TEAM SCIENCE FOR THE PUBLIC'S HEALTH

Science is not an individual sport—teams are the heart of public health and the backbone of ground-breaking achievements. The 2016–17 Grand Rounds series brings together collaborators from across the Mailman School for discussions about how interdisciplinary teams are breaking down silos to take on issues including obesity, climate change, and racism and violence.

For schedule of speakers or to watch Grand Rounds via the School’s Livestream channel, visit:
mailman.columbia.edu/events/grand-rounds
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A Pep Rally for Team Science

A litany of marquee names spans 20th-century public health: pioneers like scientist Jonas Salk, MD, developer of the polio vaccine; crusaders like Lillian Wald, founder of community nursing; and innovators like Charles Drew, MD, whose techniques for storing blood saved thousands of lives during World War II. As remarkable as their accomplishments were, generating knowledge for the 21st century demands the synergy of collective action. Whether for great science, great solutions, or great impact, public health is a team sport.

The evidence has never been clearer: As we tackle interconnected population health challenges like climate change, obesity, and emerging infectious diseases, the barriers between disciplinary silos are crumbling. Complex problems require complex solutions, conceived and realized by scholarly teams with the ability to view an issue from many angles.

Take Zika. As I write, the mosquito-borne virus is emerging in the Southern United States, putting countless newborns at risk of serious birth defects. Even before the virus arrived here, epidemiologists generated models anticipating transmission of the virus among vulnerable populations; now biostatisticians are integrating live data into those models. Infectious-disease and basic-laboratory experts are devising screening tests to detect infection and laying the groundwork for a vaccine. Experts in maternal health and health promotion are communicating prevention strategies to an anxious public. And policy analysts are advising legislators on strategies to combat Zika’s spread, while ethicists are championing the rights of affected populations in any coordinated response.

At the Mailman School, we’re cheering for Team Science. Transdisciplinary teams from all of our departments and centers are improving population health by addressing chronic disease, health disparities, and healthy aging. Team Science guides our educational philosophy, too. We’ve made an interdisciplinary core—animated by intellectual versatility—the foundation of our MPH program.

In this edition of Columbia Public Health, we report on cross-disciplinary partnerships underway from Jordan to Zimbabwe to New York City. Throughout the 2016–17 academic year, our signature lecture series—“Grand Rounds on the Future of Public Health”—will give Team Science a megaphone, bringing together researchers from across the School for lively discussions about partnerships with shared objectives that engage all of our faculty.

As citizens, we see what collective action and dedication can achieve within our communities. As scientists and scholars, we must approach our work in a similar manner—not as individuals, but as a team. Together, we can pool the vast knowledge and skills from every corner of the public health field to build a healthier, more equitable world.

Complex problems require complex solutions, conceived and realized by scholarly teams.
IN MAY, THE SYMPOSIUM “POVERTY, THE BRAIN, AND MENTAL HEALTH” brought together scientists, advocates, and policymakers to scrutinize the latest research on childhood stress.

“We have moved beyond thinking about stress as a feeling and begun to think of it as a profound experience that affects our whole body,” said New York City Health Commissioner Mary Travis Bassett, MD, MPH, in her opening remarks. “We know that families, children, and whole neighborhoods that are experiencing protracted, concentrated disadvantage are disproportionately burdened by stressors.”

Co-presented by the Mailman School, the nonprofit Partnership with Children, and the American Museum of Natural History, which also hosted the event, the program included talks by Virginia Rauh, ScD, professor of Population and Family Health and deputy director of the Columbia Center for Children’s Environmental Health; Margaret Crotty, executive director of Partnership with Children; and Renée Wilson-Simmons, PhD, director of the Mailman School’s National Center for Children in Poverty.

Rauh spoke of her research showing how toxic stress triggers physical changes in a child’s developing brain that are visible with an MRI. Consequences include cognitive deficits, emotional disorders, and learning disabilities. The good news is that with the right kinds of support, children can recover: responsive parenting and learning environments work together to buffer against adverse experiences. “The brain is a very adaptable organ,” she explained.

To foster what it calls “safe learning environments,” Partnership with Children works with New York City schools to provide trauma-informed counseling for children and families experiencing toxic stress. “The antidote to toxic stress—nurturing relationships and consistent feelings of safety—works if it’s in all the child’s environments,” said Crotty, who is also an executive MPH student at Mailman.

To promote access to the kinds of interventions researchers have already shown can help, NCCP and the Department of Health and Mental Hygiene are collaborating on two pilot projects to help parents and other caregivers attend to the social and emotional needs of their children. Says Wilson-Simmons:

"CHILDREN DO BETTER WHEN FAMILIES DO BETTER."
THE OTHER HALF

TEEN PREGNANCY PREVENTION TARGETS BOYS

IT TAKES TWO TO TANGO, and yet the vast majority of teen pregnancy interventions focus on young women. In November 2015, the U.S. Centers for Disease Control and Prevention awarded its first-ever grant for a teen pregnancy prevention program focused on young men to David Bell, MD, MPH, associate professor of Population and Family Health.

Bell is medical director of NewYork-Presbyterian’s Family Planning Program, which includes the Young Men’s Clinic, a provider—and champion—for high-quality and respectful health services relevant to adolescent and young men, including sexual and reproductive health services.

“We have so very few, if any, evidence-based models on working with guys to reduce teen pregnancy,” says Bell. With the five-year, $3.6-million CDC award, Bell is partnering with Melanie Gold, PhD, professor of Population and Family Health (and of Pediatrics at Columbia University Medical Center), to tailor a program developed by Gold that has been proven among young women to reduce rates of unprotected sex.

Known as ‘motivational interviewing,’ the approach helps people define what they want to change, what that change looks like, and how they can create that change. In one arm of Bell’s study, coaches will work with young men to encourage pregnancy-prevention measures like using condoms, talking with their partners about contraception, and utilizing healthcare services; the control group will be motivated to develop healthier diets and exercise habits and to stop smoking.

“We have so few things that work with young men—particularly young men of color—in a positive way,” says Bell. “This project is on the forefront of working with this population in that positive way, and I think we can foster more like it for our nation and culture overall.”

HONOR ROLL

* Carlos Cuevas, MPA ’12, MPH ’12, honored with the Mailman School’s Outstanding Recent Alumni Award.


* John A. MacPhee, MPH ’12, honored with the Allan Rosenfield Alumni Award for Excellence.

* Yuanjia Wang, PhD, associate professor of Biostatistics, named a fellow of the American Statistical Association.

SEBASTIAN FRIES, PHD, MA, JOINED THE MAILMAN SCHOOL IN MAY AS EXECUTIVE DIRECTOR FOR THE COLUMBIA POPULATION HEALTH PARTNERSHIPS (CPHP). He is charged with leading the School’s efforts to forge partnerships with the public and private sectors. A former chief giving officer of Toms, a socially conscious shoe company that matches each purchase with a donation, Fries brings years of experience blending purpose and profit in the private sector. He previously worked at Pfizer, where he developed business models in emerging markets.

Under Fries’ direction, CPHP seeks to build relationships with partners across sectors in pursuit of population health goals. Working with the Dean’s executive team and with faculty across departments, Fries sees potential for collaboration everywhere but plans to start from academia’s comfort zone: spurring improvements to the health-care system by connecting hospitals, insurance providers, and policymakers with the research, analysis, and expertise of Mailman School faculty.

In a tough funding environment, partnerships with private companies promise public health scholars increased access to resources, expanded influence, and opportunities to scale up proven pilot projects.

“We can find common ground and common values between stakeholders—that’s the power of coalitions,” says Fries. “We’re from different worlds, but they can overlap for the greater good.”

MATCHMAKER NAMED TO FORGE PARTNERSHIPS FOR PUBLIC HEALTH
OVER THE LAST 100 YEARS, LIFE SPANS HAVE INCREASED BY NEARLY THREE DECADES; societies around the world now boast unprecedented numbers of elders. Perhaps nowhere is the demographic shift more evident than in China, which is already home to more than one billion people over age six. In October, experts from around the world gathered in Shanghai at the Columbia-Fudan Global Summit on Aging and Health to explore the science that keeps people healthy into older ages and how to coax clinically relevant insights from the tsunami of data generated by emerging methods of genomic sequencing.

**BIG MONEY**

**BIOSTATISTICS NETS NIH AWARDS**

THIS YEAR, FACULTY IN THE DEPARTMENT OF BIO-STATISTICS GARNERED $6.2 MILLION IN NEW AWARDS FROM THE NATIONAL INSTITUTES OF HEALTH. OVER THE NEXT FIVE YEARS, THEY WILL USE THE FUNDS TO EXPLORE SUCH QUESTIONS AS HOW TO TRAIN COMPUTERS TO PERSONALIZE TREATMENT PROTOCOLS FOLLOWING A HEART ATTACK AND HOW TO COAX CLINICALLY RELEVANT INSIGHTS FROM THE TSUNAMI OF DATA GENERATED BY EMERGING METHODS OF GENOMIC SEQUENCING.

- **JEFF GOLDSMITH, PHD / $1.8 MILLION:** The assistant professor will analyze post-stroke neuroimaging data to guide the development of more effective rehabilitation techniques to combat the leading cause of physical disability in the United States.

- **MIN QIAN, PHD / $400,000:** The assistant professor will leverage machine learning to help clinicians identify the best behavioral interventions for people who have suffered a heart attack and are at risk of depression, a disease that increases the risk of subsequent coronary damage and death.

- **YING WEI, PHD / $1.2 MILLION:** The associate professor will develop analytical tools to reveal how genetic variants influence gene expression at the molecular level.

- **KEN CHEUNG, PHD / $1.6 MILLION:** The professor will develop and validate statistical methods for analyzing the efficacy of treating depression with behavioral interventions which leverage technologies like mobile apps to augment or replace psychotherapy for people constrained by geography, finances, or other impediments to face-to-face treatment.

- **IULIANA IONITA-LAZA, PHD / $1.2 MILLION:** The associate professor will create statistical methods to integrate data from multiple next-generation genomic sequencing techniques to reveal the causal variants associated with autism and schizophrenia within the abundant natural variations among people whose genomic and clinical data has been collected.

**POPULATION DYNAMICS**

**AGING CONFERENCE IN SHANGHAI**

OVER THE LAST 100 YEARS, LIFE SPANS HAVE INCREASED BY NEARLY THREE DECADES; societies around the world now boast unprecedented numbers of elders. Perhaps nowhere is the demographic shift more evident than in China, which is already home to more than 194 million people over age 60. In October, experts from around the world gathered in Shanghai at the Columbia-Fudan Global Summit on Aging and Health to explore the science that keeps people healthy into older ages and enables societies to benefit from our longer lives. Co-sponsored by the Mailman School and Fudan University, the event drew experts from the World Health Organization, Shanghai’s Center for Disease Control and Prevention, the U.S. Centers for Medicaid and Medicare Services, the pharmaceutical industry, the World Bank, and more.

"**THIS SUMMIT IS A WATERSHED MOMENT FOR THE SCIENCE OF HEALTHY AGING,**" SAYS **DEAN LINDA P. FRIED, MD, MPH.** "**THE WISDOM GARNERED OVER YEARS OF STUDYING PUBLIC HEALTH INTERVENTIONS FOR OLDER PEOPLE WILL FINALLY TAKE CENTER STAGE IN CHINA, A COUNTRY THAT HAS ALWAYS HAD AN UNPARALLELED CAPACITY TO INSTIGATE CHANGE.**"

**HOT PROSPECT**

**PARIS CLIMATE ACCORD PUTS HEALTH ON THE FRONT BURNER**

AT THE NOVEMBER 2015 COP21 CLIMATE CONFERENCE IN PARIS, THE MAILMAN SCHOOL JOINED FORCES WITH THE WHITE HOUSE TO ENCOURAGE SCHOOLS OF PUBLIC HEALTH, NURSING, AND MEDICINE TO FORM A GLOBAL COALITION TO PREPARE HEALTH PROFESSIONALS TO CONTEND WITH THE EFFECT OF CLIMATE CHANGE ON HUMAN HEALTH. TO DATE, MORE THAN 100 SCHOOLS IN 14 NATIONS HAVE SIGNED ON TO THE MAILMAN-LED CAMPAIGN.
THE U.S. CENTERS FOR DISEASE CONTROL AND PREVENTION has given its top designation for evidence-based interventions to six HIV-prevention programs—including a suite of curricula known as Sisters Informing Sisters about Topics in AIDS (siStA)—designed by Gina Wingood, ScD, MPH. Wingood has headed 20 National Institutes of Health–funded grants and penned more than 240 peer-reviewed articles. In 2015, the Mailman School named her the Sidney and Helaine Lerner Professor and founding director of Columbia’s Lerner Center of Public Health Promotion.

