Columbia Public Health

GUT INSTINCT
Clues to Autism

HIGHS & LOWS
The Heroin Bell Curve

TEXT ALERT
Cell Science

ELECT HEALTH

THE PREVENTION CAMPAIGN
The 2015–16 Grand Rounds series brings a variety of visionary speakers to the Mailman School to catalyze disruptive thinking and inspire new approaches to improving and sustaining health. Renowned voices in environment, government, public health, real estate, technology, and more will champion innovation and help set the stage for the future of public health.

For schedule of speakers or to watch Grand Rounds via the School’s Livestream channel, visit:

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Climate Changing
China tackles the challenges of environmental degradation, healthcare policy reform, an aging population, and urban planning. **BY ALEXANDER GELFAND**

Running on Prevention
As the presidential campaign season gears up, scholars advance a platform to reverse the U.S. health deficit using a combination of substance and science. **BY ANDREA CRAWFORD**

It Takes Guts
A long-running investigation ties autism to a disruption of the microbial ecosystem contained within the human digestive tract. **BY TIM PAUL**

Toxic Exposure
Nearly half of American schoolchildren are poor. Scientists seek antidotes to the developmental hazards of poverty. **BY TARA HAELE**

The Law of Epidemics
What can algorithms from infectious disease research reveal about rising rates of opioid addiction and overdose? **BY ALISA ROTH**

Mobile Methods
Portable, ubiquitous smartphones extend the reach of investigators collecting data and developing health-promotion programs for vulnerable populations. **BY SEAN CAMPBELL**
A Time to Champion Prevention

Since I entered public health, I have never seen so great a need to rally around prevention science.

In April, President Barack Obama convened an unprecedented meeting of scientists, government officials, and representatives from universities and technology companies to shine a light on the incontrovertible link between climate and health. Among his invited guests were Mailman School professors of Environmental Health Sciences Patrick Kinney, ScD, and Jeffrey Shaman, PhD ’03, who together direct the nation’s first program on climate change and health in a school of public health. I am hopeful that the president’s recognition that climate change is an urgent public health issue will lead to more awareness and, at long last, political action to address its hazards. This could be a watershed moment.

We will need more such moments in the years ahead. Since I entered public health, I have never seen so great a need to rally around prevention science. Chronic diseases and conditions have grown to epidemic proportions globally. Furthermore, the United States’ health status ranks lowest among our peer nations. Population health must become a national priority. Successfully pursuing that goal depends on building a health system that prioritizes prevention, to bring preventable diseases under control. Our public health system must lead—fully 70 percent of our population’s health is due to public health and prevention measures. Prevention promises healthier as well as longer lives.

The Mailman School has long been motivated by this goal in our research, teaching, and service. And through an array of new programs, we are redoubling our efforts.

As you will see throughout this issue of Columbia Public Health, Mailman School scholars are conducting research to inform prevention policy and practice in areas such as children’s health, the environment, and chronic disease. By committing to an interdisciplinary approach, we heighten the relevance of our work. Family health, for example, requires an understanding of environmental health. Effective healthcare policy depends on big data. And prevention, which works at every age and stage of life, is at the core of all that we do.

Now we must help our elected leaders embrace the cost-effectiveness of preventing chronic as well as infectious diseases and investing for health throughout our lives. And we must be ready to design communities and institutions that promote healthy living. As scholars and citizens, we must prioritize access to healthy food, safe places to walk, mass transit, clean air, affordable housing, and health systems for the 21st century.

To succeed with such an ambitious mission, public health professionals will have to engage ever more vigorously with the elected officials and public servants who craft and implement public policies and programs to promote health and prevent disease.

The sustainability of our healthcare system—and a national commitment to a system that will create health—may well depend upon the foundation laid during the presidential election cycle already underway. Life expectancy has grown dramatically in the United States and around the world. Now is the time to ensure that those longer lives are enjoyed in good health.
HONOR ROLL
A SAMPLING OF FACULTY AWARDS

Karolyinn Siegel, PhD, professor of Sociomedical Sciences, named to the Steering Committee of the National Human Genome Research Institute’s Center for Research on the Ethical, Legal and Social Implications of Psychiatric, Neurologic and Behavioral Genetics.

Quarraisha Abdool Karim, MS ’88, PhD, professor of Clinical Epidemiology, awarded the 2014 Thas-Lenovo Science Prize.

Ayaga A. Bawah, PhD, assistant professor of Population and Family Health, nominated to serve on the board of the Tamale Teaching Hospital of the University of Development Studies in northern Ghana.

Les Roberts, PhD, associate professor of Population and Family Health, awarded the Robert H. Kirschner Award for Global Activism by the Heartland Alliance’s Marjorie Kovler Center.

PROFS IN PRINT
TRAINING EXTENDS SCHOLARLY INSIGHTS

This past December, Tal Gross, PhD, took to the pages of The Washington Post with a bold declaration. “This year, I resolve to ban laptops from my classroom,” pledged the assistant professor of Health Policy and Management. His op-ed garnered a whopping 633 comments, and those responses gave Gross, who has since penned pieces for Al Jazeera America and The Hill, a glimmer of the influence wielded by public intellectuals.

Gross was a member of the inaugural class of Public Voices Fellows, a yearlong initiative that brings Columbia faculty together with journalists for mentoring, discussion, and collaboration. Intended to expand the breadth and quality of ideas that appear in influential media, Public Voices helps faculty members like Gross extend their reach in the marketplace of ideas.

“Researchers, as a whole, need to have a voice beyond the university’s boundaries,” says Gross. “Working all year with my writing coach, I learned how to translate my research into a story to reach new audiences.”

This past spring, six new faculty members from across the Mailman School began their fellowships, with support from Columbia’s Lerner Center for Public Health Promotion. The goals of the Public Voices Fellowship run tandem to those of the Lerner Center, says Chair of Sociomedical Sciences Lisa Metsch, PhD, a member of the Center. “Mailman School faculty have an enormous role to play in raising the visibility of public health scholarship,” she says. “One of the Center’s goals is to take academic insights out of the library and put them to work improving population health. The new media landscape is filled with possibility, and I am delighted that our faculty have an opportunity to become pioneers there.”
HONOR ROLL

Fredrica Perera, MPH ’76, DrPH ’82, PhD ’12, founding director of the Columbia Center for Children’s Environmental Health, awarded a 2015 Heinz Award for the Environment.

Robert Fulillow, EdD, professor of Sociomedical Sciences, appointed by Governor Andrew Cuomo to a task force to end the AIDS epidemic in New York.

Stephen S. Morse, PhD, professor of Epidemiology, named to the National Science Advisory Board for Biosecurity of the National Institutes of Health.

Population and Family Health professors Marina Catallozzi, MD, MSc, and Karen Soren, MD, each named a Best Doctor 2015 in New York Magazine.

Virginia Rauh, ScD, professor of Population and Family Health, invited to give the Mind Institute Distinguished Lecture at the University of California, Davis.

Alfredo Morabia, MD, PhD, professor of Epidemiology, named editor-in-chief of the American Journal of Public Health.

Diana Hernández, PhD, assistant professor of Sociomedical Sciences, named a JP Morgan Environmental Health Fellow at the Harvard University School of Public Health.

Associate Professor of Health Policy and Management Y. Claire Wang, MD, ScD, awarded a Robert Wood Johnson Foundation Health Policy Fellowship for 2015–2016.

VISITING PROFESSOR OF EPIDEMIOLOGY

Gina Wingood, ScD, MPH, an expert in gender- and culture-appropriate HIV prevention interventions, has been named founding director of Columbia’s Lerner Center for Public Health Promotion. The Center is one of three established by Meatless Mondays founder Sid Lerner—a member of the Mailman School Board of Overseers—and his wife, Helaine. “By cross-fertilizing marketing insight and public health fact, Sid’s vision is helping us take the next giant leap in public health promotion,” says Wingood, who is also a professor of Sociomedical Sciences. “Given the breadth of research unfolding in key areas like nutrition, tobacco control, and obesity prevention, this opportunity could not be more timely.”

INNOVATIONS
Amidst the outcry sparked by events in Ferguson and Staten Island, students explored public health’s role in reducing violence. “We already know these health disparities exist,” said Whitney Skillen, MPH ’16. “We want to investigate what police brutality and racism have to do with it.” Students led the charge for #BlackLivesMatter to inform discussions in Mailman School classrooms.

For the last four years, a core component of the orientation for incoming Master of Public Health students has been a module known as Self, Social, and Global Awareness (SSGA). Introduced as part of extensive curriculum revisions in fall 2012, SSGA is designed to heighten self-awareness about the power and privileges that exist based on identity—gender, race, age, sexual orientation, and religion, among other categories—and to demonstrate how they affect population health.

The program was developed by a team led by Dr. Cheryl Franks, an expert in diversity and anti-racism training, with Dean of Students Marlyn Delva, EdD, a lecturer in Epidemiology, and Associate Dean for Field Practice Linda Cushman, PhD, a professor of Population and Family Health. SSGA continues to evolve with the addition of new events including lectures, small-group discussions, and theater outings. “Each year, we’ve thought to expand it and simultaneously respond to student feedback,” says Cushman. “It’s a living, breathing thing.” For 2015–16, components of SSGA have been incorporated into Integration of Science and Practice, small-group sessions in which students meet throughout the year to discuss case studies that integrate traditional classroom education and the real-world experience of working as a public health professional. Also new this year, doctoral and MS students were welcome to participate.

The fall 2015 kickoff event featured “The Danger of a Single Story,” a 2009 TED talk by novelist Chimamanda Ngozi Adichie, in which the author explores the influence of the “single stories” we hold about others. Such stories are incomplete and even dangerous, says Adichie, because they affect not only our thoughts and feelings, but often our actions, as well. Moreover, such views are often subconscious, complicating and limiting our ability to work productively. In 2014, students saw the Pulitzer Prize–winning play Disgraced, then discussed with members of the cast the themes of cultural assimilation, deception, and identity explored in the script.

SSGA is a centerpiece of the school’s mission not only to be aware of and understand social inequities but to develop strategies to eliminate them.

By the end of 2017, all faculty will also have been exposed to the program. “SSGA is a wonderful and critical first step toward the Mailman School community embracing and prioritizing our discussion of structural power arrangements,” says Cushman. “I am very pleased with how far we’ve come, but we have a lot more work to do in our classrooms, in the School, and on the macro level, in society in general.”

Amidst the outcry sparked by events in Ferguson and Staten Island, students explored public health’s role in reducing violence. “We already know these health disparities exist,” said Whitney Skillen, MPH ’16. “We want to investigate what police brutality and racism have to do with it.” Students led the charge for #BlackLivesMatter to inform discussions in Mailman School classrooms.
This past spring, the Department of Biostatistics celebrated its 75th anniversary. Professor Bruce Levin has been on the faculty for fully half of that span, including 13 years at the department helm. He is an expert in the analysis of categorical data and the design of clinical trials. He also has a long-standing interest in the application of statistics in the law, including service as an expert witness, and has published innovative methods for clinical trials. Levin co-authored *Statistical Methods for Rates and Proportions*, *Statistics for Lawyers*, and *The Biostatistics of Aging*. We asked him to reflect on where the field has been and where it’s going.

A few years back, *Harvard Business Review* dubbed your field “the sexiest job of the 21st century.” Agree or disagree? This is a relatively new understanding of the field and I appreciate it, but I fear many among the public still believe statisticians aren’t to be trusted. I see it when I testify in court. The jurors—laypeople—are struggling, just barely able to keep up. Those of us who teach biostatistics won’t be losing our jobs anytime soon.

