to

members of lower socioeconomic groups are less likely to volunteer, they will reap disproportionately greater benefits.

“One of the good things about eternally volunteering is that it embeds people in social networks,” explains Berkman. “They are engaged, they work with others, they collaborate with people of all ages. They’re not receiving support, they’re giving support—and giving support turns out

Employment can yield both physical and mental health benefits as one ages—a potent argument for raising the retirement age.

In general, being employed is positively associated with health, says Lisa Berkman. Partly that’s because healthy people are more likely to be able to work. But employment itself also appears to bring both physical and mental health benefits. Having a job boosts social engagement, keeps up intellectual and interpersonal skills, and staves off the time when one must draw on savings and pensions. “One of the good parts of working longer is the maintenance of cognitive functioning,” says Berkman. “In societies where retirement age is early, such as France and Italy, cognition falls more as people age.”

That fact argues for delayed retirement. But not everyone is able or willing to stay in the workforce, in

live longer—which raises questions of fairness in retirement policies. “If some people will have much longer lives and some people will have just modestly longer lives, but you raise the retirement age for everybody, there’s an ethical issue,” he said in a recent interview.

BENEFITS OF VOLUNTEERING

Perhaps the most convincing argument for encouraging people to keep busy and engaged after 65—whether or not in the formal workforce—is a raft of research showing that senior volunteering has been tied to reduced risk of hypertension, improved self-reported health and well-being, delayed physical disability, enhanced cognition, and lower risk of death. And research shows that while

to be really important. One of the best things we can do is to keep people naturally embedded in communities that are cohesive and enduring.”

In the U.S., the most robustly studied volunteer program is Experience Corps, which invites volunteers ages 55 and older into public elementary schools several times a week (for at least 12 hours total) to tutor children at risk of reading failure. A 2010 study in *Social Science & Medicine* by S.I. Hong of the National University of Singapore and Nancy Morrow-Howell of Washington University compared changes in health outcomes over two years between Experience Corps volunteers and a matched sample of older adults who were not engaged

THE “LUMP OF LABOR” FALLACY

Some say that older people who feel healthy and prefer to stay in the workforce should be encouraged to do so. Others argue that the senior cohort will steal jobs from younger people.

But according to Harvard Chan’s Lisa Berkman, the latter assumption is plain wrong. Indeed, its wrongness has a catchy name in the economics literature: the “lump-of-labor fallacy.” Writing in *Daedalus* in 2015, Berkman and her co-authors explain: “For many years, common sense suggested that the number of jobs in the economy is finite, and that a new population entering the labor force would therefore push other workers out. This so-called lump-of-labor fallacy has been invoked at moments in history when women’s labor-force participation increased, because it was thought that they would take ‘good jobs’ away from men. Immigrants to the United States continue to be accused of stealing jobs from other, native lower-wage workers. Likewise, many older people who wish to continue working today are accused of

taking jobs from younger workers, creating intergenerational conflict.

“The lump-of-labor fallacy is one of the most dangerous myths in economics. ... This is shown most clearly in the United States, where the sharp increase in female labor force participation not only did not cause mass unemployment for men, but actually correlated with a rise in male employment rates. More specifically, recent findings from cross-national comparisons show that higher employment of older individuals is actually positively correlated with higher employment of the young; that is, countries with a high prevalence of early retirement tend to have higher unemployment rates and lower employment of the young.”

As Berkman says, “If older people are working, they’re earning, they’re spending. They don’t draw on Social Security as much. They contribute productively. Overall, that’s good for growth.”

But for those whose jobs have worn them down physically or emotionally, the discussion about raising the retirement age raises important ethical and practical issues.

in high-commitment volunteering. The study found that the Experience Corps group reported fewer depressive symptoms and fewer functional constraints in such activities as walking, running, or climbing stairs, while the comparison group showed an increase in these measures.

REMOVING THE COBWEBS

A 2009 study in the *Journal of Gerontology* by Michelle Carlson of the Mailman School of Public Health at Columbia University and colleagues explored in finer detail the cognitive gains among Experience Corps volunteers. This small study involved African-American women in Baltimore. All were all low-income

and low-education and therefore faced a statistically greater risk for cognitive impairment. The researchers used fMRI scans, which measure blood flow, to trace the biological underpinnings of brain plasticity. After their stints as volunteers, the women demonstrated increases in activity in several key areas of the brain, compared with those in the control group. They also had better scores in standard tests of visual function and concentration. As one woman said of her time at Experience Corps, “It removed the cobwebs from my brain.”

“[T]hese activities are generative in giving meaning and purpose to one’s life ... which may make

them more rewarding and personally enriching than highly stimulating activities performed alone,” the researchers wrote. “As a result, individuals may place more value on these activities beyond their immediate personal benefit and may sustain interest longer.”

Just as compelling, the program’s dividends were truly multigenerational, reaching far beyond the volunteers themselves. Compared with students in the control schools, the kindergarten-to-third-grade students in the Experience Corps schools had improved standardized reading scores and markedly fewer referrals for behavioral problems.

continued

4 Breakthroughs in Biology

Imagine old age without heart disease, cancer, or dementia. Imagine a long life of physical and mental vigor, capped by a brief period of decline before death. Imagine being able to achieve this ideal through a pill or simple changes in diet.

That's exactly what Harvard Chan School scientists in the Department of Genetics and Complex Diseases are imagining in their quest to understand the biology of senescence and the secrets of what has come to be known as "healthy aging."

JUNKING THE "RUST" METAPHOR

Until recently, bodily decline was considered to be the inevitable

rate breakdowns. "As humans grow older, they don't get just one aging-related disorder—they suffer a spectrum of disorders," says Associate Professor James "Jay" Mitchell. "The new thinking is that these disorders are mechanistically linked to the aging process itself—whatever that process is."

According to Assistant Professor William Mair, the key questions in this new paradigm are: "Why are we more likely to get diseases when we're old than when we're young? And how can we shift that risk of frailty?"

CLUES IN THE LAB

The idea that aging is driven by a biological mainspring is buttressed

swiftly at the end—to a broken hip, say, or a short bout of pneumonia. Put another way, they enjoy a longer "health span."

Can centenarians' hardy biology be replicated? Mitchell and Mair believe it can.

Animal research has proven that dietary restriction—whether cutting total calories, reducing specific dietary constituents such as proteins, or placing animals on various fasting regimens—extends life span and decreases age-related debility. So dramatic is this biological benefit, Mitchell describes its inverse—today's human epidemic of obesity-related metabolic disorders—as a wave of "premature aging."

Research in the lab suggests that dietary restriction—cutting calories or reducing certain items in the diet—extends lifespan and decreases age-related debility.

outcome of tiny corrosive hits to the system: genetic, cellular, metabolic, environmental, stress-induced. The reigning metaphor was the body as rusting car, with each failing part the final stage of a distinct chain of biological events.

