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# PUBLIC HEALTH

Spring/Summer 2024



Spring/Summer 2024

## Thriving Through Time

How to meet the challenges—and seize the opportunities—of an aging society

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–Dean Ellen MacKenzie, PhD '79, ScM '75

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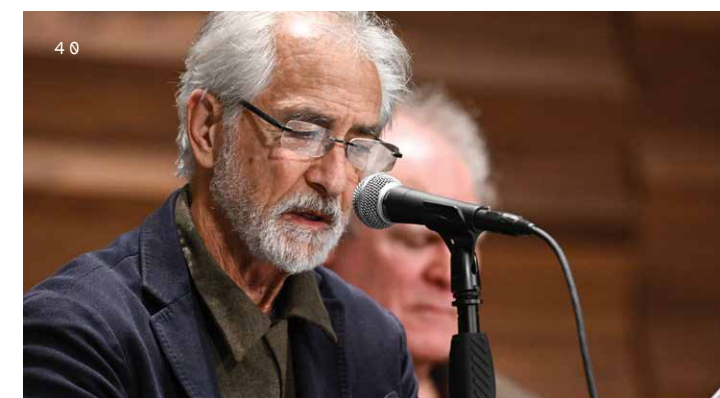
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Opening Remarks

# The Mysteries of Aging Well

Reducing frailty and disease is just the first step in helping seniors live their best possible lives.

BY JENNIFER SCHRACK

**W**e live in a society that values youth and showers us with anti-aging messages. Young people are celebrated. Older people are mostly pushed to the margins. The media trumpet the latest ways to slow the aging process, while advertisers push products to prevent gray hair and wrinkles. As a result, the bias against aging seeps into social discourse: Hard-working seniors are often asked, “When are you going to retire?” The subtext is often, “You’re getting too old to work.”

But “younger is better” is a misperception. Aging is not something to be feared. It is not a disease. It reflects a lifetime of growth and wisdom.

Fortunately, older adults are living longer and better for the most part. But as with all public health challenges, we still have a lot to learn.

There has never been a more important time to study aging. By 2035, for the first time in human history, the number of adults ages 65 and older will exceed the number of children ages 5 and younger. This critical juncture demands that we improve our understanding of aging so that we can sustain and care for our growing population of seniors in the not-so-distant future and beyond.

Adapting to this new reality will bring many challenges. One of the most important is understanding what it means to “age well.” The longer I study aging, the more I appreciate that successful aging is more than the absence of frailty and dis-

ease. Older adults say their primary concerns are independence, social engagement, and the ability to pursue what matters most to them. This means we need to move beyond traditional assessments of physical and cognitive health to encompass a more comprehensive understanding of the aging process.

We do know some of the most important factors that influence how we age: what we are born with (our genes), what we are exposed to, and how we care for ourselves through our lifetime. We also know aging begins long before the golden years. Some may argue it starts at birth, while others contend it commences once we reach peak growth and development—in our 20s and 30s. Regardless, we need to intervene earlier in life to prevent poor health in late life. Years of poor lifestyle choices can accelerate the onset of conditions such as osteoarthritis, diabetes, and hypertension in late life. This is not to say older adults can’t benefit from lifestyle modifications. Research such as the Johns Hopkins-led ACHIEVE trial has shown that seniors can be helped by something as simple as using hearing aids. But as many of us will live into our 90s and beyond, it becomes more important to understand how to preserve health later in life through personal health choices (diet, exercise, sleep, cognitive engagement, etc.) as well as equitable access to health services and care.

The good news is that evidence shows we are on the right track. Data from another Hopkins-led effort—the National Health and Aging Trends Study—suggest that more older adults are living in community settings and fewer are living in residential care like nursing homes. Extending independence and enabling

seniors to stay active and engaged for a longer portion of their lives is a major success. Yet researchers and health care providers still have much to do.

To limit the progression of diseases and conditions associated with aging, researchers, providers, and policymakers need to work as a team. We need to promote the benefits of lifelong healthy lifestyle choices and advocate for better, more equitable access to health care and public services. We need more sensitive tools to help us detect adverse health changes earlier—when treatment and interventions are more likely to be effective. We need more geriatricians, specialized physicians, and nurses with knowledge specific to the complex care needs of older adults. We need to engage older adults as meaningful, vibrant parts of our communities. And we need to promote aging as a positive part of the human experience.

Above all, we need to recognize life is short and every day that we age is a gift. No one is immune to the challenges of aging, but we can minimize and accommodate the physical, cognitive, and sensory impairments that may limit opportunities later in life. Until we unlock all the secrets of successful aging, we have time-tested principles to live by: Keep moving. Stay engaged, socially and cognitively. Live life with purpose and meaning. Take time to breathe, grieve, and seek joy in what matters most. ☺



Jennifer Schrack, PhD '11, MS, is an Epidemiology professor and director of the Johns Hopkins Center on Aging and Health.

# Longer Lifespans

BY BRIAN W. SIMPSON

Surging numbers of seniors are already causing tectonic shifts in American society. In the coming years, those changes—from the economy and the workplace to health care and beyond—will become more consequential. Is America’s future gray or silver? It depends on how quickly science and society can adapt.

## SNAPSHOT

4.9 / 55.8

Millions of people 65+ in 1920 / 2020  
*U.S. Census Bureau, 2023*

1 IN 20 / 1 IN 6

Proportion of Americans 65+ in 1920 / 2020  
*U.S. Census Bureau, 2023*

48.6%

Growth in number of people 95+ from 425,000 in 2010 to 631,000 in 2020  
*U.S. Census Bureau, 2023*

## U.S. AND PEERS

28.5, 22.6, 16.8, 15.5

Percentages of the populations of Japan, Italy, U.S., and New Zealand who are 65+  
*U.S. Census Bureau, 2023*

## CHALLENGES

54%

Share of the 14.4 million middle-income seniors who, by 2029, will not be able to pay for the level of care provided in senior housing  
*Health Affairs, 2019*

22% / 40%

Obesity prevalence among people 65+ in 1988–1994 and in 2015–2018  
*U.S. Federal Interagency Forum on Aging-Related Statistics, 2020*

27% / 50%

Share of women 65–74 living alone in 2023; women 85+ living alone that year  
*PRB analysis of data from the U.S. Census Bureau, Current Population Survey, 2024*

## BOOMER TWILIGHT

2030

Year by which all 73 million Baby Boomers (born 1946–1964) will be 65+. After this point, growth in the older population will start slowing.  
*U.S. Census Bureau, 2019 & 2023*

## BRIGHT PROSPECTS

35% / 10%

Share of people 65+ living in poverty in 1959 and 2022  
*U.S. Census Bureau, 2023*

11% / 15%

Share of adults 65+ in the labor force in 1987, 2023  
*Pew Research Center, 2023*

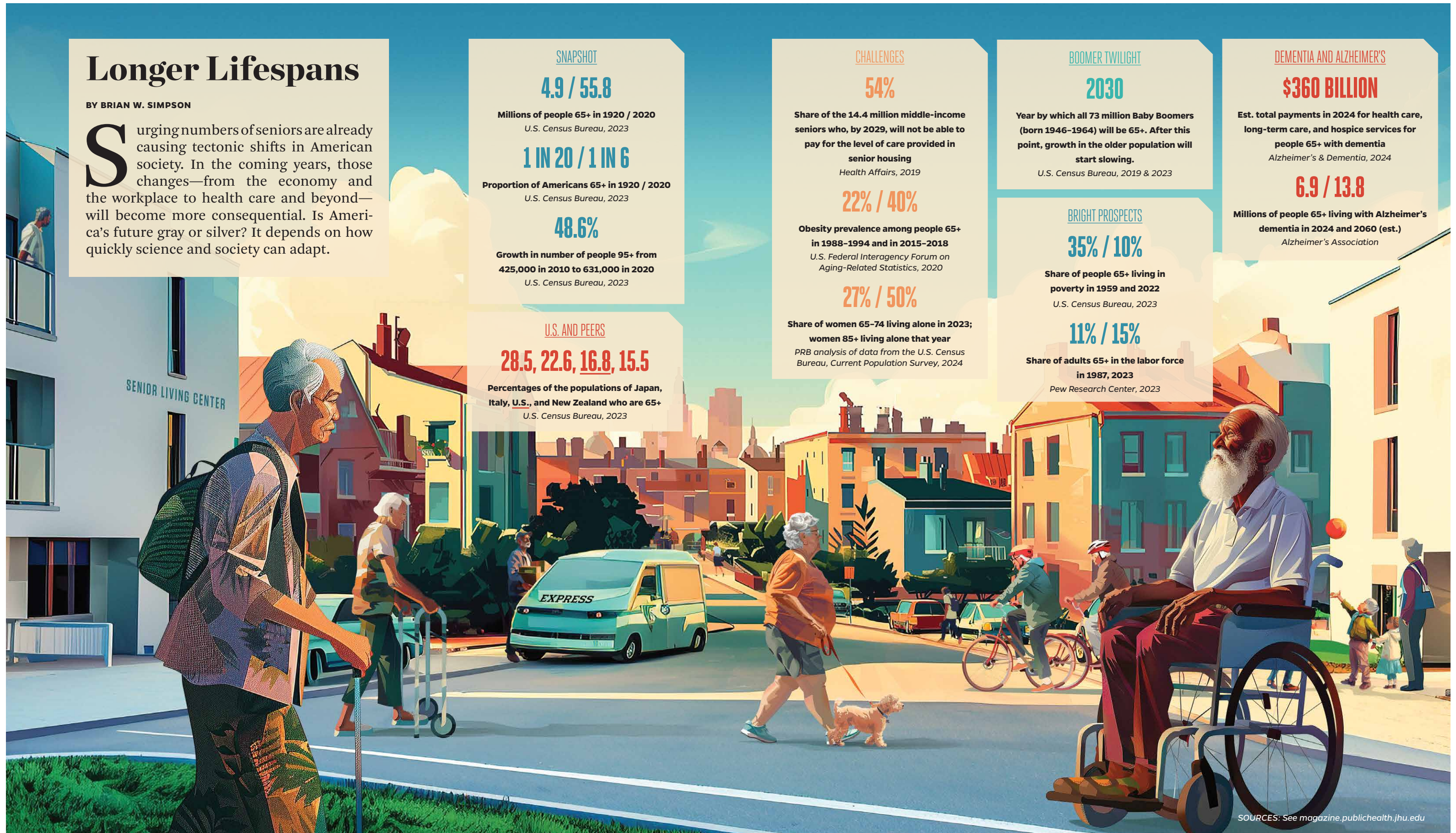
## DEMENTIA AND ALZHEIMER'S

\$360 BILLION

Est. total payments in 2024 for health care, long-term care, and hospice services for people 65+ with dementia  
*Alzheimer's & Dementia, 2024*

6.9 / 13.8

Millions of people 65+ living with Alzheimer's dementia in 2024 and 2060 (est.)  
*Alzheimer's Association*



SOURCES: See [magazine.publichealth.jhu.edu](https://magazine.publichealth.jhu.edu)

# HEALTH CARE'S HIDDEN WORKFORCE

Caregivers are the glue in a fragmented system of health care and support services for a ballooning population of aging Americans.

“A

BY MELODY SCHREIBER  
PHOTO ILLUSTRATIONS BY DUNG HOANG

lot of my life is taking my dad to doctors' appointments,” says Mia Fantaci Hale, 34. When her father's health is poor, she might take him to three different doctors' appointments in a day. Sometimes being his unpaid caregiver means changing bandages and administering IV medications through PICC lines. Sometimes it means checking his mail to make sure his Medicaid isn't getting cut off. Always it means hours spent on paperwork, phone calls, and patient portals to manage his needs and communicate with providers and insurers. ♦



“Caregiving is pretty much my whole day, between my 2-year-old and my dad,” Fantaci Hale says—and she’s expecting another baby in May.

Caregivers are an increasingly important part of the aging discussion, especially as older people are living in their communities longer. They help with health care delivery and decisions, but often their work goes unseen and unacknowledged. Jennifer Wolff, director of the Roger and Flo Lipitz Center to Advance Policy in Aging and Disability, often calls them “care partners,” reflecting their important role as members of the care team.

There are already about 26 million unpaid caregivers of older adults in the U.S., and about 4.8 million paid direct care workers like home and residential aides. By 2060, 94.7 million Americans will be 65 and older—nearly a quarter of the U.S. population—according to the U.S. Census Bureau.

The growing need for caregivers is slowly gaining national attention, but not as quickly as it should, say experts like Katherine Miller, an assistant professor in Health Policy and Management. “When we think about the public health investments that have occurred for other issues the CDC has declared an issue, caregiving has not been elevated in the same way until recently,” says Miller, PhD, MSPH.

The CDC declared caregiving an “important public health issue” in a 2018 report detailing the prevalence of unpaid caregiving and the health issues facing caregivers, including stress, lack of sleep, and high rates of chronic illness. The first-ever national strategy to support family caregivers was launched in 2022. In May 2023, President Biden signed an executive order to improve access to care and support for caregivers, including better compensation and benefits, insurance, and mental health care. The National Academies of Sciences, Engineering, and Medicine released a report on April 11 on how best to support family caregivers in the STEM workforce, including recommendations for comprehensive federal paid leave.

“It’s very exciting. Even though it has been slow, the pace seems to be accelerating,” says Wolff, PhD ’03, MHS ’95.



**FANTACI HALE AND HER YOUNGER SISTER WERE** teenagers when they began caring for their father around 2005. Their parents had divorced, and his primary struggle was ADHD. His physical health seemed good—he loved cooking, biking, rollerblading, and running. But then, around 2016, his health began deteriorating in a cascade of symptoms and diagnoses: heart failure, diabetes, dizziness, fatigue, gastrointestinal issues, and others.

Fantaci Hale grew up hearing that in her father’s Italian American and her mother’s Trinidadian cultures, children take care of their elders at home, so there was “a tremendous amount of pressure” to become her father’s caregiver, she says. But finances also played a role: “There was never an option on the table for something like assisted living, because financially it just doesn’t make sense.”

So, when Fantaci Hale and her husband decided to leave Georgia in 2019, they made choices with her father in mind. They moved to Massachusetts in

part for its social safety net and found a home with an in-law suite for the day her dad would need to move in. That day came quickly, in early 2020.

She’s glad her father can be an important part of her family’s life. She only wishes she were facing the challenges with more support—more resources, respite, respect. “It’s really overwhelming sometimes,” she says. “It really truly feels like you have zero time to yourself.”

**JEROMIE BALLREICH, PHD ’17, MHS ’12, AN** associate research professor in HPM who lives with quadriplegia, has had dozens of paid caregivers over the past two decades, and his family also helps with care. “They’re critically important in the health care system,” he says.

Yet medical professionals “rarely integrate the caregiver as part of the whole medical process,” he says. Sometimes it’s appropriate for patients to have visits with a provider one-on-one, but other

times, it’s a puzzling omission. “I’ve experienced many times when the caregivers are not involved, and that’s a problem because they are the ones doing a lot of the frontline medical tasks daily,” he said. “The fact is, I’m not the one doing the bandage dressing daily—that’s the caregiver.” Integrating caregivers into medical care can also improve that care. “It needs to be a bigger part of our national conversation for health care,” Ballreich says.

Chanee Fabius, PhD, MA, an HPM assistant professor, agrees. “One of the biggest issues is the lack of coordination that we see between medical care, long-term services and supports, and family caregivers, and it’s usually the family caregiver that’s tying all the knots together and making all the pieces fit together,” she says. “If we could improve care coordination and communication between systems, it probably would take some of the burden off of family caregivers.”

Patient web portals are one potential tool for this coordination. The current system is strongly focused on patient autonomy and patient privacy, without acknowledging that many people rely on others to navigate the system, Wolff says. With other members of the Coalition for Care Partners, Wolff is working to improve portal systems in several ways, including by creating roles for caregivers so that providers know who they are, what they’re doing, and what research, resources, and referrals they need. “It benefits the integrity of the information, but it also gives care partners legitimacy,” Wolff says. Excluding them from patient portals “perpetuates this idea of invisibility, that the caregiver doesn’t have a role.”

Defining her role with doctors—and with her father—is one of Fantaci Hale’s



**It’s really overwhelming sometimes. It really truly feels like you have zero time to yourself.**

biggest struggles. “It is a ... fine line between what he is comfortable with me saying to them and what is actually happening at home,” Fantaci Hale says. “A lot of the time when we go to doctors’ appointments and I put my foot down and I say, ‘Hang on, you’re masking how bad this issue actually is,’ he gets really upset with me,” she says. She would like to have a few minutes occasionally to consult with clinicians alone, while also respecting her father’s independence and autonomy. “It’s really hard as our parents get older, because there’s a lot of pride involved,” she says.

**THE ECONOMIC VALUE OF CARE PROVIDED BY** unpaid caregivers like Fantaci Hale far exceeds that paid out-of-pocket or by public and private insurers.

