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](http://ow.ly/h9Ruw)

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.
LESSONS FROM THE DEAD

Why investigating deaths means saving lives

Story by Linell Smith  Photography by Chris Hartlove
In autopsy findings, Susan Baker, Carolyn Cumpsty-Fowler, David Fowler and Andrea Gielen discover priorities for public health (December 3, 2012).
Carolyn Cumpsty-Fowler, PhD, MPH '96, remembers five children who never had a chance to grow up—and how they changed her life.

At the time, she was in her 20s, a neurosurgical nurse at Groote Schurr hospital in Cape Town, South Africa, and part of a team researching clinical factors that could improve survival of children with traumatic brain injury. The most severely harmed were children struck by cars while crossing the road or playing in the streets. Roughly 70 percent of the victims who died never reached a hospital, while others were admitted with catastrophic injury. One of the young nurse’s duties was to counsel parents when a decision was made to terminate life support.

In September 1984, she reached her limit. After witnessing the anguish of five families in six days, she realized her research was chasing the wrong answers.

“I walked out of the intensive care unit that Friday night with the neurosurgery professor who was my adviser and told him, ‘Nothing we can do in the hospital is really going to make a difference for these children. We’ve got to stop these deaths. We’ve got to prevent them.’ And he basically said, ‘Do it.’”

Cumpsty-Fowler changed the focus of her study from injury recovery to injury prevention. Eventually her doctoral work became the basis of a successful, developmentally appropriate pedestrian safety program that she and traffic safety colleagues implemented throughout South Africa.

Now an assistant professor in the Johns Hopkins School of Nursing with a joint appointment in Health Policy and Management at the Bloomberg School, Cumpsty-Fowler serves on the Baltimore County Child Fatality Review Team, an interprofessional group she helped create. Her husband, David Fowler, MBChB, MMed, is the chief medical examiner for the state of Maryland.

Together, the couple developed a...
course at the University of Baltimore, Forensic Medicine and the Public’s Health, that illustrated the many ways that death investigation and public health professionals’ use of forensic data can impact health, including reducing preventable death in children.

A careful reading of individual deaths, they contend, can make life safer and healthier for all.

The Fowlers belong to several generations of researchers who have gained inspiration from the work of an injury prevention pioneer whose legendary career was launched in the break room of the medical examiner’s office.

**Back in the 1960s, Sue Baker was working toward her MPH at the School when she decided to examine the relationship of automobile accidents to chronic diseases such as alcoholism. Her idea was to compare the autopsy records of drivers who were responsible for their fatal crashes with those of drivers who were merely victims.**

She found a willing partner in forensic pathologist Werner Spitz, then Maryland’s deputy chief medical examiner.

“Before Sue, no one had ever suggested or thought of using files of people who had sustained severe injuries and died, then analyzed them and thought, ‘Well maybe this can be changed or prevented,’” Spitz recalls. “Nowhere in this country was this done or thought of using files of people who had died at hospitals following severe abdominal injuries in motor vehicle crashes. Her research showed that half of the deaths may have been prevented by proper diagnosis and prompt treatment, leading to the effort to transport such patients to major trauma centers rather than local hospitals. Spitz was an author on that early study, as well as on papers on highway safety and alcohol published in *The New England Journal of Medicine* and *JAMA*.

“Sue was like a paper mill, publishing something every few months,” he says. “Not only did she need that, but we forensic pathologists needed to show the community of physicians and institutions of higher learning that there is something to be looked at in the medical examiner’s office. It’s not just a place where you cut up bodies.”

Over the next four decades, Baker published more than 250 papers, most of them spurred by data from death records. In addition to helping secure mandatory child safety seats in cars and graduated driver’s licensing for new drivers, her research also led to ways to decrease fatalities in aviation and house fires, and to reduce incidents of carbon monoxide poisoning, drowning, childhood asphyxiation and falls among the elderly.