Today, however, researchers suspect there is a fundamental cause behind all these seemingly sepa-

by epidemiological studies of centenarians. These resilient human survivors of 100-plus years tend to die not from cardiovascular disease or malignancies or neurodegeneration, but rather from the complications of overall deterioration and the body's inability to maintain homeostasis and rebound from injury or infection. Centenarians usually succumb

Elaborating on these findings, Mitchell has shown that lowering quantities of certain amino acids in the diet causes mice to increase cellular production of the gas hydrogen sulfide, which in turn protects the animals against tissue damage after minor surgery. He has also found that increased production of the gas extends life span in

worms, flies, and yeast—along the same biological pathways conserved in *Homo sapiens*.

Mair, meanwhile, has demonstrated that nematode worms that express an active form of a protein called AMPK—a kind of molecular fuel gauge—were likewise long-lived, despite eating normally. The implication is that tweaking cellular mechanisms in the nervous system that sense energy generated by nutrients could confer the same propensity for

healthy aging as do low-calorie diets, without the need to alter food intake.

WHAT'S NEXT?

Both Mitchell and Mair foresee a day when their kind of basic research finds its way into human clinical medicine.

Mitchell predicts that doctors may someday prescribe certain kinds of fasts before surgery or chemotherapy to boost the body's resilience and improve outcomes. Mair hopes to find molecular targets that could

pave the way to therapeutic drugs; if taken in old age—when one was about to encounter risk factors for certain diseases or suffer early symptoms—the medications could prevent the afflictions or at least reduce their spread or severity.

The goal, the scientists agree, is not a fountain of youth but rather golden years that are relatively robust and independent. As Mitchell sees it, “Aging is a public health problem—and basic biology is the answer.”

continued

In that context, today's human epidemic of obesity-related diseases could be seen as a wave of “premature aging.”

INVESTMENT IN DELAYED-AGING RESEARCH COULD HAVE LARGE PAYOFF



Aging is a primary risk factor for numerous deadly and debilitating conditions, but research to date has largely focused on treating the conditions commonly linked to aging today—such as cancer and heart disease—rather than on addressing the biological processes at the root of aging.

Slowing the biological aging process—what scientists call “delayed aging”—may offer substantial health and economic returns. A 2013 study in *Health Affairs* estimated that delayed aging could increase healthy, nondisabled life expectancy in the U.S. by an additional **2.2 years**. Researchers calculated the economic value of this gain to be **\$7.1 trillion over 50 years**, using a standard formula in which a healthy year of life is valued at \$100,000.

5 Connecting with Others



Good advice on lifestyle and successful aging is one thing—following it is another. “Many investments have to be made throughout the life course, in terms of health habits like exercise and diet,” says Ichiro Kawachi, John L. Loeb and Frances Lehman Loeb Professor of Social Epidemiology and chair of the Department of Social and Behavioral Sciences at the Harvard Chan School. “But I’m also interested in what you can do once you do reach old age and you haven’t made those investments. Can you still make a difference?”

Kawachi’s answer: a resounding “yes.”

“One of the most important things that you can do individually,

the health problems you may have encountered earlier in life.

“When you socialize and converse with friends, you’re exercising all your faculties and improving blood flow to the brain, which helps maintain cognitive function,” says Kawachi. “There’s exchange of information of different kinds, such as learning about the latest health tips or getting advice. And you receive affirmative messages and emotional support.”

SURPRISES FROM JAPAN’S “SPORTS CLUBS”

Japan’s population is aging at the fastest pace of anywhere in the world. The proportion of its population over the age of 60 is projected to rise to an astounding 42 percent by 2050. To

2012, looked at the effect of membership in Japan’s “sports clubs”—organizations that offer mini-golf, walking clubs, lawn tennis, croquet, and other activities shared with friends. He divided his subjects, who were 65 and older, into four groups: those who were physically active and belonged to a sports club; those who were physically active but exercised alone; those who were not physically active but still belonged to a sports club (doing administrative or other work); and those who were not physically active and did not belong to a sports club.

As predicted, people who actively exercised and belonged to sports clubs enjoyed the best health. But

Socializing with friends after retirement is as important as diet and exercise. It improves blood flow to the brain, maintains cognitive function, promotes the exchange of useful information, and elicits emotional support.

if you retire, is to maintain social connections,” he says. “Connecting with other people is as important as diet and exercise. It’s not too late, even at age 60, to overcome some of

minimize the impact of this trend on health care costs, Japan’s government has focused on preventing long-term care as much as possible—using social participation approaches.

One of Kawachi’s intriguing studies, published in *PLOS One* in

those who belonged to sports clubs and didn’t exercise came in a very close second—their functional disability rate was virtually the same as the avid sports club exercisers. Those who exercised alone actually fared worse than the sports club

sedentarians. And the stay-at-home couch potatoes, not surprisingly, came in last.

“In other words, the exercise didn’t add to the benefits of participating,” says Kawachi. “It was the belonging that prevented disability.”

IKIGAI: A LIFE WORTH LIVING

In a 12-year study of more than 30,000 men and women published in 2009 in the *Journal of Psychosomatic Research*, a Japanese team of

researchers explored the effect of Japan’s powerful—but, to Westerners, perhaps ineffable—concept of *ikigai*, which the Japanese believe to be an important factor for achieving health and a fulfilling life. *Ikigai* is variously defined as something to live for, the joy and goal of living, a life worth living, or “the reason to get out of bed.” It includes not only pleasure and happiness but also meaning and self-realization. As a baseline measure at the beginning of the

study, the researchers simply asked participants: “Do you have *ikigai* in your life?”

A dozen years later, the middle-aged and elderly men and women who answered “yes” had less risk of death from all causes, including external causes such as injury. Death from stroke and coronary heart disease was also lower among men and women with *ikigai* than among those without it.

continued

In Japan, people who said they had *ikigai*—pleasure and happiness, a life of meaning—12 years later had lower risk of death from all causes.



6 Preserving Purpose

In 1991, a family practice physician named Bill Thomas conducted a radical experiment: He brought life to a place where death had prevailed.

A PARAKEET OR A PLANT

The medical director of Chase Memorial Nursing Home in the upstate New York town of New Berlin, Thomas was struck by the

By the end of life, fewer than one-third of people have conversations about their goals and priorities for the time they have left.

sterility and despair that pervaded every room. So he issued an almost unfathomable order: to move 106 additional residents into the facility, pretty much all in one day. The newcomers included two dogs, four cats, and 100 parakeets. They were soon followed by a colony of rabbits, a flock of laying hens, and hundreds of indoor plants. Each of the nursing home's human residents was soon taking care of his or her own parakeet or plant.

ABOLISHING NURSING HOME PLAGUES

Thomas calls himself a “nursing home abolitionist.” He sees his mission as eradicating what he calls the three plagues in modern nursing homes: boredom, loneliness, and helplessness. And he is one of Atul Gawande's heroes. In his new book *Being Mortal: Medicine and What Matters in the End*, Gawande, a surgeon, professor in the Department of Health Policy and Management at the Harvard Chan School, and executive director of Ariadne Labs, explores the “medicalization of mortality”: the myopic focus on disease instead of goals when caring for patients at the end of life.