What’s a health challenge you’ve confronted? I’ve had severe asthma since birth. I can’t leave my house without an EpiPen—it could be disastrous. I also receive monthly shots to help control my asthma; without them, I would be very sick. I am also severely allergic to all nuts, nut oils, and nut products. Accidentally eating a nut can send me to the hospital for several days.

That sounds pretty scary. How do those experiences affect your approach to health promotion? It has been fascinating to apply my scholarship on behavioral-change intervention and realize what a tremendous impact my own health actions have. I’m also struck by how essential the efforts of my family have been in helping me cope with my serious asthma and allergies.

What features are common to the best health-promotion programs? It all boils down to problem-solving, communication, and decision-making skills. In HIV prevention, there is a lot of focus on condom use. But women don’t use condoms. So how do we, as women, communicate the need to use a condom in a way that’s not threatening or demeaning or demanding and that gets our needs across? If you’re all mean and in your partner’s face or you’re so uncomfortable you can’t even look the person in the eye, that’s not going to work. In the siStA programs, we role-play asking partners to use condoms in diverse situations, with different kinds of partners—someone older, someone you love, someone who abuses drugs or alcohol. You can use the same principles with any population, any problem. We all need these problem-solving, communication, and decision-making skills.

What are the implications for schools of public health? Even students in schools of public health need communication skills. This fall, the New York State Department of Health approved a new Health Communication Certificate, which we now offer through the Lerner Center.

What enticed you to move north? Typically, we public health scholars focus on grants and publications. The Lerner Center is asking, How can we promote our research to diverse audiences? My interest is not just developing HIV-prevention programs but actually disseminating them widely to diverse populations throughout the U.S.

How is that going? The siStA Program is in South Africa, Oklahoma—all over the place. We have a suite of programs: one for older women, one for women living with HIV, one for teens. The interventions all have the same framework and emphasize the same skills.

What’s the next siStA Program expansion opportunity? The megachurches can reach tens of thousands of people in the Southern U.S. I’m working with a number of them to have a more powerful impact in the area of HIV prevention. Now we’re expanding to diabetes, which is also prevalent among African-American women in the South.
Significant health problems continue to affect people exposed to hazards 15 years after the collapse of the World Trade Center twin towers on Sept. 11, 2001. Steven Stellman, MPH ’92, professor of Epidemiology, is co-author of four new studies through the World Trade Center Health Registry that report on outcomes such as cancer, acid reflux, and asthma, as well as job loss and early retirement, for people who lived, worked, or attended school in Lower Manhattan, as well as the crews that worked on the site after the attack.

Led by scientists at the New York Department of Health and Mental Hygiene, the studies appear in a special 9/11-themed issue of the *American Journal of Industrial Medicine*. “A decade and a half after the terrorist attacks of Sept. 11, we have the clearest picture yet of the effects of the events on health and well-being,” says Stellman, the former research director of the registry.

The registry will continue to monitor the population to assess changes in health over time, Stellman says, emphasizing chronic illnesses that may take longer to appear, such as cancer, heart disease, and diabetes, as well as broader questions of healthcare access and utilization. “We generously respond to disasters by providing immediate humanitarian aid, but disasters can also have a long-lasting effect,” he says. “For chronic diseases, much of the story is still to be written.”
Walking Papers

Urban planners use the term “walkability” to quantify neighborhood features that promote pedestrian activity. In a report published by the American Journal of Preventive Medicine, Associate Professor of Epidemiology Andrew Rundle, DrPH, describes the results of a study in which New Yorkers wore laboratory-grade devices similar to Fitbits and GPS trackers to identify physical activity hot spots in the city. Participants walked most in neighborhoods with a high density of intersections. They were much less active in heavily residential neighborhoods near subway stops. “How we organize neighborhoods has a positive impact on health behaviors in ways that people don’t really notice,” Rundle says. “I’m interested in how you make physical activity the thing that you do every day, by default, so it just becomes a way of life.”

HIV in the Crosshairs

A study led by Louise Kuhn, PhD, professor of Epidemiology, evaluated whether HIV-infected children in South Africa who had achieved viral suppression could switch to efavirenz-based therapy, the recommended drug for children older than 3. The treatment program resulted in excellent sustained virological control, report Kuhn and colleagues in a paper published by JAMA in November. Additional advantages include a once-a-day dose regimen, simplified co-treatment for tuberculosis, and a similar dosing arrangement for adults and children.

JAMA also reported an analysis of interventions meant to boost outcomes for Americans with HIV who also have substance-abuse problems. Programs that combine personalized case management with cash incentives for patients when they reach treatment goals have become increasingly popular, but efficacy analyses have yielded conflicting results. In a randomized, controlled study of 801 participants at 11 participating hospitals, Lisa Metsch, PhD, the Stephen Smith Professor and chair of Sociomedical Sciences, and colleagues found that one-on-one case management, with or without financial incentives, had no benefit compared with conventional treatment.

Smoking Gun

For more than two decades, congressional restrictions on the U.S. Centers for Disease Control and Prevention have limited analyses of data on gun violence. This spring, Epidemiologic Reviews unleashed a flood of media interest with its publication of a meta-study of 130 papers from 10 countries on the links between gun-related laws and gun homicides, suicides, and unintentional injuries and deaths. In most countries, firearm death rates fell after firearm legislation passed, says Julian Santaella-Tenorio, a doctoral student in Epidemiology and the study’s lead author. While the work did not conclusively prove that restrictions of laws reduce firearm deaths, it suggests that gun violence tends to fall in the wake of constraints on gun sales and ownership. “We weren’t necessarily trying to be on one side or the other,” he says. “We just wanted to look at all the gun-policy studies people have done.”
Psychological trauma—especially childhood abuse and domestic violence before age 11—can increase the likelihood of experimentation with drugs in adolescence, independent of a history of mental illness.

That finding, from an analysis of a national sample of 10,000 children, led by postdoctoral fellow Hannah Carliner and Associate Professor of Epidemiology Silvia Martins, MD, PhD, was published online in the Journal of the American Academy of Child and Adolescent Psychiatry. “We also found that trauma such as car accidents, natural disasters, and major illness in childhood increased the chances that teens would abuse marijuana, cocaine, and prescription drugs,” says Carliner.

Adolescent drug use may be a precursor to harmful drug use, mental illness, and other problematic health behaviors in adulthood, says Martins. “Targeting this modifiable health behavior in adolescence may help halt the trajectory towards the plethora of poor social and health outcomes often associated with childhood trauma.”

According to a report released in May—“Our Future: A Lancet Commission on Adolescent Health and Well-being,” unsafe sex is the fastest growing health risk for young people. Two-thirds of people aged 10–24 are growing up in countries where preventable and treatable health problems like HIV/AIDS, early pregnancy, unsafe sex, depression, injury, and violence are ongoing threats to their health and well-being. Teens also face new challenges, including rising levels of obesity and mental health disorders, high unemployment, and the risk of radicalization.

Columbia was one of four global academic institutions that led the commission. John Santelli, MD, MPH, chair of the Heilbrunn Department of Population and Family Health, was a featured panelist on country responses to the report at the launch event. Terry McGovern, JD, professor of Population and Family Health, one of the commissioners, took part in a panel on taking action in the secondary school setting.
Problem Plastics

Prenatal exposure to BPA, a common chemical found in plastic water bottles, dental sealants, and canned foods, has been implicated in a wide array of ill effects in children.

In May, Environmental Health Perspectives published a study by Mailman School investigators showing that the presence of BPA in a pregnant woman’s urine is associated with measures of her child’s risk of obesity at age 7. “This study provides evidence that prenatal exposure to BPA may contribute to developmental origins of obesity as determined by measures of body fat in children, as opposed to the traditional indicator of body mass index, which only considers height and weight,” says lead author Lori Hoepner, MPH, DrPH, an investigator at the Columbia Center for Children’s Environmental Health (CCEH) in the Department of Environmental Health Sciences and an assistant professor in the Department of Environmental and Occupational Health Sciences at SUNY Downstate Medical Center.

In August, Environmental Research published work led by Frederica Perera, MPH, DrPH, PhD, founding director of CCEH, showing that boys exposed prenatally to BPA may be more likely to develop symptoms of anxiety and depression at age 10–12.

Researchers controlled for factors that have been previously associated with BPA-exposure levels, including socio-economic factors. After separating the data by sex, they found that boys with the highest levels of prenatal exposure to BPA had more symptoms of depression and anxiety than boys with lower levels of such exposure; no such associations were found in girls. “These findings are consistent with our prior reports on BPA and children’s development assessed at earlier ages and suggest greater susceptibility of the male brain during prenatal development,” says Perera, a professor of Environmental Health Sciences.

The Utility of Futility

In a phase II clinical trial, investigators use a relatively small sample to look for signals of efficacy and safety of a treatment. While phase III trials demand a large pool of participants randomly assigned to either the experimental intervention or a control group, one option for phase II trials is to enroll just one group of participants in what’s known as a “single-arm futility trial.” Evaluation hinges on whether the treatment is sufficiently promising to proceed with a phase III randomized clinical trial or statistically futile.

The practice promises to contain costs and speed emerging treatments, but it’s not without risks in statistical evaluation. Longtime student of trial design and data analysis Bruce Levin, PhD, professor of Biostatistics, has penned a review of the practice and its pitfalls for Contemporary Clinical Trials. “There is no compelling reason to limit the arsenal of developmental trial designs,” he writes. “The futility design has a useful role to play in an institutional screening program to weed out unpromising treatment in an environment where patients and resources are precious and testing every candidate in the treatment pipeline with a phase III trial is unsustainable.”

High Time

The percentage of Americans who reported using marijuana in the past year more than doubled between 2001–2002 and 2012–2013, according to analysis by Epidemiology Professor Deborah Hasin in the American Journal of Psychiatry. More worrisome, the rise in marijuana-use disorders during that time was nearly as large. The study also showed that 2.5 percent of adults—nearly 6 million people—experienced marijuana-use disorder in the past year, while 6.3 percent had met the diagnostic criteria for the disorder at some point in their lives.

“An increasing number of American adults do not perceive marijuana use as harmful,” says Hasin. “We still need rigorous studies and data to guide our decisions about medical marijuana.”
Map Quest

Using a novel statistical model, a research team led by Mailman School scientists has mapped the spread of the 2014-2015 Ebola outbreak in Sierra Leone, providing the most detailed picture to date on how and where the disease spread and identifying two critical opportunities to control the epidemic.

The result, published in the Journal of the Royal Society Interface, matches with details known about the early phase of the Ebola outbreak, suggesting the real-time value of the method to health authorities as they plan interventions to contain future outbreaks, and not just of Ebola.

Their analysis uses data from the Sierra Leone Ministry of Health and Sanitation to chart the course of the Ebola outbreak, beginning with the arrival of the disease in the border district of Kailahun in May 2014. By mid-June, Ebola had spread west to nearby Kenema—a pathway consistent with a recent field investigation. At the peak of the epidemic, 67 percent of Ebola cases in Kenema came from Kailahun; by early July, the epidemic was firmly established in Kenema with most cases infected locally. From Kenema, the outbreak continued west, south, and north. Beginning in early July, a second path emerged in the capital city, Freetown, spreading east to Port Loko by late July, then quickly east and south.

Because of their many connections to other districts, Kenema and Port Loko were critical junction points for the outbreak. At these points, the study suggests, windows of opportunity may have existed for controlling the spread of Ebola within Sierra Leone. The researchers estimate that the first window, before Ebola reached Kenema, was approximately one month. The second window, before it reached Port Loko, was much shorter.

The method described in the paper uses three principal factors: the home district of the Ebola-positive patient, the population of that district, and the geographic distance between districts—all information that was available during the outbreak.