Last year amid the Ebola outbreak, you co-authored an essay in *The American Journal of Bioethics* calling to task officials who require placebo controlled randomized clinical trials (RCT) to assess emerging treatments. Why? I don’t want to be perceived as someone who doesn’t like randomized controlled trials. *Au contraire*. In the particular case of the Ebola outbreak, however, I believe there is a more urgent humanitarian question: What are the best options that we have to go forward and in a careful, safe manner end the epidemic?

**What were your ethical concerns?**
The outbreak was getting out of control and throughout much of West Africa, the standard of care was no care at all; some clinics didn’t even have running water. Between 70 and 90 percent of people who contracted the disease died. Even with supportive care as we understand it in this country, the fatality rate could be as high as 30 percent. Using a conventional RCT in that setting is both unethical and impractical. You’re dealing with desperate patients with a death sentence and you’re asking for their informed and voluntary consent to take a placebo? That’s tragic.

**What model do you propose?**
At the time, we had 14 possible treatments, not all equally promising. Our formulation was to take the four most promising treatments and get them to different clinics—if you can’t randomize individual patients due to the threat of violence, randomize treatment centers. In relatively short order, you can select the best treatment. You don’t know if it works better than a placebo, but you can see whether people stop dying, and know you’re going in the right direction.

**What’s your rule of thumb for study design?**
There is a simple guiding principle: What is the most important question to answer at this moment? If there’s no humanitarian crisis, you can use the traditional hypothesis-testing approach. But in the midst of a fatal epidemic, we don’t have a lot of time to answer an abstract question of statistical significance. We need to pick the best answers now and worry later about false positives.
Birth Weight

The road to childhood obesity begins even before baby’s first meal, with mother’s health during pregnancy. In April, the Mailman School convened “A Smart Start,” a symposium on childhood obesity featuring the latest science on the myriad factors that can steer a child toward a healthy weight.

Andrew Rundle, DrPH ’00, an associate professor of Epidemiology and co-director of the School’s Obesity Prevention Initiative, discussed his findings that children born to women whose weight gain during pregnancy exceeds National Academy of Medicine (formerly the Institute of Medicine) recommendations—more than half of pregnant women in the United States—were three times more likely to be obese than children whose mothers hewed to the guidelines.

Other speakers—including academic researchers and New York City health policy professionals—touched on the power of breast-feeding to reduce a child’s lifetime risk of obesity, tactics to promote healthy eating among preschool children, and the strong links between outreach to parents and a child’s lifelong nutritional status.

Childhood obesity is a complex problem and requires many different solutions—some yet unknown, says Y. Claire Wang, MD, ScD, co-director of the Obesity Prevention Initiative and an associate professor of Health Policy and Management.

“We’re not just building an evidence base, we’re building a movement.”
Sea Change

In April, the White House convened an unprecedented meeting of scientists, government officials, and representatives from major universities and technology companies to shine a light on the incontrovertible link between climate and health.

“Climate change is having an impact on our public health,” said President Barack Obama. His remarks referenced, among other concerns, the migration of insect-borne diseases to new regions and the heightened asthma risk from a prolonged allergy season—both topics studied by scientists in the Mailman School’s Climate and Health Program, the first such academic program in the U.S. when it was founded in 2008.

Environmental Health Sciences professors Patrick Kinney, ScD, and Jeffrey Shaman, PhD ’03, were invited guests at the meeting. The majority of the science that the administration relies on in the field has been generated by schools of public health, says Kinney, led by pioneering work at the Mailman School that began more than a decade ago. “If schools of public health hadn’t taken a leadership role,” he says, “we wouldn’t be in the position we are in now to tackle the problem nationally, with improved health directing our energies.”

Passing the (Medicaid) Buck

This summer, Medicaid marked its 50th anniversary. A cornerstone of President Lyndon B. Johnson’s War on Poverty, the state-administered program has changed significantly since implementation of the Affordable Care Act. Among other things, the ACA offered means to expand Medicaid access for low-income people. Yet 21 states opted to contain the program, arguing that expansion would be too expensive. According to a National Bureau of Economic Research working paper authored by economists at the Mailman School and Northwestern University, state governments have merely passed the buck to local businesses. “In the end, the money that state governments save by not expanding Medicaid is roughly equal to the money their hospitals spend on the people who are uninsured as a result,” says Tal Gross, PhD, one of the paper’s authors and an assistant professor of Health Policy and Management. “Money that states save by deciding to not implement the Medicaid expansion achieves savings for government at the expense of local hospitals.”

Spoils of War

Using records from the Dutch Hunger Winter of 1944–45, L.H. Lumey, MPH ’85, MD, PhD ’88, an associate professor of Epidemiology, and colleagues in the Netherlands have demonstrated that nutritional conditions during prenatal and early childhood development affect DNA. At age 59, research subjects whose mothers experienced famine during the first 10 weeks of pregnancy exhibited changes in DNA methylation known to suppress genes involved in growth, development, and metabolism. Says Lumey: “The civilian starvation caused by the conditions of World War II offer a unique opportunity to study the possible fetal origins of common diseases, and the relationship of adult health to critical periods in gestation.”
An Excellent Value

In 2008, the state of Oregon randomly provided Medicaid coverage to approximately 10,000 people out of 30,000 selected from all Medicaid-eligible residents. Using high-performance computers and the resources of GRAPH, a Mailman School initiative dedicated to optimizing population health policy, a team led by Peter Muennig, MD, MPH ’98, an associate professor of Health Policy and Management, showed that Medicaid provided substantial financial protections, increased rates of preventive testing, reduced depression, and improved self-perceptions of health. Participants did not have significantly lower blood pressure, serum cholesterol, or blood glucose levels. Even so, the researchers showed that Medicaid is an excellent value—a cost of just $62,000 for the quality-adjusted life years gained. 

The American Journal of Public Health published the report.

The U.S. Task Force on Clinical Preventive Services asserts that screening for disease saves lives. But because there is no scientific evidence backing the claim, these benefits were not included in the current analysis. “By excluding these potential benefits while including all of their costs,” says Muennig, “we can be even more certain that our estimate of $62,000 is conservative.”

Stress Response

Women with post-traumatic stress disorder have a 60 percent higher risk of heart attack or stroke than women who have never experienced a trauma, according to research by Jennifer Sumner, PhD, an Epidemiology Merit Fellow, with co-authors at Columbia and Harvard.

“This study raises awareness that the effects of PTSD don’t just stop in the head and that they have more holistic consequences for health,” says Sumner, whose findings were published in Circulation, the journal of the American Heart Association. “Our hope is that providers and people with PTSD can be aware of this link and monitor cardiovascular health and try to engage in prevention efforts.”

While more research is needed, the authors say PTSD may disrupt physiological stress systems such as the hypothalamic-pituitary-adrenal axis and the autonomic nervous system, in addition to leading to various unhealthy behaviors that may increase risk of heart attack and stroke. “PTSD is twice as common in women as in men. Approximately one in ten women will develop PTSD in their lifetime,” says Sumner. “Research has begun to suggest that rates of cardiovascular disease are higher in people with PTSD. However, almost all research has been done in men.”

A second study by the same team, published in JAMA Psychiatry, provides the strongest evidence to date of a causal relationship between PTSD and Type 2 diabetes. “PTSD is generally considered a psychological problem, but it also has a profound impact on physical health, especially cardiovascular risk,” says Sumner. “Ultimately, integration of mental and physical health care is key.”
Prenatal Peril

Prenatal exposure to pollution reduces children's IQ, negatively alters their brain structure, and boosts their risk of developing attention deficit hyperactivity disorder, according to a trio of studies from Frederica Perera, MPH ’76, DrPH ’82, PhD ’12, founding director of the Columbia Center for Children’s Environmental Health. Perera, a professor of Environmental Health Sciences, followed a cohort of 233 nonsmoking pregnant women and their children for a decade, tracking prenatal exposure to the class of air pollutants known as polycyclic aromatic hydrocarbons and the children’s subsequent health. “Our findings support policy interventions to reduce air pollution exposure in urban areas,” says Perera, “as well as programs to screen women early in pregnancy to identify those in need of psychological or material support.”

A Biological Basis for Chronic Fatigue

Researchers at the Center for Infection and Immunity (CII) have identified distinct immune changes in people with chronic fatigue syndrome, known medically as myalgic encephalomyelitis or, more recently, systemic exertion intolerance disease. The findings, published in Science Advances, could help improve diagnosis and identify treatment options for the disabling disorder, in which symptoms range from extreme fatigue and difficulty concentrating to headaches and muscle pain.

In a separate paper, published in Molecular Psychiatry, the team identified a unique pattern of immune molecules in the cerebrospinal fluid of people with chronic fatigue that provides insights into the basis for cognitive dysfunction—frequently described by patients as “brain fog.” “We now have evidence confirming what millions of people with this disease already know—their condition isn’t psychological,” says Mady Hornig, MD, director of translational research at CII and an associate professor of Epidemiology, who was lead author for both papers.

“Our results should accelerate the process of establishing the diagnosis after individuals first fall ill, as well as discovery of new treatment strategies focusing on these early blood markers.”

Perks of Seniority

Older workers can help solve many of New York City’s pervasive staffing challenges, according to interviews by a team of investigators including Ruth Finkelstein, ScD, director of the Age Smart program and an associate professor in the Mailman School’s Robert N. Butler Columbia Aging Center. “Our research into New York’s small-business community confirms that older employees bring more than an economic edge to the workplace,” says Finkelstein. “They have advanced technical skills and can serve as mentors to younger employees just gaining familiarity with workplace culture.” The interview results are integrated into peer-to-peer guides released by the Age Smart Employer Awards, an initiative of the Columbia Aging Center and the New York Academy of Medicine funded by the Sloan Foundation.
Assigning female community-health extension workers to a remote rural community in northern Nigeria led to major and sustained increases in the use of services, including prenatal care and facility-based deliveries, according to research reported by Alastair Ager, PhD, a professor of Population and Family Health, in Global Health: Science and Practice. The research, which spanned seven years, also showed that providing a rural residence allowance in addition to a standard salary helped recruit and retain female workers.

Other vital components of the program’s success were posting workers in pairs to avoid isolation, facilitating home visits, and allowing workers to deliver babies. Following deployment of the workers, health post visits increased by more than 500 percent. “Our pilot study led to major improvements in health,” says Ager. “The grassroots operations undertaken in this environment and described here were key to the progress we are seeing to date.”

Unconventional Cancer Care

Assistant Professor of Epidemiology Heather Greenlee, ND, MPH, PhD ’08, has developed a set of clinical practice guidelines for oncologists whose patients seek such integrative healthcare treatments as yoga, meditation, and nutrition counseling. “When patients are diagnosed with cancer, they want to know what they can do in addition to receiving the best possible standard of oncology care,” says Greenlee, who presented her findings in October 2014 at the meeting of the Society for Integrative Oncology. “They want to know what they can be doing to improve their prognosis and quality of life and manage symptoms and side effects of conventional cancer treatment.”

Greenlee and her coauthors developed the new guidelines based on a review of nearly 5,000 articles published between 1990 and 2013 and an analysis of 203 separate randomized control trials of the interventions. Based on the strength of available evidence, the researchers graded each therapy. Those earning a grade of A or B had a high certainty of patient benefit and are recommended for use. Those earning a grade of D or H—for harmful—are discouraged in the guidelines. Says Greenlee: “We need to figure out what works and doesn’t, what’s safe and what’s not.”

photos by ALASTAIR AGER
Climate Changing
China Pursues Bold Solutions

by Alexander Gelfand
This summer, the journal *PLOS One* published a chilling analysis of publicly available air-quality data collected by a nationwide network of sensors maintained by the Chinese government. Levels of ozone, carbon monoxide, nitrogen oxide, and other airborne contaminants are so high, the scientists found, that they are responsible for 17 percent of all fatalities in China—4,000 deaths every day.