Along the way, she also founded the nation’s first injury control research center to promote injury prevention as a scientific discipline. The Johns Hopkins Center for Injury Research and Policy (CIRP), which celebrated its 25th year in 2012, works to reduce injuries through research, education, policy and practice.

**Saving Others**

My 19-year-old son died in an arson fire set in the hall of his dorm at Murray State University in 1998. Michael was a gifted musician and broadcast journalism student with a 3.9 GPA. He also had an autism spectrum disorder. He had issues with remembering and organizing and also had some spatial deficits. He was very safety conscious and would unplug his lamps at night.

Four days before his death, he escaped a fire set in the same dorm by crawling out on his hands and knees. But on September 18, 1998, he died in the doorway of his room of smoke and soot inhalation from a second fire, even though he had stuffed towels under his door. We found out later that his room was not up to the fire code and that smoke had entered both under and over the door. Fourteen other people were injured.

After Michael’s death, I helped get legislation passed in Kentucky that requires colleges to report campus crimes and ongoing threats on a timely basis and to alert fire authorities about any fire. I also started a foundation to raise awareness and standards of campus fire safety.

I can’t save Michael, but I can do what I can to minimize the risk for other young people. This gives me some sense of healing. They’re not my children, but they’re someone’s children. This is what Michael would expect his mom to do.

Gail Minger helps educate college students about fire safety through the Michael H. Minger Foundation.
In 2010, Baker became the first injury control researcher to receive the Frank A. Calderone Prize in Public Health, one of the highest honors in the field. And this year the National Association of Medical Examiners established an annual award in Baker’s name to recognize research that demonstrates the greatest potential for public health impact. The award is a key feature of what chief medical examiner Dave Fowler calls “the Sue Baker Wall” at the state’s $54 million forensic medical center. Under his leadership, a staff of 15 forensic pathologists performs roughly 4,300 autopsies a year as part of the state’s investigation into any death occurring from violence, suicide or casualty, or in any other suspicious and unusual manner. Also reviewed are sudden deaths of people in previously good health who die unattended by a physician.

Nothing, perhaps, has proved more important than using such death records to protect children. In the 1970s, Baker gathered data that showed how infants in their first six months of life had a significantly increased risk of dying in a car crash because their mothers held them in their arms or laps. Evidence from the grim records she read contributed to the policy changes that require kids to ride in car seats today. From 1975 through 2008, child restraints saved the lives of an estimated 8,959 children under the age of 5, according to the National Highway Transportation and Safety Administration.

In the early 1980s, Andrea Gielen, who now directs CIRP, found herself using these data as a new School alumna working at the Maryland Department of Health and Mental Hygiene to create the state’s first child passenger safety program.

“I realized I found my passion,” says Gielen, who studied with Baker. “[Injury prevention] combined so many elements: studying risk and protective factors, educating the public and conducting community advocacy to get the law on the books and programs in place to make sure it was effectively implemented.”

For the past 15 years, Cumpsty-Fowler has served on national and state child death review committees as well as on the panel for Baltimore County. In Maryland, 24 teams

With each breath, infants “shift” just a half-ounce of air. Lying too close to a parent or a toy can be lethal.

—Dave Fowler and Carolyn Cumpsty-Fowler
cover the state’s counties and Baltimore City. Composed of representatives from the medical examiner’s office, law enforcement, emergency medical services, social services, schools, pediatrics and public health, the groups review all cases of sudden and unexplained deaths.

In Maryland, the most common causes of death in children over the age of one year are motor vehicle crashes, homicides and suicides, according to the DHMH. For infants between one month and a year of age, the leading cause is related to sleep environments and includes sudden unexpected infant death, accidental suffocation and strangulation.

For the past several years, Cumpsty-Fowler has worked with pediatrician and child abuse expert Scott Krugman, now chairman of Baltimore County’s child death review panel, to educate the public and health professionals about safe sleeping environments for infants. Because research shows that babies who sleep in their parents’ beds are 20 times more likely to suffocate than those who sleep alone, Krugman and Cumpsty-Fowler are determined to change social norms and make bed sharing with young infants unacceptable.