“While this analysis is too late to be used for application to and intervention in the Ebola epidemic, the method could be useful for future disease outbreaks,” says Jeffrey Shaman, PhD, the study’s senior author and an associate professor of Environmental Health Sciences. “To be able to infer the spatial-temporal course of an outbreak and the rate of its spread between population centers in real time may greatly aid public health planning, including the level and speed of deployment of intervention measures such as how many doctors and beds are needed and where to put them.”

The traditional method to track the spread of disease is contact tracing, in which health workers interview patients and everyone with whom they had contact. “Contact tracing is highly labor intensive,” says lead author Wan Yang, PhD, associate research scientist in Environmental Health Sciences and longtime collaborator with Shaman. “Especially in resource-poor areas, an epidemic like Ebola can easily outrun any such effort to track it. The minimal information needed in our method makes it a particularly valuable tool to aid public health efforts during a novel disease outbreak in these areas.”

Smoke Alarm

Half of smokers have lung damage, including symptoms of chronic obstructive pulmonary disease (COPD), in which airflow is limited within the lungs. Most often caused by smoking, COPD is the third-leading cause of death in the United States.

“Many smokers have symptoms without meeting the definition required for a COPD diagnosis,” says R. Graham Barr, MD, DrPH, professor of Epidemiology and of Medicine at the College of Physicians and Surgeons. The New England Journal of Medicine published his analysis, based on data collected on 2,736 current smokers and former smokers from all over the United States with a smoking history of more than 20 pack years.

Lung CT scans showed that many patients had thickening of the airways, common among those with chronic bronchitis. Symptomatic smokers had more frequent respiratory illnesses or flare-ups that required the use of respiratory medications or medical care—including hospitalization—than nonsmokers and nonsymptomatic smokers.

“Normal airflow does not rule out illness from chronic lung disease, particularly in people with a history of smoking and serious respiratory symptoms,” says Barr, who is also an internist at NewYork-Presbyterian Hospital. “Our findings build on previous studies showing that lung damage detectable on CT scans may be an important predictor of mortality in addition to airflow limitation.”
Inside the womb, a fetus seems buffered from the outside world. Her mother’s sturdy pelvis holds her in place, the placenta filters her blood and nourishes her growth, the amniotic sac cushions her against bumps. Yet even before her neural tube formed in the days following conception, her cells already had a memory. Incorporated within her DNA, the child’s cells carry the biochemical legacy of her mother’s past and ongoing interactions with the environment.

More than chromosomes pass from mother to child, then. Indeed, the very air a woman breathes and the chemicals with which she has come into contact become her child’s legacy, leaving marks that may be carried across the generations.

For decades, Mailman School researchers have worked to unravel the connection between toxic exposure—secondhand smoke, combustion-related air pollutants, flame retardants, insecticides, chemicals in plastics—and physiology. Animal models have long served as the gold standard for investigating how mammals respond to different chemicals. In recent years, powerful new tools have emerged to augment what those experimental models have revealed. Using a growing body of epidemiological evidence and a better
grasp of how insults to human DNA are expressed, these scientists are painting an increasingly detailed picture of the mechanisms by which environmental exposure affects human health over a lifetime.

**TOXIC FOOTPRINTS**

Frederica Perera, MPH ’76, DrPH ’82, PhD ’12 founding director of the Columbia Center for Children’s Environmental Health (CCEH), began delving into the effects of air pollutants on fetal and childhood development as a graduate student at Columbia in the late ’70s.

Perera decided to analyze the effects of polycyclic aromatic hydrocarbons (PAHs), a class of air pollutants found in vehicle exhaust, cigarette smoke, and other products of incomplete combustion. She wanted to know whether it was possible to detect PAHs latched onto DNA in the blood and lungs of humans and use that biomarker to predict the risk of lung cancer—questions no one had investigated before. Scientists at the time believed that the placenta was impervious to the outside environment, so for her PAH-free control, Perera collected samples from newborns and their placentas. She planned to compare those clean samples with DNA from adults exposed to PAHs. What she found surprised her.

“We were seeing damage from PAHs in these supposedly pristine control samples, and clearly the contaminants were getting into the fetus from the mother and being transferred across the placenta,” she says. “That’s what raised my alarm and turned my focus to this susceptible life stage.”

Building on this work, in the early ’80s Perera and her mentor, Bernard Weinstein, MD, proposed a new way of studying the causes of human disease. Now known as the field of molecular epidemiology, their technique integrates biomarkers—the footprints left in blood, urine, and tissues when chemicals are absorbed by the body—with epidemiological data. With their new tools, scientists could investigate the continuum between exposure and clinical outcomes months and even years later and use those findings for prevention.

“Epidemiology,” she says, “has become more powerful with the use of biomarkers, ‘omics,’ and sophisticated imaging, which weren’t available in the past.”

In the intervening decades, Perera and her colleagues at the CCEH have extended their studies to include over 2,000 at-risk children in the United States, Poland, and China, looking for clues to the effects of prenatal exposure to a wide array of compounds on neurodevelopmental disorders, asthma, and obesity, as well as potential risk of cancer. Many investigators are involved, sharing and enriching the Center’s resource of large
prospective cohorts, lab and data cores, and biospecimen and data banks.

**A NEW DIMENSION**

Epidemiologist Virginia Rauh, ScD, professor of Population and Family Health, also uses biomarkers to measure clinical disturbances among children exposed to pollutants in the womb. For two decades, the center has collected data on more than 700 children. Analyses by Rauh and Perera with Professor Emeritus Robin Whyatt, DrPH, have documented a correlation between high levels of exposure to PAHs—and to the organophosphate insecticide chlorpyrifos—with brain anomalies and adverse cognitive developmental effects in childhood, as well as motor changes through adolescence.

Many of these findings, says Rauh, fly below the radar; they appear only subclinically in most children. To detect such subtle signs, Rauh developed what she calls a “dimensional approach,” a combination of data points, to see at-risk children as a whole and predict their developmental trajectory.

“In psychiatry, clinical problems are defined by meeting a threshold,” says Rauh. “For example, one would have to have five out of eight possible symptoms. But sometimes there is variability in all of these different areas, and they miss clinical significance. The dimensional approach enables us to make a comprehensive profile of a child across four or five different domains that may not meet the clinical standard for a single diagnosis but may well reflect a unique picture of a child who has been highly exposed.”

Rauh starts with good old-fashioned epidemiological data to identify the most vulnerable populations and home in on the time and place associated with particular symptoms. Then she layers in biomarkers, neuropsychological tests, and even brain imaging—all tools that can help piece together the typical phenotype of a child who has been exposed to high levels of pollutants.

This approach, says Rauh, allows for a more sensitive examination of toxic effects on the brain and on childhood behavior, further identifying links between exposure and mental health symptoms that might otherwise be missed.

**HOW CAUSE BECOMES EFFECT**

For regulators in the United States assessing a particular chemical, however, even the most robust associations rarely suffice. American policymakers demand a detailed explanation of how a chemical works in the body before they take it off the market, says Andrea Baccarelli, MD, PhD, chair and Leon Hess Professor of Environmental Health Sciences. “It’s usually hard to convince policymakers that certain chemicals are toxic unless you understand the mechanism—how the chemical acts to cause the disease.”

Enter “omics,” shorthand for the myriad data generated by the genomic revolution. Genomics refers to the sequence of genes within our cells; epigenomics, how genes are expressed; proteomics, the particulars of the proteins encoded by our genes; and mitochondriomics, the role of genes unique to the mitochondria, the cell’s power plant. With emerging biochemical and sequencing techniques, a wealth of opportunities have emerged for investigators to drill down into the molecular changes that occur within a person’s lifetime.

Take, for instance, epigenomics (aka epigenetics): Rather than relying on the sequence of DNA, which stays fixed in every cell, epigenetics focuses on gene expression—how chemicals intertwine themselves into the DNA and affect which genes are turned on or off. “Gene expression is much more interesting than just looking at the genome,” says Baccarelli. “It’s a function of the DNA that changes during our lives. It’s flexible and can be shaped and reshaped by the environment.”

**“THOSE MOST AFFECTED BY TOXIC EXPOSURE ARE OFTEN SOME OF THE MOST VULNERABLE.”**
Like the annual rings in a tree’s trunk, changes in gene expression take time to emerge. But once they manifest, they persist. “Our cells and tissues remember our past environments, positive or negative,” says Baccarelli. “What disrupts our cells ends up having effects in our bodies many years later.”

Baccarelli, who joined the Mailman School faculty in June, has made such delayed reactions—including those transmitted across generations—a centerpiece of his research. He’s used the epigenome to link lifelong exposure to air pollution and heavy metals with age-related cognitive decline in the elderly. He’s also examined the intergenerational effects of an industrial disaster in his native Italy in the ’70s and how the children of women exposed to the chemical cloud when they were girls have been afflicted with thyroid dysfunction. “This formal memory, this gap in time, is particularly interesting,” he says, “especially for fetal exposures and neurodevelopmental disorders.” By identifying what happens in the gaps, Baccarelli sees a chance to change or even prevent aberrant gene expression before diseases develop later in life.

“We’re bringing epigenomics to the next level,” he says, “by doing studies that are epigenome-wide, so we can measure hundreds of thousands or even millions of epigenetic clues at once.”

**BY DESIGN**

For policymakers, the bottom line boils down to this: Can scientists make the leap from establishing correlation to proving causation?

Before biomarkers, omics, and big data, epidemiologists testing their hypothesis that a particular exposure led to a specific health outcome labored for decades to reveal even a correlation of risk—that is, statistical evidence that two events were associated by more than chance. They identified and measured chemicals, assessed nutritional factors, documented features of the environment, and estimated exposure through monitoring, food samples, and questionnaires on behaviors, diets, and occupations.

“We still do those things,” says Perera. And more. At the Mailman School, environmental scientists team up with biostatisticians to develop rigorous techniques for integrating epidemiological methods with the wealth of data from biomarkers, omics, and imaging.

“Using new methods to analyze these new kinds of data,” says Associate Professor of Biostatistics Shuang Wang, PhD, “makes results more valid and helps assure us that the conclusions are based on sound methods.”

**EVIDENCE-BASED POLICY**

As investigators meld scientific methods to flesh out their understanding of prenatal toxic exposure, regulatory bodies like the Environmental Protection Agency are rethinking how they craft evidence-based policy to protect public health. Consider, for example, the body of evidence available to the EPA on the safety of the pesticide chlorpyrifos, a compound whose effects Rauh, Perera, and Whyatt have investigated in multiple studies.

Farmers and urban housing authorities alike rely on pesticides to kill insects and rodents that threaten crops, make living environments uncomfortable or risky, and exacerbate diseases like asthma. Among them, the organophosphates—a class of neurotoxins, including chlorpyrifos, that interrupt enzymes vital to nerve function—have been prized for their efficacy. In recent decades, they’ve been scrutinized due to concerns about their effects on children. In 2000, the EPA banned chlorpyrifos for residential use, significantly reducing exposure in urban areas.

Large farms, however, retained the option to include chlorpyrifos in their pest-control arsenal. Now the EPA is weighing whether to further restrict its use. Among the findings under consideration are the results of three epidemiological studies—including one conducted by
Rauh and colleagues—all funded by the National Institutes of Health and jointly named 2011 Paper of the Year by the journal Environmental Health Perspectives.

Each study was designed and conducted independently, with a unique roster of participants and investigators. Yet all three confirmed similar neuropsychological disturbances in 7-year-olds whose mothers had positive biomarkers for exposure to chlorpyrifos during their pregnancies. While each study looked at different biomarkers—in maternal urine and in blood collected at birth from the umbilical cord—all of the participating children were assessed with the same developmental test. “What’s really powerful,” says Rauh, “is that while these studies were all observational, not experimental, they corroborate one another’s conclusions.”

As the EPA considers potential safeguards to prevent adverse exposure, the role of epidemiological data in the regulatory process remains contentious, with stakeholders and scientists raising concerns about how to proceed. Others in the scientific community, including many public health advocates, point out that epidemiological analyses supplement experimental data gleaned from animal models, furnishing a more complete picture of how environmental exposures affect people’s health. “We’ve entered an age when the EPA and other regulatory agencies can look at findings from epidemiological and molecular epidemiological studies, as well as experimental studies, whether they be in vitro or using laboratory animals,” says Perera. “They can take all of the data and do a full strength-of-evidence evaluation.”