Amid the stark findings, Chinese scholars and government officials alike have expressed their commitment to understanding the effects of climate change on health and planning for future climate-related risks. To speed their efforts, Patrick Kinney, ScD, a professor of Environmental Health Sciences and director of the Mailman School’s Climate and Health Program (CHP), is helping to establish a joint research and teaching program on air pollution, climate change, and human health with Tsinghua University and the Chinese Academy of Environmental Planning.

Working alongside Tiantian Li, PhD, a former postdoctoral researcher with CHP now employed at the Chinese Center for Disease Control and Prevention, Kinney will also estimate future temperature-related mortality rates in China using global climate models and projected rates of greenhouse gas emissions. Through such efforts, Kinney hopes to encourage integrated climate and air-quality planning, efforts which will allow the Chinese to simultaneously address the immediate effects of their high levels of air pollution and the long-term impact of their emissions—the latter being a matter of concern not only for China, but for the rest of the world as well. “If we care about controlling climate change,” he says, “we care about having China do it well.”

None of his projects would be possible, of course, if the Chinese government weren’t increasingly willing to confront major public health issues head-on—something that Kinney notes is rarely reported by the Western press, which tends to focus on the severity of China’s problems while ignoring the search for solutions. Nor, for that matter, would such collaborations be underway if Chinese investigators didn’t possess what Kinney describes as a “thirst for knowledge and collaboration.”

Projects like Kinney’s—in which academics, healthcare professionals, and government officials in the most populous nation on earth join forces with American university professors to explore issues ranging from air pollution and climate change to urban planning and hospital management—have been underway for years. The opportunities to address such internationally relevant challenges have never been greater. Industrialization, urbanization, and the graying of China’s population of 1.4 billion are transforming the country in ways that will be felt for generations. “China is about to have as many older adults as the United States has people,” says Mailman School Dean Linda Fried, MD, MPH. “Public health wisdom has never seen more fertile ground.”

For Mailman School scholars, China’s synergy of economic and demographic shifts affords a unique opportunity to apply public health scholarship. In 2014, Fried made two trips to China—laying the groundwork for a broad initiative to strengthen the School’s relationships with Chinese academics and government officials and to furnish scientific evidence in support of such policy issues as building healthier cities, controlling environmental pollution, and transitioning to an aging world—all priorities for the U.S. as well. “China is unique in its recognition of what its leading challenges are,” says Fried, “and its ability to enact bold solutions based on science and evidence.”

On her 12-day trip in March 2014, Fried met with hematologist Chen Zhu, MD, PhD, formerly China’s minister of health and now the vice chair-
agreement committing Tsinghua and the Mailman School to pursue joint initiatives related to environmental health. And next year in Shanghai, the Mailman School will co-host the Columbia-Fudan Global Summit on Population Aging.

Fried cautions that it may be too early to speak of results. But molecular epidemiologists Deliang Tang, MD, DrPH ’96, and Frederica Perera, MPH ’76, DrPH ’82, PhD ’12, both professors of Environmental Health Sciences, have already demonstrated the impact that investigations by American scientists can have in support of policy decisions in China.

Working with colleagues at Chongqing Medical University, Tang and Perera, founding director of the Columbia Center for Children’s Environmental Health, recruited two cohorts of women in the city of Tongliang: One group had become pregnant while a coal-burning power plant was operating in the center of town; the other, after the plant was shuttered. Children born to mothers in the second group showed lower levels of

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pollutant exposure and higher levels of a key brain protein. Furthermore, the researchers no longer saw the significant adverse effects of pollutant exposure on cognitive development that was observed in the first cohort. The study, published by *PLoS One* in 2013, demonstrated not only the harm to children caused by high levels of air pollution but also the benefits of reducing it.

As reported in December 2014 in the journal *Environment International*, Tang and Perera subsequently ran another serial cohort study in Taiyuan, the capital of Shanxi province, where the government had enacted a series of policies designed to improve air quality. Together with colleagues at Shanxi Medical University and the Fudan School of Public Health, Tang and Perera demonstrated that falling levels of air pollution over a ten-year period were associated with fewer hospital admissions and premature deaths. The economic impact of reduced death and disability, they found, translated to several billion yuan.

Research in both cities continues. Already, Tang says, Tongliang has become a textbook case for environmental health interventions in China, and Chinese officials now hold up Taiyuan as an example of the gains that can be achieved through sound environmental policies. “The most exciting thing,” he says, “is that you can see them using our data in their debates.”

Chinese officials have sought out data to inform other thorny policy debates, as well. Peter Muennig, MD, MPH ’98, an associate professor of Health Policy and Management, has advised government officials on healthcare reform in Beijing and on urban planning tactics to promote health in Sichuan province. He has also designed an ambitious set of randomized clinical trials to test the effects of housing on health status and child development. Over time, 2.5 million lower-middle-income families in Chongqing will participate in a housing lottery for 1.2 million units, with the winners moving into government-subsidized residential developments with health-promoting features like exercise facilities.
and green space. Together with colleagues at Chongqing University, Muennig and his team plan to use molecular assays, questionnaires, and other methods to explore how social policy and the built environment influence the well-being of children and their families. This past spring, Muennig, who speaks fluent Mandarin, returned to China, where he’s been building a local client base for the Mailman School’s Global Research and Analytics for Population Health (GRAPH), which aims to use big data and computational modeling techniques to optimize public health investments on a country-by-country basis.

Michael Sparer, PhD, JD, chair of the Department of Health Policy and Management and a founding director of GRAPH, has also turned his eye toward tactics the Chinese might deploy to improve their health systems. In 2014, Sparer and physician David P. Roye—founder of International Healthcare Leadership, a nonprofit that gives Chinese healthcare professionals the tools and training to improve health services back home—organized the China Healthcare Leadership Training Program, which brought 30 senior Chinese healthcare executives to New York for a three-week course on topics that included health policy and management. Sparer, who attended a follow-up symposium in Suzhou this past May, hopes to make the program an annual event. He’s already developing a similar program with Zhejiang University, in Hangzhou, with help from Joan Kaufman, ScD, former director of the Columbia Global Centers|East Asia and a senior lecturer in Health Policy and Management.

In another project, Sparer has been investigating how lessons from the American healthcare reform experience might prove useful to the Chinese, and vice versa. In 2009, the Chinese government introduced its own comprehensive reforms. Implementing them has meant confronting many of the same issues that have emerged as part of healthcare reforms in the U.S., such as balancing regulation against the role of markets. The goal of such comparisons, however, is not to suggest that American solutions be implemented in China, says Sparer. Rather, it’s to fashion the right fit with China’s own culture and politics, all while learning from solutions that the Chinese have already developed.

The work of Lawrence Yang, PhD, also features cross-cultural exchange based on mutual respect and shared learning. For more than 15 years, Yang, an associate professor of Epidemiology with training in clinical psychology and anthropology, has been investigating psychosis among...
investigating the public health implications of identifying Chinese who are at high risk of psychosis, in hopes that clinicians might be able to prevent the disorder from emerging in the first place. In a third project, he is analyzing a vast data set collected by a Canadian psychiatrist that includes information on an unusually large number of untreated schizophrenics among the adult Chinese population. “We don’t know anything about what untreated schizophrenia looks like,” Yang says. “It’s a chance to rewrite our understanding of psychosis.”

As with the many other initiatives underway by Mailman School faculty partnering with Chinese collaborators, Yang’s work involves a wide network of participants and offers benefits all around. Perhaps most important, its relevance expands outward in a series of ever-widening circles encompassing scientists, public health systems, and ordinary citizens around the globe.

In an era when one nation’s policies governing air pollution and greenhouse gas emissions, healthcare, and urban design can have repercussions far from home, research underway in China could have profound implications for the entire global community. “China’s decisions,” says Fried, “affect the rest of the world.”

ALEXANDER GELFAND covers science, health, and other topics from his home in New York City.
RUNNING ON PREVENTION

The Case for a Public Health Platform

by Andrea Crawford
Illustration by Brian Stauffer

Since the Affordable Care Act was signed into law in 2010, nearly 18 million Americans have gained health insurance and the expanded access to health-care that affords. In the intervening five years, the two houses of Congress have voted nearly 100 times between them on legislation to repeal, modify, or defund “Obamacare.”

In June, the Supreme Court removed the latest political hurdle before the ACA, upholding the financial model that undergirds the federal health insurance exchange. Expanded access endures.

Yet few signs suggest that our nation’s health status will catch up to that of our peers any time soon. In a 2014 report, the Commonwealth Fund...
ranked the U.S. worst among 11 peer nations in access, efficiency, equity, and “healthy lives,” as measured by such indicators as life expectancy at age 60 and infant mortality. In 2013, the National Research Council and the Institute of Medicine (now the National Academy of Medicine) released the report *Shorter Lives, Poorer Health*. Whether in terms of birth outcomes, heart disease, motor vehicle accidents and violence, sexually transmitted diseases, or chronic lung disease, the authors found, Americans at every stage of life fare worse than our counterparts in all other high-income countries. Our standing looks even worse in light of the vast sums Americans spend on healthcare: some $3 trillion a year, a whopping 17.1 percent of gross domestic product—more than any other country in the world.

With a presidential election on the horizon, politicians have a golden opportunity to address the U.S. health deficit with substance and science. Instead of bemoaning the shocking cost of healthcare or counting how many votes the competition has cast to repeal “Obamacare,” a rising tide of public health scholars sees an opportunity for candidates to put good health for all Americans on the national agenda. “We need to build an understanding that we can create the conditions for health—if we work together,” says Mailman School Dean Linda P. Fried, MD, MPH. “When voters hear the word ‘health’ they’ll think, not of doctors and disease, but of walkable neighborhoods, bustling, affordable farmers’ markets, and energy-efficient, healthy homes.”

**FROM RISK TO RESILIENCE**

Decades of peer-reviewed scholarship has established that 30 percent of our health derives from a combination of our genetic predisposition and what goes on in the doctor’s office. The remaining 70 percent of our risk for ill health and premature death owes to exposure: what we eat, whether we smoke or use condoms, whether we keep guns in our homes or are exposed to violence, how often we exercise, whether we drink water contaminated with arsenic or live in homes contaminated with lead. And yet, as a nation, we allocate just 3 percent of the trillions of dollars we spend on healthcare to prevention. “There’s a lot of opportunity to improve health for all of us,” says Fried, “if we correct that misalignment.”

Part of the issue boils down to a framing problem, says Dana March, MPH ’03, PhD ’11, an assistant professor of Epidemiology and member of the Mailman School’s Center for the Study of Social Inequalities and Health. “The typical American thinks of prevention as an individual-level, often clinical phenomenon—it’s getting an annual checkup, visiting your doctor, knowing your numbers,” she says, invoking the famed Framingham Heart Study, in which investigators identified risk factors for cardiac disease and death.
THERE IS GENERAL, BIPARTISAN SUPPORT FOR MUCH OF WHAT CLASSIC PUBLIC HEALTH DOES. THE TRICK IS TO FIGURE OUT HOW TO TRANSLATE THAT PUBLIC SUPPORT INTO A POLITICAL AGENDA.

To scholars of public health, with their focus on population trends, prevention calls to mind interventions on a much larger scale. “There are all kinds of things that we do at the population level for prevention,” says March. “It’s about what our nation does by monitoring food safety, compelling vaccines, preserving green space, creating bike lanes, making healthy food available.”