“Most infants in Baltimore County who die, die from preventable sleep-related [causes],” Cumpsty-Fowler says. “Most were in an adult bed.” She says suffocation can occur if a parent rolls over on an infant or a baby gets trapped under a pillow or caught between the bed and the wall. But death can also come merely from lying so close to a parent that there is only a small pocket of air for the child to breathe. When an infant lacks the motor skills to roll over or shift position, re-breathing the same air, increasingly filled with exhaled carbon dioxide, can lead to oxygen deficiency and death.

Franklin Square Hospital, where Krugman directs the department of pediatrics, now requires new parents to sign statements that they have received counseling about safe sleep before leaving the hospital with their newborns. (The Johns Hopkins Hospital has similar requirements for new mothers.)

Dave Fowler has pursued another avenue toward safe sleep. At the request of you don’t actually have to have your face up against anything. You can be close to a soft toy, a blanket, a bumper, edge of a bassinet and you can breathe out the oxygen in that area until it won’t sustain human life.”

Fowler calls pediatrics one of the most challenging areas in forensic pathology. “When you have someone who has been shot multiple times or been in a motor vehicle collision, the cause of death is usually fairly apparent. But when you’ve got a pediatric case—a young person who dies suddenly and unexpectedly, who was normally previously healthy, it is much more challenging.”

Such cases sometimes disappear in the deluge of injuries afflicting the nation. According to the CDC, more than 180,000 Americans will die this year from injuries sustained in such events as fires, vehicle crashes, intimate partner violence, drowning, drug poisonings and falls.

As medical examiners collect evidence on new threats, such as emerging infections or unsafe products, the injury prevention researchers aren’t far behind.

“In this country, injury data often come from forensic investigation and death certification,” says Carolyn Cumpsty-Fowler. “The better your relationship with the investigators, the more likely you are to get at the real heart of the information.”

And the facts of a tragedy remain critical for finding the path toward prevention. Sue Baker remembers poring over the case of a teenager who committed suicide in the early 1980s by overdosing on anti-depressant pills brought into the house by her mother’s boyfriend. At the time the girl had just broken up with her own boyfriend and was feeling distraught.

“Today that young girl might be coded as suicide from a drug overdose—or whatever was on the death certificate—and people might miss the details of the incident,” Baker notes. “It’s gotten so easy to ‘spin the tapes,’ as we say, and just look at the [computerized] tables for the findings and analyses.”

Instead Baker read the suicide note and the investigators’ records. They pointed to another problem that demanded public attention: Teenagers were abusing adult medications. Baker began imagining another research paper.
In the summer of 2010, when we were midway through the doctoral program in mental health, my brilliant, creative and soft-spoken friend took her own life.

Initially, there was a lot of guilt among those of us in the Department of Mental Health who knew her. We were psychiatrists, professionals trained in suicide prevention as well as fellow students and friends. We felt a special guilt that it happened here, among us. That we, of all people, didn’t detect warning signs and couldn’t prevent this tragedy.

I think D (as I’ll call her) was really good at not revealing this part of herself. She was a Fulbright Scholar who had studied at the top university in Pakistan; I’m certain she was aware of her own condition. After her death, I learned that she had sought treatment for bipolar disorder.

As two of just a handful of students in the same doctoral cohort, we became close after we met in 2008. We’d walk from classes together and talk about assignments. She would invite me over for a cup of tea, and we would talk. She was close to her mom and brother, but they were very far away. She was quiet but had a really good sense of humor. She also cared very deeply about injustice in the world—especially about women and people with mental disorders in her native Pakistan.

D was a perfectionist. She kept track of so many details that I often missed. She worked very hard and didn’t do much to reward herself. After that busy first term was over, I stopped by her room and suggested we go shopping or do something to celebrate. It was a bright and breezy day, perfect for a stroll around the Inner Harbor. She declined, saying something about having to prepare for the next term.