Ultimately, says Baccarelli, scientific rigor offers the greatest promise to those who are most vulnerable—the pregnant women living in impoverished urban neighborhoods or working in fields of vegetables doused with pesticides. It is their children who will bear the legacy of prenatal chemical exposure. “We in environmental health are lucky that what we publish and what we do is monitored very carefully by policymakers,” he says. “Hopefully, policies will be geared toward protecting those who are most susceptible, so the levels of acceptable exposure will be lowered to the point of being safe.”

KRISTIN BUNDY covers science and medicine from her home in Pittsburgh, where she also teaches prenatal and postpartum yoga.
Chronic Crisis
Humanitarians Respond to New Realities

by Tim Paul | photos by Mezar Matar
Fouad Mohamed Fouad, his wife, and their two children left their home in Aleppo, Syria, in late 2012 for a short visit in Beirut. What began as a two-week holiday has become a perpetually extended displacement, with no end in sight.

Back in 2011, the political situation in Syria was escalating from scattered protests to violent civil war. Fouad, a doctor and co-founder of the Syria Center for Tobacco Studies, watched as pro-democracy demonstrators endured brutal reprisals by the regime of President Bashar Assad. Even providing medical aid became increasingly risky. A friend of Fouad’s, a fellow physician, was arrested for treating protesters, then tortured by police; three students who transported medications to besieged areas were murdered.

By the time Fouad and his family arrived in Beirut, their homeland was in freefall. At first, the family hoped to wait out the violence. But a brief return to Aleppo by Fouad’s wife made it clear that going back home safely was no longer an option. Today, Fouad counts himself among the lucky. He has a research position at the American University of Beirut and many friends. Even so, he says, “it was painful to leave the place where we were so deeply rooted.”

Some 5 million Syrians have fled the country since 2011; another 9 million—more than half of the remaining population—are displaced internally.

Syrian children practice their Turkish lessons at the volunteer-run Yusra Community Center in the Balat neighborhood of Istanbul. Their teacher, Yasmin, is a volunteer and fellow Syrian refugee who is continuing her undergraduate studies at Istanbul University, where she is pursuing a degree in environmental engineering.

Of the more than 700,000 school-age Syrian children living in Turkey, two-thirds are not receiving formal education. Since 2014, the Turkish government has allowed them to attend public schools, yet language remains a barrier for Syrians who speak only Arabic.
And yet, worldwide, Syrian émigrés are a mere fraction of those displaced. According to the United Nations, there are more refugees than ever before. No fewer than 65 million people have been forced from their homes.

That number is only expected to grow as political instability and economic uncertainty exacerbate ethnic and religious clashes, and climate change devastates once habitable lands. Yet the humanitarian-aid system developed in response to short conflicts in the poorest countries is proving ill-suited for the new reality: protracted crises where people displaced from middle-income countries settle, not in refugee camps, but in cities, often coping with recent traumas as well as longer term health issues. To design a better system, say Mailman School scholars, the world requires better data on refugees’ needs, as well as the analytical tools to analyze that information.

Refugee Science
Since the founding of the International Red Cross in the 1860s, the humanitarian’s modus operandi has been a rapid response to emergencies—whether...
natural disasters or armed conflicts. And aid organizations have considered anything that delayed or diverted resources an obstacle. But according to Neil Boothby, EdD, a psychologist and authority on children in adversity, tackling the problems of 21st-century displaced populations demands a new, evidence-based approach.

“We’ll always need first responders to provide food, shelter, and urgent medical attention,” says Boothby, the Allan Rosenfield Professor and director of the Mailman School’s Program on Forced Migration and Health. “But today’s extended crises have pushed the old system to the breaking point. We must go beyond emergency response to engage with issues like chronic disease, human rights abuses, and economic constraints in a way that combines efficiency and scientific rigor and can be sustained over time.”

Consider gender-based violence. Defined as a war crime subject to penalties imposed by the International Criminal Court, its extent among refugees is largely unknown. In a 2009 study, Boothby and colleagues investigated Ugandan women’s experiences of violence and rape after the women had been displaced by a decades-long guerilla war. In the face of reluctance by officials to discuss the crimes, the investigators went straight to women living in four refugee camps, asking about the women’s own experiences and those of their neighbors. In relatively crowded conditions, Boothby notes, “everybody knows everybody’s business.”

The results revealed that 5 percent of the displaced women had been raped by someone outside their household, while nearly a third had been forced to have sex by a husband or intimate partner. Yet most interventions to that point had assumed the attackers were strangers. The team’s findings opened the eyes of government officials and aid workers to the reality of gender-based violence within households and helped them recalibrate their efforts, with parenting programs shown to reduce domestic violence. The innovative “neighborhood method” also demonstrated an effective technique for measuring gender-based violence by tapping into community knowledge while reducing the time and expense of a traditional survey.

Breaking the Mold

One of the most widely publicized images that has been captured during the Syrian crisis was that of 3-year-old Alan Kurdi, drowned as his family crossed the Mediterranean Sea en route to Canada, by way of Greece. While the American media has highlighted the stories of Syrians fleeing the Middle East for Europe, North America, and other distant lands, more than three-quarters of Syrian refugees have actually settled in just three countries: Jordan, Lebanon, and Turkey. As émigrés from a middle-income country, they carry with them a unique set of resources and health concerns.

“You’re seeing people fleeing Syria with a smartphone and some money in their pockets,” says Boothby. It’s a stark contrast to people displaced from Somalia or the Democratic Republic of Congo. “These aren’t the kind of refugees we see in Africa, dying from diarrhea or malaria,” he says. “In the Middle East, we’re seeing people come in with hypertension and diabetes.”

Chronic diseases were the leading cause of death in Syria before the war. And they remain a problem for the millions who have left the country. Surveys of Syrians in Jordan and Lebanon found that more than half of households include someone coping with a chronic condition. Yet few are receiving the care they need.

In large part, that’s because U.N. agencies and nongovernmental organizations still deliver services through refugee camps. Yet 90 percent of Syrian refugees opt for alternative housing. “The majority of these people are going to cities,” says Boothby, “because there are more opportunities there.” And with urban refugees beyond the reach of international aid agencies, the burden of providing services falls on the host countries. Consider Jordan, where in some parts of the country refugees now outnumber citizens. There, the government welcomed refugees into its public health system; in 2014, when their sheer numbers became too many, their benefits were abruptly cut off.

Lebanon, on the other hand, has a privatized health system, and while the United Nations High Commission on Refugees (UNHCR) tries to fill the void for those who can’t afford insurance, some care remains out of reach. The Syrian doctor Fouad tells the story of a middle-aged refugee who discovered a lump in her breast. Her doctor recommended a mammogram, but she was unable to afford the procedure, which isn’t covered by UNHCR. Six months later, after the cancer had spread to her lymph nodes, a doctor referred her to a hospital for treatment. While 75 percent of the costs would have been covered, the remainder exceeded her budget. She died not long after.
It doesn’t even take an acute crisis like a cancer diagnosis to undermine a refugee’s well-being, says Miriam Rabkin, MD ’92, MPH ’02, an associate professor of Epidemiology who works with Fouad and others to study the delivery of prevention, care, and treatment services for underserved populations in the Middle East. “If you’re not treating your diabetes or your high blood pressure for a couple of months during an emergency, you might get by,” she says. “But if you’re not treating it for years on end, you’re going to have serious problems.”

Unsettled
In 2015, Boothby made a fact-finding mission to Jordan and Turkey. In Istanbul, he met a Syrian who pulled out his smartphone to show the professor images of his life before and after the war, starting with the comfortable home where he had once lived. “In the next set of photographs,” says the professor, “everything was destroyed. Rubble.” A physician in his home country, the man lacked the credentials to practice medicine in Turkey. Says Boothby: “You could see what it was like to lose not only your home but who you are.”

The man took Boothby inside the rugged space where he and his family had settled—a former warehouse without running water or interior walls. In a sleeping area separated by hanging sheets, his wife kept a pair of suitcases. Two years after their exodus, both remained packed. “She wasn’t willing to give up on the idea of going home,” says Boothby. “The suitcases represented the hope of reclaiming who they were.”

A shortage of housing and jobs in host countries has exacerbated the mental and physical strains on displaced families—not least of all the children, who make up half of all Syrian refugees. Many skip school to support their families. In Jordan, Boothby saw children working long hours in a battery factory and employed as domestic servants. Several of the factory workers were scarred from handling the acid; one was blind. Among the girls working in local homes, a third had been sexually exploited or abused.

“Schools can be very protective environments, especially for girls,” says Lindsay Stark, MPH ’06, DrPH ’10, an associate professor of Population and Family Health and director of Columbia’s Child Protection in Crisis Learning Network. But forced to choose, parents send their boys to school and hope marriage will shield their daughters from hardship and sexual violence. “It is often the case that early marriage is already a common part of the social norms,” says Stark. “But in conflicts, the age of the girls goes even lower.”

Nearly a third of Syrian marriages registered in Jordan in early 2014 involved a girl under 18 years of age. Of those, close to half were wed to men at least 10 years older. In more conservative parts of Jordan, Syrian girls are forced to marry Jordanian men, sometimes becoming second or third wives and gaining only dubious legal standing. Should something happen to the husband, his refugee widow would be left unprotected.

In 2010, nearly all Syrian children attended school. Since the war began, that proportion has plummeted to one in four. Host country schools are often overcrowded and unwelcoming to refugees. Many Syrian youth have been out of the classroom for years, some never to return.

“We’re going to have a generation of youth who are uneducated and unemployable and extremely mixed up when it comes to political ideologies and getting along with people,” says Boothby. “It’s going to be a huge problem for the entire region and the world.”

Attention to Evidence
Even anecdotal information from a fact-finding mission like Boothby’s 2015 trip can be useful in complex emergencies. Following his travels in the Middle East, the professor presented his findings to UNHCR, UNICEF, the Turkish Ministry of Health, and the River Jordan Foundation. At the same time, Mailman School researchers are intent on collecting robust data to lead the way to effective solutions.

Shatha El Nakib, MPH ’15, a researcher for the Program on Forced Migration and Health based in Jordan, gives the example of malnutrition in Lebanon. A widely used nutrition estimate by UNICEF from 2013 that rated the situation “poor” was subse-
sequently revised by the U.S. Centers for Disease Control and Prevention to be “within acceptable levels.” El Nakib is among those who remain unsure which numbers to trust. It’s not just the paucity of data, she says, but the uneven quality of the data collected that should give pause to scholars and humanitarians alike.

“It’s next to impossible to tailor an intervention without having an idea of the scale of the problem,” says El Nakib. In efforts to identify more-reliable data on the extent of malnutrition in Lebanon, she uncovered records from the International Organization of Migration that can help paint a clearer picture for aid organizations like UNICEF so they know where to direct their resources. In tandem, she, Boothby, and their colleagues developed a program to train UNICEF staff to collect and analyze data themselves.

As part of an eight-day course at Columbia University’s Global Center in Amman, Jordan, in December 2015, Mailman teachers introduced UNICEF staff to the fundamentals of epidemiology, including how to do surveys and estimate the prevalence of disease. Participants also learned how to respond in the early days of an emergency, then make interventions sustainable. “A lot of it is about teaching them to conduct a rapid assessment to

Human rights activist Oula Ramadan is founder and executive director of the Badael Foundation, a Syrian NGO headquartered in Istanbul. Named for the Arabic word for alternatives, the organization works to break the cycle of violence in Syria and prepare the way for peace and reconciliation. Ramadan, who fled Syria in 2011, has taught hundreds how to de-escalate conflict, with a focus on protecting and empowering women activists. She is also a founding member of Planet Syria, which advocates an end to barrel bombs, the promotion of a no-fly zone, and meaningful peace negotiations. In 2014, the Italy-based nonprofit No Peace Without Justice awarded Ramadan its Human Rights Award.
prioritize their programs,” says Boothby, who developed the curriculum. “The goal is to help them bridge the gap between humanitarian relief and development.”