At their best, says March, measures to promote population-level prevention fade from view. Fluoridated drinking water prevents cavities. Worker safety standards prevent premature death and disability. Seat belts minimize injuries on the road. *E. coli* doesn’t spread in ground beef. Teens don’t get hooked on tobacco, and designated drivers take the keys. Parents of newborns boast of healthy birth weights and full-term gestation. But often we fixate on risk factors—tobacco addiction, alcoholism, maternal diabetes, premature birth. As individuals counting calories or getting off the couch, we have an easier time seeing the effects of personal action than the complementary, population-level policies that promote health.

“We’re really good at identifying things that are bad for us at the individual level, seizing on them, and eliminating them,” says March. Have high blood pressure? Take a pill. Obese? Go on a diet. “What’s tricky about prevention is that you don’t want those things to develop to begin with,” she says. “Instead of risk factors—tobacco addiction, alcoholism, maternal diabetes, premature birth. As individuals counting calories or getting off the couch, we have an easier time seeing the effects of personal action than the complementary, population-level policies that promote health.

“Getting a foothold

While Beltway insiders have been slow to embrace a population health mentality, the power of prevention is catching on in the C-suite. “I think every Fortune 1000 company in the country has some sort of employee wellness program,” says Michael Sparer, PhD, JD, chair of the Department of Health Policy and Management. “They’re trying to think about how to encourage healthier lifestyles and improved health among their workforce.”

As a founding director of Global Research Analytics for Population Health (GRAPH), a new program that seeks to partner with Fortune 500 executives, heads of health systems and governmental agencies, and philanthropic organizations, Sparer seeks to quantify the effectiveness of prevention programs—both in strict cost-accounting terms and in improved quality of life—and identify health system components that could improve health. “There is general, bipartisan support for much of what classic public health does,” he says. “The trick is to figure out how to translate that public support into a political agenda.”
A few years ago, Anthony Shih, MD, MPH ’01, examined the data on smoking cessation for clues to the associated cost savings. “In the short to medium term,” he says, “there is a lot of costs savings to the healthcare system if people quit, because there are so many diseases associated with smoking.” But track those former smokers long enough, he found, and their healthcare costs start trending upward. “People live longer,” says Shih, “then incur additional costs from conditions associated with older age.”

For Shih, now executive vice president at The New York Academy of Medicine, that curve captured a looming question in American healthcare: Who pays for prevention? “I’m not sure if prevention saves money all the time,” he says, “but I am pretty sure that most of the time, even if it costs money, it’s worth doing because you improve quality of life.”

A growing body of research by economist Tal Gross, PhD, an assistant professor of Health Policy and Management, (pictured right), reveals...
Scientists know a lot about what works to improve health: smoking cessation, immunization, clean air and water, gun control, circumcision to prevent HIV infection, and so on. Good political leaders advance such efforts, says John Santelli, MD, MPH, the Heilbrunn Chair of Population and Family Health. “We need somebody who understands the difference between a political message and a public health program and who is willing to come out in support of public health,” he says. “There’s abundant evidence around the world that having political leadership talking about HIV as a problem is part of the solution to that particular public health crisis.”

Voters will have to listen closely. “Talking about prevention is actually politically very safe because it’s not threatening anyone’s income,” says economist Tal Gross, PhD, an assistant professor of Health Policy and Management who investigates the effect of health insurance on hospital visits, employment status, and even bankruptcy filings. In the run-up to an election, says Gross, candidates keep things vague, leaving voters to fill in the blanks with what they want to hear as they try to imagine how campaign rhetoric might translate into real policies. “It’s important,” he says, “that as a nation we make just how complicated cost-accounting gets when quality of life enters the equation. People who previously stayed with an employer just to maintain their health insurance quit when the bond is broken; they start their own business, become full-time caregivers, retire early. Previously uninsured people actually visit the doctor when they get health insurance; at least initially, their consumption of healthcare services rises. In the wake of a medical emergency, people with adequate health insurance are more likely to maintain financial solvency and stave off bankruptcy. Most recently, Gross demonstrated that when certain states refused to expand Medicaid coverage, the dollar value of healthcare consumption didn’t change—it just shifted from the state’s budget to the bottom line of local hospitals.

“As a nation, we’re always going to have expenses related to maintaining population health and well-being,” says Gross. “We can optimize our investments by choosing the most effective interventions, and that’s a good start. But ultimately, we’re going to have to decide what kind of nation we want to be—what constitutes health and well-being and quality of life—and invest our resources accordingly.”
the distinction between preventive interventions that save lives and offer a return on investment, and those that don’t.”

THE SCIENTIFIC METHOD

The passage of the Clean Air Act in the 1970s and the revision of standards that the Environmental Protection Agency undertakes every five years exemplify how underlying health science research motivates standards. “The progress that we’ve achieved in air quality in the U.S. has mainly come from the fact that we understand the health impacts of pollution,” says Patrick Kinney, ScD, a professor of Environmental Health Sciences, “and we know it’s killing people.”

When President Barack Obama unveiled his Clean Power Plan, a sweeping set of regulations to limit pollution from power plants, he managed to thread the needle, marrying political messaging, concrete action, and the kind of emphasis on population health that makes a public health scholar swoon. “Today an African-American child is more than twice as likely to be hospitalized from asthma,” said the president in his August speech announcing the plan. “A Latino child is 40 percent more likely to die from asthma. So if you care about low-income, minority communities, start protecting the air that they breathe.”

A wealth of data backs the president’s point, says Kinney, who directs the Mailman School’s Climate and Health Program (CHP), established in 2009. The first of its kind at a school of public health, CHP produces scientific evidence detailing how climate change affects humans, and investigates tactics to diminish those effects or prevent them. While even an immediate limit on greenhouse gas emissions will yield environmental benefits only over the long haul—50 to 100 years—that same intervention, by reducing air pollution or particles in the ozone, promises a rapid improvement in health. “You can start saving lives immediately,” says Kinney, “by taking actions that are good for the climate in the long run.”

Mark Hatzenbuehler, PhD, an associate professor of Sociomedical Sciences, sees similar opportunities in the laws that govern education, employment, and housing. “Every policy we pass is a health policy,” says Hatzenbuehler, an expert in the consequences of stigma who has demonstrated that gay people who live in communities with higher levels of stigma die younger than their counterparts who reside in communities with lower levels of stigma. Despite the gains made in marriage equality, he says, there’s still much political work to be done to promote health among LGBT people. Only 21 states include protections for sexual orientation in their nondiscrimination
laws, just 19 protect LGBT youth with school anti-bullying laws, and there’s growing concern in several states about reconciling religious rights with protection from acts of sexual-orientation or gender-identity discrimination. “We need our school policies and laws to be protective of groups that we know to be at disproportionate risk for bullying and peer violence,” Hatzenbuehler says, “groups that we know to be targeted in employment, healthcare, and other forms of discrimination.”

Opportunities for policymakers to promote health touch nearly every sector of the government. Consider chemical exposure. Each day, Americans are exposed to hundreds of chemicals, a number of which are known to be hazardous but are not illegal, says Robin Whyatt, PhD, a professor of Environmental Health Sciences. Her research has documented the dangers of prenatal exposure to endocrine disruptors called phthalates—compounds widely used in consumer products. Compared with their peers, children exposed in utero display significant and dramatically reduced IQ and other cognitive aspects of brain function, including verbal comprehension, working memory, speech processing, and information processing. Exposure to some phthalates has also been linked with increases in rates of behavioral problems and asthma.

Of the 80,000 chemicals on the market, few have been tested for toxicity. “We know about the health risks of a number of them, but we really don’t know anything about the vast majority,” says Whyatt, “and we are using children and developing fetuses as guinea pigs.” Currently, U.S. laws require regulatory agencies to prove that a chemical is harmful before they can take action; in the European Union, on the other hand, chemical companies must demonstrate the safety of their compounds as a condition of registration. Avoiding these chemicals, Whyatt says, “is not a job that should be laid on the shoulders of consumers.”

Instead, that level of responsibility for protecting the health of the U.S. population should be a shared duty of political leaders relying on the insights furnished by scientists. In this campaign season, Americans need their presidential candidates to correct misperceptions about health and healthcare, base their policy positions on sound science, and foster a national conversation about what policies will promote the health of all Americans. Says Fried: “We should have leaders who dispel myths and who say, ‘These are big issues for our future, and we have scientists who can help us see what the menu of answers might be.’”

WE SHOULD HAVE LEADERS WHO DISPEL MYTHS AND WHO SAY, ‘THESE ARE BIG ISSUES FOR OUR FUTURE.’

Linda P. FRIED

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It Takes Guts

Scientists Delve Into the Role of Intestinal Microbes in Autism

by Tim Paul
Seven decades ago, child psychiatrist Leo Kanner described Richard M., an anti-social 3-year-old with obsessive preoccupations and an inability to talk, despite obvious intelligence and good hearing. Kanner’s text would become the first case report of autism, a previously unknown condition. In addition to the behavioral and developmental symptoms familiar to any modern reader, Kanner’s 1943 case study also details an array of digestive ills, including the boy’s need for daily suppositories during infancy—administered, his mother said, to “train” him “so his bowels would move by the clock”—and subsequent diarrhea. Richard M. wasn’t the last child with autism to suffer gastrointestinal distress, and yet doctors have tended to dismiss such symptoms as mere extensions of picky eating, a classic trait of autism typically lumped among the children’s other characteristic behaviors.

In March, *JAMA Psychiatry* published a report with the most robust evidence to date that intestinal distress is in fact very real for many autistic children. Authored by scientists at the Mailman School’s Center for Infection and Immunity (CII), the Department of Epidemiology, and the New York State Psychiatric Institute (NYSPI), the
report confirms what parents have long suspected. Michaeline Bresnahan, PhD ’99, with co-authors Mady Hornig, MD, Ezra Susser, MD, MPH ’82, DrPH ’92, and W. Ian Lipkin, MD, document that among children with autism, gastrointestinal complaints often begin in infancy—a year or more prior to presentation of behavioral and neurological symptoms.

A related CII study suggests why: unique features of the microbial ecosystem within the intestines of children who have both autism and gastrointestinal symptoms. Those findings, together with other studies by the team and their colleagues—funded by Autism Speaks, the Jane Botsford Johnson Foundation, the National Institutes of Health, and the Simons Foundation Autism Research Initiative—reflect the culmination of 15 years’ investigation motivated by the alarming rise in the number of children with autism. They also provide tantalizing clues about the origins of the disorder and how to treat it.

Is This Really Happening?

Today, 1 in 70 American children is diagnosed with autism. Over the last three decades, that rate has climbed precipitously—more than tenfold. Such a trend is highly unusual for any disease, let alone a developmental disorder, and it’s left many wondering whether the epidemic of children with a common pattern of atypical social and cognitive development is merely a mirage, attributable to heightened awareness about the disorder and revisions to the official diagnostic criteria in 2000.

A 2007 simulation by Bresnahan—now an assistant professor of Epidemiology and an NYSPI research scientist—and others concluded that diagnostic revisions account for only a portion of the precipitous rise. While the issue remains contentious, one recent estimate suggests that such changes account for less than half of the shift. What, then, explains the bulk of the trend?

Genetic studies may hold a clue: Autism is among the most heritable of developmental disorders. Yet a focus on genes alone won’t be sufficient. “The rate of genetic mutations doesn’t rise on its own,” says Hornig, an associate professor of Epidemiology and director of translational research at CII. Something in the environment, she says, must have changed in the last 30 years that—when combined with genetic susceptibility—gives rise to the increased number of cases. “You need a trigger.”