There were times when I’d ask her to wait so we could walk together back from class and she’d just disappear. But that didn’t seem unusual in a high-pressure academic setting where everyone is so busy, so overwhelmed.

In the spring of 2010, I left for New York for an internship. We kept in touch by email. I remember wishing her well with her comprehensive exam, telling her, “You’re almost done!” and that I was looking forward to seeing her after her exam and before she flew to Pakistan. She wrote me back two days before she died and said, “I hope to see you MAYBE in NY.” She also wrote: “Home is calling.”

Two days later, I got an email about her sudden passing. It shattered my world. I couldn’t contain the sadness in me.

How do I translate this experience professionally and personally? What do I do with D’s death? As a budding researcher, I struggle a lot with that.

We live in a fast-paced world. We don’t pause long enough to think through the value of each person and the consequences of death in our lives. It’s not cocktail party conversation, but perhaps we are supposed to stop and consider death a part of our lives instead of trying so hard to avoid it.

We need to focus as much on community building in work and school as we do on goals and outcomes. We need to establish a nourishing camaraderie with colleagues instead of letting competitiveness and individualism rule over us.

D is not the only one to feel isolated.

Since her death, I’ve been determined not to just fit myself in the frame of the “good” researcher—it’s not good to forget how precious a person in front of me is. I want to intentionally bring out my personal side, intentionally be more informal and intentionally reach out to people. I’ll always try to do my best work and seek excellence, but when it comes to doing life, it’s more like, “Hey! How are you doing?”

That takes more time. But it’s so worth our time.

Su Yeon Lee, PhD ’12, is an associate in Mental Health and a policy analyst at the Office for Research on Disparities and Global Mental Health, National Institute of Mental Health.
Rx FOR SURVIVAL
G. Caleb Alexander takes on the crisis of prescription drug abuse

INTERVIEW BY JACKIE POWDER
PHOTO BY DAN DRY
It may be the biggest public health epidemic that you’ve never heard of: prescription drug abuse. America’s fastest-growing drug problem claims a life every 19 minutes.

G. CALEB ALEXANDER, MD, MS, co-director of the Bloomberg School’s new Center for Drug Safety and Effectiveness, says that pain is at the center of the epidemic’s trajectory, beginning with the medical community’s well-intentioned efforts in the 1980s and 1990s to more aggressively treat chronic pain. Sales of opioid painkillers like Vicodin and Percocet soared, as did abuse of the drugs, emergency room visits, drug treatment admissions—and deaths.

In 2008, there were nearly 15,000 prescription painkiller deaths—more than cocaine and heroin combined. Yet Alexander believes that the epidemic may have reached a “tipping point.” Federal and state agencies are stepping up enforcement and regulatory efforts, and many other stakeholders are also responding to a call to action.

“Finding a way to promote the appropriate treatment of pain while reducing opioid use and diversion is the holy grail,” says Alexander.

**You’re a general internist, what’s your approach to prescribing opioids?**

Generally, I’m very cautious about using opioids and won’t prescribe anything more than, in most cases, a short-term supply of a low-dose opioid. One of the striking things that I’ve observed as I’ve been training residents in the inpatient setting, is how comfortable they were writing prescriptions for heavy-hitting narcotics—Dilaudid, morphine, fentanyl. Now it’s true that patients admitted are often in severe pain. Nevertheless, I was surprised. And this extends to the outpatient setting as well.

Someone recently told me that they went in for a dental procedure, went to the pharmacy and there were 100 Vicodin waiting there. They only needed eight!

**How important is health care provider training for reversing the epidemic?**

It’s vital. There needs to be more education at every level of clinical training. Given that so many people who abuse or misuse opioids get them from friends or family members, the current epidemic also suggests that clinicians … have to ask themselves, “Are these opioids that I’m prescribing going to get into somebody else’s hands?”

