Philanthropist and New York City Mayor Michael R. Bloomberg has committed $350 million to Johns Hopkins University, anchoring a major initiative aimed at bringing significant innovation to U.S. higher education.

More: ow.ly/h9Ruw

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How do you celebrate 100 years of lifesaving achievements? What are the priorities for the next 100? Send us your ideas as we begin planning for the Bloomberg School’s Centennial in 2016: centennial@jhsph.edu.

Visionary Virologist

A virus causes cervical cancer? the concept intrigued Keerti Shah who began his revolutionary studies of the human papillomavirus in the late 1970s. In our spring 2013 issue, Shah and his protégés discuss past, present and future of HPV.

Photo by Chris Hartlove

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Cover photo: Suffering from heart disease, 50-year-old Nyati Sarkar ran out of a critical medication and died in her Hindu village in Bangladesh. Following custom, relatives placed tulsi (basil) leaves over her eyes.
(Photo: Shehzad Noorani/August 23, 2006. 8:30 a.m.)

Photos above: Christopher Myers (left) and Thinkstock
“IT WOULD BREAK YOUR HEART”

Science vs. experience in a cancer cluster investigation

Story by Brian W. Simpson, Beth Resnick & Patti Truant  Photography by Christopher Myers
Citizens united: Bob Roberson, Bill Krantz, Jim Krantz and Jennifer Peppe Hahn gather outside Fort Detrick’s Area B in central Maryland (December 11, 2012).
He calls it the best farmland in the world.

All around him, the dark soil of Central Maryland’s Frederick Valley rolls in meadows and hills over porous, fractured limestone.

On a late summer day as he stomps through grass and weeds along Shookstown Road in Frederick, Maryland, Bill Krantz says, “Take a look at the soybeans across the road. Look how big they are. You won’t see them that big in the Midwest.”

Krantz has spent most of his 79 years on the land. He swam and fished in the stream, listened to the bullfrogs croak at night, played in the shade of trees his granddaddy planted and baled countless tons of hay. Mostly though, he tended dairy cattle. “We didn’t go on vacation. We just milked,” he says.

At first glance, his pastoral Eden remains. The soybeans, the green hills and trees still stretch to the horizon, but history and geology offer a different reality. In 1944, as part of the war effort, the U.S. government claimed some of the Krantzes’ land as well as acreage from other families, dubbing it Area B. The 399 acres became part of the nearby Fort Detrick. The U.S. Army base, about 45 miles northwest of Washington, D.C., would become a center for biomedical research. From 1943 to 1969, work there would also include biological weapons development and testing.

The Krantzes occasionally glimpsed Area B’s research. They saw giant concentric circles cut into a field to measure the effect of the mysterious substances sprayed at the site. They remember smoke from burning pits rising above their houses at night. And Bill Krantz recalls the summer day in 1951 when some of his dad’s cattle suddenly died. (A recent Army report blamed an arsenic-based herbicide for the deaths of eight cows that August.)

Over the decades, Fort Detrick expanded, becoming a renowned research center and the county’s largest employer with 9,200 workers. While the base thrived, however, the Krantz family suffered repeated tragedies. Bill and his cousin Jim say that 13 of the 18 members of their extended family (in their 50s and older) were diagnosed with cancer. “My dad died of pancreatic cancer. My sister died of brain cancer. My wife died of ovarian cancer. My dog died—he was ate up with cancer. My cows had cancer. So they can’t tell me that they didn’t do something,” says Bill Krantz.

Jim Krantz points to the house Bill built in the 1970s (and lived in until his wife got sick) and two next to it and says an occupant of each had a rare blood disease. “Rare is not three in a row. Something caused that,” he says. “All three houses used well water.”

The Krantzes believe that the area’s groundwater was contaminated by the radiological materials, laboratory waste and drums of chemicals buried in Area B. An April 2012 EPA report noted that anthrax, phosgene (a poison gas) and radioactive carbon, sulfur and phosphorous were buried there. Agent Orange was tested on Area B as well. According to the EPA report, a 2004 Army effort to remove contaminated...
American Cancer Society estimates about one in two men and one in three women will develop an invasive cancer in their lifetimes.