Search for a Smoking Gun

In 1998, The Lancet published a paper by British physician Andrew Wakefield reporting measles virus in the intestinal tracts of children with autism who also had gastrointestinal symptoms. The popular press fixated on the safety of the measles vaccine. Scientists focused on the study’s limited size—only 12 children—and its lack of rigor. Amid the furor, the gut symptoms went relatively unmentioned.

Even as parents worried about the hazard of vaccines, pediatricians and public health officials cautioned that further investigation of the questions Wakefield had raised could be devastating to vaccination programs. “Any research related to the idea that vaccines could have some negative effect was discouraged,” recalls Lipkin, director of CII and the John Snow Professor of
Epidemiology. “Even looking into the issue was seen as pointing the finger at vaccines.”

Hornig and Lipkin were undeterred. In 2003, they set out to painstakingly replicate Wakefield’s original study, correcting methodological flaws and draining any apparent sources of bias. They worked with three separate laboratories—including, for added rigor, the original facility that produced Wakefield’s results—to search for genetic evidence of measles in the intestines of 47 children. To minimize the risk of inadvertent introduction of a measles virus contaminant, they even used a separate, virus-free laboratory to prepare specimens for analysis. “To get clarity,” says Hornig, “required a watertight, blinded, pristinely controlled and conducted study.

The results—five years in the making—appeared in 2008 in the journal *PLOS ONE*: There was no difference in the levels of measles virus in children with autism compared with those without, no link between measles and autism. Three years later, following a British medical disciplinary investigation, *The Lancet* retracted Wakefield’s paper.

Gut Feeling

Hornig and Lipkin’s 2008 *PLOS ONE* paper closed one chapter of autism research and opened another. In a follow-up study published by the same journal in 2011, Brent Williams, an assistant professor of Pathology and Cell Biology at CII, with Hornig and Lipkin, re-examined tissue samples from the intestines of children in the earlier study. They found marked reductions in the expression of the genes that create enzymes to break down carbohydrates and transport simple sugars into the bloodstream; without them, a child with autism might be unable to absorb even glucose, the simplest of sugars. Using an assay custom-built by Williams, they recorded a shift in the bacterial population of the intestines. In other words, there was a disturbance in the gut microbiome, the delicate ecosystem within our intestines. “Because these children can’t break down carbohydrates,” says Lipkin, “all those sugars flow into the colon, where they wreak havoc with the microflora.” But whether the gut made a difference on the macro scale in the lives of children with autism was still unknown.

To dig deeper into the gut-autism question, the scientists needed a more robust data set. They turned to the Autism Birth Cohort (ABC) Study, a long-standing project that originated in work by Susser in 1999. Then chair of Epidemiology, Susser had established a partnership with the Norwegian Institute of Public Health to develop studies of neurodevelopmental disorders in a large sample of pregnant women and their children. A major outcome of the collaboration was the ABC Study, led by Lipkin, that has now followed 115,000 children since before their birth, collecting biological samples and questionnaire data (see “Learning from ABC,” page 30).

When the ABC Study children were still infants, researchers asked their parents about gastrointestinal issues—long before symptoms of autism might manifest and likely before the child was old enough to be a picky eater. The results were clear: Children who would later be diagnosed with autism had 2.5 times the odds of persistent gastrointestinal complaints, compared with children who didn’t develop autism. “The symptoms started early and in many cases persisted,” says Bresnahan, who co-authored the report with Susser, Hornig, and Lipkin. “It wasn’t just a transient issue.”
Learning From ABC

Just as there likely are many kinds of autism, researchers also believe there are many autism triggers. Over the last 15 years, Mailman School researchers and their international collaborators have reported on a number of discoveries drawn from the Autism Birth Cohort (ABC) Study, as well as the International Collaboration for Autism Registry Epidemiology (ICARE) and its offshoot, the Multigenerational Familial and Environmental Risk for Autism (MINERVA) Network, which collate birth registry data from six countries and the state of California. So far, the biggest findings have focused on differences in the ages and weights of parents of autistic children as well as the mother’s nutrition around the time of conception.

As they follow the ABC children into adulthood—the oldest participants are just 16—researchers hope to learn whether people with autism are more likely to be diagnosed with other neurological disorders—Alzheimer’s, for example—and how many of them spontaneously recover. “We’re only just beginning,” says senior investigator Ezra Susser, MD, MPH ’82, DrPH ’92, a professor of Epidemiology and Psychiatry who has authored multiple papers derived from the data.

Folic Acid Supplementation

Susser compared women who took prenatal supplements that contained folic acid with women who went without. Those who took the supplements around the time of conception reduced by more than one-third the risk that their child would develop autism. The results—published by JAMA in 2013—raised new questions. If folic acid is protective, how does it work? Says Susser: “Is it counteracting an environmental toxin that’s been on the rise?”

Parental Obesity

Could epidemic levels of obesity among adults be related to the explosion of autism diagnoses? At first, researchers hypothesized that a mother’s weight was a factor in her child’s risk for autism. The ABC Study supplied a crucial piece of information: the corresponding paternal data. Assistant Professor of Epidemiology Michaeline Bresnahan, PhD ’99, a co-author of the resulting 2014 Pediatrics paper, says her team’s findings were a surprise. “The father’s weight, not the mother’s, appeared to be the deciding factor,” she says. “And the higher the father’s BMI, the greater the risk.”

Parents’ Ages

Data published earlier this year by Molecular Psychiatry showed that mothers in their 40s were 15 percent more likely to give birth to an autistic child than mothers in their 20s. Children conceived after their fathers had marked their 50th birthday were 66 percent more likely to develop autism, compared to those with younger fathers. “We know that mutations in sperm go up with paternal age,” says Susser, a co-author of the study. “Maternal age is more of a mystery.”
Not all children who develop autism experience gastrointestinal issues, although one recent estimate puts the incidence as high as 70 percent. The CII investigators suspect there is a specific subtype of autism involving the gut, perhaps with its own causal pathway. Pulling back the curtain on the gut’s role in autism promises to do more than clear up confusion between doctors and parents. It could open the door to new treatments.

**Tractable Information**

The intestinal tract has the largest cluster of nerves in the body after the brain. It is also home to trillions of microbes that release vital chemical building blocks to form, among other things, the neurotransmitter serotonin. Serotonin in turn regulates the enteric nervous system—the nerve network found throughout the intestines—which signals pain and controls the reflexes that move food products throughout the bowel for digestion. Serotonin also has a vital role in communicating with parts of the brain involved in mood, memory, sleep, and learning. “Disturbances in the gut microbiome lead to a dysregulation of neuroactive molecules in the bloodstream that either signal or fail to signal in the appropriate way,” says Hornig. “That’s a potential source of behavioral disruption.”

Bringing relief to autistic children with gastrointestinal troubles might be as simple as modifying their diets—and the benefits extend beyond their guts to their behavioral and neurological symptoms. For example, given the findings by Williams, Hornig, and Lipkin about gene expression abnormalities within the intestines of some kids with autism, a nutritionist might recommend altering the types and quantities of carbohydrates a child is offered. If the CII team substantiates their hypothesis that disturbances in metabolism and altered gut bacteria in the intestines of children with autism may drive chemical imbalances in the blood and brains of these children, says Hornig, dietary changes that reestablish a normal biochemical state could also modify autistic behaviors.

For Hornig and Lipkin, the next step is homing in on the specific gut bacteria connected to autism symptoms. In one study, their team is conducting a census of the microbes in the mother’s placenta and in her baby’s meconium, the first bowel movement. In another, they are measuring levels of 181 metabolites in women during pregnancy and in the same mothers and their infants at birth. A third explores whether antibiotics prescribed in the first six months of life, which might precipitate changes in the gut, raise a child’s risk of developing autism.

Increasingly, scientists anticipate that it may be feasible to put the microbiome back on track. While a fetus has been thought to have a relatively sterile gut, delivery and breast-feeding bestow starter cultures from the mother’s microbiome on her newborn. Hornig envisions that there may be a way to adjust a woman’s commensal bacteria prior to pregnancy, softening the blow of environmental toxins and staving off disruptions that could alter fetal brain development. “I like the custom perfume approach,” she says. “A lab grows the bacteria to make a blend that works for the individual.”

The goal is to hit on something tractable, says Hornig. “I’m excited by things we can actually do something about.”

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**TIM PAUL** edits the Mailman School’s Transmission newsletter and covered the hazards of air pollution in the 2012 edition of this magazine.
Back in 1991, There Are No Children Here entered the public health canon with journalist Alex Kotlowitz’s account of brothers Pharoah and Lafeyette growing up amid the grinding poverty of Chicago’s Henry Horner Homes. Despite the book’s galvanizing message, the statistics have only gotten worse. In 1990, 17 percent of school-age children lived in poverty. Today, one in five—16 million youngsters—lives in poverty, and nearly half of America’s children qualify as low-income, according to the Mailman School’s National Center for Children in Poverty (NCCP).

Kids growing up in households with more economic resources have buffers. Poor kids make the best of it. They live in more crowded homes, experience more violence, have less access to healthy foods and safe playgrounds, and suffer from chronic health conditions at rates well above those of their wealthier peers. And as Mailman School investigators are confirming with an expanding body of research, the aggregate results of an impoverished childhood are compounded over a lifetime, reverberating across time and space to destabilize whole communities.

“We know that from pregnancy through the first three years of life is the most critical time in terms of brain development,” says Helena Duch, PsyD, an assistant professor of Population and Family Health. “Living in toxic environments, with its associated stressors, sets young people on a more negative trajectory than living in resource-rich environments.” Hazards on that trajectory include worse lifetime health, lower educational achievement, poorer employment opportunities, and greater risk of involvement in the criminal justice system. “The good news is that we can reverse a lot of the negative impact, especially with early interventions,” Duch says. “The sooner we can do it, the better.”

Duch’s own research focuses on how intervention during those precious first few years can shift the course of an impoverished child’s life in a better direction. But the problem is so big, she says, the solutions must be mighty as well.

“You have all these programs and interventions that are like flowers, but then there’s the infrastructure—the soil, the environmental conditions—that makes everything happen,” she says, invoking a metaphor often employed by NCCP co-director Sharon Lynn Kagan, EdD. “We need to look at the environments in which people live and create systems that are designed to take care of kids.”

Duch and her colleagues are investigating the underlying conditions that perpetuate the cycle of poverty, in a quest for interventions that can disrupt the status quo. They’re finding that the answer boils down to the physical and social environment, including a child’s relationships with the adults who care for her.

At the individual level, exposure to lead and other environmental pollutants, as well as the chronic stress caused by living in poor, crime-ridden neighborhoods, can replicate the biochemical effects of the genetic conditions that give rise to mental disorders and poorer cognitive performance. Disproportionately greater rates of incarceration among those in poverty—both a symptom and a cause of these environmental exposures—sabotage efforts to create a better life, deepening the spiral.

“You have a combination of adverse factors for a developing child that clearly will have an impact on centers of the brain that will affect how that individual behaves,” says Tomás Guilarte, PhD, chair of Environmental Health Sciences. Guilarte has spent two decades studying the effects of lead exposure on the brain in animal models, linking it to neurochemical pathways associated with increased delinquency and potentially an increased susceptibility to drug addiction and mental disorders. “Certainly genes play an important role, but the environment that an individual lives in also has a very significant impact on disease onset and progression,” he explains. “Many of these environmental pollutants and social stresses hijack the same neural systems and brain sensors that genetically defined neurodegenerative or mental diseases do.”