Going forward, Boothby and El Nakib intend to develop online courses and, eventually, a university program to provide regular trainings for aid groups and national health ministries. Meanwhile, the researchers have embarked on a multi-country needs assessment. Working with collaborators at Columbia’s global centers in Istanbul and Amman and at the American University of Beirut, including the Syrian doctor Fouad, they will interview people displaced from Syria to learn what chronic-disease treatment services refugees have benefited from and what barriers to care they have encountered. The investigators’ goal: identify effective programs that could be replicated in other settings, for Syrians or other displaced populations facing similar challenges.

One promising model is UNICEF’s work in Egypt. Instead of starting new programs or duplicating existing programs to serve refugees, the agency partnered with the local ministry of health to strengthen the national health system, investing in and lending technical expertise to campaigns that serve both refugees and the host population. As part of that effort,
COMMUNITY MATTERS

Six years after the conclusion of World War II, most displaced people returned home. But even if the conflict in Syria were to end tomorrow, experts say, the refugee crisis would likely continue for decades. Around the world, growing numbers of refugees are fleeing countries fractured along ethnic and religious lines—and with few opportunities to return. According to UNHCR, the average span of displacement worldwide is now 20 years, up from 9 years in the 1990s.

Another factor is climate change, which a 2015 study by scientists at Columbia’s Lamont-Doherty Earth Observatory found to be a factor in the drought that preceded the conflict in Syria. “Increasingly, we’re going to see environmental reasons for why people are displaced,” says Boothby. In the coming decades, rising sea levels and extreme weather threaten to displace communities from Miami to Mumbai. “This is a whole new reason to focus on emergency preparedness and resilience.”

The most successful efforts leverage talent within the refugee community. “Syrians came with tremendous resources,” says Boothby, “not least of all the doctors, nurses, and teachers.”

Fouad tells a story of a Syrian woman who started a school in Lebanon’s Bekaa Valley. When it opened in 2013, there were 60 students; today, the student body numbers more than 1,200. Through the efforts of Syrian expats, including Fouad, the school provides health services as well as a quality education. It also serves as a social hub for refugees attending soccer matches. In effect, the school stands in for a town square. “It sends an important message,” says Fouad, “about living a healthy life and how to be useful in your community.”

Fouad still dreams of returning to Syria but acknowledges that could be a long time coming. In the meantime, he says, he resists invitations to settle in Europe or the United States because he wants to stay close to his fellow refugees. “I think I can make a bigger difference here.”

UNICEF hired Syrians as community health workers. “It was a good entry point into the Syrian community,” says El Nakib, “and a good way to build trust.”

Learning from HIV

At first blush, physician Miriam Rabkin’s insight seems completely counterintuitive: Efforts to enhance care for refugees with chronic disease should be modeled after the fight against HIV in sub-Saharan Africa. Writing in Global Public Health, the associate professor of Epidemiology notes that while HIV is an infectious disease efforts to curb the epidemic have succeeded by responding to it as a chronic condition: promoting screening and providing care for those who need it for as long as necessary.

Managing any chronic condition is challenging even for non-displaced people, requiring coordinated care, a steady supply of prescriptions, clinical and laboratory monitoring, and medical records. Providers must remain in close contact with patients to boost their chances of staying on track with medications and behavioral changes. “For people on the move,” says Rabkin, “all those things are extraordinarily challenging.”

Over the last 13 years in more than 20 countries, Rabkin and her ICAP colleagues have helped orchestrate programs that help nations manage HIV for millions of people—including forced migrants. A 2014 study by a team at the London School of Hygiene & Tropical Medicine found that, in many settings, the majority of refugees with HIV were being effectively treated.

The bigger lesson from HIV is that science can do more than determine the efficacy of a given drug: It can identify successful methods for reaching patients. Over the course of 35 studies, including several randomized clinical trials, ICAP has examined questions like the value of early treatment in the prenatal setting to prevent mother-to-child HIV transmission, and how a package of interventions that includes text-message reminders and a financial incentive can improve linkage to treatment and boost people’s ability to stay on schedule with their medication. Interventions should be applied in a coordinated fashion, says ICAP Director Wafaa El-Sadr. “Research is needed every step of the way.” This kind of implementation science, she adds, can “bridge the gap between knowledge and impact.”

In complex emergencies, says Neil Boothby, EdD, director of the Program on Forced Migration and Health, program assessment must be prompt and done in a way that maintains a degree of critical distance from the situation at hand, but also closely enough so that findings can be rapidly incorporated. “When lives are at stake—whether due to Ebola, famine, or conflict—you’ve got to quickly create a learning-feedback loop,” he says. “On the playground it’s go, get ready, get set, go. In emergencies it’s go, get ready, get set. You’ve got to know within a couple of days what you’re going to do.”


Syrian citizen journalist MEZAR MATAR is finishing his first long documentary, “The Scattered Memory’s Ceiling.”

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Transmission
RETIREMENT GETS A NEW LOOK

BY SARAH C. BALDWIN
WITH REPORTING BY SHARON TREGASKIS
In June, the Pew Research Center released its latest analysis of labor trends among older Americans. Four million baby boomers reach retirement age every year, but fewer are choosing to leave the world of work. Today, nearly 20 percent of people over the age of 65 hold a paying job—and only some of them do it for the paycheck. The growing percentage of elders remaining in the workforce spans income brackets and career paths, from business executives, lawyers, and teachers to artists, cosmeticians, and truckers.

Those trends could be a very good thing for Americans, says psychologist Ursula Staudinger, PhD, director of the Robert N. Butler Columbia Aging Center, which has branches dedicated both to basic research and to policy, education, and outreach. “In countries where participation in the labor force of people over the age of 60 is higher, you find that the level of cognition among people in that age range is higher, as well,” she says. “There seems to be something about staying engaged in work that helps us to keep up our cognitive function.”

The mechanisms remain murky, says Staudinger, the Robert N. Butler Professor of Sociomedical Sciences and principal investigator for a two-year grant from the Alfred P. Sloan Foundation to explore whether mentally stimulating activities at work and beyond optimize cognitive aging. Even so, she says, plenty of research already suggests that the value of employment in later life exceeds a strict cash accounting. The mere acts of leaving home and showing up on time provide structure and boost physical activity. Furthermore, a day on the job tends to impose higher activity levels than a day hanging around at home affords.

“And then there’s the cognitive activity,” says Staudinger. Most jobs present problems to be solved and we rarely have the luxury of doing so alone. At work, we get both the mental workout of generating solutions and the social challenge of doing so with others. We negotiate, seek consensus, resolve disagreements, and engage with the emotions of colleagues, supervisors, and customers. “There are a lot of components of work,” says Staudinger, “that keep us busy and train different parts of the body: our brains, our hearts, our muscles.”

Unfortunately, the life trajectory of most Americans is still at odds with achieving the possibilities of an aging workforce—for elders and the rest of society—says Ruth Finkelstein, ScD, associate director of the Butler Center and a specialist in health policy. “You get educated in the first 25 years of life. Then, in the middle, you devote yourself to work,” she says. “After that, you fall off a cliff and commence 30 years of leisure.”

In January, The Gerontologist published “A Global View on the Effects of Work on Health in Later Life,” co-authored by Staudinger and Finkelstein with center scholars Kavita Sivaramakrishnan, PhD, assistant professor of Sociomedical Sciences, and Esteban Calvo, PhD, adjunct assistant professor of Epidemiology. Worldwide, the authors note, “healthy life expectancy”—an estimate of how many years a person might live in a “healthy” state, taking into account

“THE NUMBER ONE INVESTMENT IN AGING WELL IS BEING WELL EDUCATED.”
years lived in less than full health due to disease or injury—is rising. In their review of the literature, the authors explore how that trend intersects with those in labor markets, as well as the macroeconomic benefits often associated with delaying retirement. “It will be essential for societies with aging populations to maintain productivity,” they write, “and for individuals it will be crucial to add healthy and meaningful years rather than just years to their lives.”

To realize those benefits, employers, policymakers, and individuals of all ages will have to adopt a lifelong perspective, one in which education and work—both fundamental to leading successful, healthy lives—are seen as lifelong pursuits. “Throughout our life we need periods of education, periods of work, periods of leisure,” says Finkelstein. “There’s no real reason that everyone on college campuses should be young. The same is true of the workplace.” For our economy to leverage the skills and contributions of older adults—and so that as we age we retain the identity, social network, and purpose that work provides—we’ll have to radically re-imagine how we conceive of the world of work.

“The American workplace was not designed to support a population with the age distribution of our future society,” says geriatrician Linda P. Fried, MD, MPH, dean of the Mailman School. “It’s time for us to reconceive our assumptions about employment across the life span and pursue changes at the societal level to help our whole population thrive.”

This means, in part, letting people work as long as they want. It’s not only good for their bank accounts (and the economy as a whole), it’s good for their health. In her research, Staudinger focuses on “positive plasticity,” the hypothesis that, due to biology, behavior, and socio-cultural factors, human development—including the aging process—is modifiable. In one study, conducted in the U.K., she showed that 70-year-olds today are smarter than their counterparts were 20 years ago. In other words, improvements in cognitive functioning are outstripping cognitive decline. In another study, physical exercise by adults over 60 was shown to “reactivate” the brain in areas related to cognitive decline, making it work faster and therefore more efficiently, like a younger brain. In another study, a literature review of the effects of work on health in older people, Staudinger points to research indicating that complete retirement is associated with increased illness, decreased mobility, and reductions in mental health.

The nature of the work we do matters as well, says Staudinger. Our brains seem to get a boost when we learn new things, she says, and a degree of novelty seems to protect cognitive function. “The more complex your job is across time,” she says, “the better protected your brain is from decline.” What, then, of the people whose careers span decades of labor in the fast-food industry or on an assembly line? In a series of studies, Staudinger and her colleagues have revealed the answer. Among people who were never promoted and whose income held steady, those whose tasks changed demonstrated greater cognitive fitness than those who performed the same task for the entirety of the 17-year study.
Employers and society as a whole stand to gain by using such research to accommodate and support the success of older workers, says Staudinger, whether by providing cross-training in multiple tasks or by allowing more flexible use of pensions so that people considering career changes or re-entering the workforce can pursue professional-development opportunities. It’s not particularly difficult, says the professor. “We just have to start doing it.” For evidence, she points to the Age Smart Employer Awards program, which is run by Finkelstein in partnership with The New York Academy of Medicine and funded by the Alfred P. Sloan Foundation. (When Finkelstein was senior vice president for policy and planning at the academy, she directed the Age-Friendly New York City initiative, which the International Federation on Ageing named “The Best Existing Age-Friendly Initiative” in the world in 2013.)

Recognizing that there are 700,000 workers in New York City aged 50 and older, the awards program researches and disseminates best practices for hiring and retaining older workers, and consults with businesses and nonprofits intent on attracting senior recruits. Each year, it honors employers whose policies and practices support their older workers—by offering flexible work schedules and settings, for example, and providing opportunities for training and skills development. This year, award recipients attended a reception during the Butler Center’s Age Boom Academy, a three-day seminar connecting journalists with experts on aging. “The best spokespersons [for the Age Smart awards program] are the employers and the older workers themselves,” says Finkelstein. “They bring the best practices to life.” Funded by the Alfred P. Sloan Foundation, the program is in its third round of applications from business owners.

And it’s not just working for pay that boosts well-being. Volunteering has also been shown to bring about positive health outcomes in later life. In the 1990s, Fried, who is the DeLamar Professor of Public Health Practice, developed Experience Corps, a novel, evidence-based public health program in which older volunteers serve in public elementary schools to support the academic success of the students. Designed as a mutually beneficial experience, the intergenerational program also promotes health among the older volunteers. Fried has tested the model (now called AARP Experience Corps and replicated in 24 cities) in a randomized controlled trial, which is ongoing in Baltimore, where the program launched. Preliminary results, published in 2004, exemplify what Fried calls a “win-win-win”: the students benefit from the social capital of the older volunteers, the schools benefit from higher student achievement and the calming effect of the volunteers, and the volunteers create a significant legacy while improving their mental and physical health. “Experience Corps demonstrated how life experience can be productively directed towards critical unmet societal needs,” says Fried. “Cities, in particular, present opportunities to introduce large numbers of volunteers to under-resourced school systems; fill classrooms with diversity, knowledge, and the hard-
won lessons of longer lives; and honor a community’s commitment to securing its children’s futures.”