When investigating a possible cluster, experts analyze data to uncover unusual cancer patterns. Do cases cluster in time and space? Are there more cases of a rare cancer than expected? Are cancers striking the young or otherwise healthy? Are there known carcinogens in the area? It’s a difficult task: Consider that it can take 20 or 30 years for cancer to develop after exposure. In the interim, an individual encounters innumerable other chemicals in water, air, their diet, the workplace and so on. “We’re starting at a scientific disadvantage,” says Burke. “For instance, if we have an outbreak of a foodborne disease, you can go to the refrigerators of people and see what they ate the night before. That’s not the case for 30 years ago when there may have been environmental exposure … that would lead to increased cancer incidence in a community.”

The difficulty involved is borne out in the scientific literature. Of the more than 400 investigations of perceived cancer clusters since 1990, only 13 percent found a statistically significant increase in the cancer rate, according to a 2012 article in Critical Reviews in Toxicology. And only one investigation found a clear cause. (That investigation found that “an excess in pleural cancers” in coastal South Carolina was due to asbestos-exposed shipyard workers.) And a CDC review of 108 investigations of perceived cancer clusters from 1961 to 1982 found that none could identify a cause, according to a 1990 American Journal of Epidemiology article.

Such long odds mean little to people like Carroll Rice, whose family, with deep roots in Frederick, has been decimated by cancer. Fourteen immediate family members have developed a rare form of leukemia, erythroleukemia. Thirteen have died from it. “In my way of thinking, if you’re part of our Rice clan, you gonna die with cancer,” Rice says. “It’s no question because all of the others have—with the exception of one. He had a heart attack.”

Rice says that the family’s cancer victims all descend from his grandfather, Charles “Tuff” Rice. They believe he developed the genetic mutation that’s been passed down through the family because he worked at Fort Detrick. Given the devastation visited upon his family, Rice is incredulous that the existence of a cluster is questioned, much less denied.

“Dammit, my family alone is a cluster,” he says.

Jennifer Peppe Hahn recalls long summer days playing in a natural spring in her friend’s backyard just east of Area B. From when she was a young girl until she got sick at age 12, Hahn and her friend splashed in the water, drank lemonade and invented adventures for their Barbies. They also may have been exposed to tetrachloroethylene (PCE) and trichloroethylene (TCE).

In 1997, the Army found that levels of PCE (a chemical solvent linked to breast, lung and other cancers) spiked at 20,000 parts per billion (ppb) in the spring though the level returned to less than 1 ppb a month later. (The increase may have been caused by nearby excavation work in Area B.) The EPA’s maximum contaminant level of PCE for drinking water is 5 ppb. Hahn thinks the chemicals were in the spring long before monitoring began. Had she been warned, she says, she might not have become sick.

Hahn, now 39, was diagnosed with...
The Way Forward

I vividly remember speaking with the parents of childhood leukemia victims in New Jersey in 1978. These were parents who lost their kids. They had a tremendous sense of loss, a tremendous sense of anger and suspicion about industry, about exposures, about things that may have contributed to that cluster.

At my first public meeting, there were hundreds of people jammed into this grammar school auditorium. As I began to say what we would do, a woman stood up and said, “Mr. Burke, I don’t care what you’re going to do. You’re never going to bring my baby back!” It stopped the meeting. She stormed out crying.

Having been in a family where there have been people I love who died, I can understand the human part of that, but also had to be an epidemiologist, a scientist responding to communities.

We have to have a way to scientifically move forward. What we can do is do the best investigations possible so that if we identify risk factors, we reduce the risk for future children, so they won’t be lost. And that’s the promise of the future. We won’t turn away from these things. They’re difficult, and they’re gonna be really, really challenging but we need to continually improve our science so we can do better, understand the causes and prevent these tragic losses.

Thomas Burke, PhD, MPH, associate dean for Public Health Practice and Training at the Bloomberg School, worked for 13 years with the New Jersey departments of Environmental Protection and Health.
The long-awaited October 2011 report from DHMH and the Frederick County Health Department (FCHD) found that there were no statistically significant increases in specific types of cancer within 1 mile of Fort Detrick—except for lymphoma. Rates for lymphoma near Fort Detrick were higher than Maryland’s rates, but not higher than Frederick County’s, she says, adding that lymphoma rates will continue to be scrutinized as new data become available.

Few in the community were satisfied. “It is the saddest thing I’ve ever witnessed. You’ve got the state of Maryland trying to put together evidence that there is no cancer cluster,” says White. “I think it’s all smoke and mirrors to protect their ass. I think there’s a day of reckoning coming because the citizens of Frederick are tired of the song and dance, the pony show.”