Today, one in five American children—16 million youngsters—lives in poverty.
Today, one in five—16 million youngsters—lives in poverty.
In mouse and human studies, Guilarte and other researchers have demonstrated that an enriched early childhood environment can buffer the effects of prior exposure to a toxic environment. In a cage with running wheels, hammocks, tunnels, toys, and the weekly introduction of something novel, lead-exposed mice thrived compared with their counterparts in plain cages. Creating an enriched environment for children, however, requires a bit more than a regular rotation of cool toys: visiting the library or the theater, taking violin lessons, playing sports or educational games, and above all, interacting positively with adults.

Early childhood education can help provide that enriched environment. But for many impoverished kids, such enrichment is too little, too late, if it’s even available at all. And meanwhile, the health disparities that plague those living in poverty keep piling up. Children from lower-income homes have a higher risk from childhood through adulthood of asthma, obesity, mental and behavioral conditions, heart disease, stroke, and myriad other health problems. Due to limited resources, many of their symptoms go undiagnosed, untreated, or undertreated, compounding what might otherwise have been relatively manageable complaints.

By the time these children reach public school, their unmet health needs interfere with their ability to make academic progress, further eroding their prospects for lifelong well-being. “The interaction between health and academic achievement is well known,” says Caroline Volel, MD, MPH ’01 (pictured above), a part-time assistant clinical professor of Pediatrics and of Population and Family Health and director of the Mailman School’s academic School Health Program. “An unhealthy child can’t learn. It’s simple. The more difficult thing is that schools are in the business of teaching and making sure kids learn, but more and more, there’s a public health burden on the schools.”

Public schools may be ill equipped to carry that burden, but they also present an opportunity to lighten the load, says Volel, who also works as a field physician for New York City’s Office of School Health serving 25 schools in Central and East Harlem. “You have to put an intervention where you have a lot of people,” she says. “School is compulsory and there are a lot of people involved, so it’s not a bad place to start.”

For the past three years, Volel’s seminar Issues in School-Based Health has challenged Mailman School students to integrate public health into public education. Volel’s timing couldn’t have been better: A growing number of New York City public schools have opted to transition to a paradigm known as the community school model.

“Making schools community schools means using a public health approach to leverage everything you have in your community to make sure everything in the school is working well and all the neighborhood and community assets are reflected in the school,” Volel says. Whether partnering with banks, grocery stores, churches, or gyms, a community school embodies the idea that it takes a village to raise a child. Achieving that level of integration requires identifying the array of resources available in a particular community, building relationships with community leaders and stakeholders, and then working together to establish programs and partnerships. “The skill set to do an assessment and find the resources and evaluate whether this connection is working—that’s public health,” Volel says.
And that’s precisely what Volel’s students learn to do. Last year, they worked with PS 154 to identify resources within the community to address children’s mental health needs and created a “referral pipeline,” a directory the school can use to get students the help they need so that they can thrive in the classroom.

“Dr. Volel wants the class to be more than just pedagogy. She wants it to be about how we can impact our community in New York City,” says former school nurse Jill Humphrey, an MPH candidate in Population and Family Health who took the course this past spring. “The real world is our classroom.”

Progress takes hard work, and time: One of the highlights of Humphrey’s work in the eight-week course was bringing together the school nurse, representatives of a community clinic, and community outreach professionals for a two-hour meeting to discuss goals and begin addressing the health needs of students at Community Health Academy of the Heights. It may not sound like much, Humphrey says, but it’s challenging—and essential—to give these stakeholders an uninterrupted opportunity to collaborate. Ideally, Volel says, such collaborations will help city schools harness the local resources within every community that can help families make the most of a challenging environment.

The trick—as work by Mindy Thompson Fullilove, a professor of Psychiatry and of Sociomedical Sciences, reveals—becomes holding tight to those resources. Whereas Volel uses a public health framework to help schools address the many effects of poverty on students, Fullilove focuses on an underlying cause of the perpetuation of poverty and the biggest threat to successful intervention: displacement, by which impoverished communities are uprooted when the land they occupy is reappropriated—for a highway or a convention center, for example.

Fullilove’s research builds on the work of previous scholars who described how access to resources affects patterns of disease. That is, it’s not just whether smoking causes cancer, but whether a person has the resources to quit smoking. And perhaps the ultimate magnifier of resource disparities is urban renewal. “Urban renewal destroys resources,” Fullilove says. “When communities are broken they lose financial, social, cultural, and political capital. There’s a devastating loss of resources, and there’s an opportunity cost because they have to rebuild while other communities that haven’t experienced upheaval can move forward.”

This process, echoed in cities nationwide, leads to “root shock,” a term Fullilove coined in her 2004 book *Root Shock: How Tearing Up City Neighborhoods Hurts America, and What We Can Do About It*. A seedling handled roughly during transplant wilts; similarly, people displaced by urban renewal are wrenched from robust community ecosystems, with withering effect. “It’s a spectrum of problems that has horrific effects on neighborhood stability and community functioning, and therefore health,” Fullilove says. Unemployment and myriad other social ills follow; risk of incarceration rises. As the ripples spread, the destruction of community ties rends the nation’s social fabric.

And there’s no quick fix. Shuttered factories don’t reopen and bulldozed homes don’t rebuild themselves, so the first step is simply to stop urban renewal. “You can’t undo something that’s done,” Fullilove says. “But as a society, we can evolve and adapt to harm, and going forward we can pursue more equitable and more inclusive policies.” That’s where interventions that we know to be effective enter the equation: eliminating lead from paint and plumbing, implementing screening programs to identify early health problems and refer children for early intervention, expanding early childhood education programs, and forging school-community partnerships that lead to an enriched environment for children. “Every once in a while,” says Fullilove, “there’s a tipping point. That’s what you have to stay focused on.”

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“School is compulsory and there are a lot of people involved, so it’s not a bad place to start.”
THE LAW OF EPIDEMICS

Heroin, Prescription Painkillers, and the Addiction Dilemma
by Alisa Roth
Drug abuse spreads within a community, sometimes quickly. It devastates. And it kills. But unlike diseases such as HIV or Ebola, drug abuse is not, technically, infectious.

So, is talking about an epidemic of drug abuse—the surge in opioid and heroin abuse reported this summer by the Centers for Disease Control and Prevention, for example—just a sloppy metaphor? Or can we actually use epidemiological tools to predict its course and figure out ways to stop it?

Epidemiologist Guohua Li, DrPH, MD, thinks we can. According to Farr’s law, infectious outbreaks follow a predictable and symmetrical path—a steady rise in cases to a peak, followed by a decline. The 19th-century model has been applied to cattle plague, smallpox, even the AIDS epidemic. In a January article in the journal Injury Epidemiology, Li, the Finster Professor of Epidemiology, and his research team applied it to drug use in the United States. If Li’s resulting predictions are correct, the number of drug overdoses will keep rising until 2017, then begin to fall.

“One of the contentious points,” he says, “is to apply Farr’s law to a noninfectious epidemic like opioid abuse.” As with infectious diseases, he says, environmental factors play a part in drug abuse trends. Addiction—like other “social contagions” such as behavioral disorders and obesity—spreads through social networks, much like a pathogenic outbreak. If his projections are borne out, says Li, they “may help to gauge whether interventions are working and guide long-term planning and management of public health resources and prevention efforts.”

In the last two years, the increase in overdoses of opioid painkillers—Demerol, Dilaudid, Vicodin, and the like—has begun to slow, likely because multiple ongoing interventions are starting to work. Prescription monitoring programs, as the name suggests, are statewide databases that track the dates and details of all prescriptions for controlled substances. They’re designed to make it more difficult for patients to shop around, getting multiple doctors to prescribe opioid painkillers or using multiple pharmacies to fill a single prescription. (Some states even make the information available in neighboring states, to prevent a New Yorker, for example, from scoring a duplicate prescription in New Jersey or Connecticut.)

Meanwhile, drug companies have been reformulating opioid painkillers to make them harder to abuse. And increasing access to overdose treatment—by having police carry the antidote naloxone, for example—has helped.

But as the fairy tales caution, beware what you wish for. The current heroin

37 states where drug overdose is now the leading cause of accidental death
epidemic is a result, at least in some measure, of the success states have already had in limiting access to opioid painkillers. As pharmaceuticals become less accessible, people turn to heroin. “We call this the substitution effect,” Li says. “It’s going to make control of this drug overdose epidemic more challenging.”

Between 2002 and 2013, the number of people in the U.S. dying from heroin overdose quadrupled. And in 2013, more than half a million Americans said they had used heroin in the past year, an increase of almost 150 percent from 2008.

It’s gotten so bad that, in the last three years, drug overdose has been overtaking motor vehicle crashes as the leading cause of accidental death in the U.S.; in 34 states, it already has. For Li, much of whose earlier work focused on traffic injuries, turning his attention to drug abuse and prevention was a logical shift. And, he points out, there is even overlap between the two, since driving under the influence is (obviously) dangerous.

Beyond vehicular risks—public health scholars know them as “unintentional injury mortality”—opioid injection poses additional hazards. Heroin use has been implicated in the spread of HIV, hepatitis C, and other blood-borne diseases. Earlier this year, the governor of Indiana declared a public health emergency in rural Scott County after health officials there noticed a surge in the number of new HIV infections tied to intravenous use of opioid painkillers. The county had already recorded an increase in hepatitis C and endocarditis, an infection of the lining of the heart that can be spread through the use of dirty needles. The governor, who had previously been opposed to harm reduction programs, quickly stepped in to implement a temporary needle-exchange program.

Given the geographic concentration of the painkiller abuse, the intervention focused narrowly on Scott County. That approach exemplifies one of the first steps in figuring out how to stop an epidemic: Understand who’s involved. Associate Professor of Epidemiology Silvia Martins, MD, PhD, uses data from the federal government’s National Survey on Drug Use and Health to analyze who is using opioid painkillers and heroin and how those patterns have changed over the last few years.

In a report this year for Drug and Alcohol Dependence, Martins documented critical differences in drug abuse across racial and other lines. Between 2002 and 2011, for example, heroin use rose 75 percent among non-Hispanic whites. Among blacks, on the other hand, use increased only among those who had taken opioid painkillers within the prior year, particularly those who had used them frequently—at least once daily for between 100 and 365 days. “We need to better delineate who is at higher risk,” Martins says, and target prevention programs to those populations.

That means updating old-fashioned “Just Say No”–style drug abuse prevention programs to promote harm reduction, the drug use equivalent of teaching safe sex rather than abstinence only.

In an age of Google and the increased information—and misinformation—the
internet affords, we need comprehensive public education, Martins says. With prescription drugs, that means explaining not only the benefits of the medication but also its side effects, not stigmatizing prescription opioid use, and reminding people that it’s important to get professional help for psychological problems, rather than trying to self-medicate. (In another study, published in *Psychological Medicine*, Martins documented a higher incidence of opioid drug use among people with mental illnesses like bipolar disorder and anxiety and mood disorders.)

Equally important, Martins says, is targeting the right audience with those drug abuse prevention programs. Many universities emphasize the dangers of opioid abuse in their drug prevention programs. Martins’ study published last year in *Social Psychiatry and Psychiatric Epidemiology* showed that people who don’t have a college education are more likely than those with a degree to abuse opioid painkillers. It would probably be more effective, she says, to find ways to engage a non–college educated audience to talk about opioid drug abuse and perhaps refocus college programs to address stimulants, which her studies show are a bigger problem among people with a college education.

The U.S., Martins says, has the highest rate of opioid painkiller use in the world; medical professionals here use the drugs not just to manage the extreme pain caused by, say, cancer but also to manage much less serious complaints, like the discomfort following a tooth extraction.