John W. Rowe, MD, the Julius B. Richmond Professor of Health Policy and Aging, is so convinced of the benefits of volunteering that he’s called it “the next great public health opportunity,” on a par with quitting smoking. A member of the Butler Center faculty, Rowe has championed the idea that optimal aging combines the absence of disease and the maintenance of brain and body function with a third element: active engagement with life. Like many healthy habits, he says, volunteering should begin early, and employers should promote arrangements that allow their workers to give back to the community. Further, physicians should routinely check their older patients’ “volunteerism level,” just as they check their temperature and blood pressure.

Rowe also chairs the MacArthur Foundation’s Network on an Aging Society, which aims to help policymakers craft solutions for a country in which there will soon be more people over the age of 60 than under the age of 15 and in which 76 million baby boomers will have reached retirement age by 2029. While it’s worth weighing whether Social Security and Medicare are sustainable, says Rowe, we should also be addressing such societal issues as worsening economic inequality and the civic damage it’s causing, the impact of technology, and how changes in the family—fewer or no children, longer lives, geographic distance between members—are compromising its traditional supportive role.

“When it comes to work and aging and health, we cannot only talk about one story,” says Staudinger. “There is great variability among people, depending on what their histories were up to that point.” While eligibility for Social Security is unaffected by gender, race, and educational attainment, those factors have a powerful influence on the number of years we live after retirement—and whether we live long enough to retire at all. “The number one investment in aging well is being well educated,” says Finkelstein. “It is in the gaps in education that you’re finding the gaps in well-being, earnings, longevity, and wellness in later life.”

Together, work by Finkelstein, Staudinger, and their colleagues offers the beginnings of a blueprint for optimizing our longevity—what Fried calls “a new third stage of life”: engage the mind, engage the body, engage with others. If our society is to make the most of increasing life spans, we must also realign social structures—from making Social Security more flexible to growing a robust geriatric workforce to re-engineering our cities, where 80 percent of us live—with the new demographic reality. “What being old is, is changing really fast,” says Finkelstein. “There is no ‘the’ answer. It’s a big, complicated puzzle that needs to be thought about at all levels simultaneously.”

“IT’S TIME FOR US TO RECONCEIVE OUR ASSUMPTIONS ABOUT EMPLOYMENT ACROSS THE LIFE SPAN.”

SARAH BALDWIN covers science and medicine from Providence, RI. Her personal essays have been published in Cargo, Rumpus, and Salon.
BEYOND GOOD INTENTIONS
EDUCATING FOR EMPATHY
BY MERIL CULLINAN

For as long as there have been people aspiring to change the world, there have been do-gooders who, despite the best of intentions, screw up.

Schools are built in communities without teachers. High-tech medical equipment is donated to rural hospitals without a steady power supply. T-shirts are sent abroad to communities lacking not clothes but jobs.

Brena Sena, MPH ’14, saw the gap between local needs and outsider interventions firsthand in her home country this past year. A researcher and freelance reporter from Brazil, Sena was struck by the disconnect between conditions on the ground and advice from local and international officials as the Zika virus made global headlines. “Don’t get pregnant,” they urged women in Latin America. But for poor women throughout the region, affordable, reliable birth control is often out of reach. “The CDC and the WHO talked about choice,” says Sena, “but poor women here, they don’t have choice.”

The U.S. Centers for Disease Control and Prevention and the World Health Organization had good reason to sound the alarm: Zika infection among pregnant women has been tied to birth defects. And yet, says Sena, “they have made recommendations that are unrealistic to the context, the reality of the situation here.”

THE POLITICS OF POWER

For public health practitioners, context is king. Effective community collaboration emerges in relationships that feature a strong foundation of cross-cultural empathy, the capacity to build trust, and a deep understanding of power dynamics—skills that few students have mastered on day one of their public health training.

That’s why the Mailman School developed “Self, Social, and Global Awareness” (SSGA), a series of workshops and events designed to help students explore and discuss privilege, power, and identity; recognize their own relationship to these and related issues; and increase their cultural awareness. Every new student participates in SSGA, and by the end of 2017, every faculty member will also have done so.

One element of the program is a viewing and group discussion of Chimamanda Ngozi Adichie’s 2009 TED talk “The Danger of a Single Story,” in which the Nigerian novelist warns against oversimplification. Individual identities, she notes, are more complicated than a country of origin, skin color, gender, or socio-economic background. “It is impossible,” says Adichie, “to engage properly with a place or a person without engaging with all of the stories of that place and that person.”
COMMUNITY COLLABORATION FIRST

The danger of a single story is especially prevalent when people travel abroad with grand intentions to cure the world’s ills. The popularity of “voluntourism” has led increasing numbers of civic-minded travelers to low-income communities, laden with high-tech supplies but minimal training for fieldwork. After a few weeks—or just days—they head home feeling good but having failed to make a long-lasting impact.

Bucking this trend, the field of public health aims to put community partnerships first. Local organizations furnish a deep knowledge of the target area’s history and culture, as well as the people’s health needs and goals, while public health professionals supply technical expertise. The synergy fuels sustainable change.

“In the field, it’s not, What can we do for you? it’s, What can we do with you?” says Vice Dean for Education Julie Kornfeld, PhD, MPH. “The most critical component for our students is the partnership with organizations on the ground, where they see what community stakeholders are trying to accomplish and work alongside them.”
Fieldwork is required by the U.S. Council on Education for Public Health for all MPH degrees. At the Mailman School, most students complete a three-month practicum between their first and second years of study; those in the global health track spend six months abroad. The projects vary, depending on students’ interests and the technical skills they can offer, but each develops in response to the leadership of local partners.

“A student’s practicum project must not only benefit our partners in the community but really be defined by the needs and priorities of the host organizations and agencies,” says Linda F. Cushman, PhD, associate dean for Field Practice.

It’s a philosophy—and a responsibility—central to the field of global health. Anaise Williams, MPH ’17, spent her practicum in a Sudanese refugee camp in eastern Ethiopia, helping the International Rescue Committee evaluate a program designed to empower adolescent girls and prevent gender-based violence. “A Mailman professor told us that

WHEN YOU GO INTO THE FIELD YOU SHOULD ALWAYS THINK OF YOURSELF AS A STUDENT—NOT AN AID WORKER, RESEARCHER, OR DONOR—NO MATTER HOW OLD YOU ARE,”

says Williams, who learned about cultural norms and context through friendships with her locally based co-workers. “You are a student ready to learn from the people you want to work with,” she says, “to learn what they see as their greatest needs, and to learn how you can best use your resources to help them get to where they want to be.”

The Office of Field Practice manages field sites around the world, working with agencies large and small to identify projects where public health students can speed progress toward the host organization’s vision. Alongside their partners, Cushman and her team help supervisors and students set project goals and objectives; they also coach students on professional conduct in a community setting and evaluate projects after students return home.

“Students may come here because they want to change the world, and that’s good—we want to bottle that passion—but we also want to train them to do it in ways that create sustainable change,” says Kornfeld. “It’s not enough to want to do good: It’s about building the skill set to do good in meaningful ways and, in collaboration with local leaders and organizations, bring the science of what works in public health to communities.”
To raise awareness of food insecurity issues in New York City, this past winter a coalition of student groups organized the Mailman School’s first SNAP Challenge. For four days in March, participating students and faculty stuck to the same budget as someone relying on the federal Supplemental Nutrition Assistance Program, commonly known as food stamps.

For Janice Desmangles, MPH ’17, a crucial component of the event was to spur action: “We weren’t just ‘trying out poverty,’” says the historian for the Black and Latino Student Caucus, who notes that several of the organizers grew up on SNAP. “A lot of us know what it’s like to live on this budget every day, to deal with food insecurity, to come from and live in a food desert. We want to challenge ourselves to go beyond this experience and get involved with these issues in the community.”

Born and raised in Philadelphia, Ashley Gripper, MPH ’17 (pictured below, left), president of Food Policy and Obesity Prevention (FPOP), worked at a nutrition-education organization in her hometown before enrolling at the Mailman School. In her coursework—including her practicum helping to develop a housing project in an area of Brooklyn hard-hit by Hurricane Sandy—Gripper is exploring connections among healthy eating, public health, and urban planning. “As public health professionals, a lot of us will work in low-income communities ‘teaching’ people how to be healthy,” she says. “But if we don’t have any insights into how hard that is on food stamps, how can we effectively help them learn how to change?”

Students shared online support as they posted advice, photos of meals, and thoughts about their experience on Facebook. Some lamented the repetition in their diets, others discussed the difficulty of strategic menu-planning, and nearly all acknowledged how much harder it would be to prepare healthy meals on $4.16 a day if they worked multiple jobs or had children to feed.

At the end of the challenge, participants gathered to reflect on their experiences and brainstorm about future actions with local hunger organizations. As Gripper has learned by organizing events in Washington Heights, community work starts with trust. “It has to be mutually beneficial—you learn from the community, they learn from you—you exchange knowledge, skills, experiences, wisdom,” she says. “It all boils down to building relationships with commitment, consistency, and hard work. That’s so fundamental for public health, no matter where you work.”

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Staff writer **MERIL CULLINAN** manages the Mailman School’s social media channels; she has also worked at Oxfam America and the United Nations Foundation.
Knock on a stranger’s door. Offer a warm smile and a freshly baked pie and there’s a good chance you’ll be invited inside. Explain that you have run over the family pet and you’ll probably get a far cooler reception.

And if you ask to test the whole family for HIV . . . what then?

The answer is beginning to emerge from the first three sub-Saharan nations participating in the Population-based HIV Impact Assessment (PHIA) Project, a five-year, $125 million dollar survey funded by the U.S. President’s Emergency Plan for AIDS Relief (PEPFAR). Led by ICAP, the Mailman School’s global HIV/AIDS center, the PHIA Project is deploying more than 1,000 field-workers to knock on doors in 13 countries hardest hit by AIDS to prepare Africa for a new era—one in which access to HIV treatment is radically altering the trajectory of the epidemic.

ICAP is no stranger to the front lines of the war on HIV in Africa. Beginning in 2003, Wafaa El-Sadr, MD, MPH—the Mathilde Krim-amfAR Professor of Global Health and founding director of ICAP—led global efforts to provide antiretroviral treatment for pregnant women and their newborns, a program that marked the first glimmer of hope for the HIV-ravaged continent.

More than a decade later, the magnitude of the epidemic in Africa still strains the imagination. The sub-Saharan region comprises just over 10 percent of the world’s population but 70 percent of those infected with HIV. The nation of South Africa accounts for one-fifth of global HIV infections; in Swaziland and Lesotho, one in four people lives with HIV.

The PHIA Project, conducted in partnership with the U.S. Centers for Disease Control and Prevention (CDC), will illuminate the epidemic in participating countries so that officials can identify and deploy resources to tailor treatment and prevention efforts. “When one thinks about what needs to be done next, it’s daunting,” says El-Sadr. “The countries need this information in order to fine-tune their response in a time of constrained resources.”
In the U.S. and Western Europe, the epidemic has affected distinct populations, such as men who have sex with men, sex workers, and people who inject drugs. In much of Africa, HIV prevalence is far greater in the general population, a distinction reflected in the design of the PHIA Project.

For years, epidemiologists have used data from prenatal clinics in Africa to project infection rates based on the number of pregnant women who test positive for the virus. But critics contend that such models fail to capture HIV’s effect on the population as a whole. The PHIA Project aims to bridge that gap by collecting nationally representative data on HIV and its risk factors in select countries—Cameroon, Ethiopia, Ivory Coast, Kenya, Lesotho, Malawi, Namibia, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe, and Haiti—and building local capacity to monitor future progress in confronting the epidemic.

“COUNTRIES NEED THIS INFORMATION IN ORDER TO FINE-TUNE THEIR RESPONSE.”

Jessica Justman, MD, the PHIA Project’s principal investigator and senior technical director at ICAP, sees the effort as a turning point in the fight against HIV and she has set her sights high. “Prevalence is the percentage of people living with HIV,” says the associate professor of medicine in Epidemiology, “and that number alone doesn’t provide a complete picture.” Accordingly, the PHIA Project is assessing HIV prevalence and the rate of new infections and whether people with HIV have viral load suppression, a measure that would have been discouraging even five years ago.