Mitchell understands people’s frustration. They want to know if a specific exposure caused the cancer that’s afflicted them, and he can’t say for sure. “Sometimes it might be a family that has a genetic risk. Sometimes it might be that they are people who are very long lived and so they might have died of other causes, but they didn’t. … And after a while nature takes its course—something happens, and oftentimes that’s cancer,” says Mitchell. “At the end of the day, I can’t answer the question, ‘Can you promise me that this wasn’t an environmental exposure?’ What I can say is, this is what we know, this is what we don’t know. And I have to admit the limits of my own knowledge.”

From the front porch of his hilltop house, Bob Roberson can see Area B. The view may be idyllic, but Roberson is worried about what is below the ground, what chemicals may taint the groundwater and make their way into his home’s 500-foot deep well. He says the Army has tested his well water and deemed it safe. Roberson has his doubts, but he drinks it.

“I just hope the day doesn’t come when something down there gets out and we all regret that something wasn’t done before. I firmly believe that’s a possibility, and I don’t want to see that happen,” he says.

He was disheartened by the cluster investigation, but he continues to meet with Brookmyer and other TAC members. They are launching a case control study that compares cancer incidence among former students of an elementary school near Area B with those from another school farther away. He’s not optimistic. “I don’t think there’s ever going to be an answer of, yeah, Detrick caused these cancers,” says Frederick resident Bob Roberson.

In March 2012, a National Academy of Sciences committee essentially agreed with Roberson in its review of the cluster investigation and a 2009 report on Area B’s groundwater by the Agency for Toxic Substances and Disease Registry. The committee found there was simply not enough historical data on exposures and cancer incidence to determine whether or not people’s health was harmed by toxins from Area B’s groundwater. Given that lack of data, the experts said, additional studies “would not be useful.” DHMH and FCHD, meanwhile, will continue to examine lymphoma and total cancer rates in Frederick as more recent data are added to the Maryland Cancer Registry.

Existing data may not be conclusive for government experts, but personal experience suffices for Bill Krantz. He bitterly recalls his family’s and his neighbors’ losses. “I’m telling you they’ve lost their families and their loved ones and their children. To see this happen, and I did, it would break your heart,” he says.

As he walks among the high grass on the land his family once owned, Krantz mulls over the past and future at the same time. “You can’t bring people back to life, your loved ones. You can’t do that. And how many more are going to die, I don’t know.”

Editor’s note: This article is based on research conducted for “Fort Detrick, Maryland: A Case Study of Disease Cluster Investigations,” by principal investigator Beth Resnick, MPH; MPH student Brian W. Simpson; and PhD student Patti Truant, MPH.
When I received the invitation to contribute to this magazine on the topic of death, a flurry of ideas came... and went.

As a clinician and a public health grad, I could have written about health care, death and dollars. All tired topics, all underwhelming. So I decided not to write anything at all.

Until this morning.

I live on a small farm in Maryland with my girlfriend and two dogs. During their early morning walk, the three of them spotted a badly wounded buck inside our field. (For readers abroad, buck is the American term for male deer.) His hind leg had been mangled, likely by a car. He was in pain and terrified. The dogs were beside themselves, overwhelmed by curiosity, territorialism and the smell of blood.

I was urgently summoned to help contain the dogs and deal with the buck. Grabbing my field jacket and cowboy gloves while still in my pajama pants, I marched with total detachment and strong determination (indispensable personality traits for surgical types like myself) toward the far end of the field to assess the situation. I was convinced it could not possibly be as bad as my girlfriend was describing it. I was wrong.

Wounded, trembling, exhausted and with labored breathing, the poor animal raised himself, wobbling back and forth from one end of the field to the other, with me in comic pursuit on the slippery, frosted grass. It was clear the deer needed to be corralled somewhere before we could decide what to do.

Once cornered in the most remote area of the field, the desperate buck looked at both of us and made a final run for the fence, managing to get his head and single antler trapped in the railing. Gently, while leaning my body against his to prevent further damage—to him or us—we lassoed and disengaged his head. Then we walked him like a dog on a leash for a few yards before he fell to the ground, unable to get up.

That’s when the discussion started. I should clarify that my girlfriend has been an orthopedic surgeon for many years, and I have practiced cardiac surgery most of my professional life, so we have strong opinions and a good understanding of what is fixable. She argued for euthanizing him. I contended—I have no idea why, because she was right—that given a safe place, water, wound care and antibiotics, perhaps he could be saved. Obviously, I was no longer objective.