**Don’t patients with chronic pain expect their doctor to give them a prescription for a powerful pain medication?**

I think we underestimate the degree to which patients are open to alternative treatment approaches. One of the important questions that clinicians have to ask themselves, and that patients have to be aware of, is have we tried all the appropriate alternatives prior to reaching for this type of medicine? We [can] use acetaminophen, nonsteroidal anti-inflammatories, topical treatments and a whole host of other agents.

**Who is abusing prescription drugs?**

Prescription drug abuse spans a wide spectrum of people, in part because opioids are so liberally dispensed and so prone to nonmedical use. Patterns of nonmedical use vary, ranging from a high school kid who may have picked up a few Vicodin from a family member, to an executive misusing OxyContin to manage chronic lower back pain, to a senior with chronic anxiety and headaches [who] is taking Percocet when other therapies would be both safer and more effective.

**Is there a particular group that is more at risk of death from prescription drug abuse?**

Deaths from prescription opioids are more common among adolescents and young adults, males, those with less education, living in rural areas, and individuals with a history of alcohol or substance abuse. This latter point is noteworthy because it is easy for people to underestimate the synergistic effects of combining opioids with alcohol or other drugs. But keep in mind, for every overdose death, 10 patients are admitted for treatment of abuse, 25 patients are evaluated in an emergency department, and more than 700 people report nonmedical use during the past year. So the deaths—while catastrophic and highly visible—represent just the tip of the iceberg of this public health problem.

**What research at your Center targets prescription drug abuse?**

We have a number of projects under way. In one recently completed investigation, we used nationally representative data from ambulatory office practices to characterize the treatment of opioid dependence with buprenorphine. In another, we are conducting a 10-year survey of the diagnosis and treatment of chronic nonmalignant pain to look at how care patterns for chronic pain have changed over time, and to answer some key questions: Are we diagnosing more pain than we did a decade ago? Has our threshold for using opioids changed substantially? In a third, we are using pharmacy records to rigorously evaluate the policy impact of states’ prescription drug monitoring programs, one of the key ways that states are working to stem the epidemic.

**Why has this epidemic been so tough to get a handle on?**

This is a complex issue, and there are no magic bullets. Just consider one of many challenges—how to continue to improve the care of patients with pain, some with severe pain, while reserving these therapies for those who need them most. And consider the issue of diversion, which can take place at any point along the supply chain of prescription drugs, from warehouse robberies to a patient whose medicines are inappropriately taken by a family member. The epidemic also touches a huge number of different stakeholders: pharmaceutical manufacturers, health plans and health insurers, professional societies, patient advocacy groups, law enforcement, state departments of public health, pharmacies, pharmacy benefit managers, employers—and we’re just getting started.
When death comes to newborn children in Bangladesh, its causes often are distressingly familiar and highly preventable: respiratory infection, measles, tetanus, diarrhea, premature birth. Such deaths are also distressingly common: Bangladesh had a neonatal mortality rate of 36 deaths per 1,000 live births in 2004.

Arriving at that sobering statistic is difficult. Bangladesh numbers among the nations in which “vital statistics systems are not adequately developed to capture deaths,” says Henry D. Kalter, MD, MPH ’87, an associate in International Health (IH). “A lot of people die without even having seen a doctor, or if they saw a doctor, they did not die in a medical facility. The death is not captured [statistically].”

In fact, only one-third of the nearly 56 million deaths worldwide in 2004 had a medical certification of death, WHO reports.

That lack of data on deaths and their causes denies governments and researchers evidence that can help focus resources and set priorities for interventions.

The answer? Verbal autopsies.

With a structured questionnaire and an open-ended recounting of facts surrounding the death, trained lay researchers interview surviving family members and elicit sufficient information for physicians to determine and record a cause of death.

“It’s a crude tool, but it’s the best we have available,” says Rolf D.W. Klemm, DrPH ’02, MPH ’85, an associate scientist in IH. “By knowing a proximate cause of death, however crude the method, we can advocate for earlier detection and treatment.” Klemm
has used verbal autopsies in his own research on how vitamin A supplementation may be able to reduce infant mortality by 15 percent.