Because of the increasing access to HIV treatment in PEPFAR-supported countries, researchers expect that higher levels of viral suppression are already being achieved, reducing each individual’s capacity to transmit the virus to others and saving millions of lives. “The ‘e’ in PEPFAR stands for ‘emergency,’” Justman says. “In the early days, it was imperative to roll out treatment and keep people alive. Now that PEPFAR has been in place for more than ten years, it’s important to take the time to understand the state of the epidemic. Without this evidence, neither individual nations nor donors will know what progress is being made or where to focus energies.”

Beth Tippett Barr, DrPH, directs the CDC’s activities in Zimbabwe, one of the high-burden countries the federal agency has vowed to help focus and refine their national HIV programming. The PHIA Project will be critical to achieving that goal, she says. “This survey will provide vital details about the breadth and depth of access to and uptake of HIV services,” says Barr, “to identify under-reached populations, as well as geographical or occupational groups in need of outreach services, and guide the further tailoring of HIV programs to have a more effective reach.”

Designed to roll out sequentially, the PHIA Project hints at the scale of HIV in Africa. By the time the final household visit is completed, the survey will have reached nearly half a million people, with about 15,000 visits in each participating country. Surveys have already been completed in Malawi, Zambia, and Zimbabwe and are underway in Lesotho, Swaziland, Tanzania, and Uganda.

In each country, knocking on the doors of 15,000 households is, relatively speaking, the easy part. Large-scale community outreach began in 2015, with a combination of print and digital media, radio spots, meetings with community leaders, and public events. Roll-out follows a meticulous schedule: A few days before household visits begin, teams wearing brightly colored PHIA Project T-shirts distribute posters that introduce the survey’s goals. The day before survey teams make contact, a mobilization team personally alerts every household in selected districts that they may receive a visit. At homes randomly chosen for participation, the assessment team provides extensive information on the PHIA Project and requests consent, first from the head of the household and then from each of the other household members. And before the first drop of blood is drawn, staff meet privately with every consenting adolescent and adult family member to assess their knowledge and attitudes about HIV.

Then the test.

Participants receive test results within minutes after their blood has been drawn. Those who are HIV-positive are also tested on the spot for their T-cell count and referred to nearby clinics for follow-up and to receive antiretroviral therapy if they are not already on treatment. When a child tests positive, survey staff give the results to a parent or guardian and explain the importance of taking the youngster to the nearest clinic as soon as possible. The majority of individuals test negative and receive counseling on strategies to prevent infection.

Despite the gravity of the conversations, popular feedback has been positive. “People like the convenience and privacy,” Justman says. “They don’t have to go to a clinic. They don’t have to wait on line. And they know it’s important.”

Stigma, which slowed the response 35 years ago when HIV emerged, is beginning to subside in Africa. Mobilization teams see the shift firsthand when residents of homes that are not selected ask whether they can take part in the survey, in hopes that something can be done to help people living with HIV under their roofs.
Given the extent of the PHIA Project’s ambition, as well as the challenging geographic terrain and number of regional languages in play, locally recruited mobilization teams are a core feature of the project’s design. Zambian community-health worker Anthony Nkole has years of experience conducting the kind of outreach on which the survey relies.

“After I’ve been welcomed in the house, I explain the survey,” says Nkole, who has already conducted more than 100 interviews. “I say, ‘You are free to ask questions and we’ll discuss them together,’ and it will flow from there. I tell them, ‘This survey will help improve HIV services for all Zambians.’” In more than a year on the job, Nkole says, he’s rarely encountered resistance. “Even in remote areas,” he says, “they’ve heard of HIV, they’ve heard of the survey, and they are glad they were chosen.”

Initial data from Malawi, Zambia, and Zimbabwe are expected late in 2016. Justman is hopeful that analyses will show progress toward the UNAIDS 90-90-90 global targets: 90 percent of all HIV-positive people aware of their infection, 90 percent of those who test positive on treatment, and 90 percent of those on treatment with effectively suppressed viral loads. By contrast, in the U.S., only about 30 percent of all HIV-positive people have effective suppression.

The PHIA Project’s potential is difficult to overstate. Millions of data points are being assembled on the effectiveness of treatment and prevention in 13 countries. A clear picture of the trajectory of each national epidemic will emerge, and planning, especially where incidence rates are higher than expected, will be reinvigorated. And due to the capacity-building efforts at the core of the PHIA Project, in every country, a cadre of public health specialists, survey coordinators, community workers, and lab technicians—all skilled in detailed population monitoring—can be tapped to perform other surveys.

Owen Mugurungi, MD, who directs the AIDS and TB unit within Zimbabwe’s Ministry of Health and Child Care, says the PHIA Project’s data could inform national efforts to eliminate HIV throughout sub-Saharan Africa and beyond. “By making regular HIV testing the norm,” he says, “we can turn the tide against this pandemic.”

HIV has emerged from the shadows. And what may be most important for the millions of people living with HIV in Africa is that open, well-informed conversations about testing, treatment, and prevention are now taking place in thousands upon thousands of households. 🌍

Mailman School Chief Communications Officer Peter Taback previously worked in global health and HIV/AIDS outreach, including posts at amfAR and the San Francisco AIDS Foundation.
COUNTING THE COST

LEAD POISONING EXACTS A HEAVY TOLL

BY SHARON TREGASKIS

WITH REPORTING BY TIM PAUL
ACROSS AMERICA, OUR AGING INFRASTRUCTURE THREATENS TO CRUMBLE.
It’s seriously un-sexy stuff: local power grids on the brink of a brownout; sewage treatment systems overflowing into local waterways; bridges, highways, and dams on borrowed time. In its latest report, the American Society of Civil Engineers calculated the cost of infrastructure fixes required by 2020 at a jaw-dropping $3.6 trillion. It’s a price so high, it’s tempting to ignore—until disaster strikes.

Take, for example, the lead water lines of Flint, Michigan. In April 2014, officials intent on cutting costs opted to draw water from the highly corrosive Flint River. The resulting chemical reaction exposed thousands to neurotoxic levels of lead, doubling the percentage of kids with elevated levels of the heavy metal in their blood. They risk reduced cognitive ability and executive control, lower lifetime earnings and poorer health, and increased likelihood of criminal activity.

In August, Health Affairs published a letter by Peter Muennig, MD, MPH ’98, associate professor of Health Policy and Management, totaling the social costs incurred by Flint in the debacle. “The city’s decision to switch its water supply was penny wise and pound foolish,” says Muennig, who puts the total at nearly $400 million.

“In an effort that would have saved approximately $5 million, the city of Flint will suffer losses 80-fold greater.”

Muennig ran the numbers in response to an analysis of our nation’s haphazard drinking water infrastructure—also published in Health Affairs—penned by David Rosner, MPH, PhD, the Ronald H. Lauterstein Professor of Sociomedical Sciences and author of Lead Wars: The Politics of Science and the Fate of America’s Children.

“Many policymakers consider the costs of action primarily in economic and financial terms, and ignore the costs of inaction on human health and communities’ livelihoods.”

To promote an apples-to-apples comparison that weighs such costs, health economists have developed two tools known by their acronyms—the QALY and the DALY. The quality-adjusted life year reflects the expenses associated with lost productivity and medical expenditures for ill health, while disability-adjusted life years account for health gaps reflected by premature mortality and years lived with disability. Perfect health equals one QALY. Death clocks in at zero.

When Muennig ran the numbers in a 2009 paper for JAMA Pediatrics—using the same methodology that undergirds his Flint analysis—he calculated a savings of 2–4 million QALYs and more than $1 trillion in lifetime contributions by each cohort of children in the United States below the age of 6, if their lead exposure were aggressively reduced. The city of Flint has already spent $2 million to replace approximately 500 water lines; the cost of replacing all of the city’s hazardous lines is estimated at $55 million, a mere fraction of the costs of lost health and productivity of Flint’s children.

Running the numbers can help policy makers from China to Chile, says Muennig, whether accounting for increased physical activity related to a high-speed rail between Beijing and Shanghai or weighing the benefits of reduced air pollution due to an underground highway in Santiago. He argues for a similar approach in Flint and the dozens of other cities with aging water systems. “When you consider all of the costs, the price tag for replacing these pipes is a bargain.”

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Price Point

Author Miriam Laugesen Follows the Money

In November, Harvard University Press will publish Fixing Medical Prices: How Physicians are Paid. The 300-page tome is the result of a decade-long inquiry by Miriam Laugesen, PhD, associate professor of Health Policy and Management, into the subtle influence of physician organizations on federal reimbursement schedules for medical services.

In prose lively enough to keep a lay audience turning the pages, Laugesen digs into why medical care in the United States costs more than anywhere else in the world and how 1989 legislation meant by Congress to promote primary care and improve population health nationwide has been subverted.

The book takes as a starting point a 2007 encounter between the author and her internist neighbor, who bemoaned low reimbursement rates for primary care. The physician’s comments sparked Laugesen’s investigative passion and in 2011 she published her first paper on the subject in the journal Health Affairs with Sherry Glied, PhD, a longtime professor of Health and Policy Management who is now dean of New York University’s Robert F. Wagner Graduate School of Public Service.

In that preliminary paper, Laugesen and Glied compared fees paid by public and private insurers for primary care office visits and hip replacements in Australia, Canada, France, Germany, the United Kingdom, and the United States. Their analysis revealed that disparities in fees—not practice costs, volume of services, or tuition expenses—were responsible for radically higher prices here in the U.S.

In Fixing Medical Prices, Laugesen picks up where earlier works left off, with a deep dive to the heart of the U.S. medical pricing process. She zeroes in on the role of a largely unknown yet influential committee of the American Medical Association, comprised of specialists who so effectively dominate the system that Medicare adopts the vast majority of their recommendations as policy. In this work, the scholar explores how and why the AMA makes its recommendations and the secrets of its influence. Writes Laugesen: “Understanding how and why we value different medical services is a necessary step toward fixing our health care system.”

Cities for Tomorrow: Hosted by the New York Times at its Times Square Center, the daylong event brought together urban planners, architects, policymakers, and researchers, including Ruth Finkelstein, ScD, assistant professor of Health Policy and Management and associate director of Columbia’s Butler Aging Center, who appeared on the “Boomer Cities” panel alongside Richard Rosen, principal at Perkins Eastman, and Times moderator Ginia Bellafonte. “We need a world that works for all of us—not a parallel world for old people,” said Finkelstein, who called for fresh attitudes toward aging. “We need to reclaim oldness as experience, wisdom, as being workers, as being teachers, as being activists.”
The Heat is On

A three-day Health and Climate Colloquium, organized by the Mailman School and the International Research Institute for Climate and Society, took place at Columbia’s Lamont-Doherty Earth Observatory campus in June.

Acknowledging the achievements of COP 21 and the UN Sustainable Development goals, Keith Hansen from the World Bank affirmed in his keynote speech that climate change threatens to undo the health and development gains of recent years, potentially increasing the number of poor people by 100 million in the next 15 years. To stave off this outcome, he said climate science is urgently needed. “The work you do may be technical,” he said, “but it can be transformational.”

To spur such transformation, the Mailman School is leading the Global Consortium on Climate and Health Education. The first training is in October at the American Public Health Association Conference in Denver. Plans to offer online courses to train working professionals and other new audiences are also in the works.

Beyond Buzz

Big Data Hits the Books

For public health scholars without training in computer science, it’s no mean feat to leverage the power of big data. To help graduate students make the most of the data they collect, the Mailman School now offers Fundamentals in High-Performance Computing, a seven-week class offered for the first time in January 2016. “We’re in a Big Data era,” says Rebecca Yohannes, director of High Performance Computing and developer of the training program. “There is a lot of information out there, and to make sense of it, you can’t do that on a personal computer.”

To promote the best use of datasets, large and small, the Department of Biostatistics offers a consulting service, co-directed by Shing Lee, PhD, and Codruta Chiuzan, PhD, both assistant professors of Biostatistics. “If there is one piece of advice I can give people, it’s to include a statistician early,” says Lee. “If it is a badly designed study, there might be a bias we can’t undo at the end.”