“When we don't know what people's priorities are, their care is often out of alignment with some of their most important goals,” Gawande said in a recent interview. “You really see it when you visit people who end up requiring residential care—assisted living or full-scale nursing homes. The facilities look more and more like hospitals. They're built around nursing stations. The rules are focused on safety.”

On the one hand, it seems prudent to put safety first in nursing

homes. But the upshot is that other goals of life may matter more to people, Gawande says. “People are forbidden from having a drink if they want to. Alzheimer's patients on medically ordered puréed diets get caught sneaking cookies. You could have a roommate imposed upon you with no choice whatsoever. No regard for privacy. These are incredibly important concerns.”

Gawande's prescription for this devastating mismatch of intent and results includes a list of clarifying questions that should be asked when a person has a serious or life-threatening illness, such as cancer, congestive heart failure, chronic obstructive pulmonary disease, or end-stage renal disease. [See sidebar, page 27.]

But having these conversations often eases suffering, reduces unwanted care, and sometimes even extends life.

CONVERSATIONS IMPROVE OUTCOMES

“We measure the wrong things,” he says. “Less than a third of the time do people who arrive at the end of life have any conversation about what their goals and priorities are for the time they have left. When they have those conversations, they have markedly better outcomes, including reduced suffering, spending more time at home, and also living at least as long as they otherwise would—in many cases, longer. And better outcomes means that they’re less likely to get unwanted care. They have more peacefulness at the end of their lives.”

AUTONOMY, NOT JUST SAFETY

Gawande adds that Bill Thomas’ innovative experiment and similar



interventions have demonstrated that people with the opportunity for purpose—even caring for a bird—at the end of life can bring meaning and joy to one’s final days, even for people with severe disabilities.

But to get there, society must overturn its conventional thinking about old age. “There are sometimes regulations that stand in the way, but most of the obstacles are cultural,” Gawande says. Medical care professionals frequently focus on giving patients the longest possible life,

regardless of the quality. What a patient with a terminal disease may actually be looking for is “a few good days,” Gawande notes. As one nursing home administrator told him, “Safety is what we want for those we love; autonomy is what we want for ourselves.” 🌸

SEVEN QUESTIONS

Serious Illness Conversation Guide
for Doctors and Patients

- 1 What is your understanding now of where you are with your illness?
- 2 How much information about what is likely to be ahead with your illness would you like from me?
- 3 If your health situation worsens, what are your most important goals?
- 4 What are your biggest fears and worries about the future with your health?
- 5 What abilities are so critical to your life that you can’t imagine living without them?
- 6 If you become sicker, how much are you willing to go through for the possibility of gaining more time?
- 7 How much does your family know about your priorities and wishes?



Ellen Agler wants the world to stop turning a blind eye to five devastating—and easily prevented—diseases of poverty.

When Ellen Agler, MPH '04, met Oumar three years ago in Mali, the teenager was wearing a soccer jersey—fitting attire for his favorite sport. But he could never play the game that delighted him: His legs and feet were huge and disfigured, the result of elephantiasis, a mosquito-borne parasitic infection that causes extreme swelling in the extremities.

Not only was Oumar unable to play soccer, he also could barely walk. The children in his village tauntingly called him “Big Foot” and “Boy Who Can’t Run.” And while all of his nine siblings attended school, he was dispatched by his parents to beg on the side of the road during the day, “because people will feel sorry for you.” When Agler asked him what he would

do first if he had normal legs and feet, he replied, “I would run straight to school like the other kids.”

Also known as lymphatic filariasis, elephantiasis is one of the five most common neglected tropical diseases in sub-Saharan Africa; the others are intestinal worms, schistosomiasis, trachoma, and river blindness. This devastating quintet inflicts suffering and chronic disability on the world’s most impoverished people. Agler met Oumar on her first trip as chief executive officer of the END Fund—an organization dedicated to ending neglected diseases. The encounter reinforced her determination to shine a light on the often-shocking afflictions the world chooses not to see.



SHINING A LIGHT ON NEGLECT

INVISIBLE SUFFERING

Neglected tropical diseases are a group of parasitic and bacterial infectious diseases that affect more than 1.4 billion people across the globe, including 875 million children. For most, they bring severe pain and long-term disability. For some 500,000 people each year, they bring death. Among children, these infections lead to malnutrition, cognitive impairment, and stunted growth, typically interrupting school. Adults are often unable to work, and the anemia associated with these diseases brings an elevated risk of maternal mortality.

continued

Ellen Agler, MPH '04, visiting Idjwi Island in the Democratic Republic of Congo, where more than 90 percent of residents suffer from one or more neglected tropical diseases. Jacques Sebisaho, right, a native of Idjwi and founder of a nonprofit providing health care on the island, recently marveled at how the financial aid that helped Agler complete her MPH degree was directly benefiting people in his home country.

Neglected diseases also reinforce cycles of poverty, persisting in communities where residents have scant protection from insects that transmit disease and where access to medical care and prevention education is limited. Because of their chronic and disabling impact, the infections impede a nation's progress in education, economic growth, and overall development.

Worse, they cause stigmatizing conditions, their blinding and disfiguring complications ostracizing individuals from their own communities. "These are diseases that affect the poorest of the poor, the most marginalized people in our world," Agler

says. "As such, these infections—and the people who suffer from them—have not traditionally received much attention. We are working to change that."

THE POWER OF DETERMINATION

Born in Montana, Agler grew up moving often with her father's military assignments. Residing in Germany for several years when she was young helped her view the world as interconnected. "I had a 'one global village' concept even as a kid," she says. "Living in so many different places made me very open, flexible, curious."

For years, she had focused on a single dream: to become a journalist. At 15, by then in a small town in Idaho near a military base, Agler traveled—unbeknownst to her parents—to Idaho's big city, Boise, some 50 miles away, to begin the serious pursuit of her desired future. She took a portfolio of articles she'd published as an intern at the weekly *Mountain Home News* to editors at the *Idaho Statesman*, the state's big daily. They offered her paid work as a freelance writer on the spot.

Her next tactical step was to present her parents with a written proposal that included the name of the Boise high school she had chosen and a budget of how she was going to support herself. Although initially taken aback, her parents were very encouraging. In the first of several pivotal moments throughout her life, as a junior in high school and barely 16, Agler moved to Boise on her own, attended school, wrote for the newspaper, met a network of political leaders—and was noticed. A state senator asked her to volunteer as his campaign communications manager, and she became known as a superb political speechwriter. At 17, as an intern in the governor's office, she helped write major speeches for then-Governor Cecil Andrus, who had been secretary of the interior under President Jimmy Carter.



During a visit to END Fund programs in Mali, Ellen Agler asked Oumar about what it is like to live with elephantiasis.