The argument continued, with the buck still lassoed on the ground, until I heard myself saying in a self-delusional but nevertheless convincing tone: “I will not kill this animal as long as there is hope for him to recover.”

Then I added: “He must be thirsty after all the struggle so at least let me get some water before I decide what to do.”

My girlfriend, now late for an appointment, had to leave. Meanwhile, I grabbed a shallow container at the house and collected water from the nearby creek.

When I got back, I realized the deer’s condition had deteriorated. His breathing became faster and deeper. Then it stopped. I stood beside him, in my pajamas, with a water container in my hand, watching life come to its end, feeling awful about my inability to do something else for the beautiful young buck with one antler, on the far side of the field.

It struck me then how often I found myself in similar situations, standing by a patient, in my surgical pajamas, watching life slip away, feeling awful about my inability to do something else; maybe one more drug, one more test, one more procedure.

I couldn’t help thinking that perhaps when my own end is near and inevitable, all I really want, all I will really need is a compassionate human being to order one less test, one less procedure, while taking the time to stand by me and help me take that last sip of water before I die.

Marcelo Cardarelli, MD, MPH ’06, is the former director of pediatric cardiac surgery at University of Maryland and scientific advisor to a health information technology company. He lives in Lutherville, MD.

Read on: More than two dozen alumni responded to a magazine challenge and contributed remarkable essays and poems about death and life. magazine.jhsph.edu/extras.
Demographer Vladimir Canudas Romo uses beautiful equations to study living populations.
VLADIMIR CANUNAS ROMO, PHD, is a glass-half-full kind of guy. Demographically speaking, at least.

In certain research circles, a debate rages about whether well-to-do humans living in places like Japan, France and the U.S., where life expectancies have been increasing dramatically for the past century and a half, can keep on living longer and longer. Isn’t there a limit?

Some mortality forecasters say there is; in fact, they warn that Americans’ life expectancy will decline. The reason: obesity. “Me, I’m less confident that the obesity epidemic will have such a fast and clear-cut impact in producing a decline in life expectancy,” says Canudas Romo, a demographer, an assistant professor in Population, Family and Reproductive Health at the Bloomberg School and an associate professor at the University of Copenhagen. “I think life expectancy will keep inching up; maybe at a slower rate, but still increasing.”

Why are you optimistic about our life expectancy rate?

There’s nothing modest about the life expectancy increase over the recent past: In 160 years, average life expectancy moved from levels of around 40 years—where it was for a long time throughout the ages—to above 80 in the U.S. and above 86 in Japan. That’s an increase of 2.5 years per decade in Japan and slightly less for the U.S. Why should it stop suddenly?

Give us some historical context in terms of life expectancy.

If we go back to about halfway through the 19th century, there were some fundamental developments in public health, medicine, economic development, nutrition, education and household conditions. Those changes had a major impact on the health of whole populations. And by health, I mean less death.

Is the big increase in life expectancy in the last 160 years attributed to reduced child mortality?

The first “big steps for humanity” occurred when child and infant mortality started to reduce, and the demographic and epidemiological transitions started their long road of change.

For developed countries until the 1950s, changes in infant mortality were the main reason [behind] the life expectancy change. Today, improvements at older ages [are why] we keep gaining years of life. For many developing countries, reducing infant mortality will give them many extra years. A population that has a life expectancy around 40 is actually divided into two big groups: those that die in the first years of life and those that not only make it to 10 but will likely reach a life span of around 70.

Can you explain the gender gap in life expectancy?

Life expectancy for females is probably about four to five years higher than that of males. Japanese females—who live, on average, longer than anyone else—have a life expectancy of 86.5, compared to Japanese males, at 79.5.

It was just recently, probably in the first decade of the 21st century, that life expectancy for females passed that of males in every single country in the world. In some countries, female life expectancy had been lower than, or about the same as, that of males. Indian females, for example, passed their male counterparts in terms of life expectancy in the early 2000s. But still, if you go to certain Indian states, there is higher mortality among females than males at ages below 5. Biologically it would be hard to explain [that] since in other populations, females have lower mortality at every single age compared to males. Are we then observing some sort of sex preference for boys over girls in terms of care of children under 5? Life expectancy aggregates all the mortality information. So even though there are certain ages in India where females have not surpassed males in terms of survival, life-expectancy-wide they have.

Tell us about another pivotal moment in demography.