Together with staff biostatisticians Jimmy Duong and Vivian Zhang, Lee and Chiuzan meet with health sciences investigators from across Columbia’s campus to formulate abstracts, rework rejected articles, or develop grant proposals. This past year, the group assisted researchers in Radiation Oncology to assess the accuracy of preoperative imaging for breast cancer patients as a tool for radiation therapy and with the Division of Pediatric Cardiology to select the right variables and methodology to evaluate a computer algorithm that uses MRIs to measure blood flow through a patient’s heart. “The motivation is simple,” says Lee. “We want to contribute to improving the science on campus.”

The “Care Tank”

Center for Healthcare Management

In June, the Mailman School’s Center for Healthcare Management hosted its fifth international forum to promote a new vision for the organization, financing, and delivery of healthcare. The two-day event in Berlin took a personal approach, barring Power Point slides and privileging face-to-face conversations. “We created a new, very interactive format,” says Katharina Janus, PhD, founder and director of the Center. “We call it a Knowledge Party, a dinner party with content.”

An adjunct associate professor of Health Policy and Management who also has a professorial post in Germany, Janus balances the needs of patients, providers, and payers in the work of what she’s dubbed the “Care Tank.” “My goal has always been to bring the best minds together, no matter where they come from,” says Janus, who has recruited members with professional backgrounds in healthcare delivery, academia, and industry. “The Care-Tank is a cross between a think-tank and a do-tank. It grew out of my past collaborations with people from very different organizations, from all over the world.”
In May, the Mailman School conferred more than 600 degrees earned by 21 doctoral students and the largest class of master’s students in the School’s history, including the first cohort to earn a Master of Health Administration, the School’s “healthcare MBA.”

In her address to the Class of 2016, Cecile Richards, president of Planned Parenthood Federation of America (pictured above, center), urged the graduates to be “the kind of troublemakers who change lives.” In a speech citing U.S. Rep John Lewis, birth control pioneer Estelle Griswold, Black Lives Matter, and the speaker’s mother, the late Ann Richards, governor of Texas, Richards saluted the graduates for their commitment to change. “You could’ve let public health issues in Flint, Michigan, or West Texas or sub-Saharan Africa be someone else’s problem,” she said. “But when you dedicated your life to public health, that’s not what you signed up for.”

In her remarks, Dean Linda P. Fried, MD, MPH, discussed the creativity required of public health advocates. “We are only successful,” she said, “when we allow our thinking to evolve, fearlessly exploring new avenues that others haven’t tried or didn’t even know were on the map.”

Echoing Richards’ speech, student speaker Arielle Juberg, MPH in population and family health, reflected on the power of collaboration to affect positive change. “Our class has had the privilege of learning from professors and mentors who joined with others to confront injustices and disparities,” she said. “Their examples—working in the Civil Rights Movement, fighting for the rights of HIV-positive women, and advocating for environments free of lead and other toxins—inspire us.”

Fried presented Richards with the Mailman School of Public Health Visionary Leadership Award. Austin Montgomery Coe, of the Graduate Student Association, presented Martina Pavlicova, PhD, associate professor of Biostatistics, with the Teaching Excellence Award, and Joseph Graziano, PhD, interim chair of Environmental Health Sciences, with the Core Teaching Award. (Pavlicova was also the recipient of a University-wide Presidential Teaching Award.)

At an earlier event, Fried recognized Outstanding Teaching Award recipients Katrina Kezios, a doctoral candidate in Epidemiology, and Ramael Osasogie Ohiomoba. Coe received the Campbell Award for “exceptional leadership and Columbia Spirit,” and Juan Manuel Flores received the John and Kathleen Gorman Public Health Humanitarian Award. An additional 36 students received awards in 24 categories for departmental distinctions.

The ceremony concluded as Fried led graduates in the Oath for Public Health Professionals, starting with the declaration, “Health is a human right.”
In *Prison Dogs*, documentarian Perri Peltz, MPH ’84, follows a cohort in the non-profit Puppies Behind Bars, which houses Labrador retrievers with inmates who train the dogs to work as service animals for disabled veterans. “The process is transformative,” says Peltz, who calls the 72-minute film a story of redemption, love, and hope. “It’s about the relationships that form among the men, the puppies, and the veterans who ultimately benefit.”

While only half of the pups in the film graduate to careers as service animals, most of their trainers — like most people in prison — return to society. For former inmate Jon Rivera, Puppies Behind Bars was a chance to acquire new credentials, including certifications as a dog groomer and a dog trainer. “He’s working doing both of those things,” says Peltz. “He’s got housing and family, a way to sustain himself, and he’s happy.”

For Peltz, who is also pursuing a DrPH in Sociomedical Sciences at the Mailman School and serves on its Board of Overseers, *Prison Dogs* is the latest production in a 25-year career dedicated to telling the stories behind public health statistics. An alumna of *Dateline NBC*, ABC’s *20/20*, and CNN, Peltz has worked as an anchor, a director, and a producer, covering topics from alcohol abuse to the war on poverty.

In *A Journey of a Thousand Miles: Peacekeepers*, she follows Bangladeshi women on assignment in Haiti for the United Nations; her short films for *The New York Times* Op-Docs series “Conversations on Race” explore identity in America. *Prison Dogs*, which made its premiere at the Tribeca Film Festival in April, was filmed at the Fishkill Correctional Facility in upstate New York. “So many of these issues are pressing, and they don’t get the time and attention I feel they deserve,” says Peltz, who currently hosts two radio programs — on women’s health and on medicine in the media — for SiriusXM.

“All of us in public health need to do a better job of communicating to the public.”

To command attention, especially when the material is complicated or painful, Peltz seeks out compelling characters grappling with issues she hopes her audience will explore. In her 2011 HBO documentary *The Education of Dee Dee Ricks*, Peltz chronicles a woman’s journey from breast cancer diagnosis to survivorship. Along the way, the film’s eponym — a Manhattan financial consultant and philanthropist — contends with the disparities in care encountered by women who share her diagnosis but not her socio-economic status, and ultimately embraces a new career as an advocate for access to affordable, high-quality healthcare.

Committed to making such stories widely available, Peltz and editor Geeta Gandbhir formed the joint production company G2P2 Films to pursue their shared passion for social justice. “Perri’s deeper understanding of public health helps us to find angles,” says Gandbhir. “She knows what to ask and what to focus on so that a larger audience can understand the complexities of the issues.”

Peltz’s knack for finding a compelling angle came in especially handy when the pair turned their gaze to the American prison system. “The United States incarcerates more individuals than any other country, and our prison recidivism rates are sky high,” says Peltz. “We wanted to showcase prison reform in a very specific program so people can focus on the problem.”
Leaders

Fan Fiction

When Tribeca Film Festival co-founder Robert DeNiro announced that festival organizers had determined to drop the movie *Vaxxed: From Cover-up to Catastrophe* from their 2016 lineup, he had a champion in W. Ian Lipkin, MD, the John Snow Professor of Epidemiology and director of the Columbia Center for Immunity and Infection, whose own investigations have repeatedly shown no causal link between childhood vaccines and the risk of autism. “If *Vaxxed* had been submitted as science fiction, it would merit attention for its story line, character development, and dialogue,” wrote Lipkin in a *Wall Street Journal* op-ed. “But as a documentary, it misrepresents what science knows about autism, undermines public confidence in the safety and efficacy of vaccines, and attacks the integrity of legitimate scientists and public health officials.”

Law & Order

Students and faculty rallied on March 2 as the Supreme Court heard *Whole Woman’s Health v. Hellerstedt* and considered whether restrictions imposed on Texas abortion clinics constituted the kind of “undue burden” prohibited by the 1992 case *Planned Parenthood v. Casey*. Rally organizers included the Queer Health Task Force; SHAG, the Sexual and Reproductive Health Action Group; and students and faculty in the Sexuality, Sexual, and Reproductive Health Certificate program. Catherine Sokoloff, MPH ’16, was in the gallery as the Court heard arguments. “I was struck by the knowledge that, outside these walls, thousands gathered and exercised their constitutional right to demonstrate, while still more rallied in their cities and states around the country,” she wrote in an essay for the Mailman School website. “That day, the fight was over access and, ultimately, over choice.”

Museum Quality

This summer, Jeffrey Shaman, PhD associate professor of Environmental Health Sciences, partnered with the American Museum of Natural History to swab the tongues, noses, and hands of visitors to the exhibit “The Secret World Inside You,” all about the human microbiome. The experiment is part of a larger study meant to shed light on respiratory viruses and how our immune system responds to them. “While we all suffer from colds and flu, we still know very little about their transmission dynamics,” says Shaman, who develops computer models to forecast outbreaks of influenza and Ebola and will use the data collected at the museum to enhance their predictive value. The work is of great interest to the Department of Defense, which funded the study. “The military has always been interested in infectious disease, and for good reason,” says Shaman. “In the history of the U.S. military, more people have died from infectious disease than from combat.”
The Google Method

Mailman School epidemiologists have developed a novel method to assess how the streetscape affects a pedestrian’s risk of injury. Using Google Street View, the investigators assessed the pedestrian environment at more than 500 New York City intersections. In the resulting American Journal of Public Health report, the authors reveal that intersections with more pedestrians had a lower risk of injury per pedestrian and that more injuries occurred in contexts with visual distractions, such as billboards and bus stops. “The Google Street View approach to conducting ‘virtual’ neighborhood inspections does away with the need for field teams to conduct in-person audits,” says Andrew Rundle, DrPH, associate professor of Epidemiology, who led the project. “To our knowledge, virtual audits have not previously been used to assess risk factors for pedestrian injury.”

Moving to the Music

A pop song with sunny Afro-jazz beats and a catchy jingle is making the case across Zimbabwe for ICAP’s Population-based Impact Assessment (PHIA) Project, a survey to measure the effect and reach of HIV programs. To lead musical production, ICAP approached Albert Nyathi, a Zimbabwean poet, musician, and activist, who recruited fellow artists. Together, they are the voices and faces of “Knock Knock Knock,” produced in English and eight languages native to Zimbabwe. “Many people are understandably reluctant to allow someone to come into their home and draw their blood,” says Jessica Justman, principal investigator for the PHIA Project and ICAP’s senior technical director. “The song makes it easier for people to understand why it’s important for them to participate.”

Book Smarts & Beyond

Since 2013, the free, after-school program BridgeUp—funded by the Helen Gurley Brown Trust and hosted by the New York Public Library, has offered kids in grades 8 to 10 from low-income families mentorship and enrichment activities meant to boost their academic prospects. This year, BridgeUp added Be Well, a health and wellness component created by Alwyn Cohall, MD, professor of Sociomedical Sciences, and his co-director at the Harlem Health Promotion Center, Renee Cohall, LCSW-R. “We want to get rid of the barriers between academics, youth development, and health,” says Alwyn Cohall. “If a young person gets pregnant or is so depressed that they don’t want to get out of bed, they’re not going to take advantage of all that BridgeUp has to offer.”
An Acquired Taste
Scholars Sink Their Teeth Into the Art of Persuasion

In May, the FDA issued its final rules on menu labeling and started the one-year countdown until grocery stores, convenience stores, and restaurants with more than 20 locations will be required to provide nutritional information for all prepared foods. Industry groups have been fierce critics of the guidelines—and they’ve done a much better job of making their case than did public health proponents, say James Colgrove and Rachel Shelton.

For evidence, they point to the campaigns waged by industry to humanize their concerns in the seven years since the rules were introduced in 2010 as part of the Affordable Care Act. This spring, with support from the Lerner Center for Health Promotion, the Sociomedical Sciences professors made a rhetorical analysis of public comments submitted to the U.S. Food and Drug Administration in response to the proposed regulation. In the process, they identified two divergent approaches to the debate. Public health used the language of social justice, prioritizing collective responsibility and cooperation, while industry emphasized the values of market justice, placing a premium on individual liberty and economic opportunity.

Key shortcomings that emerged in their analysis were public health’s seeming unwillingness to respond to industry, emphasis on academic data, and failure to humanize their case. While industry comments acknowledged the importance of health in the debate over menu labeling, public health failed to address industry arguments over financial and logistical burdens.

Public health pros favor scientific rhetoric, says Shelton, while industry wrote the book on lobbying lawmakers. In the meantime, how scholars should modulate their public messaging is becoming its own debate, one the Lerner Center for Health Promotion intends to win by coaching faculty in the art of public persuasion.
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