DTJ / The END Fund

THE FIVE MOST PREVALENT NEGLECTED TROPICAL DISEASES

INTESTINAL WORMS

Intestinal worms, or soil-transmitted helminths, are the most common cause of neglected tropical diseases worldwide. A group of parasitic worms, they are transmitted either through contaminated soil or by ingestion of parasite eggs. Transmission mainly occurs in tropical climates and where sanitation and hygiene are poor.

SCHISTOSOMIASIS

Schistosomiasis (also known as bilharzia or snail fever) is a chronic disease caused by parasitic worms that live in certain types of freshwater snails. It is second only to malaria as the most devastating parasitic disease in tropical countries. In children, the disease contributes to stunted growth, impaired cognitive development, malnutrition, and anemia, and disrupts school attendance.

LYMPHATIC FILARIASIS

Lymphatic filariasis (LF, also known as elephantiasis) is a mosquito-borne disease caused by parasitic filarial nematodes. Though infection usually is acquired in childhood, the grotesquely disfiguring effects of LF are greatest in adults.

TRACHOMA

Trachoma is the leading cause of infectious blindness worldwide. A bacterial infection of the eye caused by *Chlamydia trachomatis*, it is spread through direct contact with infected individuals and through contact with flies. Although it causes irreversible blindness, trachoma can be treated if diagnosed early.

ONCHOCERCIASIS

Onchocerciasis (also known as river blindness) is an eye and skin infection caused by a parasitic worm and transmitted by the bite of a black fly that lives and breeds on the banks of fast-flowing rivers and streams. While the infection is not a direct cause of mortality, the socioeconomic consequences extend beyond the infected individuals, affecting families and communities.



Multiyear school-based mass drug administration, coupled with sanitation and hygiene education, was key to reducing disease prevalence in Burundi.

FROM MONTANA TO THE WORLD

Agler continued with journalism during and after college. But soon came a second turning point. “An editor told me I was getting too attached to the stories I was writing,” she says. “There was an influx of Bosnian refugees in Boise at that time who were resettling after the war. I wrote a story about them and met families struggling with grief and trauma and culture change. I ended up volunteering for some Bosnian families to help them get set up in their new lives. Then I wrote a story about the Idaho Commission for the Blind, and I ended up volunteering to read books for people who were blind. I got so into the cause-related pieces I was writing about that I began thinking maybe I should be doing more social-impact kind of work.”

“A little bit of money, a little bit of organization, goodwill, compassion—these are the ingredients for making the world a better place,” says Ellen Agler. “It’s very personal. You can have systems and macroeconomic approaches, but actually people are changed by people.”

Agler found her way to Operation Smile, a nonprofit that provides surgeries to repair cleft-lip and -palate conditions, a project for which she managed teams of medical personnel and supplies for medical missions around the world. “A little bit of money, a little bit of organization, goodwill, compassion—these are the ingredients for making the world a better place,” she learned. “It’s very personal. You can have systems and macroeconomic approaches, but actually people are changed by people.”

After two years with the organization, she realized that her goal—and she herself—had changed. “I’d become addicted to impact, not just diving in and out of stories,” she says. “I thought—and still do—about living a life of value, about spending my entire life dedicated to helping others, about how I could be my best self and help others be their best selves.”

HEALTH AS A BRIDGE TO PEACE

Offered the opportunity to set up Operation Smile’s first permanent in-country comprehensive care center, in Bogotá, Colombia, Agler lived in that city from 1999 to 2001, a time of great national instability. To create programs, she drew upon her Operation Smile experience in Gaza and the West Bank of bringing together Palestinian and Israeli surgeons. “That was the beginning of my understanding of how health can be a bridge for peace and that citizen-level diplomacy can happen through this kind of work,” she says.

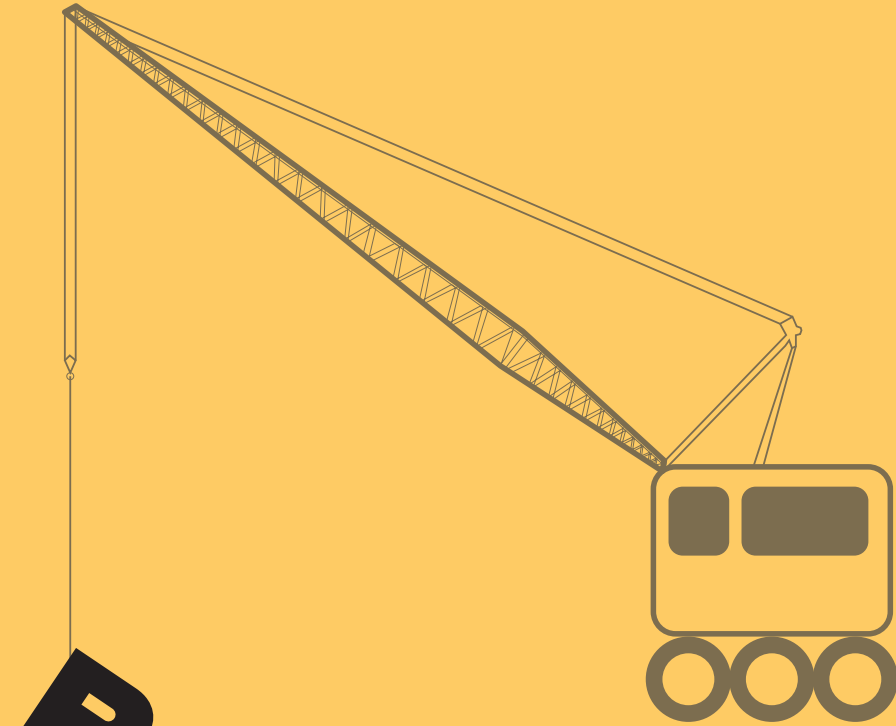
In Colombia, Agler and her colleagues teamed up with the minister of peace, the head of the FARC guerrilla group, and the president’s and first lady’s offices to organize health-

as-a-bridge-to-peace initiatives, through which they conducted surgeries for children with cleft lip and palate in conflict zones and in zones controlled by the guerrillas.

“One of the boys we operated on was a teenage FARC soldier, and some of the medical team caring for him had had family members kidnapped and killed by the FARC,” Agler remembers. “Yet the soldier was still just a kid with a deformity that even in his community made him isolated. These are little seeds of peace that we can generate. It was beautiful work that brought a lot of people together who never thought they would be.”