In terms of mortality alone, it was an exciting moment when the United Nations declared it wouldn’t put any more ceilings on life expectancy projections. It may not seem groundbreaking to many, but for demographers like me who are called to look at projections of populations, it made us realize a few things. Among them was that life expectancy has been very badly predicted, and so too future population.

What do demographers base their predictions on?

We look at mortality, fertility, population growth, migration, mathematics and change. Permanent change. Demography is a moving target. To study it, we use lots of mathematical methods and beautiful equations.

Tell us about a project you’re working on now.

I come from Mexico, and one of the things that interests me is how many years of life expectancy have been lost due to violence resulting from almost a whole decade of tragic atrocities. Many of these deaths are among young people, so also, I wonder about how much of the workforce in Mexico has been lost because of violence.

You teach a course in mortality. What do your students learn?

Mortality is probably the best predictor of how healthy your population is. If you have exact numbers that tell you the ages people were when they died, then you have the information that you need to determine the health of that population, namely its mortality level.

My students address questions like: How will life expectancy change if HIV is eliminated? How many years of life are lost in a population because of smoking? Can you come up with a whole mortality pattern for a country that has only a little information on infant mortality and no census data or vital statistics?

I couldn’t, but I bet you could. Well, I can give you a guess!
After learning that suicide recently had surpassed motor vehicle crashes to become the leading cause of injury deaths in the U.S., Holly Wilcox, PhD, set out in search of specifics.

She knew the kinds of questions she wanted answered. Are males or females largely responsible? Is there an increase among certain ethnicities or age groups? What methods did they use?

Identifying both the who and the how behind the 38,364 suicide deaths reported by the CDC in 2010 is vital to prevention efforts, says Wilcox, a School of Medicine assistant professor with a joint appointment in Mental Health at the Bloomberg School.

Working with a team led by injury prevention icon Susan Baker, MPH ’68, Wilcox teased apart various threads of the data to learn the specifics behind the 16 percent increase in suicides during the previous decade. Among the trends revealed in the November 22 American Journal of Preventive Medicine:

• Suicide by hanging rose by 52 percent—the greatest increase of any method. Rates rose by 19 percent for suicide by poisoning but remained flat for suicide by firearm, the predominant method for all ages.
• The rate of suicide among people ages 45 to 49 increased by 39 percent, the most of any age group.
• Rates for suicide among females increased faster than for males.
• Rates for whites, Asians and Native Americans rose by 20, 12 and 10 percent, respectively, while rates for blacks decreased by 6 percent.

“Just knowing that the rate of suicide...
has increased doesn’t tell us a whole lot,” says Baker, a Health Policy and Management professor and the founding director of the Johns Hopkins Center for Injury Research and Policy. “We need to understand the detailed epidemiology for insight into the causes, and to know where to focus prevention efforts.”

Baker explains that effective prevention strategies reduce access to the means that individuals use for suicide—availability of handguns, for instance. Innovations such as fingerprint recognition systems on firearms can be used to save many depressed teens, she adds.

“Focusing on the means and methods of suicide is a logical and successful approach,” concurs William Eaton, PhD, the Sylvia and Harold Halpert Professor and Chair in Mental Health. “Why? Because, although lots of people don’t believe it, suicide is so often impulsive.”

Eaton relates an anecdote about a young man who survived jumping off the Golden Gate Bridge. The instant after jumping, he realized it was the worst decision he had ever made. After his miraculous survival, he went on to lead a long, productive life. The point: Restricting the means for suicide saves lives. Successful interventions include barriers installed on bridges, reduced emissions standards for cars and modernized gas ovens that cut out when there is no flame.

Public health can save more lives, says Wilcox, by emphasizing early intervention. The goal is to alter the trajectory of risk well before individuals pose any danger to themselves.

Currently, there’s no gold standard method for identifying those at future risk of suicide, says Wilcox. However, a proactive screening tool for suicide risk called the Columbia Suicide Severity Rating Scale is being used in several military and clinical settings, including here at Johns Hopkins. The task of screening is complicated because of the multitude of risk factors, few of which are exclusive to suicide. For instance, although the overwhelming majority of people who take their own lives have depressive disorders, only a fraction of people with depression ever attempt suicide.

“It’s difficult to predict which individuals will die by suicide,” Wilcox says, adding that this argues for deploying a coordinated range of screening and intervention strategies. “The recognition and treatment of mental illnesses like depression help to enhance resilience, needed at all ages to cope with the unavoidable stresses of life.”