The raw transcripts of verbal autopsies, replete with heart-wrenching details, also provide a richness of detail that is invaluable to researchers, says Alain Labrique, PhD ’07, MHS ’99, an IH assistant professor. “Verbal autopsies help us understand and identify broader nuances in repeated trajectories to mortality,” says Labrique. “The verbal autopsy offers a much richer picture about contextual factors and the pathway to mortality than a death certificate.”

Yet even expertly handled verbal autopsy interviews are less authoritative than a clinical autopsy and death certificate. One key problem is that it can be difficult for evaluators to discern between causes of death that have similar symptoms or multiple causes. For instance, the symptoms of malaria may overlap with those of pneumonia and other diseases.

“Every verbal autopsy is only as strong as its design,” says Keith West, DrPH ’87, MPH ’79, the George G. Graham Professor of Infant and Child Nutrition.

The earliest verbal autopsies usually consisted only of open-ended survivor interviews. Eventually, more rigid close-ended questionnaires—which reduce variability and lend themselves to coding—were devised. Today’s verbal autopsy is a hybrid of the two approaches, balancing greater rigor in responses and the advantages of electronic data gathering with the wealth of detail gleaned only by allowing survivors to tell their story about the death.

Do verbal autopsies work? Numerous studies have examined the results, and the answer is a strong but qualified yes.

“Verbal autopsy gives a reasonably good performance on causes of death,” observes Kalter. Verbal autopsies obtain stronger results in assigning causes to types of death that are more readily identifiable from a verbal interview and questionnaire (neonatal tetanus, for instance); results are acceptable but less authoritative with potentially murkier causes of death such as pneumonia and birth asphyxia.

The verbal autopsy has become indispensable to any comprehensive discussion of mortality in regions where vital statistics are lacking, says Parul Christian, DrPH ’96, MPH ’92, MSc, an IH professor. Researchers trying to reduce unnecessary deaths in those regions need information on causes of death as well as whether specific interventions are making a difference. “As a researcher, you have to rely on this sort of instrument,” says Christian.

Indeed, thousands of verbal autopsies compiled over more than a decade by researchers involved in the School’s JiVitA Maternal and Child Health and Nutrition Research Project in Bangladesh have informed the findings of micronutrient supplementation trials for pregnant mothers and newborns. They also have generated new data and hypotheses, such as recent findings suggesting that hepatitis E (preventable with a recently developed vaccine) is responsible for almost 10 percent of pregnancy-related deaths in the country.

Improvements to the public health infrastructure in Bangladesh and other countries that would make the verbal autopsy obsolete are still decades away, says Shegufa Shefa Sikder, MHS ’10, a PhD candidate conducting JiVitA research. “Verbal autopsies help to allow us to identify the major causes of mortality and prioritize research efforts,” she says.

Given the ongoing need for verbal autopsies, researchers are focusing on ways to enhance it. New technology is allowing interviewers to collect more data electronically, while innovative statistical methods can improve the validity of diagnoses. And Kalter is leading a movement to add a “social autopsy” component—questions that systematically explore social, behavioral and health care infrastructure factors. “We’re trying to extend what the verbal autopsy can tell us,” he says. “Verbal autopsy is used to determine the causes of death that health programs should focus on, while social autopsy helps understand the best ways to implement the interventions against these causes.”

As a researcher at the beginning of her career, Sikder is enthusiastic about the possibilities with the addition of the social autopsy: “It can let us trace the complex pathway to mortality.”

Editor’s note: Originally written in Bangla, this is an excerpt of a narrative written by a female data collector. She conducted the verbal autopsy interview with the parents of the infant following the report of a neonatal death in rural Gaibandha, Bangladesh, as part of the 2002–2007 JiVitA study. From this narrative, a physician would likely infer preterm birth, with possible premature rupture of membranes, followed by a complicated delivery leading to trauma and early neonatal death, according to Parul Christian, DrPH ’96, MPH ’92, MSc.
IN NIGER, DEATH HAS LONG BEEN A WAY OF LIFE.