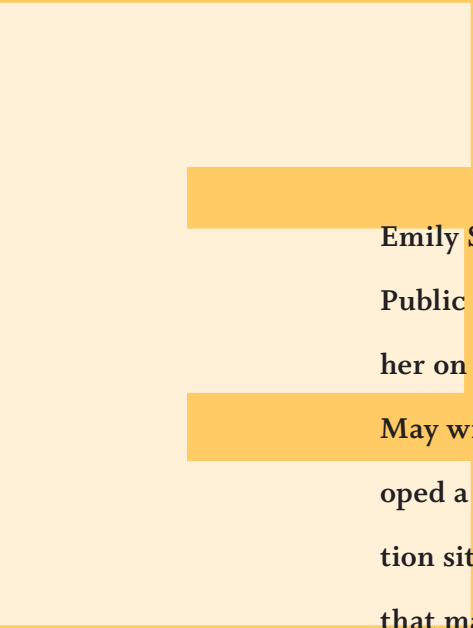
Working in Colombia also helped her realize that humanitarian work was her true path. To prepare for this career, she attended the London School of Economics and received a master’s in international development studies with a focus on nonprofit management, while also working full time setting up Operation Smile as an organization in the U.K.

continued on page 49



BUILDING SAFER CONSTRUCTION SITES

Emily Sparer, SD '15,
created a novel
program that can help
protect construction
workers from the
perils of their trade.



Emily Sparer may be the first Harvard T.H. Chan School of Public Health student to have construction workers cheering her on at her dissertation defense. Sparer, who graduated in May with an SD in occupational safety and ergonomics, developed a B-SAFE safety communication program for construction sites built on a simple, low-cost idea: Take the safety data that managers already gather and share it with the workers.

Posters at Sparer's pilot sites around Boston displayed safety scores each week, broken down by subcontractor, to encourage workers and managers to look at conditions outside of their own area and trade. Sites with high ratings earned a free lunch at the end of the month. As a result of participating in the program, workers are reporting improved teamwork and better communication around safety—and they want it to continue.

“At my defense, one of the construction workers in the audience said that he and his coworkers had met with their corporate-level safety people to see if they could adopt the program companywide,” Sparer says. “That felt like completing a circle—I developed the program, tested it, and now it’s being implemented on work sites. That’s what I want to do with my work: take it beyond a published paper into the real world.”

continued

DANGEROUSLY DYNAMIC ENVIRONMENTS

Construction workers suffer from high rates of work-related injuries such as broken bones and loss of vision and hearing, in addition to chronic health problems such as shoulder, low back, and knee pain. Sparer first became interested in improving their health while she was working for an environmental consulting firm and touring industrial sites across the country. She had recently graduated from Barnard College, where she studied pre-med and environ-

mental science, and found that occupational health was an intriguing way to combine her passions.

“The workplace is a direct interaction between environment and health,” she says. “What struck me about construction sites is how dynamic and fluid they are. You can be on a site one day talking to people, and come back the next day to find a giant hole or a wall in the spot where you were standing. Safety systems need to be designed for an environment that is constantly evolving.”



“You can be on a [construction] site one day talking to people, and come back the next day to find a giant hole or a wall in the spot where you were standing. Safety systems need to be designed for an environment that is constantly evolving.” —Emily Sparer, SD ’15

After enrolling at the Harvard Chan School, Sparer began working with Jack Dennerlein, adjunct professor of ergonomics and safety, on construction work site safety research that would later develop into her thesis. She explored the ways that hazards are communicated—or not communicated—between workers and managers, and among trades.

On most work sites, Sparer says, a manager from the general contracting company regularly walks the site to take note of positive and negative working conditions: Is scaffolding properly secured? Are ladders

safety on site that I have never experienced before,” he says. “Safety became fun.”

According to MacEachern, one reason for B-SAFE’s success is that the program taps into the playful jousting pervasive on construction sites. “I’d see a plumber asking a carpenter where his safety glasses were. That certainly never happened on my projects in the past.”

ADAPTABLE TO MANY WORK SITES

David Michaels, U.S. assistant secretary of labor for occupational safety and health, lauds B-SAFE as an

As part of Emily Sparer’s B-SAFE program, she sent supervisors a weekly narrative report, including a description of both safe and hazardous working conditions, which they were encouraged to share with their crews. For many workers, this was the first time in their rough-and-tumble jobs that they had received positive feedback for the things they were doing right.

in good condition? The information may be shared with insurance companies or government inspectors, but typically not with workers. As part of Sparer’s B-SAFE program, supervisors received a weekly narrative report from her, including a description of both safe and hazardous working conditions, which they were encouraged to share with their crews. For many workers, this was the first time in their rough-and-tumble jobs that they had received positive feedback for the things they were doing right.

LOOKING OUT FOR EACH OTHER

Sparer found that the program not only prompted workers to talk about safety but also boosted their sense of shared responsibility for keeping their sites hazard-free. If scores were down, workers and managers noticed and resolved to make changes, she says. “People were looking out for each other’s safety where they hadn’t before.”

Justin MacEachern, a project executive at Gilbane Building Company in Boston, worked with Sparer on two building projects. “B-SAFE created a culture of

innovative alternative to traditional employee safety incentive programs, which typically aim to “correct” workers’ behavior rather than identifying and eliminating safety hazards at the system or worksite level.

B-SAFE was designed to be adaptable to different types of construction sites and is broken into components so that companies can freely implement it as their time and budget allow (see www.neu.edu/b-safe). Sparer believes it could be adapted to fit other types of worksites, such as manufacturing or health care.

Sparer hopes to construct her own career on intervention research in different types of workplaces. This summer, she started a joint fellowship at the Harvard Chan School and Dana-Farber Cancer Institute in Boston analyzing elements in a variety of work environments—from physical hazards to shift work to social networks—that may raise the risk of cancer. As she sees it, “I’d like to be able to look back on my career and see that my research has made a real difference in people’s lives.”

—Amy Roeder is assistant editor of Harvard Public Health.

HARVARD CHAN SCHOOL RESPONDS TO THE EARTHQUAKE IN NEPAL

Student group keeps spotlight on continuing crisis

A massive earthquake on April 25 in Nepal and a major aftershock on May 12 killed more than 8,800 people and injured more than 23,000. It was the worst natural disaster to strike this rugged Himalayan nation since a 1934 earthquake. The 2015 quakes triggered deadly landslides and avalanches, flattened entire villages, leveled historic buildings and religious structures, and left hundreds of thousands of people homeless and at the mercy of the elements, with the monsoon season fast approaching.

As news reports of the tragedy started to circulate, the Harvard T.H. Chan School of Public Health—where four Nepalese students are currently enrolled—quickly responded.

- *In April, students from the Harvard Chan School, other schools across the Harvard campus, and universities across the U.S. launched Students for Nepal, a coalition to support relief efforts following the Nepal earthquake.*
- *In early May, a team from the Harvard Humanitarian Initiative arrived in Nepal to assist major nongovernmental organizations, the United Nations, and the Nepalese government with digital data collection, and to observe civil-military engagement in response to the disaster.*
- *Renee Salas, a part-time MPH student at the Harvard Chan School and an emergency medical physician at Massachusetts General Hospital, was among those who treated injured survivors in several stricken areas of Nepal where she had been working since March as part of a two-year fellowship in wilderness medicine. Salas served with both the Himalayan Rescue Association and the International Medical Corps.*



BEFORE NEPAL QUAKE, PAINTING A PICTURE OF DISASTER

Before a pair of major earthquakes struck Nepal this spring, Harvard T.H. Chan School of Public Health student Kai Hsiao, MPH '15, had described the overwhelming health care needs in the aftermath of such a hypothetical disaster. In a class paper he handed in just weeks before massive quakes on April 25 and May 12, Hsiao portrayed the country's health care system as unprepared for the triple burden it would face following an earthquake: acute injuries, the threat of potentially epidemic diseases such as typhoid and cholera, and the needs of large numbers of people with chronic diseases whose care would be disrupted.

