15 Years & Counting
9/11 effects persist

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.”
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.”

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.

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.”
Mind the Gaps

Severe obesity was associated with $69 billion in total medical costs in 2013. Nearly 11 percent of the tab—$8 billion—was paid for by Medicaid, ranging from a low of $5 million in Wyoming to $1.3 billion in California. Research led by Y. Claire Wang, MD, ScD, associate professor of Health Policy and Management, predicts these costs will only grow as Medicaid eligibility is extended to more people with ongoing implementation of the Affordable Care Act.

To slow the rise in obesity-related healthcare costs, states should identify effective obesity prevention and treatment services, ensure access for those who are eligible for Medicaid, and include obesity in policy discussions around state Medicaid expansions. Wang’s report appeared in the November issue of the journal Health Affairs.

“In the past, U.S. clinicians have been more comfortable treating obesity-related health consequences such as high cholesterol and hypertension than delivering counseling and treatment for obesity,” says Wang, who co-directs the Mailman School’s Obesity Prevention Initiative. “Filling the gaps is our challenge.”

Teen Risk Profile

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 post-doctoral 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 (CCCEH) 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 ’76, DrPH ’82, PhD ’12, founding director of CCCEH, 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.”