The people of this West African nation endure pervasive poverty, persistent food shortages and a punishing climate. Especially vulnerable are the young; many children in Niger perish before their fifth birthday.

“Sometimes when you ask people how many children they have, they’ll say, ‘I have five children—three living and two dead,’” says Sarah Dalglish, MA, an International Health (IH) doctoral student.

A new study, however, suggests things have changed. Researchers found a direct connection between the country’s child survival policies from 1998 to 2009 and a 43 percent drop in under-five deaths. The mortality rate plummeted from 226 deaths per 1,000 births to 128.

In 2009 alone, the measures saved the lives of nearly 60,000 children.

IH assistant scientist Agbessi Amouzou, PhD, MHS, the study’s lead author, partnered with UNICEF-Niger and Countdown to 2015 on the research. Jennifer Bryce, EdD, a study co-author and IH senior scientist, led the School-based group that analyzed the research data. The findings were published in The Lancet in September 2012.

“Niger ... has produced remarkable results for child survival that can set the bar for other countries in the region and worldwide,” says Amouzou.

POSTING HEALTH IN COMMUNITIES

Central to Niger’s dramatic child survival gains is the country’s 2000 presidential declaration to deliver more and better health care to women and children—especially in the most rural and remote communities—by ramping up its network of health posts to provide basic preventive and curative care.

Between 2000 and 2007, nearly 2,000 posts were established and staffed by community health workers trained to treat diseases that are frequently fatal in children. Severe cases are referred to centrally located health centers with professional staff.

During the study period, community workers continued to receive training, and when possible, the posts offered additional services, including nutrition screenings, educating parents on appropriate health care for sick children and distribution of contraceptives.

“If you look at the coverage data on how many children were taken for care for diarrhea, pneumonia and malaria, there are large increases that other countries have not been able to achieve,” says Bryce, who notes that change takes time.

“Looking for success in two to three years is really not enough time,” she says. “In Niger, it took three, five, seven years for sound policies to translate into strong programs and to save lives.”

Writer Jackie Powder spoke with Bloomberg School experts about four key strategies that contributed to Niger’s success.
NO CHARGE FOR MOTHERS & CHILDREN

A pivotal piece of Niger’s child survival initiative is a program, launched in 2006, to provide free health care to pregnant women and children. Earlier, expansion of the country’s rural health posts improved geographic access to care and led to steady increases in the use of health services among women and children. But visits to the posts spiked after the no-charge policy took effect, according to the study.

Removal of the cost barrier meant that mothers received antenatal care and children were treated earlier for life-threatening conditions and illnesses, including Niger’s leading child killers: malaria, pneumonia, diarrhea and malnutrition.

“You can’t separate free care from all the other successes—it underlies everything else,” Dalglish says. “It gets people in the door to treat their children, get vaccinated and diagnose disease.”

With Niger’s widespread poverty and a fertility rate of seven children per woman, the country’s health officials recognized free care as a top priority.

“Even very small fees are going to be too expensive for people,” Dalglish says. “It’s particularly true [in Niger], for example, right before the harvest. People have very little or no cash on hand.”

“A” POWERFUL SUPPLEMENT

Niger’s impressive reductions in child mortality refute an old public health maxim that a country must increase its wealth before it improves its health, says Alfred Sommer, MD, MHS ’73, Bloomberg School dean emeritus.

“Since this School was founded, we’ve taken the position that there are ways to improve health, largely through methods that don’t require waiting until a country is wealthy,” says Sommer. “They [countries] can leapfrog ahead by effectively deploying inexpensive, proven interventions, which is critical, since many won’t be getting wealthy anytime soon.”