An emergency medicine resident originally from New Zealand, Hsiao had spent three months working in a hospital in eastern Nepal before enrolling as a student at the Harvard Chan School in 2014. He noted that emergency medicine is still new in Nepal, with only a handful of physicians trained in the specialty.

Hsiao had researched Nepal's earthquake preparedness for a course he took earlier this year as part of his concentration in Humanitarian Studies. He actually learned about this spring's disaster while participating in a three-day humanitarian response simulation exercise as part of the program. A fellow student working for an aid agency was called to leave the simulation exercise to deploy to Nepal for the actual emergency.

In Hsiao's predicted scenario, which placed the epicenter of the quake in Kathmandu, deaths and injuries would have been far higher because of the city's haphazard development and poorly designed buildings.

Presciently, Hsiao stressed the importance of building long-term preparedness and resilience into the humanitarian response to the disaster. "Rather than simply reacting to the immediate needs, how do we leave the place stronger than it was before?"



Elina Pradhan, SM '13, SD '18, second from left, and Jigyasa Sharma, SD '19, center, joined with students across Harvard and other universities in a vigil on May 14. Following the earthquakes, their group Students for Nepal organized a panel discussion, submitted newspaper opinion pieces, raised funds, and created a short film. Pradhan told the *Harvard Gazette*, "It's a feeling that you've lost more than 8,000 of your own. It's hard to communicate that loss and sense of urgency."

- On May 7, Students for Nepal co-organized a panel discussion on the disaster that was webcast from the Harvard Chan Leadership Studio to hundreds of interested parties. Speakers included Kai Hsiao, MPH '15, and Jennifer Leaning, François-Xavier Bagnoud Professor of the Practice of Health and Human Rights and director, FXB Center for Health and Human Rights.
- Student Government and other student organizations raised more than \$5,700 for Nepalese aid relief by selling eco-friendly aluminum water bottles with the Harvard Chan School logo. Profits were matched by Student Government and went to local Nepali organizations Child Workers in Nepal and Association of Youth Organizations Nepal.
- On June 1, the Nepali ambassador to the United States, Arjun Karki, met with Harvard Chan School students and administrators, as well as students and faculty from other nearby universities, to discuss public health priorities in the devastated nation. "All of us are earthquake victims," Karki said.
- As the disaster faded from the headlines, Jigyasa Sharma, SD '19, and others in Students for Nepal published editorials in local and international news outlets to raise awareness of the tremendous unmet needs in the stricken country—from immediate concerns over lack of food and housing to long-term planning for mental health care and health system strengthening.
- Upcoming efforts planned by Students for Nepal include advocating for loan forgiveness for Nepal from international lender organizations, and organizing a symposium to help connect Nepali government and nonprofit representatives with Harvard and other researchers working in the region.

For updates, visit https://twitter.com/Students_Nepal.

Commencement 2015

Harvard Chan Graduates Urged to
Stay Alert to Unexpected Opportunities



Top, Harvard Chan students gather on Quincy Street in Cambridge before the Harvard Yard ceremonies. Above, commencement speaker Leslie Ramsammy, former minister of health of Guyana. At left, celebrants at the Commencement eve award ceremony.

Near left, opposite top, J.D. Levine Photography; all others, Kent Dayton / Harvard Chan

Student speaker Shaniece Criss, who earned a Doctor of Science degree from the Department of Social and Behavioral Sciences



“You are not just creating a résumé. You are creating a biography,” Dean Julio Frenk told graduates on May 28 at the School’s 2015 commencement ceremony. He urged them to stay alert for “the tap on the shoulder from unexpected opportunities” and not to fear following career paths that diverge from traditional trajectories.

In his final commencement address before stepping down as Dean, Frenk reflected on the School’s “extraordinary” activity over the last two years, from the launch of the centennial year in October 2013 to the transformational gift last fall from the Chan family’s Morningside Foundation, spearheaded by Gerald Chan, SM ’75, SD ’79.

“I will leave my deanship confident that this School is positioned to change the world,” he said.

Leslie Ramsammy, who played a pivotal role in preventing the spread of HIV/AIDS as Guyana’s minister of health, called on graduates to add improving global life expectancy to the list of challenges they’ll face as public health professionals. “I am confident,” he said, “that by the time your generation passes the baton on to the next, you will hand them an even better world than my generation gave you.”

Student speaker Shaniece Criss, who earned a Doctor of Science degree from the Department of Social and Behavioral Sciences, described her awakening to public health: the realization that her grandmother’s premature death from cancer was likely influenced by racism and other negative influences in her social environment. In public health, Criss said, she sees a way to redefine seemingly intractable problems and “refract negative health exposures into life-giving outcomes.”

Anthony Dias, MPH ’04, president of the Harvard Chan School Alumni Association, urged graduates to maintain ties with the School by connecting with the global alumni network.



Staff recognition award-winner Dale Trevino (left) with student honorees Virgie Fields, Alvin Tran, and Sandhya Kajeepeta



From left: Ronnie Chan, Former Dean Julio Frenk, and Gerald Chan, with portrait of T.H. Chan

Portrait of T.H. Chan Unveiled during Commencement Week

When the Harvard T.H. Chan School of Public Health kicked off the celebration of the first Commencement under its new name this past spring, the opening event of the two days of festivities was the unveiling of a portrait of T.H. Chan. On May 27, members of the School's community packed Rosenau Atrium in the Kresge Building to watch Dean Julio Frenk unveil the portrait with the help of painter Everett Raymond Kinstler, whose previous subjects have included Presidents Gerald Ford and Ronald Reagan.

The School was renamed last fall following a transformational gift from the Chan family's Morningside Foundation, spearheaded by Gerald Chan, SM '75, SD '79.

In pre-recorded remarks, Harvard President Drew Faust praised T.H. Chan as "a person who instilled such a sense of moral responsibility in his family that it has led to this extraordinarily generous gift to the School and to Harvard University."

After the unveiling, Frenk said that he saw in the painting "the marriage of heart and head that was fundamental to T.H. Chan's life." He said, "We are fortunate to have this painting as a permanent touchstone, a reminder of what it looks like to live for the greater good."

Speaking for the Chan family, Ronnie Chan described his father as a humble man with tremendous respect for all human beings. He believed in using his money to serve society, Chan said, and he never turned away a young person looking for help to pay for education. He said, "I am so proud that now my late father's portrait should be hung in this wonderful school called the Harvard T.H. Chan School of Public Health."