Although Fantaci Hale’s father receives Medicaid, applying for caregiving funds from Medicaid “feels very daunting,” she says, adding that it would be an enormous help if social workers could go through the paperwork with her family. “It really feels like there’s an extraordinary amount of hoops to jump through if you want to

establish care for a loved one,” Fantaci Hale says. Meanwhile, she and her husband, like many family caregivers, spend their own money on expenses related to providing care.

Most paid caregiving—including for direct care workers, nursing home aides, and some family caregivers—is funded through Medicaid, which has significant asset limits determined by states. More than 6.9 million older adults received Medicaid in 2019, which is only about 10% of Americans over 65. Medicare does not pay for long-term services and supports, regardless of who provides them.

**FANTACI HALE IS GRATEFUL FOR THE COMMUNITY** support she’s found at Tandem, a co-working community with onsite childcare she is helping to create in Salem. “Anyone who is doing any sort of caregiving in any capacity really needs that community because it can be mentally and emotionally draining to be filling somebody else’s cup constantly,” Fantaci Hale says.

At Tandem, she connects with other intergenerational families and finds tremendous comfort in “being able to talk to somebody else about how stressful sometimes it can be having a grandparent or grandparents in the house.” Just as important, she enjoys sharing the good parts—the French onion soup her dad made from scratch for Easter, the hours he spends with his granddaughter in the garden—and the reminders that this time together is worth the challenges.

“One day, my dad won’t be around anymore,” Fantaci Hale says. “I want to know I did the best I could for him when that day comes.”

## MORE THAN THEIR SHARE

59%

Share of unpaid caregivers who are women

53.8%

Share of caregivers who give assistance for two years or more

55%

Share of family caregivers who also work full- or part-time

54.3% / 38.6%

Share of Black/white caregivers who provide more than 40 hours of care per week

14.5%

Share of caregivers who reported experiencing 14 or more mentally unhealthy days in the past month

Sources: See magazine.publichealth.jhu.edu

# OLDER LENS

# ON AGING



## AGING WHILE QUEER

For the LGBTQ+ community, the aging journey is often a winding path shaped by minority stress—the compounding effects of stigma, discrimination, and social isolation tied to sexual or gender identity.

Harry Barbee, PhD, MS, an assistant professor in Health, Behavior and Society, is shedding light on the complex ways those stressors manifest across the lifespan. In a 2023 study of over 1,200 LGBTQ+ adults ages 50 to 76, Barbee found that experiencing major problems at work, such as overwork or interpersonal conflicts, nearly doubled the odds of mild cognitive impairment.

While external stressors play a significant role, the way LGBTQ+ people perceive their own aging process—what Barbee calls “subjective aging”—also shapes health outcomes for this community.

For many queer elders, that perception is indelibly shaped by the generational trauma of the AIDS crisis, watching vibrant lives cut short while the world looked away. Among LGBTQ+ adults ages 50 to 59, those who witnessed more AIDS-related deaths in their social networks tended to have a more pessimistic outlook on aging, which was linked to poorer self-rated health, Barbee’s research shows.

Yet Barbee’s interviews with 41 people of different gender and sexual identities—10 lesbians, 10 gay men, 10 straight men, and 11 straight women—in midlife and beyond also capture resilience and growth: Gay men finding purpose in mentoring queer youth. Lesbian women boldly confronting injustice after decades of holding their tongues. Spirited talk about sex and newfound freedom.

“I embrace the elder role that comes with age in the gay community,” one subject shares. “We have so much experience to offer.”

Looking ahead, Barbee emphasizes the urgent need for more representative data to understand the diverse experiences of LGBTQ+ elders. “Oftentimes, when you look at these national data sets of LGBTQ+ people, it’s a lot of white people, and it’s a lot of gay men,” they note. “That’s something that I think about a lot: increasing representativeness within the data that we have.”

Public health research examines aging at every level, from molecular to societal.

BY GABRIEL MULLER

**A**ging is not just one process but many. It affects—and is affected by—changes in biology, social structures and norms, and our own experiences in the world. Across the Bloomberg School, researchers untangle aging’s causes and effects to suggest ways older adults around the world can stay healthier and safer—through better data, new therapies and vaccines, more inclusive norms, and lifesaving policies. ♦

## OUTSMARTING THE FLU

Of the 30,000-plus influenza deaths that occur every year, 9 in 10 are among adults 65 and older.

It's well accepted that the body's immune response weakens as we age, so Jay Bream, PhD, wants to know how vaccines work in seniors and how they can be improved.

Bream and his collaborator Sean Leng, MD, PhD, both professors in Molecular Microbiology and Immunology, are investigating why some vaccinated seniors still catch the flu, despite receiving their seasonal vaccination. By following a group of adults over 75 for the past decade—a rare cohort in this type of research—they are uncovering clues about how aging affects the immune system's response to flu vaccines.

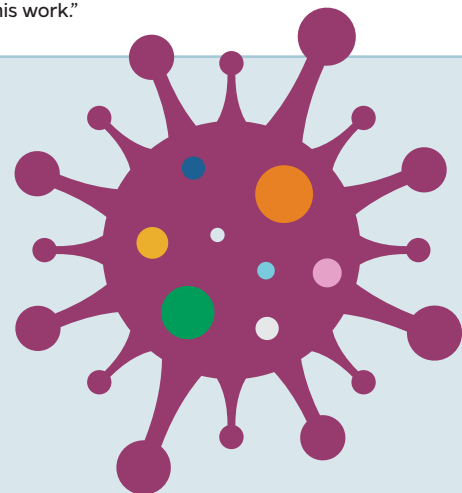
"Many studies group everyone over 65 together, but we're learning that a 65-year-old is closer to 55 than to 75 in terms of immune function," Bream explains. "Our study's focus on the over-75 age group, combined with its longitudinal nature, is one of its strengths."

Complicating Bream's efforts to pinpoint the factors contributing to breakthrough flu infections is the presence of cytomegalovirus. This stealthy, persistent virus infects nearly everyone by adulthood and may be monopolizing the aging immune system's limited resources.

Diverting a substantial part of the immune system to focus on combating the cytomegalovirus may reduce our capacity to effectively respond to other threats like influenza, Bream hypothesizes, though he cautions that more research is needed to prove this connection.

Ultimately, Bream hopes his team's findings could inform the design of improved flu vaccines tailored to the elderly, perhaps by boosting T cell responses, altering doses, or optimizing timing.

The road ahead is challenging. "It's sobering that we still don't understand so much about how aging impacts the immune system," Bream says. "How we utilize that information eventually to make better vaccines really is one of the ultimate goals of this work."



## NO SAFE HAVEN

In conflict-affected and displaced communities, such as in the Democratic Republic of Congo and Burma (Myanmar), older women and men may suffer abuse and neglect at the hands of their families—further compounding the challenges brought on by war.

"Older people are often seen as a burden in humanitarian crises, especially if they can't contribute financially," explains Kathryn Falb, ScD, MHS '07, an assistant professor in International Health. Falb's team conducted in-depth interviews with more than 100 conflict-affected adults, including older individuals, uncovering a complex web of factors that contribute to the emotional and financial abuse they face.

The stressors that accompany displacement, such as inability to provide for the family financially, contributed to family members' abuse of older refugees.

But the problem isn't just within families. Falb's research also reveals a systemic failure by humanitarian organizations to address the unique needs of older refugees.

"Older people are often invisible in these settings," she explains. "Aid programs are designed for the general population, and it's difficult to take into account the specific challenges of aging, like mobility issues or chronic health conditions."

The consequences of this neglect can be devastating. Older refugees are left to navigate the daily hardships of displacement without the support they need, from accessing food and water to managing complex medical needs. And when abuse does occur, which happens to 1 in 6 people over age 60, there are few places to turn for help.

But Falb's research also points to potential solutions. She and her team are engaging local organizations and community groups to shift social norms around aging and promote the value and rights of older people.

They're also exploring and advocating for a more inclusive approach to humanitarian aid, which could include simple measures like more accessible cash transfers, or more complex interventions like tailoring violence and health services to meet the specific needs of those who need it most.

## DISARMING THE ELDERLY

Spencer Cantrell has spent her legal career working with survivors of domestic and sexual violence. Now a practitioner at the Johns Hopkins Center for Gun Violence Solutions, she's bringing that experience to bear on a different aspect of the gun violence epidemic: preventing firearm suicide among older adults.

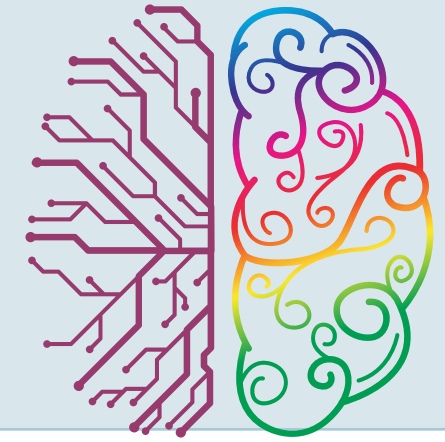
"Elderly people 75 and older are at the highest risk for dying by gun suicide," says Cantrell, JD. "We know that when someone has access to a firearm, it increases the risk of firearm suicide. And we know that there isn't a lot of 'means substitution' when it comes to suicide attempts. So if you take away the firearm, that individual is not likely to die by some other means."

One promising tool to reduce this risk is extreme risk protection orders (ERPOs), which allow law enforcement and family members to temporarily remove firearms from individuals at risk of harming themselves or others. Cantrell's research has shown that for every 10 to 20 ERPOs issued, one life is saved. ERPOs have strong due-process protections and have received bipartisan support in more than 21 states and Washington, D.C.

But removing firearms is just the first step, Cantrell emphasizes.

"We don't want to just remove the firearm and then wash our hands of the situation," she says. "We want to remove the firearm, think about what were the underlying factors that led to that crisis, and try to address those factors."

By connecting at-risk individuals with social services and mental health support, Cantrell believes ERPOs can be a crucial tool not only for saving lives in the short-term but putting people on a path to long-term well-being and safety.



## REPROGRAMMING CELLS TO FIGHT DEMENTIA

In the quest to tackle neurodegenerative diseases like Alzheimer's and ALS, most research has focused on targeting the misfolded proteins that clump together and wreak havoc in the brain. These plaques, such as the beta-amyloid in Alzheimer's, are the hallmark pathologies of these devastating diseases.

But Jiou Wang, MD, PhD, Walder Foundation Distinguished Professor in Biochemistry and Molecular Biology, is shifting the battle lines. His strategy? Bolstering brain cells' own defense mechanisms against these malformed molecules.

In healthy brains, proteins are regularly broken down and cleared away, with lifespans ranging from hours to months. But as we age, this process can go awry. Proteins start to misfold and stick together, forming toxic plaques that can overwhelm the cell's clearance systems. Over time, this buildup can lead to the death of brain cells and the devastating symptoms of neurodegenerative diseases.

Rather than playing whack-a-mole with individual misfolded proteins, Wang's team is searching for master switches that can reprogram brain cells to better handle and clear out these dangerous aggregates.

Using genetic screens, they've identified several promising candidates—genes that, when tweaked, can enhance the cell's ability to dispose of misfolded proteins. Just as the immune system can be bolstered through vaccination to better recognize and combat specific threats, Wang believes that brain cells can be reprogrammed to more effectively target and eliminate toxic protein aggregates.

Wang envisions that modulating these genetic switches, either through gene therapy or drugs that mimic their effects, could reprogram brain cells to be more resilient against toxic protein buildup. Although plaques could still accumulate, the cell's enhanced defense mechanisms could help prevent or delay the onset of neuronal dysfunction.

By targeting multiple genes and pathways, Wang's solution offers a more comprehensive solution than targeting individual misfolded proteins alone. "Neurodegeneration is almost an irreversible process," he notes. "It takes more effort than fixing one or two things." 🔄



Aging in  
America

Long Read

# Activity, Sleep & Dementia

Untangling relationships among sleep, physical activity, and brain health may suggest ways to reduce dementia risk.

BY MARILYN PERKINS  
ILLUSTRATIONS BY FEDERICO GASTALDI

**E**pidemiologist Jennifer Schrack has good role models when it comes to aging.

Her grandmothers both lived to be 92, and both stayed active into their final years. One walked every day and went to the gym for as long as possible, and the other kept busy playing with her grandchildren, volunteering at church, and serving meals to her senior citizen community.

“I see them as wonderfully strong, independent women,” says Schrack. “They were never unable to walk or unable to have some independence. And I think that’s what everybody wants, right?” ♦

Of course, many are not so lucky. An estimated 1 in 9 people over age 65 have Alzheimer's disease, for example. Schrack, PhD '11, MS, a professor in Epidemiology and director of the Johns Hopkins Center on Aging and Health, has spent her career researching how older adults can stay healthy as they age. She thinks movement is the key, but the relationship may not be as simple as some would think.

At the Energy, Activity & Aging (ENGAGE) Lab, she is co-leading studies that explore the connection between physical activity, rest, and dementia. For years, researchers have touted the benefits of staying active and sleeping well to promote healthy aging, and Schrack and her colleagues' work confirms this. But their research also points to a more complex relationship—one in which physical activity and sleep are quick to change when cognitive impairment starts. Schrack hopes to leverage that link to identify new indicators of dementia risk based simply on movement, with the goal of helping those with early-stage dementia stay independent for longer.

**AMERICA IS AN AGING NATION. BY 2050,** almost 1 in 4 adults will be over 65. By 2040, nearly 12 million Americans will be living with dementia.

"We're facing a crisis," says Adam Spira, PhD, MA, a professor in Mental Health. Because no cure exists for dementia, many researchers are instead focusing on identifying preventive measures or early warning signs, he says.

More than two decades of research supports the notion that staying active helps prevent cognitive decline; one analysis found that higher levels of physical activity may decrease dementia risk by as much as 18%.

Multiple mechanisms likely underpin physical activity's protective effects. Exercise spurs the body to produce important proteins, such as brain-derived neurotrophic factor, that help brain cells stay healthy and form new connections. Exercise also causes the heart to pump harder and pump more blood throughout the body.

"When you move more, blood flow to the brain improves," says Amal Wanigatunga, PhD, MPH, an assistant professor in Epi-

demiology and a co-leader of the ENGAGE Lab. "With improved blood flow, complex brain areas related to higher-order thinking can work better."

**BUT WHAT IF THE RELATIONSHIP BETWEEN** physical activity and dementia isn't a one-way street?

While Schrack and Wanigatunga have both seen the protective effects of exercise in their own research, they're also interested in movement patterns more generally, examining how changes in daily physical activities are directly impacted by brain health.

One example is how Alzheimer's affects walking: Many Alzheimer's patients begin to take shorter, shuffled steps, becoming unsteady and struggling to navigate turns and obstacles. Neurodegenerative diseases not only degrade the neural pathways for memory and cognition; they also damage parts of the brain that plan and execute movement.

In studies analyzing the energy needed for older adults to walk—a useful measure of physical fitness—Schrack and Wanigatunga found that those who struggled to walk were also more likely to show signs of brain deterioration, cognitive decline later in life, and higher levels of amyloid beta, a protein whose accumulation can signal Alzheimer's risk.

"It may be that as pathology accumulates in the brain, the way you move actually changes before your cognition becomes noticeably diminished," says Schrack. "In that way, changes in how we move could act as early indicators."

With more data, the researchers hope to detect subtle changes in movement patterns that create a "digital signature of cognitive decline." To do that, they're collecting annual physical activity data from several thousand participants in some of the longest-running studies, such as the Atherosclerosis Risk in Communities study. These studies provide decades of behavioral and health data, and researchers will continue to monitor participants for dementia into the future. Using research-grade wearable accelerometers similar to an Apple Watch or Fitbit, the researchers are gathering an



**It may be that as pathology accumulates in the brain, the way you move actually changes before your cognition becomes noticeably diminished. In that way, changes in how we move could act as early indicators.**

entire week of movement data every year to see if certain patterns are associated with the development of dementia. (They've been collecting data for seven years in some cohorts and hope to continue for at least another five.)

"What we're trying to do is use physical activity as surveillance," says Wanigatunga.

Early results are promising. In two studies led by Spira, data show that, compared to those without significant amyloid in their brains, older adults with more amyloid deposition tended to be more active in the early afternoon, with activity patterns in this time window more consistent on a day-to-day basis, compared to their counterparts without substantial brain amyloid.

While intentionally moving more is generally a good thing, these specific differences in afternoon movement may not be. Dementia is often associated with a phenomenon called sundowning, where patients become distressed and agitated in the late afternoon. Elevated afternoon physical activity in the amyloid-positive group may signal the beginning of neurodegeneration, as changes in the brain result in subtle differences in movement patterns, possibly connected to sundowning behavior. Schrack says they hope to publish further results within the next two years.

**BUT PHYSICAL ACTIVITY MAY BE ONLY HALF OF** the equation when monitoring for early signs of dementia. Spira is also interested in changes in sleep patterns, which he measures with the same accelerometers.

Like low levels of physical activity, poor-quality sleep is also associated with higher dementia risk: People with sleep disturbances such as insomnia or sleep apnea are 19% more likely to develop dementia. And, as with physical activity, the relationship appears to go both ways.