Universal prevention programs can affect suicide risk factors, according to Wilcox. With Sheppard Kellam, MD, she investigated the fates of young adults who had participated two decades ago in a behavior management method called the Good Behavior Game. (Described by others as a “behavioral vaccine,” the game targets aggression and disruption by treating the classroom as a community. It was implemented in 1985 in 41 first-grade classrooms in Baltimore City schools.)

Wilcox’s research, published in 2008 in the journal Drug and Alcohol Dependence, found that students who had played the game were 50 percent less likely to report suicide ideation in young adulthood and 30 percent less likely to report a suicide attempt.

“It taught kids to self-regulate and that their behavior had consequences that affected others,” she explains.

Given that finding, the Good Behavior Game was cited as a promising program in the newly revised National Suicide Prevention Strategy.

The recent rise in suicide rates emphasizes the need for all to be vigilant and proactive at a personal level as well, Wilcox says. If you think someone might be suicidal, it’s important to ask him directly, she advises. “And if someone is suicidal, she should not be left alone and should be connected with mental health resources such as a crisis line or an emergency psychiatric assessment,” she says.

The key is to get the person through the crisis. Wilcox says: “If they have the chance to take a deep breath and think about it, there is hope.”

“However, the ultimate goal is to prevent not only the crisis moments from happening but also all the stuff—the mood disorders and the alcohol and drug abuse, for instance—that lead to these moments.”

Mom’s Second Chance

My mother, Kathy Webster, was an amazing woman. She held our family of seven together though she struggled with bouts of depression and anxiety through much of her adult life. Her mental health worsened in 1983, soon after both of her parents died. Seeing no way out, she drove her car into the Ohio River. Thankfully, a brave young man dove into the river and saved her.

Following her suicide attempt, my mother was treated for depression; she awakened spiritually and shored up a frayed relationship with my father. She lived another mostly happy 27 years, welcoming five grandchildren to the family. In 2010, when she was very ill, she sensed that she was nearing the end of her life. “But it’s okay,” she said, “I’ve lived a good life because I married a fun man.” Mom hung on long enough to attend the wedding of her first grandson before leaving this world.

I will forever be grateful to the man who rescued my mother from the river. I’m also thankful that there were no guns at home when she felt so desperate. Even the most talented surgeons can rarely rescue someone who attempts suicide with a gun.

Some believe that if a person wants to take their own life or someone else’s, it is fruitless to limit their access to a gun. My research and personal experience suggest otherwise.

Daniel Webster, ScD ’91, MPH, is a professor in Health Policy and Management and directs the Johns Hopkins Center for Gun Policy and Research.
“Enough is enough. It’s time for Congress and the White House to put public health above special interest politics. And it’s time for Congress to stop gagging our scientists, military leaders, and law enforcement officers and stop trying to hide the truth from the American people.”

—Michael R. Bloomberg, Mayor of New York City and Co-Chair of Mayors Against Illegal Guns

Less than a month after the idea surfaced, the two-day Summit on Reducing Gun Violence in America: Informing Policy with Evidence and Analysis convened in mid-January and yielded not only policy recommendations but also a published book.

More than 450 people attended and thousands more watched on the Web and C-SPAN as U.S. and international gun policy experts presented research and personal experiences about gun violence and its prevention. New York City Mayor Michael R. Bloomberg, Maryland Gov. Martin O’Malley and Johns Hopkins University President Ronald J. Daniels opened the Summit.

Since its close, Summit organizers Daniel Webster and Jon Vernick, along with Stephen Teret, of the Johns Hopkins Center for Gun Policy and Research have handled numerous media interviews and requests from policymakers interested in improving gun laws. “I’ve been working on this issue for 22 years and I’ve never seen the ground shift so quickly, creating an opportunity to make change,” says Webster, noting the December 14 Sandy Hook school tragedy changed the public’s attitudes toward gun violence as well as the political dynamics.

The breadth of papers and topics presented at the Summit addressed key policies as well as new ideas that merit federal and state policymakers’ attention, says Webster. The experts’ research was almost instantaneously published in a 320-page book/e-book by Johns Hopkins Press (see below) that was delivered to every member of Congress.

As they propose policies to stem gun violence, policymakers want solid evidence, expertise and experience behind them, Webster says, adding that nothing says credibility more than a group of world experts.

As the Summit’s aftermath continued swirling around him, Webster stole a moment for reflection: “This is why people gravitate to public health. There’s an aspect of intellectual curiosity. But a far bigger driver is, you want to make an impact.”