1975

Alan B. Cohen, SM, SD '83, was appointed to the International Scientific Advisory Group for the National Health Service's Collaboration for Leadership in Applied Health Research and Care in the West Midlands region of the UK. He also is co-editor of *Medicare and Medicaid at 50: America's Entitlement Programs in the Age of Affordable Care*, released in July by Oxford University Press.

1983

J. Jacques Carter, MPH, received the Jack Colbert Award from the Massachusetts Prostate Cancer Coalition in June. Carter, an internist at Beth Israel Deaconess Medical Center in Boston and an associate professor of medicine at Harvard Medical School, has worked to educate health care providers and the public in Massachusetts about the burden of prostate cancer.

1992

Kathleen Jagger, MPH, became vice president of academic affairs and dean of the college at Kentucky's Thomas More College on June 1. Jagger had previously served at Transylvania University in various roles, including interim vice president and dean of the college, associate vice president and associate dean of the college, and professor of biology.

1999

Tejal Gandhi, MPH, was named in April as one of the 100 Most Influential People in Healthcare by *Modern Healthcare*. Gandhi, who ranked 49th, is a board-certified internist, associate professor of medicine at Harvard Medical School, and a certified professional in patient safety. In subsequent issues, the magazine also named her one of the 50 Most Influential Physician Executives and one of the Top 25 Women in Healthcare. In 2013, Gandhi became president of the National Patient Safety Foundation, and in November 2014, president and CEO of the foundation. Previously, she had been chief quality and safety officer at Partners HealthCare, where she helped lead the efforts to standardize and implement patient safety best practices across the system.

Pratik Multani, SM, was named chief medical officer at Ignyta, an oncology biotechnology firm, in February. He was formerly chief medical officer at Fate Therapeutics.

Juan C. Celedón, MPH, DrPH '01, was inducted into the Association of American Physicians at the ASCI/AAP annual meeting in Chicago on April 25. He also received the Lifetime Achievement Award for Innovations in Health Equality from the American

Thoracic Society on May 16. His research focuses on genetic and environmental risk factors for obstructive airway diseases such as asthma and chronic obstructive pulmonary disease, particularly in racial or ethnic minorities.

2002

Jesse Selber, MPH, participated in the first known partial skull and scalp transplant from a human donor in May. Selber is a reconstructive plastic surgeon at MD Anderson Cancer Center in Houston. The patient suffered from a head wound caused by radiation treatment and was experiencing multiple organ failure. Because doctors could not perform a needed kidney-pancreas transplant as long as the patient had the open wound, Selber proposed performing it at the same time as a partial skull and scalp transplant. The 15-hour operation was successful.

2005

Hossein Jadvar, MPH, recently became president of the Society of Nuclear Medicine and Molecular Imaging for a one-year term. It is the premier international society in nuclear medicine, with more than 18,000 members worldwide. Jadvar, who is associate professor in radiology at the University of Southern California Keck School of Medicine in Los Angeles, also recently received

continued

the Academy of Radiology Research Distinguished Investigator Award. He holds an executive MBA from the University of Southern California, an MD from the University of Chicago Pritzker School of Medicine, and a PhD in bioengineering from the University of Michigan, Ann Arbor. His postgraduate medical training included an internship in internal medicine at the University of California, San Francisco, a residency in diagnostic radiology and nuclear medicine at Stanford University, and a fellowship in positron emission tomography at Harvard Medical School. He lives with his wife, Mojgan, and daughters Donya and Delara, in Pasadena, California.

2012

Monica Bharel, MPH, was appointed by Massachusetts Governor Charlie Baker to head the state Department of Public Health in February. Bharel had previously served as chief medical officer at the Boston Health Care for the Homeless Program.

2014

Aynharan Sinnarajah, MPH, was named medical director of the Palliative and End of Life Care program for the Calgary Zone of Alberta Health Services, in Alberta, Canada.

Harvard Public Health is interested in hearing from you. Please send comments or class notes to:

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IN MEMORIAM



FRED LI

Frederick Pei Li, a renowned cancer researcher, died on June 12 at age 75. A professor at Dana-Farber Cancer Institute, Harvard Medical School, and the Harvard T.H. Chan School of Public Health, Li laid the groundwork for today's genetic counseling services for people with an inherited risk of cancer—and for efforts to develop cancer-prevention strategies for such individuals.

In the late 1960s, Li and his colleague at the National Cancer Institute, Joseph Fraumeni, began tracking patterns of cancer in children. Together, they identified a small number of families in which the same rare cancers had arisen across several generations. Their research led them to describe what is now known as Li-Fraumeni syndrome, a rare but devastating condition in which people are highly prone to develop a variety of serious cancers at an early age.

For the next two decades, Li and his colleagues worked to identify the mutated gene or genes responsible for the syndrome. In 1990, they published a paper identifying a mutation in p53, a tumor-suppressor gene, as the culprit. It was one of the first times an inherited abnormal gene was linked to cancer in humans. The genetic test for Li-Fraumeni syndrome became a paradigm for the evolving field of genetic epidemiology. 🌟

WARREN BERGGREN



Warren Berggren with Gretchen Berggren

The Harvard T.H. Chan School of Public Health community was saddened to learn of the death on January 30, 2015, of Warren Berggren, MPH '63, DPH '67, who passed away in Golden, Colorado, at age 85. Together with his wife, fellow physician, and public health partner, Gretchen Glode Berggren, SM '66, Warren Berggren launched groundbreaking community health programs in the developing world.

Their early years as medical missionaries in what is now the Democratic Republic of Congo led to their strong advocacy for health as a human right. In 1962, the Berggrens came to the School to study disease prevention.

The couple moved to rural Haiti in 1967, founding the Community Health Program of Hôpital Albert Schweitzer, in partnership with the School. Their visionary work delivering vaccines for neonatal tetanus to local communities led to the virtual elimination of that infection. They also engaged local residents as community health workers.

As a member of the Harvard Chan faculty, Berggren served as an associate professor of tropical public health and population sciences from 1972 to 1981. He was later director of primary health care at Save the Children and consulted for USAID, UNICEF, World Relief, and the Colorado Haiti Project, on projects affecting 26 countries.

The Berggrens received several prestigious awards, including a lifetime achievement award from the American Public Health Association and a presidential citation from President Bill Clinton. In 1998, the couple received the Harvard Chan School's Alumni Award of Merit—the highest honor bestowed by the School on its graduates. 🌟

AWARDS AND HONORS



David Bloom, Clarence James Gamble Professor of Economics and Demography, was named one of 32 inaugural Andrew Carnegie Fellows in April. Recipients of the new annual fellowship supporting scholars in the social sciences and humanities will receive up to \$200,000 each, which will enable them to devote between one and two years to research and writing. The anticipated result of each fellowship is a book or major study.