Missing out on slow-wave sleep—the deepest stage of sleep where the body repairs itself from the day—is associated with the build-up of amyloid beta. In turn, brain changes associated with Alzheimer's disease themselves also seem to disturb sleep, disrupting the synchronized brain waves that characterize deep sleep. This bidirectional effect creates a "vicious cycle" that may begin long before cognitive or memory problems emerge, says Spira.

Brendan Lucey, MD, a sleep and aging researcher at Washington University School of Medicine in St. Louis and a collaborator of Schrack's and Spira's, also is concerned about sleep disturbances' impact on cognitive function. Though blood tests to measure amyloid beta levels are becoming more accurate and accessible, he says, "They don't tell you about brain function.

Sleep could give you an earlier signal that there's starting to be some dysfunction in the brain."

Since most treatments for dementia work better the sooner they're started, such early warning signals are key. Some researchers believe many dementia drugs fail because they're started too late, when the brain has already significantly deteriorated.

If implemented early, lifestyle changes can also stave off dementia. A 2020 *Lancet* commission on dementia found that among other factors, quitting smoking, treating hypertension, staying social, and, of course, physical activity could help prevent dementia in 40% of cases.

By monitoring study participants for 24 hours a day, Spira hopes to capture those subtle changes in sleep preceding cognitive decline. The accelerometers can't capture some of the subtleties of sleep stages, but they can provide valuable data about overall rest and movement patterns. Spira describes the data as a pie sliced into three pieces: one for sleep, one for sedentary wakefulness, and one for active wakefulness. If the size of

one slice changes—a participant sleeps less, for example—the size of another slice must change to accommodate.

"They're all connected," says Spira.

**ANALYZING A WEEK'S WORTH OF MOVEMENT** data presents its own challenges, though: Some wearable accelerometers churn out 240 readings per second. That means more than 145 million raw data points per participant per week.

Biostatistics associate professor Vadim Zipunnikov, PhD, MS, MA, is part of the team that helps decode the data. By analyzing changes on the sub-second level, he's able to pick out gait-related features, and he can look for movement patterns on longer timescales to get a sense of daily movement habits.

While the team is beginning to glean some connections between movement patterns and dementia risk, Zipunnikov says they're still a long way from a dementia warning feature on an Apple Watch or Fitbit.

But that doesn't mean that people can't harness the protective effects of sleep and exercise. The researchers recommend reaching out to a physician if you see major changes in either.

Wanigatunga and Schrack emphasize the importance of early, preventive messaging when it comes to movement and dementia. But current CDC recommendations—150 minutes of moderate-intensity physical activity and two days of muscle strengthening activity each week—may sound overwhelming for some.

Wanigatunga says it's more important to make small, sustainable changes; even moving for just a few minutes a day instead of sitting is an improvement. Most people—even those with dementia or cognitive impairment—are capable of more than they think, he says.

"It's never too late to become active," he says. "Older adults are resilient."

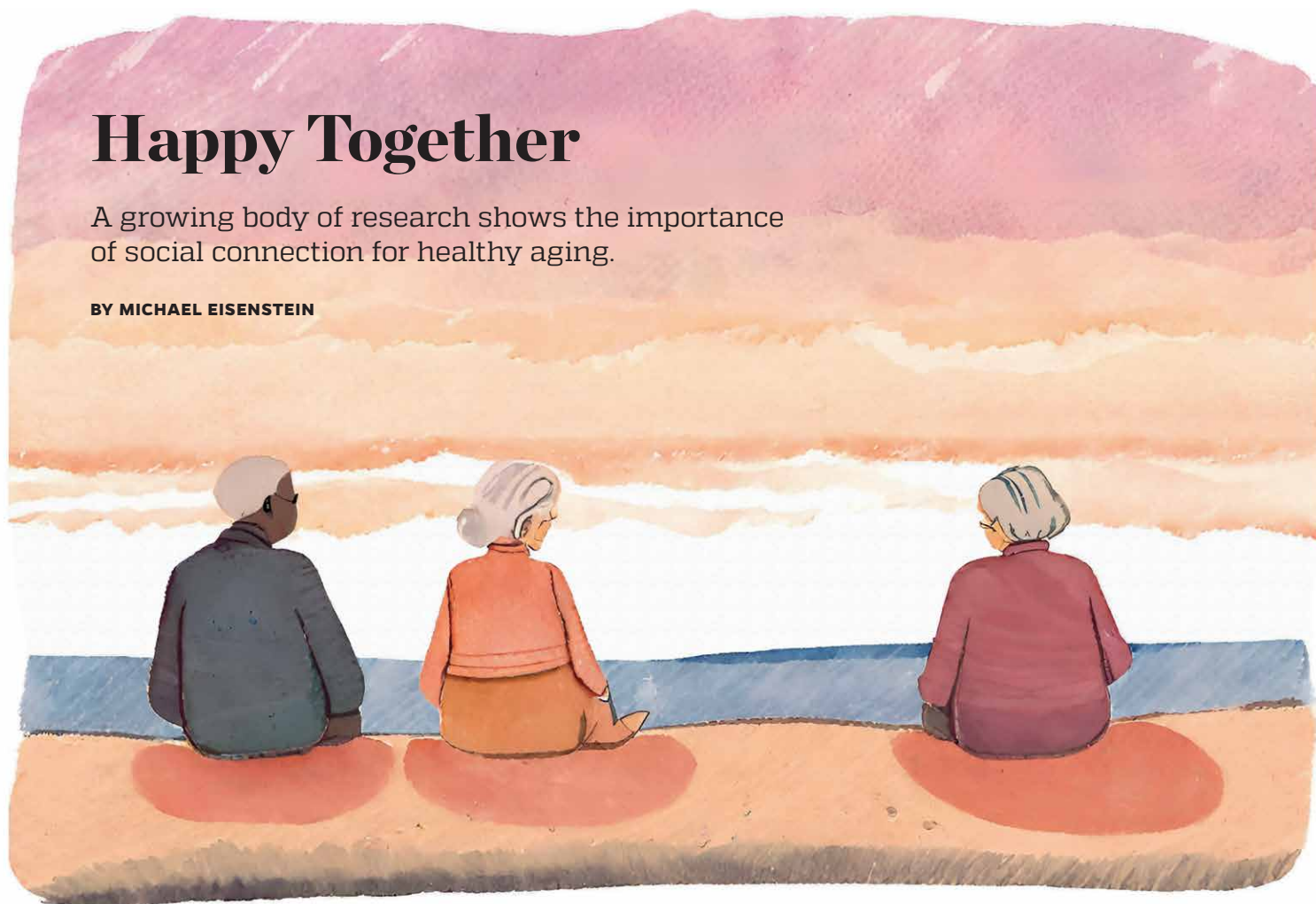
He would know. Like Schrack's grandmothers, Wanigatunga's grandfather lived to be nearly 100. As a child, Wanigatunga would watch him pace around the dining table to get his steps in, leaving him with a piece of wisdom he still repeats today: "If you don't use it, you'll lose it." ❧



# Happy Together

A growing body of research shows the importance of social connection for healthy aging.

BY MICHAEL EISENSTEIN



**T**oo much time alone can take a toll on the mind—and for older adults, the consequences can be particularly severe.

“Individuals who experience isolation have higher levels of negative cardiovascular outcomes, functional limitations, cognitive health, and a 30% increased mortality risk as indicated in certain studies,” says Thomas Cudjoe, MD, MPH, an assistant professor at the Johns Hopkins School of Medicine. Indeed, the increased risk of mortality from social isolation has been compared to smoking 15 cigarettes a day.

At the societal level, roughly 1 in 4 people over 65 are socially isolated, which could potentially affect the health and well-being of millions of Americans, according to research from Cudjoe and colleagues. Another cost: Medicare spends \$6.7 billion annually in added cost of care for socially isolated older Americans, according to a 2017 AARP report.

While the COVID-19 pandemic may have forced the issue of social isolation

onto everybody’s radar, it has been a long-standing problem for older Americans. As we grow older, it can be all too easy to lose touch with both family and the friends we’ve acquired over a lifetime. Aging also leads to inevitable physical decline, including disabilities that can make it more difficult to get out of the house and engage with the outside world.

Hearing loss, for example, can make communication challenging and can take

the pleasure out of activities like dining out or going to the movies, cutting off important avenues of social stimulation. “Two-thirds of older adults have age-related hearing loss,” says Alison Huang, PhD ’22, MPH ’14, a senior research associate in Epidemiology. A 2024 study by Huang and colleagues found that loss of hearing is associated with a 28% greater risk of social isolation over time.

Cudjoe points out that other factors can further exacerbate this problem. “I’m particularly interested in how poverty influences social connections, and how this burden potentially is different than for people who have more financial resources,” he says.

Both loneliness (the subjective feeling of being isolated) and social isolation (the objective lack of social contact) can have negative impacts on health and longevity. Some effects are indirect, arising from

reduced access to or utilization of health care services by isolated individuals.

“Someone who is socially isolated, you could envision might have more difficulty keeping their prescriptions refilled all the time, or more difficulty accessing the health care system if they’re dependent on others for transportation,” says Cynthia Boyd, MD, MPH, director of the Division of Geriatric Medicine and Gerontology at the School of Medicine and professor in Health Policy and Management and Epidemiology.

In a 2018 study, Boyd, Cudjoe, and others examined the impact of self-reported loneliness on the long-term health of more than 2,000 patients who had previously been hospitalized for heart failure. The study found that people experiencing high levels of loneliness were at more than three-fold greater risk of death and 68% greater risk of hospitalization over the course of a year than those with low levels of loneliness.

Mental health is also a casualty, and isolation can heighten the risk of depression, anxiety, and cognitive decline. In a 2022 study of dementia, Cudjoe and colleagues tracked more than 5,000 elderly Americans over the course of nine years and found that those experiencing objectively measured social isolation faced a nearly 30% greater risk of developing dementia during this span. Boyd sees a potential vicious circle here. “Having cognitive impairment may then make it harder for you to maintain connections or get feedback from things that might keep you from feeling lonely,” she says. This could in turn further exacerbate the progression of cognitive decline.

Creating effective interventions for loneliness and isolation remains a challenge, but there may be greater opportunities to intervene when isolation is directly tied to some form of disability.

For example, Huang says that relatively few hearing-impaired adults—between 10% and 20%—use hearing aids, but a clearer demonstration between auditory function and mental health may help motivate people to seek treatment. “I think it’s an interesting way of thinking about isolation interventions,” says Huang, who is now in the midst of a clinical trial to

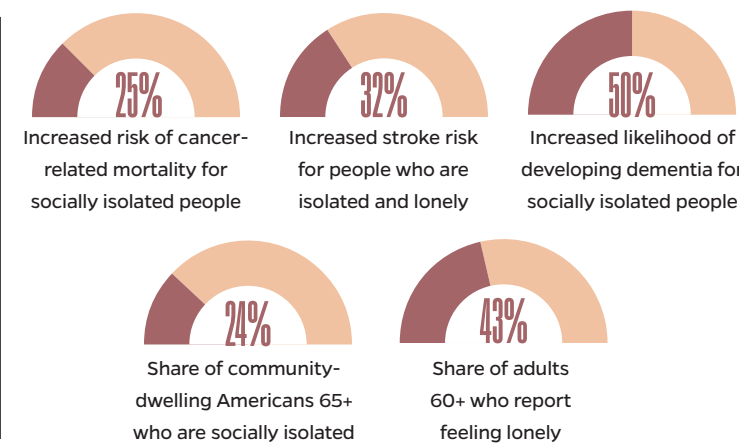
assess whether treatments for hearing impairment help preserve cognitive health in older adults. She also points out that the design of more accommodating environments—for example, restaurants and cafes with walls that dampen noise rather than echoing and amplifying it—might offer more welcoming environments for hearing-impaired people to socialize.

Another potential strategy involves “social prescriptions,” in which clinicians match people with group activities or help them coordinate opportunities for regular interaction with other people, either in-person or virtually via platforms like Zoom. But there are limited data demonstrating benefits from such social prescriptions, and their implementation requires careful evaluation of why a given individual feels isolated and what kinds of treatments are accessible and enjoyable to them. “We really have to have a comprehensive and holistic approach,” says Boyd.

Cudjoe agrees, and believes it is important to not approach isolation and loneliness as monolithic problems in the elderly community, but instead to work with individuals to identify and meet their needs. In his view, this includes educating both clinicians and the general public about the importance of connection, and designing environments where individuals can readily obtain the level of social connection that they need and want in their lives. “We shouldn’t have a paternal or authoritarian kind of approach to this, but support people in the goals that they have,” says Cudjoe. ☺

“We really have to have a comprehensive and holistic approach.”

## ISOLATED RISKS





# MISSING MEASURE

How can we eliminate racial disparities in dementia?  
Step one: Gauge the impact of structural racism.

BY SARAH ACHENBACH  
ILLUSTRATIONS BY DAVIDE BONAZZI

During a 2010 lecture to Johns Hopkins undergrads about cultural factors in public health, Roland Thorpe Jr. showed a slide of life expectancies for Black and white men and women from 1900 to 2006. It was not new data to Thorpe, but seeing it that day on the big screen had an impact.

“What was shocking to me is that African American men always had the lowest life expectancy, [ever] since data has been collected,” he recalls. “That really made me think, Why is that the case?”

Black men in 1900 were expected to live 32.5 years compared to 46.4 years for white men. Over a century later, the life expectancy for Black men is 69.1 years versus 75.1 years for white men, according to CDC 2022 life expectancy data. Black men also have a higher prevalence of chronic disease and are twice as likely to develop Alzheimer’s disease and Alzheimer’s disease related dementias (AD/ADRD). ◉

Thorpe, PhD, MS, a professor in Health, Behavior and Society and senior associate with Johns Hopkins Center on Aging and Health, is now focusing on those latter disparities. As part of a team of researchers from the Bloomberg School and the Columbia University Mailman School of Public Health, Thorpe is working on an NIH-backed study to understand the role of structural racism in disparities in dementia prevalence and outcomes.

The goals of the study, Reducing Dementias (AD/ADRD): Addressing Structural Discrimination and Resilience, are ambitious. Led by principal investigator Sarah Szanton, PhD, MSN, dean of the Johns Hopkins School of Nursing with appointments in the School of Nursing and in Health Policy and Management, the study aims to develop a measure of structural racism and resilience, to use that measure to predict outcomes in AD/ADRD, and to erase the disparity in prevalence.

“Creating a measurement of structural racism is imperative to conducting high-quality research on it—and dismantling it,” Thorpe explains.

**STRUCTURAL RACISM ENCOMPASSES SYSTEMS** and institutions including education, housing, health care, employment, and more—and how they interact to advance racist policies, practices, and beliefs. The definition has evolved over time, Thorpe and co-author Lorraine Dean, ScD, explain in a 2022 *American Journal of Epidemiology* article that traces research on the topic.

Previous studies on structural racism and health have tended to focus on the connection between a single domain, such as segregated neighborhoods, and

health. “What’s missing is a precise definition of structural racism and a life-course perspective,” Thorpe says.

To address those gaps, the AD/ADRD study team is mapping nine domains of structural racism including housing, education, employment, earnings, and other discriminatory systems, from birth to older adulthood. Each domain is complex, and they are interconnected.

“Neighborhood is just one domain of structural racism, but it can affect the quality of the schooling, the quality of the air and water ... and whether people have access to green space or healthy food,” Szanton explains. Street layout, walkability, and social cohesion contribute to health outcomes, as do policing and discriminatory housing policies like redlining.

Nearly three decades ago as a home-health nurse in West Baltimore, Szanton witnessed how overlapping structural inequities affected her patients’ aging process. Some elderly patients greeted her at the door, while others threw their housekey down from the bedroom window because they couldn’t walk down the stairs. What struck her—and inspired her subsequent research—were the factors beyond her patients’ immediate health concerns.

For example, she saw major health differences even for people who had worked in the same field. The retired janitor with good health care access and a retirement plan had better health and well-being than the housekeeper who retired without benefits. “The ones with pensions and good care could access medication and specialty care more easily,” Szanton explains. “This was a structural reason they had different health.”