So healthcare providers and policymakers will have to do their part. This summer, the U.S. Senate debated the Safe Prescribing of Controlled Substances Act, which would impose new continuing education requirements on prescribers (already required in New York and nine other states), while the White House boosted training for federal healthcare providers.

At the state level, prescription monitoring programs vary widely. While 49 states have laws in place, Missouri legislators have wrangled for years over competing bills. Nationwide, Martins sees room for improvement. Physicians could inquire about prior drug use and mental health history, for example, to identify patients for whom opioids might become a problem, then monitor those individuals more closely or offer them alternatives such as physical therapy or non-narcotic painkillers.

Then there’s the question of how people end an addiction. Only a small number of those with a drug problem seek treatment, says Martins. Others just quit using on their own. Certainly, we need monitoring programs and other interventions to avert overuse and addiction. But that won’t be enough. “It’s complicated,” she says. “We need policies to regulate this, but we also need to make sure that people who need medications can get them.”

Regardless how difficult the work may be, says Li, public health has a duty to help turn the tide. “A decline in overdose deaths shouldn’t be used as justification to pull back,” he says. “That would be wrong. If there is no intervention, then the epidemic will last much longer.”

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Mobile Methods
Public Health Gets a Signal Boost

by Sean Campbell

The small kingdom of Lesotho has one of the highest rates of tuberculosis in the world. Containing the virulent epidemic requires a population-scale approach that reaches even itinerant populations. Andrea Howard, MD, MS, partnered with TEBA, an African employment bureau, to text diagnoses and treatment reminders to the cellphones of migrant workers from Lesotho laboring in neighboring South Africa. “Because of the nature of their work, these individuals are hard to monitor,” says Howard, “but we noticed everyone has cellphones.” In the first nine months of the program, more than 51,000 people were screened for TB, and 166 cases were diagnosed.

Howard is in good company. Throughout the Mailman School, investigators are incorporating mobile technology to bolster health for marginalized communities and collect real-time data to advance health, especially among underserved populations worldwide. Alwyn Cohall, MD, for example, reaches minority youths in Northern Manhattan with text-message alerts promoting risk reduction of HIV and STIs. Another project—work by Jessica Justman, MD, with Columbia Engineering faculty—turned smartphones into mobile HIV-testing stations in Africa through hardware and software modifications.
A sampling of other projects underway:

**Pollution Cycle**

Cyclists breathe faster and more deeply than pedestrians, increasing their exposure to air pollutants with each breath. This summer, Darby Jack, PhD, partnered with public radio station WNYC to recruit bicycle-riding volunteers willing to don a personal pollution monitor mounted in a mesh vest. Jack will track the volunteers’ routes using a smartphone app to collect global positioning data, then pinpoint the locations where exposure peaks. The findings on inhaled pollutants can inform city planning, says Jack. “How can we route bicycle paths and create amenities that minimize exposure?”

**Finding Clues**

Tracking teens’ menstrual cycles isn’t easy, but the resulting data may hold clues to lifelong health. To get the most detailed and up-to-date information, Jasmine McDonald, PhD, and Lauren Houghton, PhD, partnered with developers at Clue, a period tracking app, to collect data. “We’re looking for connections between women’s periods and a host of chronic diseases associated with the menstrual cycle,” says McDonald. The current pilot will last three months, but Clue won’t limit the scientists’ access to new data. “As long as the subjects consent and keep using the app, we can collect data,” says Houghton, “so the cohort can go five, ten years, or longer.”

**On the Ground**

In Rio de Janeiro, Brazil, the government lacks reliable street-level data on living conditions. Working with Medtronic Philanthropy, Gina Lovasi, PhD, is putting researchers on the streets to record infrastructure details, complete with global positioning tags. Staffer Daniel Sheehan tailored Fulcrum, a data collection app so that Lovasi’s team could take detailed notes and even upload photos shot with their smartphones. Lovasi plans to share the data with policymakers. “It gives a picture,” she says, “of the current reality on the ground, what’s currently working, and helps us keep the assets of the community in mind as we address the challenges they face.”

**Looking for Love**

Grindr, Bender, GROWLr, and similar smartphone dating apps marketed to gay or bisexual men may increase users’ chances of contracting HIV and other STIs. Eric Schrimshaw, PhD, compared the apps with face-to-face methods men use to find partners and found cause for concern. “Users of these apps,” says Schrimshaw, “are at greater risk for STIs than from other high-risk activities like group sex or going to sex parties or bathhouses.” The trouble, he says, is that profile prompts don’t elicit users’ STI status or desired level of intimacy. “The next step is to work with app makers to include this information on expectations and STIs as fields in the profiles.”

**Mass Messaging**

Influenza can be costly, even deadly. Some youngsters need two doses of the influenza vaccine in a season, but many don’t get both. Melissa Stockwell, MD, MPH, sent computer-generated, personalized text messages reminding parents of the second dose. Pediatrics printed her results: The texts boosted full vaccination by 15.6 percent. Another study uses texts to monitor respiratory infection rates. Preliminary finding: 75 percent of participants with signs of infection don’t seek care. To assess the real disease burden, community-based surveillance is vital. “It’s just as easy to text 1,000 people as one person,” Stockwell says. “The potential lies in the ability to offer personalized messages, but in a scalable way.”

**Achievements in Africa**

In 2014, ICAP received a 5-year, $125 million award to perform population-based HIV-impact assessments of 20 countries in sub-Saharan Africa. Using tablet computers, staff administer questionnaires and link the data with point-of-care HIV test results to document the HIV epidemic and the reach of treatment programs in each country. The project builds on ICAP’s HIV survey of more than 12,000 households in Swaziland, done in collaboration with the country’s government. “This is an opportune moment,” says ICAP Founding Director Wafaa El-Sadr, MD, MPH ‘91, “to take stock of what has been achieved in confronting the HIV epidemic in Africa.”
This spring, Dean Linda P. Fried, MD, MPH, announced a new prize to support research by mid-career investigators. Four faculty were named Tow Scholars in recognition of outstanding research and thought leadership: Katherine Keyes, Jeffrey Shaman, Yuanjia Wang, and Patrick Wilson. Each will receive $25,000 annually for three years to support research, along with mentoring and training in leadership and development.

The Tow Foundation—established by Mailman School Board of Overseers member Leonard Tow and his late wife, Claire Tow—funds the program, which reflects the foundation’s commitment to vulnerable populations and health equity. “These four faculty have demonstrated a unique capacity for original research,” says Fried. “I am grateful to The Tow Foundation for their vision and generosity in creating this program to help our scientists realize their full potential to improve population health.”

Katherine Keyes, MPH ’06, PhD ’10, an assistant professor of Epidemiology, has authored more than 130 peer-reviewed publications. She has documented precipitous declines in nightly sleep times among teenagers over the last 20 years for the journal Pediatrics and has debunked the notion that compared with men, women initiate alcohol use at a later age and become dependent more quickly (in the American Journal of Psychiatry). Her textbook on epidemiological methods was published in 2014; she has a second textbook forthcoming in 2016.

Jeffrey Shaman, PhD ’03, an associate professor of Environmental Health Sciences, develops computer models to predict the spread of infectious diseases. In June 2014, the Centers for Disease Control and Prevention chose Shaman’s method as the winner of its “Predict the Influenza Season” challenge. In the first months of the Ebola epidemic, Shaman was invited to extend his work to anticipate the growth of the outbreak in West Africa. In July, PLoS Computational Biology published his technique for generating reliable flu forecasts in Hong Kong, where influenza infection rates ebb and flow year-round.

Yuanjia Wang, PhD ’05, an associate professor of Biostatistics and a core member of the Division of Biostatistics at the New York State Psychiatric Institute, uses data-driven approaches to discover disease origins and increase diagnostic capabilities for conditions like Huntington’s disease and Parkinson’s disease, as well as psychiatric disorders. Wang’s research productivity—described as “astounding,” by Biostatistics Chair DuBois Bowman, PhD, in his nomination letter—places her in the top 2 percent nationally for biostatistics scholars in her cohort across all specialty areas. She is a member of the editorial board of the Shanghai Archives of Psychiatry and a biostatistician for Columbia’s Complicated Grief Treatment Program.

In his research, Patrick Wilson, PhD, an associate professor of Sociomedical Sciences and founder of the Society, Psychology, and Health Research (sphere) Lab, aims to address health disparities affecting diverse and marginalized populations. He investigates the psychological, socio-cultural, and institutional factors that shape HIV-related health outcomes among minority gay men, other men who have sex with men, and HIV-positive youth and adults. In 2014, Health Psychology published his finding that HIV-positive men whose moods improved in a given week were more likely to use a condom, while poor mood was associated with instances of unprotected sex.

In Memoriam

Mervyn Susser, 92
Mervyn Susser, MD, longtime chair of the Department of Epidemiology and founding director of Columbia University’s Sergievsky Center, died in August 2014. He was 92. Susser was widely credited with helping the field of epidemiology establish proven methods for studying and treating disease. His work ranged from running an apartheid-era clinic for black South Africans to investigating famine in the Netherlands and AIDS in the U.S. and South Africa. With his wife, Zena Stein, MD, a professor emerita of Epidemiology, Susser promoted some of the earliest educational and treatment programs for AIDS in South Africa. Their son, Ezra Susser, MD, MPH ’82, DrPH ’92, also a former Mailman School chair of Epidemiology, has continued the couple’s investigations into the effects of famine on prenatal development and lifelong health.
SHIFTing the Campus Climate

Study Launched

In May, the Mailman School hosted a symposium identifying gaps in understanding the prevention of sexual violence on college campuses, calling for a broad interdisciplinary agenda for the next generation of research.

The daylong event, “Transforming the Campus Climate: Interdisciplinary Perspectives on Sexual Violence,” was one of the first public activities sponsored by the Sexual Health Initiative to Foster Transformation, or SHIFT, a research initiative announced in February by Columbia University President Lee C. Bollinger, JD. “Sexual violence has deep roots within our society,” says SHIFT co-director Jennifer Hirsch, PhD, a professor of Sociomedical Sciences. “In order to address it effectively, we need to understand more about the individual, social, and institutional factors that make it more likely to occur.”

Incidents of sexual assault on college campuses—approximately 90 percent of which are not reported—are thought to be pervasive across most kinds of educational institutions. The most recent national study indicates that as many as 1 in 5 women, and 1 in 16 men, experiences some form of sexual violence while in college.

The conference included national leaders in sociology, medicine, and psychology, who explored the factors that underlie student vulnerability to sexual violence. Says Hirsch: “Our capacity to respond effectively to the challenge of building campus climates where everyone is safe must not be held back by a lack of empirical knowledge.”

Jennifer Hirsch, PhD (right), and Claude Ann Mellins, PhD, co-direct the SHIFT study.
A Capital Career
Spring Break Field Trip

Compared with the beach, cherry blossoms could be a tough sell. But for more than 70 Mailman School students intent on careers in the nation’s capital, Washington, D.C., was the perfect spring break destination. In March, the Office of Career Services—in collaboration with the Offices of Alumni Relations and Student Affairs—hosted a four-day field trip for master’s and doctoral students to meet with alumni and employers to learn more about career options in the District of Columbia.

“Washington, D.C., is where important national health-policy decisions are shaped in and around federal agencies,” says Heather Krasna, assistant dean of Career Services, who spearheaded the second annual outing. “It’s also the No. 1 starting point in the United States for an international career.”

More than 20 D.C.-based employers—including the U.S. Departments of State and of Health and Human Services—welcomed the students, who also visited the U.S. Agency for International Development (USAID), Pact International, Chemonics, the Kaiser Family Foundation, and Families USA.