Stephen Gilman, adjunct associate professor of social and behavioral sciences, became acting chief of the Health Behavior Branch of the Eunice Kennedy Shriver National Institute of Child Health and Human Development in April. Gilman, SM '99, SD '01, researches the developmental origins of health inequalities and aims to identify intervention targets during childhood that could reduce inequalities over the course of life. Results of his research demonstrate the link between disadvantaged

continued

AWARDS AND HONORS *continued*

childhood environments and the formation and subsequent recurrence of mood and substance disorders in adulthood.



William Hsiao, K.T. Li Research Professor of Economics, was awarded the Presidential Medal—Order of Brilliant Star with Violet Grand Cordon—by Taiwan President Ma Ying-jeou at a March 17 ceremony at the Presidential Palace, in Taipei. Hsiao was cited for his contribution in establishing Taiwan's widely praised National Health Insurance system.

Curtis Huttenhower, associate professor of computational biology and bioinformatics, was named winner of the 2015 Overton Prize from the International Society for Computational Biology in February. The prize recognizes early or midcareer scientists who are emerging leaders in computational biology and bioinformatics for their accomplishments in research, education, and service.



Franziska Michor, professor of computational biology, was awarded the Vilcek Prize for Creative Promise in Biomedical Science in February. Michor was chosen for her research that fuses

evolutionary biology, mathematics, and clinical research toward a better understanding of cancer genesis and treatments.



Michael Reich, Taro Takemi Professor of International Health Policy, was awarded the Order of the Rising Sun, Gold Rays with Neck Ribbon, by the Japanese government, for his contributions to promoting Japan's global public health policy and advancing public health in Japan. The award was announced April 29.

APPOINTMENTS AND PROMOTIONS

Sheila Isanaka

Assistant professor of nutrition

Karestan Koenen

Professor of psychiatric epidemiology

Xihong Lin

Henry Pickering Walcott Professor of Biostatistics and chair of the Department of Biostatistics

Nicolas Menzies

Assistant professor of global health

Murray Mittleman

Tenured professor in the Department of Epidemiology and director of the MPH program

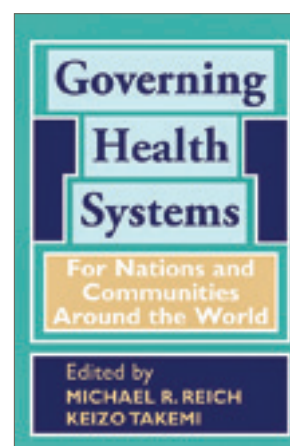
Roger Shapiro, MPH '03

Associate professor of immunology and infectious diseases

Christopher Sudfeld

Assistant professor of global health and nutrition

BOOKSHELF



GOVERNING HEALTH SYSTEMS: FOR NATIONS AND COMMUNITIES AROUND THE WORLD

Michael R. Reich and Keizo Takemi, editors

Lamprey & Lee, 2015

419 pages

What are the complex relationships between governance and performance in community and national health systems? Each chapter in *Governing Health Systems* provides an in-depth case study, using both qualitative and quantitative methods, on health systems in many countries, including Brazil, Ghana, India, Indonesia, Japan, Nigeria, Palestine, South Korea, Uganda, and Zambia. The chapters were written by former Takemi Fellows, who were midcareer research fellows at the Harvard T.H. Chan School of Public Health, and their colleagues. The case-study approach yields important findings as well as contextual insights about the challenges and accomplishments in addressing governance issues in diverse health systems around the world.

SHINING A LIGHT ON NEGLECT *continued from page 31*

NEXT MOVE: HARVARD CHAN SCHOOL

Her search for a specialty within international development led Agler to the Harvard T.H. Chan School of Public Health, where she earned an MPH in international health. She calls Jennifer Leaning, François-Xavier Bagnoud Professor of the Practice of Health and Human Rights and director of the FXB Center for Health and Human Rights, “an icon for me” and especially remembers participating in the Humanitarian Studies Initiative.

For her part, Leaning notes that Agler was “essentially a social and intellectual beacon” for her fellow MPH students, many of whom were already accomplished doctors and other health professionals. “In her questions and observations, they realized they were dealing with someone who’d had more world experience than they had,” says Leaning. “Without being a medical person, Ellen exemplified and, in a quiet way, transmitted the major power of medical ethics. I think that’s an important aspect of her standing in public health. She understood the difficulties but was just alive to the positive possibilities—and people felt that.”

Following her time at the Harvard Chan School, Agler moved to California to work with the International Medical Corps, which conducts complex emergency work. After the tsunami in East Asia in December 2004, she traveled to Banda Aceh, Indonesia, to treat tsunami survivors, bring together medical teams, and set up health centers. She later oversaw programs in Burundi, Darfur, and Somalia, and ultimately returned to Operation Smile as the senior



Ellen Agler meets with a beneficiary shortly after the woman's 15-minute sight-saving trichiasis surgery in Arusha, Tanzania.

greatest good for the greatest number, why not dedicate your energy and your time to do something that affects a billion people? It was like a fire got lit under me. I started learning everything I could about neglected tropical diseases.”

In 2012, now with a husband and 2-year-old daughter, she became the END Fund's first employee, distilling the lessons from her early years in humanitarian work. “This is not a hierarchical world anymore. This is a collaborative world,” she observes. “As one of my friends says, ‘How do we minimize our importance in order to maximize our impact? How do we lower ourselves to a higher cause?’”

Under her leadership, the END Fund has raised more than \$50 million and last year helped treat 45 million people at risk for or suffering from neglected tropical diseases.

In an ethics class at Harvard Chan, Ellen Agler learned that philosophical debates in public health revolved around “decisions about your personal life as well, and if you want to do the greatest good for the greatest number, why not dedicate your energy and your time to do something that affects a billion people? It was like a fire got lit under me.”

vice president for global programs. During all those stints, she drew on knowledge gained at the School, including biostatistics, epidemiology, and global health system strengthening. She also cherishes the copy of the Universal Declaration of Human Rights that she received at graduation. “I always have that framed next to my desk,” she says. “It lives with me.”

GOING TO THE END

When Agler received a call from a recruiter asking if she would be interested in joining the END Fund—then a startup with significant financial backing and a big vision—it revived a Harvard Chan experience. “I remembered my Harvard ethics class and the debates we would have about making decisions around public health,” she says. “It involves decisions about your personal life as well, and if you want to do the

The organization works through local partners, through building capacity, and through supporting organizations with a track record of tackling the problem effectively. And while pharmaceutical companies donate nearly all the necessary medicines, delivery is uncertain—a key impediment to ending these catastrophic diseases. Agler's response: “Let's get on with it. Let's solve the problems like this that really are solvable.”

Her former teacher, Leaning, agrees and is pleased that Agler is on the case. “This zest for what lies ahead is a very important quality in a human being,” says Leaning. “People like Ellen who have this quality know the perils but are eager to surmount them. She has an enthusiasm for life that is almost wondrous.”

Jan Reiss is assistant director of development communications and marketing at the Harvard Chan School.



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