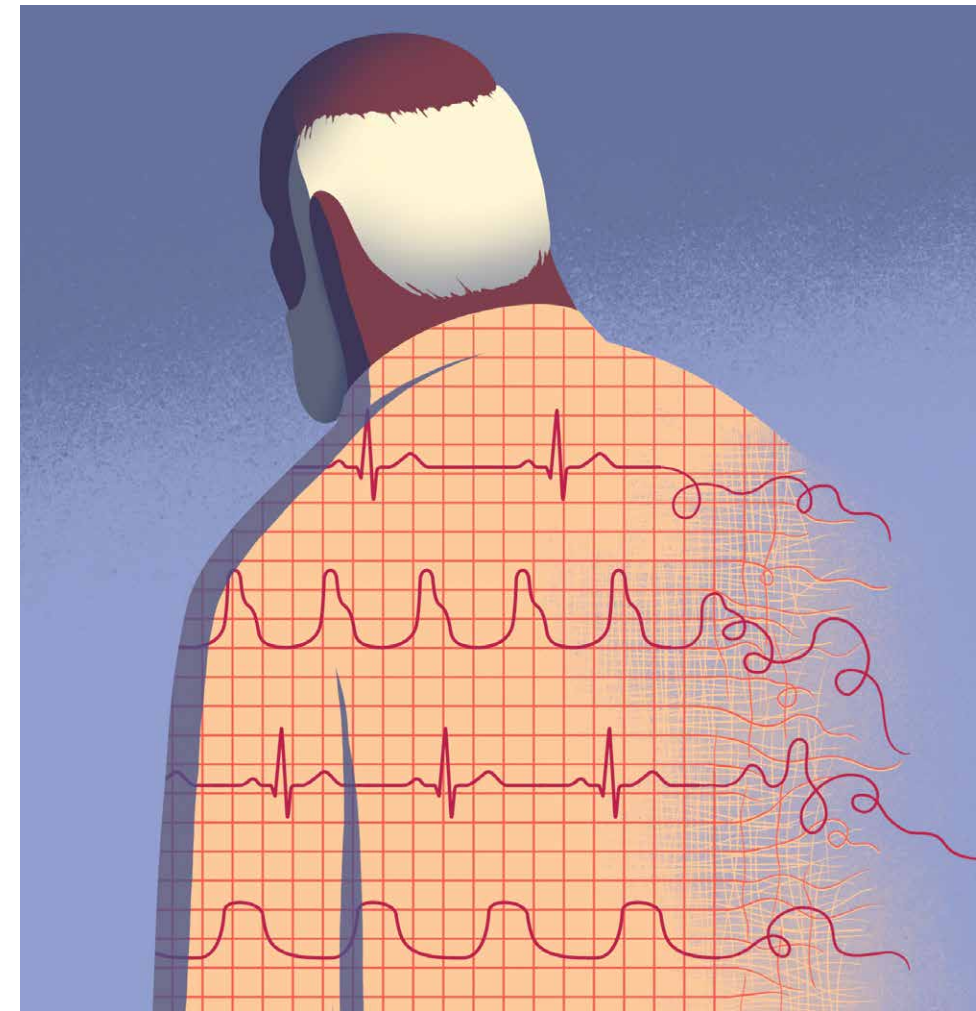
**KAREN BANDEEN-ROCHE, PHD, MS, A PROFESSOR** in Biostatistics and co-director of the Johns Hopkins University Claude D. Pepper Older Americans Independence Center, brings nearly a decade of pioneering research on frailty to the project. In a 2015 study on the epidemiology of frailty, Bandeen-Roche and collaborators found a 60% to 80% greater prevalence of frailty among older Black and Latino adults. “The most stunning finding was the very large disparities in frailty by race and ethnicity, far more striking than any other finding,” she says.

In 2021, Bandeen-Roche, Thorpe, and others published a subsequent study exploring racial/ethnic disparities in frailty. “We studied whether those disparities could be explained away by poorer health or by income disparities,” Bandeen-Roche says, but the answer was “absolutely not.”

“This opened the hypothesis that it is the experience of racism that really sustains disparities in health and aging,” she says.

Proving that—and ultimately eliminating health disparities caused by structural racism—requires a valid measure of structural racism. Paris “AJ” Adkins-Jackson, PhD, MPH, assistant professor of Epidemiology and Sociomedical Sciences at the Mailman School, brings expertise as a psychometrician to this part of the study. She also brings personal experience with the generational significance of what the team is studying.

“While I might not have been alive for some of the ugliest parts of our history, my grandmother, who has dementia, has been alive for that, and that impacts how she has raised me, the lessons she taught me, and the fear she had, so it ripples and continues to impact the present,” she says.



In a 2022 *American Journal of Epidemiology* article, Adkins-Jackson and co-authors offer several recommendations for measuring structural racism, including using mixed methods and considering exposures in terms of time, history, and life course—which the NIH study has done from the start.

To create their measurement, the team started by conducting oral histories of older Black adults, examining the nine domains of structural racism across a person’s lived experiences. For aging people of color, teasing out history’s impact on health is essential. What a person recalls of the infamous U.S. Public Health Service Untreated Syphilis Study at Tuskegee, for example, gives insight into how willing Black men are to engage in the health care system and research studies, Thorpe says.

Combining oral histories with publicly available data—some 70,000 census surveys, voting wait times, ZIP codes across the

“**What we’re trying to do is restorative, to document the stories that have been lost, forgotten, or ignored, to explain how to help them in the present. Without that documentation, we cannot get to a place of healing.**”

lifespan, and more—can further illuminate the effects of structural racism on health. Aisha Dickerson, PhD, MSPH, an assistant professor in Epidemiology, is examining the neighborhood domain, specifically the complex environmental issues in communities where study participants live.

“Black men are often segregated into neighborhoods with more air pollution exposure, high-traffic roads, and industrial facilities”—all of which increase inflammation, stress, and exposure to

fine particulate matter, which is linked to dementia risk, Dickerson says.

The “wealth-health” gradient casts a haze over the deeper causes. Some industrial companies are attracted to the lower property values and cheaper land in racially segregated neighborhoods. Today, 70% of Superfund sites, severely contaminated industrial sites as determined by the U.S. EPA, are within a mile of federally funded housing.

“What we’re trying to do is restorative, to document the stories that have been lost, forgotten, or ignored, to explain how to help them in the present,” Adkins-Jackson says. “Without that documentation, we cannot get to a place of healing.”

**A TOOL THAT WILL ALLOW RESEARCHERS TO** measure directly the impact of structural racism has enormous potential. “The raw ingredients we’re using to make our measure—for example, place of birth, place of primary school, and place of midlife—could be included in other studies,” Szanton explains.

Adding this data could be a game-changer for research on hypertension, kidney disease, heart disease, cancer, life expectancy, and disability, Bandeen-Roche adds. “Future studies would only require participant residence address information, which links to the publicly available information from which [our] measure is created,” she says. “Then, the impact of lived experience on older adult health could be unpacked from the crude ‘race/ethnicity’ label that has historically anchored disparities research.”

A proven risk-prediction tool will also improve prevention, diagnosis, and treatment for strokes, brain tumors, Parkinson’s disease—all of which can cause AD/ADRD.

Longer term, the team hopes that their work measuring structural racism’s impact on health outcomes will inform efforts by researchers, clinicians, and policymakers alike to improve health and aging for people of color—by ultimately dismantling structural racism.

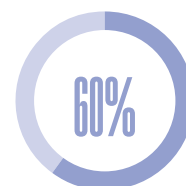
“The goal,” says Thorpe, “is to leave society a better place than we found it, with research.”

## MULTIPURPOSE TOOL

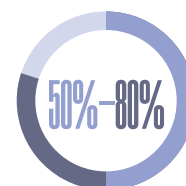
A measure of structural racism might help address disparities beyond AD/ADRD. Compared to white Americans, Black Americans have:



Increased risk of dying from heart disease



Increased likelihood of being diagnosed with diabetes



Higher incidence of stroke



Increased likelihood of having high blood pressure

# 5 FIXES FOR AGING IN AMERICA

Shifts in attitudes and policies can pave the way to thriving in later life.

## 1

### SEE THE GOOD IN AGING

When I say that I do geriatrics, often people's first response is, "Oh, that's so sad. That must be so difficult."

There's nothing sad about my practice. I have a pretty elderly patient population in my clinic—they are all over 75—and they are out living happy, healthy lives. Yes, they accumulate chronic diseases, and we manage those. But my patients don't experience aging in the negative ways promoted by our culture.

In the grocery store's beauty aisle, there's anti-aging lip cream and anti-aging moisturizer and anti-aging everything. But I am *pro*-aging. Because some things are better as you get older. Creativity continues to grow. Older people have more measured reactions to some stressors. They're better problem solvers. They tend to have a more clarified sense of values and stick to them. So, actually, happiness goes up as they get older.

These are messages we don't hear often. We need to confront the negative stereotypes about aging with the reality.



Colleen Christmas, MD, is a geriatrician and an associate professor at the Johns Hopkins School of Medicine.

## 2

### BUILD AN INFRASTRUCTURE OF CARE

A lot of our public policies and spending around health insurance and health care go toward cures and treatments.

What we don't have is an infrastructure of care for people as they age.

Our society does not value care the way we value curing, preventing, and managing chronic diseases. We have no comprehensive public financing of long-term care. Medicare will pay for home health care, but only in the context of getting better. Unless she's on Medicaid, there's no way to pay for a caregiver to come to the home and help get your mother out of bed in the morning. It's a terrible gap.

We need to raise awareness about the costs to families who must provide caregiving. These costs along with unmet caregiving needs must not be forgotten when considering our priorities for supporting an aging population. What will tip the balance from policies that prioritize technological solutions to those that prioritize dignity through sufficient public financing of long-term care services?



Dan Polsky, PhD, MPP, is a Bloomberg Distinguished Professor in Health Policy and Management and at the Johns Hopkins Carey Business School.

## 3

### NORMALIZE GOOD HEARING

No matter what you do, everybody's hearing slowly and progressively declines a little bit year by year over your entire life.

Hearing loss is the single largest risk factor for dementia. Treating it can promote cognitive and brain health. The challenge is to drive awareness so people can act on their hearing loss.

This fall, we will launch a national campaign called Know Your Hearing Number to encourage people to use an app that measures how well they hear.

If people begin tracking their "hearing number" like they track their weight or blood pressure, it can change how people engage. The problem with hearing loss now is that getting hearing aids is a life event. But if you treat hearing just as a metric that changes over your lifetime, you can start trying different technologies like over-the-counter hearing aids to help you hear and communicate better.

That changes how you think about hearing, and optimizing it becomes a normal, ordinary thing.



Frank Lin, MD, PhD '08, is a professor at the School of Medicine with joint appointments in Epidemiology and Mental Health. He is the director of the Cochlear Center for Hearing and Public Health.

## 4

### FOSTER RESILIENCE AT EVERY AGE

Resilience has to do with accommodating stress. We know that exercise, sleep, and good nutrition do a lot to help us to handle stress. Prioritizing these things goes a long way to make people more resilient at any stage of life.

We can do a better job of motivating people to value these behaviors. Perhaps we can change structures, like making it easy in the workplace to get 30 minutes of daily physical activity.

For older people who can't just start jogging around the neighborhood, we need fundamental knowledge of how to safely manage health in the face of loss of resilience. We need to design care in a way that respects the person's wishes and optimizes what we can according to where they are now. Teams at Hopkins are working hard on these vital research priorities.

There may be compensations that still allow for a very fulfilling life, even if one loses some function.

Even if one isn't going to be running marathons, there's a lot more we can do to enhance the fulfillment of their aging.




Karen Bandeen-Roche, PhD, MS, is a professor in Biostatistics.

## 5

### MAKE PUBLIC TRANSIT WORK FOR ALL

As people age, many will develop health conditions or face financial barriers that make driving difficult or impossible. In fact, there are over 7 million nondriving older adults in the U.S. Making public transportation accessible is critical to helping older adults maintain independence and quality of life.

Research shows that using public transportation is associated with greater levels of physical activity and social participation for older adults. It also connects you to almost every other social determinant of health: You need transportation to get to your health care facility, to shop for groceries, to be able to volunteer, to see your friends and family.

We need improved accessibility standards that go beyond the Americans with Disabilities Act. And they need to be informed by the lived experiences of older adults and people with disabilities. To do that, we need better data to identify and address accessibility gaps, as well as increased funding for accessible transit infrastructure. This is how we can create a system that works for everyone. 



Erica Twardzik, PhD, MS, is a postdoctoral scholar in Epidemiology.

# Discovery



## A FOUR-DECADE FOLLOW-UP

“So! Many! Moose!” Mary McQuilkin shouted to Bionca Davis, MPH, as they flew above Alaska’s frozen tundra. The dozens of moose were just another remarkable sight for the CDC’s Arctic Investigations Program epidemiologists as they hopscotched to 11 Alaska Native communities. Their mission: Take blood samples from people vaccinated against hepatitis B in 1981 to determine if they were still protected against the virus. “It has been an honor to contribute to this important research in a small way,” says McQuilkin, MSN-NP, MPH ’14, now a nurse practitioner for Southcentral Foundation in Alaska. Her essay and photos are at [magazine.publichealth.jhu.edu](https://magazine.publichealth.jhu.edu).



Discovery

Long Read

# Two-Way Science

Brittany Jenkins-Lord seeks clues in the lab and the community to understand the biological causes of cancer disparities.

BY LEAH SMALL  
PHOTOS BY MIKE MORGAN

Soon after Brittany Jenkins-Lord came to the Bloomberg School in 2019 for her MPH, she often sat at a table at the front door of Baltimore's Northeast Market. She was volunteering for a community-based project.

"When people walked in, we asked them, 'Do you know about your family history? Would you like to learn how you can talk to your family about your health?'" she says.

Jenkins-Lord helped women chart their family histories in relation to disease risk and urged them to share the information with their doctors. Many had family histories similar to her own.

Growing up in Charleston, South Carolina, Jenkins-Lord, PhD, MPH '20, MS, lost several family members to cancer who also suffered from diabetes, high blood pressure, obesity, and other comorbidities. It's a narrative shared by many Black families in the South, where "there's a lot of disease and a lot of risk factors for disease," she says. ●

She was in her early 20s when her mother needed a hysterectomy as treatment for cancerous polyps in her uterus. A few years later, her mother developed a chronic cough that doctors discovered was caused by a metastatic tumor in her lungs. Surgeons removed the tumor, and her mother has since been cancer-free. But the impact on Jenkins-Lord was permanent.

Now an assistant professor in Biochemistry and Molecular Biology, Jenkins-Lord is investigating the interplay of molecular, genetic, environmental, and social contributors to breast cancer risk in African American women. It's work that combines basic science and epidemiological approaches in new and powerful ways, fueled by collaborations across departments and with the community.

## CANCER'S ANCESTRAL LINKS

Though Black and white women have similar breast cancer incidence rates, Black women are more than 40% more likely to die from the disease. They develop more aggressive breast cancer tumors and are diagnosed younger.

Epidemiologists have associated environmental factors such as neighborhood deprivation, exposure to pollutants, and racism with more aggressive tumors and higher breast cancer mortality for Black women, as Jenkins-Lord lays out in a 2022 *Cancer Causes & Control* review. But discerning why these factors are more lethal to Black women requires looking beyond race to ancestry.

Race is a social construct based on physical characteristics, while ancestry refers to shared genealogical lineage. Genetic variations based on ancestry have been linked to disease. For example, sub-Saharan African, Mediterranean, and Saudi ancestry, among others, have been linked to the development of sickle cell disease. Similarly, molecular biologists have found that certain genetic variants linked to breast cancer occur more frequently in women with West African ancestry, the lineage shared by most Black women in the U.S. The researchers also identified variants unique to women of African ancestry. But only recently have scientists—including Jen-



**I want basic scientists to consider the community and environment.**

kins-Lord—began researching how environmental and genetic factors interact to cause greater mortality among Black women.

“Making connections between environmental exposures and cancer has been done for probably a century now,” Jenkins-Lord says. “You have your risk, you have your outcome, but in the middle, you have everything biological that’s happening. That’s the part I am focused on understanding more.”

## A MORE COMPLETE GENOMIC BLUEPRINT

Starting in 2014, during her doctoral studies at the University of Georgia, Jenkins-Lord explored the genetics guiding immune response in Black women with triple negative breast cancer (TNBC), an aggressive cancer. TNBC cells lack the three receptors that respond to hormone therapies that are effective for other types of breast cancer. She worked in the lab of cancer geneticist Melissa Davis, PhD, now director of the Institute of Translational Genomic Medicine at Morehouse School of Medicine.

Women with West African ancestry have twice the risk of developing TNBC and are more likely to die from it than women of European ancestry. The big question is why—but scientists don’t have all the tools they need to find the answer.

The problem is that African ancestry is less represented than European ancestry in parts of the human genome scientists have sequenced. Scientists need more genetic information from women with African ancestry to analyze, Davis says.

“We haven’t truly interrogated the reality of a patient’s genome when the refer-



Brittany Jenkins-Lord in her Wolfe Street lab

ence, the blueprint we’ve been using, is completely devoid of that genetic information,” Davis says. “It’s like trying to assess what’s wrong with the plumbing in a house when there are two rooms completely missing from the blueprint.”

To fill in the genomic blueprint, Jenkins-Lord and Davis worked with Lisa Newman, MD, MPH, chief of breast surgery at Weill Cornell Medicine, to map more genetic profiles of TNBC patients with African ancestry, using donated tissue from patients in Ghana that Newman and her clinical team treated for breast cancer.