At each organization, public health professionals took a few minutes to discuss pressing issues with the students. In 2014, for example, students heard about tobacco policy in Latin America from an expert at the Pan American Health Organization and about the impact of the Affordable Care Act on the federal budget from an economist at the Congressional Budget Office. Participating alumni in 2015 included Ariel Pablos-Méndez, MPH ’92, assistant administrator for global health at USAID, and David Michaels, MPH ’81, PhD ’87, who heads the Occupational Safety and Health Administration.

Other activities included one-on-one informational interviews and a cocktail party with area alumni. To help students maximize the opportunities, Krasna led a workshop with tips on networking, advice for setting up informational interviews, and proper etiquette for thank-you letters. In advance of the trip, students were also able to order Mailman School–branded business cards and meet with the Career Services staff to discuss job search strategies and review their resumes. “A Mailman School degree is the ticket to a huge variety of exciting and rewarding career choices,” says Krasna. “We want to give students every opportunity to explore the options and make the connections so they can follow their dreams.”
In June, 21 doctoral students and more than 600 master’s students celebrated the completion of their degrees.

Babatunde Osotimehin—executive director of UNFPA, the United Nations’ Population Fund, and the recipient of the Dean’s Distinguished Service Award—gave the Commencement address, reflecting on this year’s adoption by the global community of sustainable development goals to improve international health and well-being. “We have made progress,” he said, “but it’s not enough.” He urged the graduates to protect the vulnerable, whether earthquake victims in Nepal or poor Americans. “You can be agents of change.”

Tioluwa Olokunde, who like Osotimehin is a Nigerian national, delivered remarks on behalf of the graduating class. “Though we are a diverse group, we are united by one thing: our unique dreams,” she said. “They are dreams to succeed in our commitment to protect and improve the health of populations in our home countries and all over the world.”

When Nina Morency-Brassard, MPH ’15, traveled to Jordan in June 2013 for her summer practicum with Women Under Siege, she expected to resume her coursework within a few months. Instead, she was gone more than a year. “The refugee situation was worsening by the day, and it seemed against the ethos of humanitarian work to leave when my skills could be of use,” says the 29-year-old, who worked as a public health consultant for International Medical Corps relief programs in Syria. “I felt compelled to stick around.”

To honor that spirit—exemplified, as well, by her work with the Mailman School’s Reproductive Health Access, Information and Services in Emergencies (RAISE) Initiative—Morency-Brassard was this year’s recipient of the John and Kathleen Gorman Public Health Humanitarian Award. In July, she began work with the International Rescue Committee’s emergency response and preparedness team.

Global Health grad Anna Larsen, MPH ’15, was this year’s recipient of the Bernard Challenor Spirit Prize, in recognition of her expansive connections with departments throughout the Mailman School. Now a Centers for Disease Control and Prevention fellow in Pretoria, South Africa, Larsen worked with ICAP on the Global Nurse Capacity Building project during her first year at the Mailman School. For her practicum, she traveled to Tanzania with the Connect Project, led by faculty from Population and Family Health. Back in New York, she extended her work on the project. “I wanted to see how different research groups do things,” says Larsen, who also worked as a teaching assistant for the course Systems Thinking Approach to Maternal Health. In pursuit of a network of peers, Larsen strove to build camaraderie among her Global Health cohort. “You’re in different countries throughout your career,” she says, “and having a core of peers was really important to me.”
Leaders

Honor Society

Sea captain and industrialist Joseph DeLamar was a champion of public health, providing in his estate for the 1922 creation of the Joseph DeLamar Institute of Public Health, the precursor to today’s Mailman School of Public Health. Today, the School’s DeLamar Society honors the dedicated donors who make annual student scholarship gifts of $500 or more. Society benefits include invitations to seminars featuring leaders in the field and opportunities to meet scholarship recipients. Membership increased by 30 percent in 2014. Howard Nadel, a member of the Mailman School Alumni Association board, has been a DeLamar Society member since 2009. “We give every year,” says Nadel, who is longtime director of research for the North Bronx Healthcare Network and administrative director of the Human Genetics Lab at Jacobi Medical Center. “You give and see the impact right away—through these students I’m creating a great wealth for society, because they’re all going out into the world and giving back.”

Mirror Image

In June, the Alumni Association selected Paul W. Brandt-Rauf, MD, DrPH ’87, as the 2015 recipient of the Allan Rosenfield Alumni Award for Excellence. Established in 2009 to honor the memory of Rosenfield, who served as dean from 1986 to 2008, the award recognizes the achievements of the School’s outstanding alumni and their leadership in the field of public health. Brandt-Rauf is dean of the School of Public Health at the University of Illinois at Chicago, and a professor emeritus and former chair of the Department of Environmental Health Sciences at the Mailman School. His major research interests are in occupational and environmental carcinogenesis. He has authored more than 230 journal articles and book chapters and has edited several volumes on occupational and environmental health. He is editor-in-chief of the Journal of Occupational and Environmental Medicine. He has served as an adviser and consultant to the World Health Organization, the Occupational Safety and Health Administration, the U.S. Department of Energy, and the Environmental Protection Agency, among others.

In his acceptance speech, Brandt-Rauf remembered the award’s namesake. “Allan always told his students, ‘If you can look in the mirror and honestly say you used your degree to make this world a better place, then you’ve earned your diploma.’” There’s no doubt, said Brandt-Rauf, that Rosenfield left the world a better place. “It’s an inspiration to me to continue to strive for excellence in public health and all the values that embody Allan’s legacy as long as I’m able. Even in the end when the world could no longer heal Allan,” he said, “Allan continued to heal the world.”

Excellence on Board

“My Mailman experience engrained me with two things: first, the lesson that I’m not the smartest person in the room,” says Carlos Cuevas, MPH ’12, “but more important, the ability to embrace the ideas of people with new approaches and perspectives so that, together, we can tackle complex issues.” As a senior adviser to New York’s Medicaid director, Cuevas helps oversee the Empire State’s redesign of the program, which serves nearly 6 million people. When Governor Andrew Cuomo pledged to send a “Healthcare SWAT Team” to Puerto Rico to help the people redesign their Medicaid program, he tapped Cuevas.

Connecting with the smartest people in the room requires being in the room—so soon after graduation, Cuevas joined the board of the Mailman School Alumni Association. “If you want to take on complex public health issues, you can’t look at just one facet of the field,” he says. “I’m always looking to hear and read about new ideas, strategies, and approaches. I constantly think about how we develop flexible, agile policy that allows tailored implementation across various settings.” Through the Alumni Association’s educational activities, student and peer mentoring, social events, and career networks, Cuevas has access to a vibrant community of public health leaders working around the world. “Remaining engaged in the Mailman community has given me access to thought-leaders across the public health spectrum,” he says. “It’s like having access to my own public health think-tank!”

With the 30 other members of the alumni board—who span graduation years from the 1950s through the current decade—he works year-round to foster alumni connections. Says Cuevas: “It’s the people comprising the Mailman School community that make us unique.”

The Alumni Summit for Public Health Leadership on June 4 featured the discussion “Managing the Ebola Crisis and Pandemic Preparedness” between Professor of Epidemiology Wafaa El-Sadr, MD, MPH ‘91, founding director of ICAP, and Craig Spencer, MD, MPH ’13, a Doctors Without Borders volunteer who treated people with Ebola in Guinea and after returning home became the first person diagnosed with the disease in New York City. “We know what can happen,” said Spencer, “because it’s happened before.”

photo by LESLYE SMITH
A Lofty Vision

by Maria Costanzo

Jason Friesen, MPH ’12, was on a flight over the Caribbean when the pilot called passengers’ attention to a view that would transform the young translator’s career trajectory. It was August 2005, and the terrible power of Hurricane Katrina was unmistakable even from the air. Back on the ground in Miami, Friesen witnessed the devastation firsthand.

When he returned home, Friesen signed up for emergency medical technician training. Paramedic’s license in hand, he volunteered with the Red Cross in Mexico. When an earthquake struck Haiti in 2010, he served as a program manager with the international relief organization Project Hope. The work highlighted a stark need for better emergency response systems in less developed regions of the world. Still employed full-time for Project Hope, Friesen enrolled in the Mailman School, commuting monthly from Port-au-Prince to Washington Heights for classes.

After completing his degree, Friesen left Haiti to focus on Trek Medics International, a nonprofit he’d started years earlier to solve the problems he’d witnessed in Mexico and Haiti. “I walked out of that MPH program with a business plan, a marketing plan, and tools for recruiting,” he says. He also gained a medical director: Kevin Munjal, MD, MPH ’12. Says Friesen: “Trek Medics International went from a weekend hobby to a full-time job.”

In the U.S., the linchpins of emergency response are an elaborate 911 system, specially trained professionals, and ambulance transport. In the developing world, emergency response relies on an informal network of Good Samaritans who get people to the hospital any way they can—in taxis, pickup trucks, or buses. To foreign donors and government officials, the dearth of ambulances can be concerning. But as an EMT, Friesen had discovered that ambulances aren’t enough. Dedicated emergency vehicles cost a lot to maintain and rely on a network of paved roads—rarities in isolated, impoverished communities. “An ambulance,” says the 35-year-old, “does not a system make.”

Instead, Trek Medics bolsters existing systems and resources in each community it serves. Volunteers from the U.S., supported by Trek Medics, train local emergency responders in the classroom and in the field. Working with fire departments or hospitals, the nonprofit assesses local emergency transport resources, taking into account the road and traffic conditions in the area. In effect, Friesen has created a new model of emergency response tailored to the conditions in developing countries.

Trek Medics also provides low-tech emergency dispatch software known as Beacon, dubbed “Uber for disaster zones” by *Time* magazine. Based on widely available cellphone text-messaging technology, Beacon uses numbers, rather than words, to speed communication about patient status and responder needs within a network of participating drivers.

Trek Medics now coordinates programs in the Dominican Republic, Mexico, and Tanzania, with growth on the horizon. Google awarded the nonprofit a grant for Beacon, and USAID has given additional funds for expansion in the Dominican Republic.

Now based in Manhattan, Friesen devotes the bulk of his time to administrative duties these days. He still gets a thrill from seeing people embrace the organization’s mission. “The most rewarding part,” he says, “is when volunteers who have really gone out on a limb to work with us come back to me and say, ‘I get it. I get it and it works.’”
Philanthropist Eugene Lang is no stranger to bold promises. In 1981, he told sixth-graders in East Harlem that he would provide college tuition upon their high school graduation. Since then, Lang’s I Have a Dream Foundation has benefited more than 16,000 young people. In 2003, Lang sought to create a pipeline of underrepresented minority youth into health sciences and the Lang Youth Medical Program was born at Columbia University Medical Center.

As part of the program’s “mini–medical school,” students from Upper Manhattan explore the professional opportunities in healthcare. Each year, more than 200 sixth-graders apply for 1 of 14 slots. The chosen few spend six years of Saturdays—and full weeks each summer—rotating through classrooms, hospitals, and clinics at CUMC. Beyond scientific training, they also receive college counseling and mentoring—often from program alumni who return to the community after graduating from college.

In 2013, Jacob Barela, MPH ’15, and Chelsea Kolff, MPH ’15, developed a public health curriculum for Lang scholars in the 10th and 11th grades. Mailman School students and faculty volunteers pitch in, too, covering prevention science, ethics, and global issues.

“Few people can decide at age 12 that they want to be doctors,” says Marina Catallozzi, MD, MSc (pictured upper right), an assistant professor of Population and Family Health and of Pediatrics at Columbia P&S, who for eight years was the program’s medical director. “Lang scholars see everything—from social work to dentistry to surgery, and of course, public health,” she says. “They enter college with strong personal interests in improving community health.”
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