By Maryalice Yakutchik  Photos by Will Kirk
"We want to use this opportunity to cut through the din of the shrill and the incendiary, the rancorous and the baseless, by identifying specific recommendations that evidence-based analysis shows will work."

Ronald J. Daniels, President, The Johns Hopkins University

“Our gun laws make it easy to profit from selling guns to criminals and traffickers. Universal background checks and strong regulation of gun dealers reduce the flow of guns to criminals.”

Daniel Webster, Director, Johns Hopkins Center for Gun Policy and Research

“I hope that some kind of bipartisan solution [like Australia’s] can be found for the U.S. and will enable policies to be based on what actually will save lives rather than anything to do with money or politics.”

Rebecca Peters, Surviving Gun Violence, Australia

“Those of us who lost children at Dunblane were deeply shocked by the shooting at Sandy Hook. I wish you strength, and I wish you success in improving the gun laws in this country.”

Mick North, Advocate, Dunblane, Scotland

“The United States is not a more violent nation than other high-income nations. We are not more violent but when we’re violent, we kill. With guns.”

Matthew Miller, Harvard School of Public Health

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**BULLET POINTS GUN USE IN THE USA**

**GUNS CLAIM MORE THAN 31,000 LIVES EVERY YEAR IN THE U.S.**

**MORE AMERICANS UNDER 40 DIE FROM GUNFIRE THAN FROM ANY SPECIFIC DISEASE.**

**THE U.S. FIREARMS HOMICIDE RATE IS 20X HIGHER THAN THAT OF OTHER ECONOMICALLY ADVANCED NATIONS.**

**TWICE AS MANY U.S. KIDS DIE FROM GUN INJURIES AS FROM CANCER.**

**1 PERCENT OF U.S. GUN DEALERS SOLD MORE THAN HALF OF GUNS USED IN CRIMES.**

**89 PERCENT OF AMERICANS SUPPORT BACKGROUND CHECKS FOR ALL GUN SALES.**

**61 PERCENT OF FIREARMS DEATHS IN THE U.S. ARE SUICIDES.**

*Sources: CDC; Journal of Trauma, January 2011; New England Journal of Medicine, December 2012; Reducing Gun Violence in America, 2013.*
Road Work Ahead

For many working in public health, economic development is a wind at their back: As incomes rise, for example, the incidence of infectious disease tends to diminish.

But for the experts at the Johns Hopkins International Injury Research Unit (IIRU), economic development sometimes creates dangerous headwinds. This is particularly true of road traffic injuries. “As development proceeds, you have more roads, but not necessarily safer roads,” says JH-IIRU director Adnan Ali Hyder, MD, PhD ’98, MPH ’93. “So you have roads where people actually drive faster and not necessarily safer.”

Hyder first became interested in road traffic injuries (RTIs) 20 years ago as a young physician in northern Pakistan, where he treated many motor vehicle–related injuries. RTIs kill more than 1.2 million people annually. Yet they attract far less attention than HIV or malaria, a gap that Hyder set out to fill.

Hyder established IIRU to collect data and train new practitioners. One of the Unit’s major projects is a multicountry collaboration with other institutions called Road Safety in 10 Countries Project (RS-10), supported by Bloomberg Philanthropies.

RS-10 has already yielded new data on the prevalence of seatbelt use and speeding rates in major developing countries that had not been previously available. In Kenya, where the project also addresses trauma care, IIRU has identified key areas for improvement, developed a trauma care registry and helped strengthen trauma care legislation. And IIRU has trained more than 550 individuals worldwide—from researchers, to health specialists, to transportation professionals, to data collectors. IIRU is now in the process of developing a free online training program to reach many more, says Hyder.

“The other thing that is happening as a result of this project is that health [researchers are] working very closely with police and transport, and that has not traditionally happened much,” says Hyder, adding that this cross-sectoral collaboration is important to any project seeking to improve global road safety in the future. —Ted Alcorn

The Virtual Patient

If mice and rats were fortunetellers, we’d fire them. They only succeed in predicting whether a drug will be found toxic to humans 43 percent of the time—yet animal testing is the backbone of our safety system. Little wonder, then, that adverse drug reactions cause the death of one in a hundred hospitalized patients.

Thomas Hartung, MD, PhD, director of the Hopkins Center for Alternatives to Animal Testing (CAAT), says he’s on to an approach that’s better for people and animals.