From these samples, the researchers gained insights into how the immune cell landscape of women with TNBC is shaped by ancestry. In a 2022 study in *Cancer Discovery*, they found that higher immune cell counts were correlated with a greater degree of quantifiable African ancestry. The discovery could have implications for new immunotherapies for TNBC that would be more effective for patients with West African ancestry.

In another cohort, Jenkins-Lord, Davis, and Newman found in a 2019 study in *Cancer Epidemiology, Biomarkers & Prevention* that DARC—a gene that regulates inflammation,

a key driver of cancer—is more often suppressed in people with sub-Saharan African ancestry. Physicians may eventually be able to measure DARC expression in patients to create more effective treatment plans.

These insights were significant and valuable, but Jenkins-Lord’s motivating question of why breast cancer disproportionately kills Black women in the U.S. remained unanswered. As she continued to read papers on cancer disparities and genetics, she noticed that researchers usually wrote that their findings were controlled for socioeconomic factors.

“That was always the only mention of these factors. It was such an afterthought,” she says. “I remember thinking, What are these factors? How do they influence the biology of cancer disparities, and how can you control for all of them?”

Jenkins-Lord started to dig into those questions as a postdoctoral Cancer Prevention Fellow at the National Cancer Institute. The program included the opportunity to earn an MPH.

“In less than a year, I went from a basic science perspective of cancer into public health and looking into environmental risk factors for cancer,” Jenkins-Lord says.

## BASIC SCIENCE LEAVES THE LAB

Research tying breast cancer disparities to environmental influences on biology is nascent, but Jenkins-Lord is quickly advancing the science. She is now working to uncover the epigenetics—changes in how genes are expressed or to what degree—behind breast cancer in Black women. She wants to know how factors such as pollution, poverty, and systemic racism interact with the biology of women with African ancestry to cause health disparities.

In a 2023 study in *JAMA Network Open*, Jenkins-Lord and collaborators showed that Black women living in disadvantaged neighborhoods may be more susceptible to breast cancer. The researchers analyzed donated breast tissue from 187 women who underwent surgery for breast cancer in Baltimore hospitals. They found that two cancer suppression genes were frequently expressed at lower levels in Black women who lived in disadvantaged neighborhoods—an epigenetic change that allows mutated cells to spread uncontrollably as cancer. Those genes were not affected in white women in those same neighborhoods.

The next steps are to determine “what upstream is molecularly causing the differences in gene expression we see in the Black population,” Jenkins-Lord says.

Jenkins-Lord is also collaborating with Avonne Connor, PhD, MPH, an associate professor in Epidemiology, to design a study that would link ancestry, neighborhood-level disparities such as food insecurity, and structural racism to breast cancer in Black women who were recently diagnosed.

“Looking at the epidemiology for risk and lifestyle factors and linking those aspects to assays Brittany will do for DNA methylation [epigenetic changes] would be novel for a large study,” Connor says.

The pair plan to create a study participant questionnaire that includes social and environmental determinants of health in order to connect external factors to immune-related gene expression in these women. “We would ask participants about their food security, housing stability, transportation issues—factors that could be important to investigate with the biological associations Brittany is interested in,” Connor says.

Figuring out more about why Black women are more likely to die from breast cancer is “going to take a generation of scientists” trained in both epidemiology and molecular biology, Jenkins-Lord says. “Scientists need to understand both sides of that coin: What’s going on genetically and in our environment.”

And to do that, she says, scientists have to get out of the lab. “I want basic scientists to consider the community and environment,” she says. “Talking to people was one of the most impactful things during my MPH.”

This simultaneous pursuit of epidemiology and genetic studies makes Jenkins-Lord a leader in this new generation of cancer researchers.

Ashani Weeraratna, PhD, Bloomberg Distinguished Professor and chair of Biochemistry and Molecular Biology, says she sees great power and potential in Jenkins-Lord’s ability to combine those disciplines: “When I recruited Brittany, it was because she represents the future of BMB—a true pairing of basic science with public health.” ◉



## Fake Drugs, Real Dangers

As counterfeit medications proliferate, researchers work to alert doctors and patients to the risks.

BY KELLIE SCHMITT

**B**randon Macsata was 28 and newly diagnosed with HIV when his pharmacist delivered the alarming news: Lifesaving medication would cost him \$1,200 a month.

As a nonprofit worker making \$45,000 a year, he was floored.

“I thought, Holy cow, what am I going to do?” Macsata says. “I can’t afford that.”

In a daze, he returned to his Washington, D.C., apartment and started searching online for options. He discovered a purported Canadian online pharmacy that would charge him just \$450 per month for the same pills. He took that medication for five months until his physician warned about the risk he was taking and connected him with an HIV-drug assistance program.

“My case demonstrates why people look for cheaper alternatives online,” Macsata says. “You don’t think, Am I putting myself at risk?”

A team of Bloomberg School experts has partnered with pharmaceutical giant Pfizer to better understand why patients skirt regulated supply chains and how health care providers can communicate the hazards.

The project, BESAFE, or Behavioral and Educational Strategies for Avoiding Falsified Medicine Exposure, is a timely initiative. U.S. prescription drug costs are higher than in other wealthy countries, making it harder for people to afford out-of-pocket costs. And more Americans are buying prescription medication online than ever before, driven by both costs and convenience.

But people have little awareness about the risks, says Saifuddin Ahmed, MBBS, PhD ’96, a professor in Population, Family and Reproductive Health who is leading the effort.

Substandard and falsified medications include drugs that have no active ingredients or the wrong ingredients or deliberately and fraudulently misrepresent identity, composition, or source.

“If you’re buying a fake Rolex, you’re probably intentionally buying it,” Ahmed explains. “On the other hand, when people start buying counterfeit medicine, they’re not buying it intentionally—they’re in a trap.”

### A PUBLIC HEALTH RISK

The problem has disproportionately plagued low- and middle-income countries (LMICs), where about 10% of pharmaceutical products are substandard or false, according to the WHO.

Counterfeit drugs can lead to dire individual outcomes, explains Patrick Caubel, MD, PhD, MBA, Pfizer’s chief safety officer. In Nigeria, for example, a hospital gave patients with a severe bacterial infection a placebo instead of an antibiotic. Some died as a result. When Pfizer investigated, they found the hospital had unknowingly received and distributed a fake product.

“The counterfeit was so well made—the same vial, the same label, everything was identical—that even the nurses in the hospital thought it was real,” Caubel says.

That’s why regulatory systems are key. The U.S. FDA has largely protected the country’s pharmacies against fake medications. As a result, the country’s greatest health risks related to counterfeit drugs are most experienced when people buy drugs outside the standard system, such as through internet pharmacies or on the street, explains Joshua Sharfstein, MD, vice dean for Public Health Practice and Community Engagement and Distinguished Professor of the Practice in Health Policy and Management.

### ‘ALARMING GROWTH’

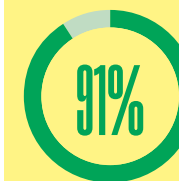
Yet despite regulatory safeguards, the U.S. has seen an “alarming” growth in fake medications, says Shabbir Safdar, executive director of the Partnership for Safe Medicines, a group of nonprofits committed to prescription drug safety. He points to counterfeit Adderall pills laced with meth, fake Ozempic, and a cancer drug with no active ingredient.

There’s no guarantee where medications delivered by international mail really originated. Even if an advertisement says a drug is from Canada, there’s no one policing such claims.

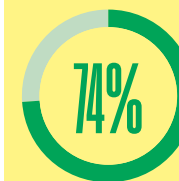
In recent years, India has emerged as a major global manufacturer of generics, explains Charles Preston, MD, MPH ’10, who works in regulatory affairs for the Gates Foundation. While that’s helped create more affordable generics, the country has struggled to build a culture of strong, consistent regulatory oversight. Drugs from India that have received FDA approval meet U.S. standards. But in LMICs without

### WHAT DO PROVIDERS SAY ABOUT FAKE MEDS?

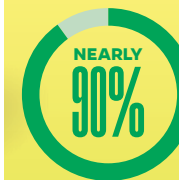
A recent BESAFE survey of about 400 providers in the U.S. and South Africa gauged their knowledge of fake medications. Of the respondents:



said they don’t talk to patients about counterfeit drugs.



said an inability to determine counterfeit products is a barrier to reporting incidents.



said cost savings are the main reason patients end up with counterfeit medications.

robust regulatory resources, the quality of drugs can be highly variable.

Educating not only patients but providers is vital to combating false products that can make their way to U.S. consumers via online pharmacies and other non-regulated avenues.

“The danger of counterfeit therapeutics is still not considered a public health crisis,” says Safdar. “Doctors are woefully misinformed about the safety of the drug supply.”

### SPREADING AWARENESS

Promoting awareness of fake meds is a key component of the BESAFE effort because health care providers rarely educate patients about the risks.

Subsequent phases of the project will look at ways to better use technology to monitor medication pathways and to strengthen regulatory bodies and providers’ roles. BESAFE will tailor its efforts: In LMICs, it might address weak oversight and monitoring systems, while in the U.S., it might focus on consumer and health care provider awareness.

“The idea is to have physicians, PAs—the ones writing the prescriptions—have more of a conversation with patients,” Ahmed says.

But awareness alone won’t solve the problem. Consumers often turn to cheaper international pharmacies because they can’t afford medications. Long term, the U.S. will need to address medication costs through legislation, improved pathways for generics, and better insurance coverage.

“You can’t address this simply by saying, ‘Don’t buy it,’” Ahmed says. “You need to provide affordable, safe drugs.”

That rings true for Brandon Macsata, the D.C. man who sought HIV medications online. He now has insurance that covers a monthly injection that keeps the virus undetectable. He still doesn’t know if the drugs he took were fake but recognizes the risk he took—and has empathy for people who unknowingly choose that path.

“You have to make choices, and sometimes you’re driven by cost,” he says. “As a society, we take for granted how safe our supply chain is.” ☪

“The danger of counterfeit therapeutics is still not considered a public health crisis. Doctors are woefully misinformed about the safety of the drug supply.”

Discovery

Long Read

# The Hunger Gap

Food programs tend to target adults and younger kids. What about adolescents?

BY JESSICA M. SCULLY  
ILLUSTRATIONS BY DUNG HOANG

**W**hen Kate was about 13 years old, her mother had just gone through a divorce and was struggling financially. They lived in a neighborhood with 7-Elevens and dollar stores, but no grocery stores. When she was hungry before her mother came home late from work, she had to make do with whatever she could find. Kate didn't know how to cook beyond using a microwave. ♦





“That wasn’t always nutritious,” says Kate, now a 19-year-old college sophomore. “Noodles all the time is not healthy for anyone. Eating just snacks is not healthy.”

Kate’s experience with food insecurity—not having enough food or enough high-quality food to meet one’s nutritional needs—is not uncommon in America. In 2021, 10% of Americans and nearly 13% of children were food insecure, according to Feeding America, a nationwide network of food pantries and meal programs. In Baltimore, the issue was even more pronounced, with 14% of residents and 26% of children experiencing food insecurity.

Not having enough food takes a particularly heavy toll on adolescents, who need more calories than younger children to support their rapid physical, emotional, and social development, says Kristin Mmari, DrPH, MA, an associate professor in Population, Family and Reproductive Health. Food insecurity may also be more prevalent among adolescents than younger children: A 2018 study in *European Economic Review* of 1,600 low-income U.S. households, for example, found that

when a family is food insecure, younger children are prioritized and adolescents often go without.

A longtime adolescent health researcher, Mmari started studying food insecurity after seeing a 2016 Urban Institute report showing that food-insecure adolescents were taking serious risks to get food, including shoplifting and stealing. In some communities, teens tried to get arrested or fail out of school knowing they would be fed in jail and in remedial education programs.

“If adolescents are food insecure, they’re hardly able to learn,” Mmari says. “All kinds of linkages with different health outcomes and particularly mental health have been shown.”

The solution seemed simple: Make sure teens and young adults have access to food. But first policymakers needed to see this hidden hunger and then get on board with programs to address it.

**IN 2018, MMARI AND PFRH COLLEAGUES ASARI Offiong, Susan Gross, and Tamar Mendelson** conducted a qualitative study to understand food insecurity among urban adolescents and identify potential com-

munity-based interventions to address it. To involve teens in the study, Mmari collaborated with Joni Holifield, founder of HeartSmiles, a nonprofit that provides mentorship and leadership training for disadvantaged Baltimore teens and is affiliated with the Johns Hopkins Center for Adolescent Health.

The resulting 2019 *Public Health Nutrition* article found that almost half of the 53 participants were food insecure, and 13% reported not eating for whole a day because their family lacked money for food. Many said they were shamed or bullied for needing food—and that they took risks to get it.

“Girls in every single community spoke about it being easier for them to engage in transactional sex than it was for them to go into a food pantry where they were judged,” Mmari says. Boys described stealing, selling drugs, or cleaning car windshields to get money for food.

The teens felt a huge amount of stigma against admitting they were hungry and food insecure, Mmari says. “They said they’d admit almost anything else rather than that, because that was just such an embarrassing thing.”

**ADOLESCENTS IN LOW-INCOME HOUSEHOLDS** are in a challenging spot with food, says Kaitlyn Harper, PhD ’22, MS, MA, an assistant scientist in Environmental Health and Engineering who started volunteering with HeartSmiles in 2018 as a doctoral student.

They are more responsible for obtaining their own food than younger children, but they don’t have a full income or full autonomy. Many Baltimore food pantries are not open when adolescents can access them, or they require a legal ID or that children be accompanied by an adult, she says.

To address the issue among Baltimore youth, several HeartSmiles teens started the Youth Food Security Network (YFSN). In 2021, they came up with a solution: Start an online food pantry. In the first year, the network received \$81,000 in funding, and in the second year, \$62,000.

To get food from the pantry after its January 2022 launch, young people between ages 14 and 24 filled out an online form with their name, age, address, and contact information, and selected a week’s worth of foods, including fruits and vegetables, starches, and proteins. The Heartbeats, as HeartSmiles teens are known, entered the information into Instacart, which delivered the food directly to the young clients. The pantry grew dramatically as word got out, and in 2023 it served just under a thousand weeks of meals to young people, Harper says.

One of those young people was Kayla Mayfield, 19, a former YFSN member and then a first-year nursing student at Bowie State University. Before the program, she’d order fast food because it was the most convenient and inexpensive, but she knew it wasn’t nutritious.

“Once I started using the pantry, I started to meal prep,” she says. “I would order my vegetables, like green beans and broccoli, and my favorite protein, the pepper steak.”

Mayfield found the service so helpful, she recommended it to several college friends, who also used it.

At the end of February 2024, the online pantry ran out of funding. Harper and HeartSmiles are now looking to develop a more financially sustainable model and for partners to help them.



**When we talk about food assistance programs, we typically think of families with younger children, But we don’t associate adolescents with food insecurity.**

Another of the group’s projects is still running but also struggles to keep up with demand. The Granny Project began in 2020 and operates as a cooking show, with an older community member providing video instruction on how to cook a meal, while young people cook along at home with food provided by HeartSmiles. Dishes have included shrimp alfredo, pizza, and chicken breasts baked with broccoli. Before each week’s session, Heartbeats help with purchasing, packaging, and transporting food for the week’s meal to up to 25 families who have signed up.

Every week, more people try to register than the project has funds for.

**MMARI, HOLIFIELD, AND HARPER KNOW THE** work they’ve done so far is only a partial solution. They constantly ask young people for ideas. They’ve advised that food should be combined with other services to decrease stigma, including job training, employment programs, and training teens how to grow food in a community garden. Offering food with programs is something HeartSmiles has long done, Holifield says.

“Heartbeats frequently invite family and friends to our programs because they know they will get to eat,” she says. “It’s such a huge driver and factor because too many times we might be the only option a young person has for obtaining a meal they actually want to eat.” Yet finding the funds for this food is one of her biggest challenges because funders don’t understand why food is so important, she says.

Policymakers also tend to overlook adolescents when they consider this issue. “When we talk about food assistance programs, we typically think of families with younger children,” Mmari says. “But we don’t associate adolescents with food insecurity.”

Mmari has studied food assistance policies to understand both their effectiveness and how they can better serve adolescents. She and Harper studied Baltimore teens whose families received Supplemental Nutrition Assistance Program (SNAP), Summer SNAP, and P-EBT during COVID. The results, published in 2023 in the *American Journal of Public Health*, showed that none of the programs made a measurable difference in adolescent food insecurity.

One reason may be that SNAP benefits are tied to the U.S. Department of Agriculture’s Thrifty Food Plan, Mmari explains. The plan is based on a family of four: a man and a woman ages 20–60, a child age 6–8, and another child age 9–11. Adolescents’ higher calorie needs are not considered. SNAP benefits also go to the head of the household, not the teen, although teens may be at least partly responsible for getting their own food.

The program could be modified to better serve adolescents, says Mmari, who has applied for an internal grant through the Bloomberg American Health Initiative to keep studying the issue. A pilot project she’s considering would give adolescents an Instacart card with the money equivalent to SNAP benefits.

“Would adolescents use these benefits? How would they use them? How long would they last? We don’t know the answers to these questions yet,” she says.

Partnerships across sectors will be essential to solving the problem, Mmari says. Examples could include connecting youth employment opportunities with food assistance programs or developing a culinary school or community garden project for teens.

“There are a variety of different ways to form multisectoral partnerships on this issue, but we often silo each of these sectors, which creates more barriers for addressing adolescent food insecurity,” she says. ☺

# A Brief History of Traffic Deaths in the U.S.

More and faster cars, wider highways, and unsafe driver behaviors contribute to tens of thousands of deaths every year—but researchers see a safer road ahead.

BY KELLIE SCHMITT

One evening in 1899, New York City real estate dealer Henry H. Bliss stepped off a streetcar and into history books as the country's first recorded motor vehicle fatality.

The Manhattan intersection at Central Park West and 74th Street where a taxicab ran over Bliss was called the “Dangerous Stretch,” a section of street shared by horses and buggies, trollies, cyclists, and pedestrians. Early automobiles were a new and unwelcome intruder.

“Motorists were expected to yield to pedestrians,” says Peter Norton, PhD, MA, an associate professor of history at the University of Virginia. “People agreed that the street is for everyone.”

As more and more autos clogged the early 20th-century streets, traffic fatalities climbed for people inside and out of cars. Today, roughly 120 people die each day, or 44,500 individuals in 2023, from vehicle collisions in the U.S., according to the nonprofit National Safety Council.

“It’s as if a regional jet were crashing every day, but somehow we accept it,” says Lorraine Martin, MS, the council’s president and CEO. “We don’t see traffic fatalities the same way as other public health

crises. But getting on our roadways is the most dangerous thing we do every day, across the board.”

Complex factors have influenced the country’s traffic fatality rates, from the safety of the vehicles to drivers’ behaviors. An emphasis on swiftly transporting goods and people has driven roadway design, says Health Policy and Management Distinguished Scholar Jeffrey Michael, EdD, a national expert on road safety.

“It’s good for the economy, but it’s very bad for people in crashes, particularly vulnerable road users like pedestrians and cyclists,” he says.

Back when Bliss alighted from the trolley that evening, automobiles were considered a novelty reserved for the rich. That changed with the mass-produced Ford Model T, which brought car ownership within reach of middle-class Americans in the 1920s.

With more drivers, increasingly powerful engines, and scarce laws, the 1930s were a risky decade to be on the roads. A popular *Reader’s Digest* article “And Sudden Death” described the frightening uptick in fatalities. Political support grew for more protective laws and regulations. But auto lobbying groups deflected the idea that speed was to blame, turning the conversation to safer design features like three-way traffic lights and shatterproof windshields.

The war years led to a drop in fatalities as fewer people drove. Afterward, home ownership grew, fueled by low-interest loans for veterans and a baby boom. This was a time of suburbs and commutes, a growing love for the automobile, and a surge in traffic-related deaths.

“What happens next is paradoxical: Engineers would look at these highway deaths and say we need more highways,” Norton says. “The more deaths we have, the more that proves we need bigger, wider highways with better visibility, and that will solve the traffic death problem.”

In the 1950s, the national highway system carved a vast network of interstate routes across the country. With more people traveling at faster speeds, the next decade emphasized crash safety efforts. Car manufacturers debuted crash test

dummies and installed energy-absorbing steering columns that would cushion impact.

Once again, global events shaped traffic death tolls in the U.S. The 1973 oil embargo—and the sky-high gas prices that followed—reduced driving and fatalities. Meanwhile, radar guns helped enforce a new 55-mph national speed limit. Even though 1972 marked a record 55,000 traffic deaths, the fatality rate per miles traveled was steadily dropping. By the end of the ’70s, 3.3 people died per 100 million vehicle miles traveled, after hovering around five for most of the previous decade.

In the 1980s, the focus turned to driver behavior to reduce roadway deaths. While laws against drinking and driving had existed for decades, the practice was normalized. That shifted, thanks to the forceful advocacy of Mothers Against Drunk Driving and the unbearable losses so many suffered. “Designated driver” and “friends don’t let friends drive drunk” entered the cultural lexicon. The ’80s also became the seatbelt era, with a flurry of state-by-state laws requiring their use.

A 2015 government report credits seatbelts with saving more lives—about 330,000 total from 1960 to 2012—than any other car safety technology. That period overall represented “a revolution in safety” for people in vehicles with features like air bags, braking improvements, side impact protection, and electronic stability control, a technology that prevents skidding by automatically adjusting braking.



A traffic jam in Detroit in the 1920s

In subsequent years, though, fatality rates plateaued, and then rose during the COVID-19 pandemic. In 2019, the traffic fatality count was about 39,000, according to the National Safety Council. In 2022, it rose by 18% to roughly 46,000. Even though 2023 figures declined, they’re still nearly 14% above pre-pandemic levels. While it’s hard to single out one cause, experts point to a mix of distracted driving, increased alcohol and substance use,

shifting weather, increased speeding, and longer commutes.

Despite the disconcerting recent figures, many observers see a better road ahead. Attention is turning to a “Safe System” approach that prioritizes safety for pedestrians and bike riders as well as car occupants. This might mean slimming lanes on busy arterial roads to slow vehicles and creating separate spaces for bike lanes. Roundabouts replace risky intersections and speed cameras enforce lower speed limits.

There’s money fueling the shift thanks to the Bipartisan Infrastructure Law’s Safe Streets and Roads for All program. Over five years, \$5–6 billion is dedicated to improvements designed to prevent roadway fatalities with the goal of zero deaths. Accomplishing that will require an important shift from speed to safety, says Shannon Frattaroli, PhD ’99, MPH ’94, a professor in Health Policy and Management.

“Public health, the government, and law enforcement need to roll up their sleeves and understand that 45,500 people should not be dying on the roads each year,” Frattaroli says. “There is a solution and the solution is smarter design.”

## TRAFFIC SIGNALS

**1901:** Connecticut passes the first statewide speed limit law: 12 mph in the city and 15 mph in the country.

**1914:** The country’s first electric traffic signal is installed in Cleveland.

**1925:** Los Angeles passes a no-jaywalking rule that becomes a national model.

**1934:** The first driver’s education course is held at a Pennsylvania high school.

**1956:** The Interstate Highway Act paves the way for 41,000 miles of highways.

**1979:** Tennessee enacts the country’s first law requiring approved restraints for children.

**1998:** A federal law requires all new cars, light trucks, and vans to have front seat air bags.

**2021:** More than 13,000 people died in alcohol-related traffic deaths, a 14% increase from 2020.

# Vision



## A CONVERSATION-STIRRING DRAMA

A pathogenic threat. An enraged population. Disinformation. A public health hero targeted for telling the truth. They all emerge in Henrik Ibsen's 1882 play *An Enemy of the People*. Bloomberg School faculty including Joshua Sharfstein and Keshia Pollack Porter joined actors like David Strathairn and Frankie Faison in a February 22 reading of the timeless play sponsored by Theater of War Productions, the Johns Hopkins Berman Institute of Bioethics, and the National Academy of Sciences in Washington, D.C.



Ellen's Take



## Rewriting the Story of Life's Later Years

Advances in three key areas will help us ensure people everywhere enjoy longer, healthier lives.

Over the past three decades, public health has transformed the lives of children around the world through vitamin supplements, vaccine campaigns, water access, and more. From 1990 to 2022, the global under-5 mortality rate dropped by 60%. While there's still much work to do, improvements in maternal and child health are no doubt one of public health's greatest successes.

We rewrote the story of life's early years—we can rewrite the story of life's later years, too.

By 2030, older adults will outnumber the young for the first time in human history—1.4 billion people will be 60 and older. By 2050, that number will pass 2 billion. It's wonderful that more older adults are living longer lives, but are we doing enough to ensure good health and high quality of life in these extra years?

In another five years, 60% of American seniors will face mobility challenges. But more than half of them will not be able to afford the care and housing needed to overcome these challenges. And the number of Americans living with Alzheimer's will nearly double by 2060, creating a significant caregiving gap.

We need to take swift and bold action to meet the challenges—and seize the opportunities—of an aging society. The coming decades will be crucial, and our goal must be clear: Help people everywhere enjoy longer, healthier lives.

By shortening the period of declining independence and poor health, we can help everyone lead more fulfilling lives and realize the benefits that older people bring to families, communities, and society.

To be sure, the problems of an aging population are complex. To reshape our world and our individual futures, we need to improve our health systems, address overarching social issues such as ageism, and adapt our physical environment (from embracing age-friendly housing design to creating more accessible public spaces). And, of course, we must resolve health disparities in marginalized communities to ensure equity in aging for all older adults. These broad changes can only be achieved through robust and sustained investment across sectors and disciplines.

We must act with urgency and lift up efforts on these fronts:

**Support discovery and innovation:** The scientific community is on the cusp of uncovering new knowledge that will markedly benefit older adults. Researchers are working on new blood tests for Alzheimer's and other forms of dementia that may be available within five years,



**By shortening the period of declining independence and poor health, we can help everyone lead more fulfilling lives and realize the benefits that older people bring to families, communities, and society.**

and we've seen the first drugs promising to slow physical/cognitive decline. AI is poised to improve care through everything from the development of smart devices that detect falls to using deep learning to better understand the fundamental biology of aging. These efforts have the potential to be transformational, but only if we continue to invest in bringing them to the finish line.

**Pursue proven, scalable interventions:** Aging experts will tell you we need more programs like CAPABLE, which was developed by Johns Hopkins School of Nursing Dean Sarah Szanton. This program helps people age in place through visits from an occupational therapist, a nurse, and even a handyperson who can make minor home modifications and repairs. It's currently offered in more than 20 states and costs an average of \$3,000 per person, while saving an average of \$30,000 in avoided medical costs and nursing home admissions. We need to commit to developing and advocating for these types of practical, economically effective solutions that protect health but also increase independence and well-being.

**Develop and advocate for evidence-based policies:** We need policies that improve access and affordability of health and social services. At the Bloomberg School's Cochlear Center for Hearing and Public

Health, director Frank Lin helped craft the legislation to enable over-the-counter hearing aids, which have the power to improve access and care for millions of Americans. Jennifer Wolff, director of our Roger and Flo Lipitz Center to Advance Policy in Aging and Disability, worked on the first ever National Strategy to Support Family Caregivers, which includes nearly 500 actions that can be adopted at every level of government and across other sectors to support family caregivers. To continue addressing the needs ahead—whether it's increasing preventive strategies or addressing mental health needs of the elderly—we need to expand our work in advancing innovative and effective policies.

Our best chance for successfully pursuing these goals is to work toward them collaboratively, across disciplines and guided by a shared strategy. Developing a vision and advancing the field in parallel would supercharge discovery and enable maximum impact. Biological discoveries would be translated—and then implemented—to benefit older adults and their communities. Clinical and population health discoveries would be leveraged to optimally target next-generation biological research. And importantly, generations of cross-disciplinary researchers and practitioners would be trained to take on evolving challenges.

Over the past 30 years, by improving child health, we created a world that is healthier and safer, with fewer tragedies and more room for joy. By meeting the needs of older adults, we can bring more of these benefits into our lives.

Imagine a world where an Alzheimer's diagnosis is met with effective treatment instead of despair, where the demands of caregiving don't overshadow the precious moments and years of one's life, where a smartwatch helps predict illness, and where all older adults can remain active and connected within their community.

By working together, we can write a better final chapter for people everywhere. **o**

*Ellen J. MacKenzie, PhD '79, ScM '75, is the 11th dean of the Johns Hopkins Bloomberg School of Public Health.*



# OUR PETER AGRE'S BROAD ACT

## Vision

Long Read

How a humble Nobel laureate found a new mission: science diplomacy

BY ALEXANDER GELFAND

**I**t's a gray February afternoon in Washington, D.C., and Peter Agre—Nobel laureate in Chemistry, emeritus director of the Johns Hopkins Malaria Research Institute, and staunch advocate for science diplomacy—is patiently waiting to introduce an expert panel on cybersecurity, technology, and diplomacy convened by the Johns Hopkins Science Policy and Diplomacy Group. ♦

## CONNECTION POINTS

Over the years and across the globe, Peter Agre has been building bridges between cultures through his public health work.



2009

at Pyongyang University of Science and Technology



2010

with Deputy Health Minister of Burma (Myanmar) Mya Oo



2012

at Tehran University of Medical Sciences



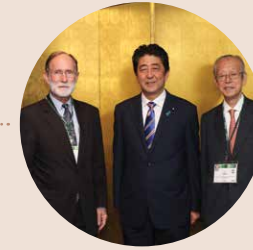
2013

in Macha, Zambia



2015

at Cuba Academy of Sciences, Havana



2016

with Japanese Prime Minister Shinzo Abe



2023

with Indian Prime Minister Narendra Modi



2023

with Cuban President Miguel Diaz-Canel

Agre has no formal position in the student-run organization, nor is he a panelist. It is even possible, given his near-pathological modesty, that the people milling around the glass-walled conference room at the Johns Hopkins University Bloomberg Center, do not fully appreciate who he is. Clad in an old pair of brown corduroy pants and a tie emblazoned with a map of Antarctica, he could easily be mistaken for a random policy wonk.

Not that Agre seems to care. “He’s very humble,” says William Moss, a deputy director of the JHMRI.

Nonetheless, his record speaks for itself. Over the past decade and a half, Agre has led groundbreaking scientific delegations to Cuba, North Korea, Burma (Myanmar), and Iran. He has dined with Fidel Castro in Havana, taken morning tea with former Iranian president Mahmoud Ahmadinejad in Tehran, and serenaded members of the State Academy of Sciences in Pyongyang with Tom Lehrer’s “The Elements” (a recitation of the periodic table set to the tune of Gilbert and Sullivan’s “Major-General’s Song”)—all in the interest of improving human lives and international relations through peaceful scientific engagement.

At the moment, however, he is doing his best to encourage the next generation of science diplomats.

“I’m here to cheer you on!” he tells the student moderator of the panel before turning his attention to the audience.

“Science diplomacy is an important part of science, and an important part of diplomacy,” he says, the dome of the U.S. Capitol visible through the window behind him.

On the surface at least, Agre might seem an unlikely candidate for the role of roving science ambassador. After earning his medical degree at Hopkins in 1974 and studying red blood cell disorders, he spent much of the 1980s and ‘90s in his lab establishing the existence of aquaporins, a class of proteins that allow water to pass through cell membranes and are therefore essential to life. That discovery earned him the Nobel in 2003, which he shared with Roderick MacKinnon, a Rockefeller University researcher who discovered the structure of another group of membrane proteins called ion channels.

Not long afterward, Agre became vice chancellor for science and technology at Duke University Medical Center. He returned to Hopkins in 2008 to lead the Johns Hopkins Malaria Research Institute, where he investigated the relationship between aquaporins and malaria and vastly expanded the Institute’s presence in Africa through the NIH-funded International Centers of Excellence in Malaria Research (ICEMR) program.

Tackling malaria was something that Agre had wanted to do for decades: It is, he points out, the most severe disease of red blood cells, as well as a crushing global health burden. The WHO estimates that there were 249 million cases and 608,000

malaria deaths in 85 countries in 2022.

“I hate to put different aspects of my career in competition with each other, but the directorship and the work in Africa was a very special part of it,” says Agre, who stepped down as director in 2023. (The JHMRI is now led by malaria researcher Jane Carlton, PhD.)

There seemed little reason, however, to suspect that a late-career tilt toward science diplomacy was in the cards.

Yet Agre’s friends and colleagues agree that it was nonetheless perfectly consistent with his character and values; less a lark, as he self-deprecatingly describes it, and more an expression of his belief in the power of science to benefit the world.

“What changed was not Peter’s interests so much as the opportunities that became available to express [them],” says Landon King, who spent 10 years in Agre’s lab and is now executive vice dean for the Johns Hopkins School of Medicine. “He was in the pantheon of science, and it provided Peter with opportunities to do these things that he thought were really important.”

Or as Agre himself told his audience in Washington, “Science opens doors—for the good of all humanity, and the good of our planet.”

**SCIENCE AND TECHNOLOGY HAVE LONG BEEN** used as diplomatic tools. Even at the height of the Cold War, American and Soviet scientists and engineers cooper-

ated on projects such as joint space programs and environmental protection initiatives that helped their nations maintain lines of communication.

For much of the 20th century, the principal aim of science diplomacy was to defuse tensions between superpowers and prevent the proliferation of nuclear weapons. As the 21st century dawned, however, scientists and diplomats shifted their attention to other urgent global issues such as climate change, sustainability, and food security.

Agre first became engaged in science diplomacy when he was elected president of the American Association for the Advancement of Science (AAAS) in 2009. The organization had recently launched a new Center for Science Diplomacy with the express goal of “using science and scientific cooperation to promote international understanding and prosperity.”

The Center aimed to strengthen ties with countries where official relationships either didn’t exist or were highly strained. Its leaders hoped to ease tensions while materially benefiting the populations of these target nations, which often suffered under international sanctions and embargoes.