The trouble with animals is “they can hardly substitute for the variety of humans,” says Hartung, the Doerenkamp-Zbinden Endowed Chair in Evidence-Based Toxicology. Our sensitivities morph over time, and many people, especially the elderly, take several drugs at once. When vetting a single substance can require $10 million to $20 million with traditional toxicology tests, vetting combinations simply isn’t affordable.

What’s the alternative? Studying human toxicity in human cell systems, one pathway at a time. As a test case, Hartung is exposing induced pluripotent stem cells to chemicals suspected of leading to autism early in life. “We only get one small piece of info,” says Hartung, but his approach—identifying critical molecular interactions—yields insights that apply readily to new challenges.

Ultimately, Hartung’s vision is to compile a catalog of human toxicology to guide therapy decisions. Someday, he says, “[when] you come to the hospital, an avatar will be produced, with all of your genetic background, your disease, your physiology, your body weight.” Doctors will use this computer-based avatar to simulate treatments—heading off adverse drug reactions and fine-tuning dosages.

“The virtual patient project… will be a very big job,” he recently told the Dutch journal Medicines, “but I don’t think it belongs in the world of science fiction.” In fact, CAAT has been working with more than 140 other organizations to create a sophisticated virtual patient.

—Rebecca Widiss
**The Health Zone**

In 2008, Jacky M. Jennings (right), PhD ’03, MPH ’98, and Rachel J. Thornton, MD, PhD ’04, took on an unusual mission: Find ways to tweak Baltimore City’s proposed zoning code to improve health and save lives.

The researchers, both assistant professors in Pediatrics at the School of Medicine, worked with Baltimore City officials on a health impact assessment (HIA) of the proposed major revision of Baltimore’s zoning.

Reducing violent crime—a major cause of death in the city—was a top priority. The researchers found several studies noting the strong connection between the location and density of liquor outlets and increased violent crime.

In the world of zoning, “mixed-use” development is usually desirable, but the HIA found that the new code’s proposed increase in mixed-use zoning could lead to more alcohol outlets. So Jennings, who has a joint appointment in Epidemiology, and Thornton recommended decreasing the concentration of outlets.

Some of the researchers’ recommendations became part of the comprehensive rewrite now under consideration by the Baltimore City Council. Their work includes a provision to prevent new liquor outlets within 300 feet of existing ones, and another to give 98 liquor stores in residential areas two years to relocate, close or stop selling alcohol. The City Council is expected to vote on the new code by late 2013.

Earlier in the process, when the number of affected outlets was estimated at 128, a “crimes averted analysis” suggested that the new policies had the potential to prevent 871 violent crimes over two years—a 31 percent reduction—in the 300-foot areas around the closed outlets.

But Thornton and Jennings say what’s most important is that public health researchers, planners, and health department officials are at the table together, looking ahead for opportunities to evaluate long-term policy impacts and demonstrate how zoning can be used to promote health.

—Rachel Wallach

**Clues to Longer Living**

“How long will I live?”

It is a tantalizing question, and one for which there is rarely a satisfying answer until it is too late. Now a group of Bloomberg School faculty and students is teaming up with an insurance giant to try to get answers, by collaborating on a study of mortality of unprecedented scale and scope.

The academic researchers are interested in understanding past increases in life expectancy so they can anticipate future increases, says Gerard Anderson, PhD, a professor of Health Policy and Management who is leading the group.

For the insurer (which did not want to be identified) a data-driven understanding of mortality may improve its decision making in a number of important ways. The results could also have profound implications for the Social Security and Medicare trust funds. A one- or two-year difference in Americans’ life expectancy in 2025 and beyond will have major implications for how long the trust funds will be solvent, says Anderson.

The insurance giant has made a unique dataset available to the researchers: records of the 14 million current and former policyholders, with all personal identifiers removed to protect privacy. “Nobody has ever had this large a dataset looking at mortality from a research point of view,” says Anderson, “so we’re kids in a candy store.”

Even more important than the dataset’s breadth is its collective depth. It contains remarkably detailed information from driving records to minutia like whether or not policyholders are scuba divers. “All the other datasets have limitations,” says Anderson. “This one has all the pieces.”

While the researchers are still a year from publishing any results from the partnership that began in March 2012, Anderson is confident the findings will be important. “We’re going to be able to predict in much better specificity and much better ways how long people are going to live,” he says.

—Ted Alcorn