This, Agre says, is what distinguishes science diplomacy from other forms of international outreach, like cultural diplomacy involving artists and athletes: When scientists collaborate, they can improve the health and well-being of large numbers of people, “sometimes in a permanent way.”



**Science diplomacy is an important part of science, and an important part of diplomacy.**

Consequently, when the Center approached Agre about the prospect of traveling the globe to promote collaboration on peaceful scientific projects, he leapt at the chance.

In a sense, he’d been waiting for such an opportunity his entire life.

**AGRE’S FATHER WAS A CHEMISTRY PROFESSOR** at Lutheran-affiliated colleges in Minnesota, and from an early age Agre was aware of medical missionaries who journeyed abroad to places like West Africa and South Asia.

He also found a role model in the two-time Nobel Prize winner Linus Pauling, who used his celebrity as a chemist to lobby against the nuclear arms race. Agre’s father knew Pauling professionally, and invited him to stay at the Agre home in the early 1960s while he gave lectures at local colleges on chemistry, biology, and the dangers of thermonuclear war.

“He definitely was a hero, and still is,” says Agre, who keeps a photo of Pauling, inscribed to his father, in his office.

A summer trip to the Soviet Union in 1966 further whetted Agre’s appetite for

travel and his interest in world affairs, and he decided to pursue a career in medicine in part because of the international opportunities it would afford.

When it came time to attend medical school, the presence at Johns Hopkins of what was then known as the School of Hygiene and Public Health was a major attraction. By the time he arrived on campus in 1970, Agre had already visited the School’s Narangwal Rural Health Research Centre in Punjab while traveling solo across Asia for several months after finishing college.

As a medical student and postdoctoral fellow, Agre conducted research on the cholera toxin with faculty members who did work at the School’s cholera research station in Calcutta. When he left Hopkins to pursue further medical training at Case Western Reserve University Hospitals in Cleveland, he thought he knew where his future lay.

“At that point, my ticket was punched,” says Agre, who intended to research infectious diseases in developing countries.

A plan to work on cholera in Ethiopia as part of a new program in global medicine fell through, however, when Agre’s wife, Mary, became pregnant; and after completing a clinical fellowship in hematology and oncology at the University of North Carolina, Agre returned to Hopkins for further postdoctoral work. In 1983, he secured a position in the School of Medicine and a small lab at Johns Hopkins Hospital.

Agre had by then developed an interest in red blood cell disorders and was attempting to isolate a particular red cell protein when he discovered a second, unidentified protein in his sample. That protein, which Agre wryly refers to as “the contaminant,” turned out to be aquaporin—the first known membrane water channel.

“It took some doing to figure out what it was,” says Agre, who assembled an international team of collaborators to investigate aquaporin’s structure and function.

As interest in aquaporin began to build, Agre found himself once again traveling the world, this time as a lecturer. He especially enjoyed meeting with and encouraging young scientists, a trait he may have inherited from his father.

“His students were his life,” Agre says. “Teaching the next generation seemed like an honorable tradition.” When Agre was asked to make a speech at the Nobel laureates’ dinner in Stockholm, he used his time to promote science education for young children. (When asked about that speech, Agre characteristically deflects attention from himself by shifting the focus to Mary, who taught preschool. “Her 3-year-old students and my 26-year-old graduate students had a lot in common,” he says, “although her students bit each other and peed their pants more often.”)

If science education and advocacy were high on Agre’s list of priorities, so were human rights: From 2005 to 2007, he chaired the Committee on Human Rights at the National Academies of Sciences, which helps secure the release of persecuted scientists, engineers, and health professionals around the world; and one of his first acts as president of the AAAS was to launch a Science and Human Rights Coalition. “He had a very strong set of social justice sensibilities,” says King.

He also had a strong interest in politics—so strong that he seriously considered running for Minnesota’s open Senate seat in 2007, going so far as to consult with pollsters and national political figures before ultimately deciding against it.

Agre looks back on this period of seemingly divergent activities with mild bemusement. “I was having attention

deficit difficulties,” he says. The unifying thread, however, was Agre’s desire to use the cachet conferred by his Nobel to effect positive change in the world, much as Pauling had.

“He knows the power that it has over people, and that he can use that for the greater good,” Moss says. “He refers to it as his ‘pixie dust.’ It’s like this little magical power that he has.”

**AGRE DID NOT HESITATE TO USE THAT POWER TO** advance the work of the JHMRI, where he was finally able to fulfill his goal of addressing diseases of the developing world.

“I had been waiting to get into malaria,” says Agre, who made frequent trips to Zambia, Zimbabwe, and the Democratic Republic of Congo to support the work that Institute scientists and their African partners were doing in the field to better understand and control the disease.

Science diplomacy may have presented the ideal venue to scatter his pixie dust, however. The North Koreans, for example, were reportedly hesitant to receive a Western scientific delegation until they learned that a Nobel laureate would be leading it. And Agre had other qualities that made him uniquely well-equipped to handle the hardest diplomatic cases.

“He’s a very unusual person,” says Linda Staheli, a veteran science diplomat who led the DPRK Science Engagement Consortium that organized Agre’s first trip to Pyongyang. (Staheli recently pro-

duced a documentary about U.S. scientific engagement with North Korea, *A Peace of Science*, in which Agre features prominently.) In her telling, Agre blends scientific credibility with a genuine interest in policy and impeccable soft skills—a rare and powerful combination that has made him a kingpin of U.S. science diplomacy. “He is so easy to engage with, so warm and funny, and gets the people-to-people stuff,” she says.

The “people-to-people stuff” turned out to be particularly important. The AAAS delegations that Agre led abroad between 2009 and 2012 set out to explore the possibility of cooperating in uncontroversial areas of mutual interest like agriculture, health, and environmental science. But given the lack of familiarity between the various parties, the primary goal was simply to build sufficient trust to continue the conversation.

“I was hoping to establish friendships,” Agre says.

The North Korea mission, for instance, represented the first time that a U.S. science delegation had visited the country; and while the North Koreans were hoping to gain access to American resources, most had never actually met an American before. One of the delegation’s official chaperones confided to Agre that when he told his grandson that he would be meeting a bunch of Americans in Pyongyang, the little boy responded, “Grandfather, bring the rifle.”

Yet Agre bridged the divide through charm, humor, and simple acts of humanity: Singing the periodic table during a

formal toast to high-ranking officials; dancing to Madonna’s version of “American Pie” during a demonstration of audio equipment in the Grand People’s Hall of Study (the North Korean equivalent of the Library of Congress); presenting the tie he wore while delivering his Nobel lecture to the vice president of the State Academy of Science, so that he could someday give it to the first North Korean to win a Nobel.

By the end of that trip, the two sides were sharing stories of their families and their hopes for the future. “Our chaperones became our friends,” Agre says. According to Staheli, it was Agre’s involvement that led the North Koreans to sign a memorandum of understanding formalizing their willingness to pursue potential collaborations. That goodwill led to additional meetings in the U.S. and Italy, and ultimately to a program to teach English to North Korean scientists and the creation of a virtual science library to grant them access to Western science journals.

Yet Agre is realistic about the limits of science diplomacy, which is inevitably subject to the vicissitudes of global politics. Although he made several subsequent trips to North Korea to visit Pyongyang University of Science and Technology, worsening relations between the U.S. and the DPRK have prevented him from returning since 2015. And he has yet to revisit Iran, despite having been given an office at Sharif University of Technology in Tehran on the condition that he return for 10 days of lectures and scholarly activity every year. “I’ve been in touch with them,” Agre says. “But it’s just not safe.”

Even in Cuba, the country where the greatest inroads have been made, results have been mixed. Agre has visited the island nearly a dozen times, has met with President Miguel Díaz-Canel in both Havana and New York, and has arranged for Cuban researchers to attend the Lindau Nobel Laureate Meetings, an annual gathering in Germany of Nobel laureates and young scientists. Moreover, Cuban scientists, including members of the Castro family, have visited the School, taught classes at Hopkins, and spent time at the JHMRI; while the AAAS and the Cuban Academy of Sciences have



Agre in Macha, Zambia, in 2013

convened symposia in Havana on neuroscience, cancer immunotherapy, and mosquito-borne illnesses. Yet prickly relations between successive U.S. and Cuban administrations still make sustained collaborations difficult.

Nonetheless, Agre remains committed to using science as a means of fostering international cooperation and understanding. “I would like to see more exchange; I’d like to see more partnerships,” he says, adding that science diplomacy need not be limited to situations where diplomatic relations are poor, but can be practiced anywhere, from Libya to Finland.

Agre himself seems to prefer the toughest cases, however. “I’m a little bit of the opinion we should be looking for things that are hard to do,” he says. While he claims to have slowed down somewhat—he was diagnosed with Parkinson’s disease 12 years ago and tires more easily than he once did—his schedule suggests otherwise: He met with an Iranian contact while visiting the University of Arizona in February, zipped back down to Washington to attend another event organized by the Johns Hopkins Science Policy and Diplomacy Group a couple of weeks later, and returned to Cuba to speak at an AAAS event in March. Yet if his unflagging dedication to science diplomacy is idealistic in the best sense of the word—“there’s no reason not to try,” he says—it is also highly pragmatic.

For one thing, experience has taught Agre that even governments hostile to the U.S. tend to welcome American scientists. “I think they see us as maybe harmless, possibly even better,” he says. What’s more, even the most oppressive regimes harbor talented and well-meaning scientists; and when those regimes collapse, as Agre believes they eventually will, “there are competent people we should know.”

For another, there are under-resourced parts of the world where the close partnerships and scientist-to-scientist interactions that science diplomacy seeks to cultivate represent the best hope for making progress on pressing global health issues.

“I think it’s the best entry into Africa,” says Agre, who points to the JHMRI’s successful malaria research and control efforts undertaken with African scientists and physicians. Collaborations between the Institute and the Macha Research Trust in Zambia, for example, have contributed to the reduction of malaria cases in the area by more than 95%.

From that perspective, science diplomacy represents a unique tool for advancing public health. The obstacles may be significant and the rewards uncertain, but Agre has never been one to shy away from a challenge.

“If I’d wanted to play it safe,” he says, “I would have never left Minnesota.” ◻

## DIPLOMATIC DIVIDENDS

Scientific collaboration across national borders can yield lasting health benefits for large numbers of people.

Despite the historically fraught relationship between India and Pakistan, for example, **Indian and Pakistani fellows of the World Academy of Sciences**, a program unit of UNESCO devoted to the advancement of science in developing countries, succeeded in distributing an inexpensive Indian-produced hepatitis B vaccine in Pakistan. The **23 member states of CERN**, the European Organization for Nuclear Research, have driven advances in cancer treatment, diagnostic imaging, and air quality analysis—all while inspiring the formation of similar international consortia in Africa and the Middle East. And Agre’s own work in the DPRK helped lay the groundwork for an ongoing collaboration between **British and North Korean volcanologists** to study Mt. Paektu, an active volcano on the Chinese-North Korean border that poses a threat to the local population.



## Minding the World

The lack of sufficient mental health care in every country leads Pamela Collins to prioritize prevention.

INTERVIEW BY BRIAN W. SIMPSON

**P**amela Collins's journey to global mental health started on a bus in Haiti in 1987.

Working for the first time in a predominantly Black country, the young medical student sometimes took public transportation and enjoyed blending into the majority. "What really struck me that summer was how important social context is for health," says Collins, MD, MPH, Bloomberg Centennial Professor and chair of Mental Health. "Our daily experiences, how we move through the world, as members of the majority or minority groups—all of those have ramifications for our health outcomes and certainly our mental health status."

She left Haiti with a commitment to pursue global mental health—and would later lead research into HIV and mental health, stigma and discrimination, and urban adolescent mental health.

**Why don't more people get the mental health care they need?**

Access is an issue everywhere. This is a story where the issues are global, where the challenges are truly global. There are tremendous differences in resources between countries, but surprisingly simi-

lar challenges: Only a minority of people receive minimally adequate care once they are recognized as having depression, anxiety, or substance use disorder. That is something that we really must fix.

Also, in many parts of the world, the history of mental health services has been tainted by negative experiences with colonialism and its sequelae. The services that evolved are often not services that people typically feel comfortable accessing, compounded with the fact that those services are extremely underfunded. I think many people have a lot of reservations about specialist mental health services in most parts of the world, this country included. And given a history of human rights abuses and misuse of these services as well as discrimination and poor-quality care, that's understandable.

**So, even if access were universally available, people would still be leery about getting care?**

If you know that you're getting access to poor quality, overly restrictive mental health services, most people don't want that. In the United States, overly restrictive care often means jails and prisons, right? A large percentage of people in jails and prisons live with mental health conditions. The National Alliance on Mental Illness points out, for example, that the Cook County jail in Chicago is one of the largest mental health care providers in the country. And the pathway to jail can sometimes be linked to a lack of services in the community. The goal is to create and deliver quality, community-based care that will meet most needs.

**How do you approach improving global mental health?**

That's a complex question because there are biological, social, and environmental factors that add to vulnerability to poor mental health. We can start with felt need: How do we prevent and reduce the risk for mental illnesses? And, when they occur, how do we provide care and reduce disability? Those are the key questions for global mental health.

“

**One of the responsibilities of public health is to continually ask what we can do at a population level to keep children and youth safer and reduce their exposure to adverse events that are likely to affect both their physical and mental health.**

**What can the U.S. learn about mental health care from other countries?**

There's no country in the world that has enough mental health care providers for the population. One of the exciting things about the last 15 years or so has been the chance to see how people are innovating in places around the world that have very different levels of resources, very different kinds of health systems. When I was leading the work on global mental health at [the National Institute of Mental Health], some of our early initiatives were focused on whether nonspecialists can deliver mental health care that is evidence-based and culturally congruent in a variety of settings. Community health workers and peers—for example, if you are a woman suffering with perinatal depression—can be equipped to deliver mental health services.

**What can we be doing now to prevent mental disorders?**

In 2022, researchers conducted a rigorous global meta-analysis to identify important risk factors for mental disorders that, if addressed, could reduce population-level mental illnesses. They found that childhood adversity topped the list.

If you could reduce childhood adversity—which was a broad bucket of issues from war crimes to neglect and child abuse—you could potentially reduce the global incidence of schizophrenia spectrum disorders by around 38%. That's just one example, but it means we should really be thinking about the causes of childhood adversity. About 50% of mental disorders begin in the teenage years. We need to intervene then and earlier! One of the responsibilities of public health is to continually ask what we can do at a population level to keep children and youth safer and reduce their exposure to adverse events that are likely to affect both their physical and mental health.

**Your recent *Nature* analysis focused on creating mental health-friendly urban areas. Why?**

As humans, we survive adversity, but it still leaves a scar. That paper is looking aspirationally at the things a city could do to prevent the scarring. What are the resources that people need in a city to foster strength and to support their development? We want to ensure the trajectory of youth is not curtailed by the fear of violence, by harassment, by injustice, by discrimination, by the kinds of things that interfere with people's ability to develop freely as human beings. These require complex actions, but we can take simpler steps. We can create nonjudgmental spaces for young people, where you can actually, authentically be yourself.

**What's your main priority for the department?**

Our priority is to respond to the current public mental health crisis and to anticipate population-level mental health needs of the next decade. I met with a group of young people on the West Coast recently, and they were saying, "We can't get attention without a crisis. How do we get help before we get to crisis?" Some of our work helps to respond to these crises by designing interventions, testing them, and studying their implementation. But how do we avert the crisis? This gets us back to the theme of prevention, which continues to be a priority for our department. ☉



A group of doctors at a rally outside the U.S. Supreme Court on April 24.

## Dobbs' Long Shadow

Abortion bans are changing OB-GYN training and practice—and stand to exacerbate health care shortages and disparities.

BY ANNALIES WINNY

When Rachel Jensen applied for a fellowship in complex family planning at the University of North Carolina, Chapel Hill, in the spring of 2022, she knew that the U.S. Supreme Court was likely to overturn the federal right to abortion in its upcoming decision in the *Dobbs* case.

By the time she was accepted to the program, *Dobbs* was in place, and the state had reinstated a decades-old 20-week abortion ban, which was ruled unconstitutional in 2019. After she arrived, the state scaled that back further, issuing a near-total abortion ban after 12 weeks' gestation.

In the wake of *Dobbs*, 14 states have fully banned abortion, and another three have banned it after six weeks' gestation. But complex family planning is an OB-GYN specialty that involves caring for patients who need later-stage abortions for a range of reasons: They may discover health complications, for example, or lethal fetal anomalies well into the second trimester, or later.

The state's restrictions mean that Jensen has to travel to Virginia to get the

practice she needs to do the work. They also mean that providers are having to jump through hoops to get patients care they can't provide, referring them to out-of-state clinics and organizations that can help with transportation and other costs.

As for staying in the state to practice, the hurdles are a significant consideration for Jensen. "It may not make sense professionally," she says.

About half of OB-GYN programs are in states with significant abortion restrictions. A December 2023 study in the *Journal of Law, Medicine & Ethics* shows that post-*Dobbs*, abortion training gaps will exacerbate long-standing health disparities in reproductive health, diminish clinical skills and knowledge in abortion care, and lead to a rise in complications and maternal mortality. This is especially true in rural areas also suffering from hospital closures and health care access gaps.

More than 2 million women of child-bearing age already live in so-called maternity care deserts—the 1,052 U.S. counties with no obstetric providers and no hospital or birth center offering obstetric care. In the wake of *Dobbs*, dozens of abortion clinics closed across the U.S. And amid post-*Roe* bans and restrictions, the proportion of patients traveling out-of-state for abortion care has doubled from 1 in 10 in 2020 to 1 in 5 in the first half of 2023. Those who can't travel may forgo abortion care altogether, resulting in unintended births, which have also increased after *Dobbs*, or be forced to rely on providers who can't—or won't—give them medically accurate and complete information about their options.

But the impact is broader than OB-GYN care. The vast majority of physicians and trainees in all specialties prefer to practice or study in states with abortion access, according to a 2023 report in the *Journal of General Internal Medicine*. Trainee physicians, most of whom are of child-bearing age and deciding where to plant their roots, are making their choices based on where jobs are available, where they can best provide care, and where they can get it for themselves and their families.

That reality paints the bleak forecast for health care staffing, says Benjamin Thornburg, a PhD candidate in Health

“We need to have succession planning. A sizable segment of abortion providers in the U.S. are older, and there has been concern for a while about getting younger, newer graduates in.”

Policy and Management who is studying the long-term impacts of *Dobbs*.

"There tend to be [health care] shortages in states that have bans already." If medical students avoid applying to residency programs in ban states, "downstream the shortage areas get worse and worse," they say.

Although applications to OB-GYN programs in ban states were down 10% last year compared to the previous match cycle, the specialty remains in demand, and residencies in restrictive states are still filling up. "But how many of those providers will actually be performing abortions?" wonders Joanne Rosen, JD, MA, a practice professor in Health Policy and Management who studies the impact of law and policy on abortion access.

"We need to have succession planning" for this increasingly scarce and stigmatized workforce, says Rosen. "A sizable segment of abortion providers in the U.S. are older, and there has been concern for a while about getting younger, newer graduates in," she says.

Cross-state training programs between protective and restrictive states, like the one Rachel Jensen is involved in, are one solution—and, because the Accreditation Council for Graduate Medical Education requires access to abortion training for OB-GYN trainees, a necessary one. Such programs are already ramping up to help more students and cover more of their costs.

But these programs have limitations, says Jessica Lee, MD, MPH '17, associate professor in Obstetrics & Gynecology at the University of Maryland School of Medicine and director of the university's Ryan

Residency Training Program, one of the programs offering cross-state support.

"I have colleagues across the whole country emailing me about opportunities for their residents to seek training out-of-state with us," she says. "But honestly, there's no great way to get that training accomplished because we still have to address the training needs of our current residents."

Lee also must consider how to use limited resources: "What does it mean to train a resident and provide one or two weeks' experience—what are they going to do with that if they're not going to get to continue those skills when they return to their home program? It raises a lot of questions about how we invest our time."

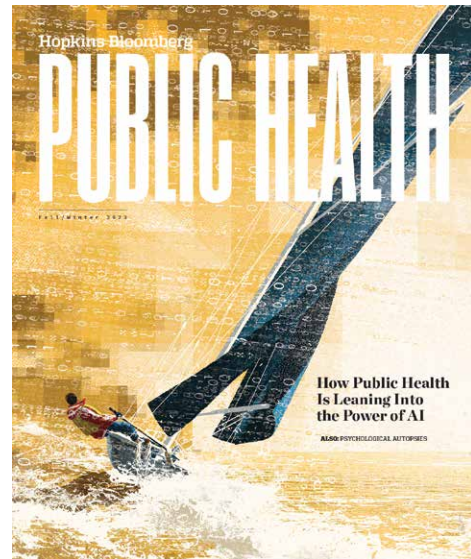
One thing that brings her hope is that, galvanized by *Dobbs*, the current generation of medical trainees is deeply committed to ensuring that abortion care is available to their patients.

Jackline Lasola, an OB-GYN resident at the University of California, San Francisco, has ruled out living in a ban state but wants to "find some way to provide services" in ban states, perhaps by working as a traveling provider. "That's something that I'm open to in those types of places."

When it comes to abortion access, the current crop of trainees is "200% more interested than medical students were five or 10 years ago, and I'm absolutely ecstatic," says Lee. "This current generation is really fired up, and we're lucky to have them fighting for our patients, regardless of what the future legal landscape looks like." ○

# How Public Health Is Leaning Into the Power of AI

Readers respond to our reporting on AI in public health and other stories from our Fall/Winter 2023 issue.



What can AI do for health, and what must humans do to safely and ethically realize its potential? Our writers delve into those questions in stories about efforts to root out AI's baked-in bias, research that harnesses AI to do everything from identify unfamiliar compounds in wastewater to boost patients' physical activity, and more. The issue's other reporting covered environmental contributors to autism, psychological autopsies, challenges to transgender health, and how Indigenous peoples are overcoming colonization's impacts to reclaim health.

Catch up on these and other stories from previous issues at [magazine.publichealth.jhu.edu](http://magazine.publichealth.jhu.edu).

**This is an exciting read** by Scott Zeger. It really digs into the AI-human dynamic. AI's potential is vast, yet its alignment with human needs is paramount. I've witnessed AI's impact firsthand, collaborating with health leaders handling complex big data to enhance patient care while preserving human expertise.

Let's champion a future where AI serves humanity's best interests, shaping a world where technology complements human values! —*Emmanuel Elorm Nortey-Adom via LinkedIn, in response to "AI's Very Human Challenge"*

**It's great to know** that we're not alone in this struggle to keep our culture and traditions alive for our future generations. I am from the Pueblo of Acoma, New Mexico, and I recall a time being a part of this particular ceremony with the Māori people. Our Buffalo dance group, Pueblo Enchantment Dancers, exchanged dance, gifts, and greetings with them. It was a beautiful time and place. If this is the same group of people I would love to reconnect, collaborate, and extend an invitation to visit our Pueblo "Sky City." Many prayers and blessings to you all for your efforts. —*Mark Lorenzo via web, in response to "We Are All Connected"*

**Several years ago**, annoyed by the insistence of some glitterati that mercury/thimerosal caused autism, I plotted British data on true autism diagnoses vs. cesarean section. The data were closely correlated, with an offset of about five years. The hypothesis is that vaginal birth "inoculates" the newborn in a way cesarean does not. I don't see that hypothesis included in the list of environmental factors, but perhaps it should be. —*Alan Silverman via web, in response to "Outside Influences"*

**Let's not discount** the contribution [to rising autism rates] of the increased capacity for "diagnostic ascertainment"—both in terms of our understanding of autism and the tools available to us to more accurately diagnose. Having trained in pediatrics in the 1980s, there is little doubt that we definitely mischaracterized children as

“**Let's champion a future where AI serves humanity's best interests, shaping a world where technology complements human values!**”

intellectually disabled when they would, today, be diagnosed as autistic. A great paper from 2015 [in *Neuroscience News*] lays out the premise. —*Steven Merahn, MD, via LinkedIn, in response to "Outside Influences"*

**I often think** that more than a few children I went to school with in the '50s and '60s might have been autistic. I doubt the numbers will ever be known because the labels were different then, and the kids were just lumped into special education classes until they aged out, if they attended school at all. —*Sue Nichols via web, in response to "Outside Influences"*

**Amidst an ongoing** onslaught against gender affirming care and trans rights, it can be easy to forget about holistic trans health care. While access to gender affirming care is important, trans care needs to address housing, HIV/AIDS, substance use disorders, comorbid mental health conditions, poverty, routine preventative care, etc. I thought this was a well-written article that urges addressing trans health care and community holistically, as well as being both intentional and responsive in research questions and study design. —*Chris Reinhardt via LinkedIn, in response to "The Journey to Thrive"*

**It is so interesting** that suicide survivors are a different profile from those who die by suicide, i.e., that perhaps suicide "attempt" is a different behavior than suicide. I wonder if that implies that suicide attempt is almost a form of self-harm or self-injury. —*@Aon\_Maha via X, in response to "Looking for Why"*



## Make a Lasting Impact

# PUT A STUDENT'S PUBLIC HEALTH CAREER ON A FLIGHT PATH TO SUCCESS!

A Bloomberg School scholarship and a modest stipend set Gertrude Huster, MS '84, on a path to success, one that included working at the Naval Air Station at Patuxent River while she prepared for a biostatistics career in public health.

Huster never forgot how other people's generosity set her professional life in motion, which is why she and her family decided to create a bequest to endow a scholarship in the Department of Biostatistics just before she passed away from breast cancer in June 2023.



Nora Elhaisouni

Today Nora Elhaisouni is a master of science student in Biostatistics and the first Gertrude A. Huster (née Russell) Scholarship recipient. As a first-generation college student, she is grateful for Huster's gift which is helping her build a career in data analysis focused on infectious disease and maternal and child health.

Planned gifts such as Huster's provide scholarship and stipend support. Think about how you can

turn a student's dream into a career and open up exciting professional opportunities.

**To make a lasting impact on public health—and the world—contact Richard Letocha, JD, CFP, director of gift planning, at [rletocha@jhu.edu](mailto:rletocha@jhu.edu).**



JOURNEYS

# The Missing Ingredient

If we want to help people eat better, we need to teach them how to cook.

BY JULIA WOLFSON

**W**hen you are a chef, everyone asks you questions about cooking.

The queries, like how to cook fish or braise lamb, begin as soon as people learn that I was a chef in some of New York City's highest-rated restaurants. As a line cook and later an executive chef, I moved from French fine dining to cooking more casual, local, and seasonal fare. I loved the frenetic energy and pace of restaurant kitchens, the physicality and challenge of the work, and the creativity required to create daily changing menus.

Eventually, for myriad reasons, I changed careers to study public health policy. My main interest, of course, was food—and how our food system makes healthy diets difficult. In recent years, nutrition experts and policymakers have sought to reduce upstream barriers to healthy diets. They helped place grocery stores and farmers markets in underserved areas, set up mobile produce trucks, and strengthened nutrition assistance programs like SNAP and WIC. Better school meals and food labels have also been important improvements.

But these policies fail to address a key fact: At the end of the day, someone has to make dinner. Someone has to plan the meals, shop, cook, and clean up. Make no mistake, this is hard work. The barriers extend beyond a lack of access and time, beyond high prices and nutrition knowledge.

Cooking skills, I learned through my research, also play a huge role in shaping food choices, diet quality, and diet-related disease risk. As a society, we've largely stopped teaching people how to cook. If

you don't know how to cook an eggplant, or fish, or lentils, you won't purchase them, and you certainly aren't turning them into a meal. Too often, cooking skills are left out of the conversation about how to improve diets. The HHS's Dietary Guidelines for Americans, for example, barely mention cooking at all.

I've spoken with or surveyed thousands of people about cooking. I've asked them why and how they cook, what healthy eating means to them, what makes home-cooked meals challenging, etc. I've also taught cooking classes in community health centers and other settings. I've learned that technical cooking skills are important, but confidence, self-efficacy, and how people feel about cooking are just as critical. Many people learn a few key recipes (often from their mothers), and then cook those and similar foods most of their lives. When they need to change their diets later in life (often because of health concerns), they find it challenging.

Planning for and preparing healthy home-cooked meals takes time, skills, and mental energy. Think about your local grocery store: What is on the shelves? Much of the food is highly processed, which is detrimental to health in a multitude of ways. Yet ultra-processed foods (like chicken nuggets and frozen pizzas) make up more than 60% of most American's diets, according to the National Health and Nutrition Examination Survey. Even when people cook at home most days, more than half of their calories come from ultra-processed foods. Hot dogs and mac 'n' cheese from a box is a home-cooked meal, but it's not healthy home cooking. This may explain why adding grocery stores in areas with low food access doesn't always improve diet quality and health.

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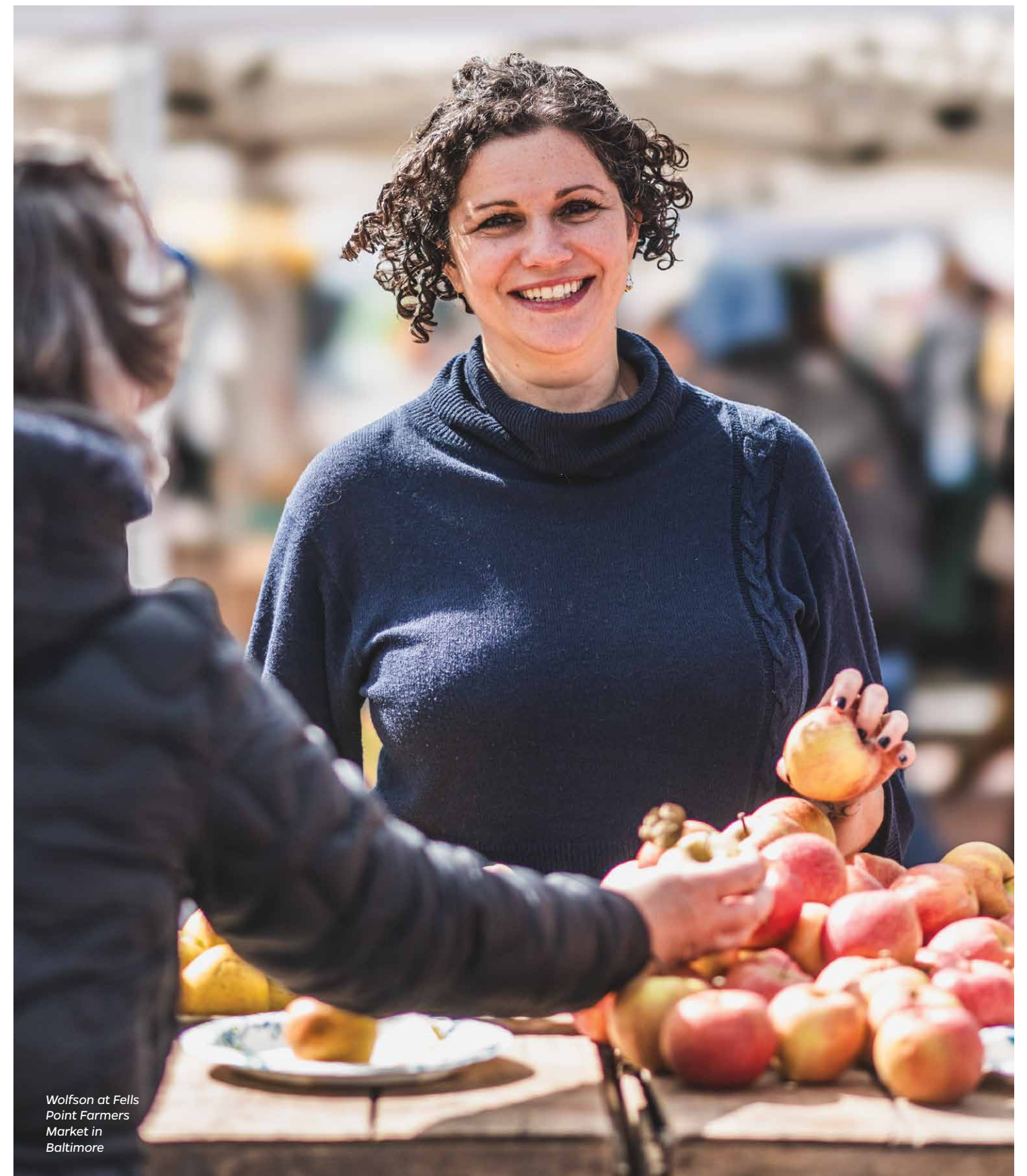
**At the end of the day, someone has to make dinner. Someone has to plan the meals, shop, cook, and clean up. Make no mistake, this is hard work.**

I love food, and I love cooking. To me, cooking is a source of joy and a way to express creativity. It doesn't have to be that for everyone, but cooking skills should be available to everyone and something we value as a society. After all, cooking and food help us keep our cultural and family traditions alive. Food brings us together as families and communities.

Schools and community centers, as well as preventive health care and nutrition assistance programs, can all be leveraged to teach people how to cook. I've seen how learning basic cooking skills and healthy recipes in a supportive setting can expand people's palates and empower them to start cooking more healthy meals at home, increase vegetable intake, and, in some cases, allow them to reduce blood pressure medication or lower their HbA1c (an indicator of diabetes).

As we work together to solve societal issues of poor diet quality, food insecurity, obesity, and diet-related chronic diseases, we must work toward policy, systems, and environment solutions to food-related structural inequalities. And we also need to invest in policies and programs to build people's capacity to cook. ☪

*Julia Wolfson, PhD '16, MPP, is an associate professor in International Health (Human Nutrition Program) and Health Policy and Management.*



*Wolfson at Fells Point Farmers Market in Baltimore*

photo MOLLYE MILLER