There’s no better example of a “health before wealth” intervention than vitamin A. Sommer’s discovery that vitamin A supplements dramatically cut child mortality has saved millions of children worldwide.

Integral to Niger’s child survival program are twice yearly mass campaigns to provide vitamin A supplements, along with insecticide-treated bed nets (see next story) and measles vaccinations. Of the strategies analyzed in the study, vitamin A supplementation and bed-net ownership showed the largest increases in usage.

“The question is, will this be a lasting change?” Sommer says. “While magic bullets are cheap, getting them to the people who need them is not cheap.”

NET GAINS AGAINST MALARIA

The use of long-lasting, insecticide-treated bed nets is a powerful malaria control weapon, even with a community coverage level just above 50 percent, says William Brieger, DrPH ’92, MPH.

“What’s important is that insecticide-treated nets are a community protection; they don’t just protect individuals,” says Brieger, IH professor and senior malaria specialist at Jhpiego. “If you get enough treated nets being used in a village, you start to see the effects even though not everybody is using them.”

In Niger, researchers found that the rapid scale-up of treated bed net distribution is responsible for saving one in four children in 2009.

Still, Brieger says that most demographic surveys on antimalarial nets show that even in households that have nets, the most vulnerable groups don’t use them enough. And there are frequent reports of people using nets for fishing, covering crops and even as wedding veils.

Another challenge relates to the lifespan of the long-lasting, insecticide-treated nets. After an international push for universal bed-net coverage between 2009 and 2011, Brieger says that millions of nets are nearing their expiration date.

“We’re now looking at 2013, and there needs to be a lot of replacements,” he says.
Robust Mosquitoes, Less Malaria

The mosquito’s immune system might be more sophisticated than anyone suspected. And that could help scientists to develop novel strategies to control malaria, a disease that annually kills more than 650,000 people worldwide.

Mosquitoes can’t produce antibodies like humans do to target specific infections with sniper-like precision. But, in a new study, Bloomberg School scientists have identified a single gene called AgDscam that makes it possible for the insects to destroy an array of pathogens—including the human malaria parasite, *Plasmodium falciparum*—with some degree of specificity.

“When the mosquito is infected with the human malaria parasite, this gene will produce a certain repertoire of proteins that have the ability to bind to the parasite in the [mosquito’s] gut tissue and mediate its killing,” says George Dimopoulos, PhD, MBA, the study’s senior author. It was published in *Cell Host & Microbe* in October 2012.

“It’s exciting because insects have been known not to have antibodies and people wonder how they can deal with a broad spectrum of bacteria, parasites and viruses,” explains Dimopoulos, a Molecular Microbiology and Immunology professor. “The AgDscam gene does not produce antibodies but the building blocks of antibodies, and can also combine them to produce diversity in defense specificity.

“It’s like casting a net, rather than shooting a harpoon,” he adds, comparing the mosquito and human immune systems. Mosquitoes use the AgDscam gene to “weave the net,” researchers discovered. It contains immunoglobulin domains—present in human antibodies—that theoretically can produce up to 32,000 protein combinations to resist pathogens, including different malaria parasite species. However, it’s unclear exactly how the AgDscam proteins kill the pathogens. “If we can understand this mechanism better at the molecular level,” says Dimopoulos, “we may be able to create a genetically modified mosquito that produces a repertoire of proteins capable of targeting a broader spectrum of malaria parasite strains, rather than just a single strain.”

—Jackie Powder

A Broken Heart

A 3-year-old with flu-like symptoms in the morning dies in her mother’s arms that evening.

A 32-year-old running a half-marathon collapses and dies at the finish line.

A high school athlete drops dead on a treadmill.

Myocarditis, often symptom-free, does out death suddenly and silently. The disease is frequently caused by viral infections that reach the heart and trigger a fatal immune response, says immunologist DeLisa Fairweather, PhD. This acute form of the disease is a leading cause of sudden death among seemingly healthy young people. In its chronic form, myocarditis causes inflammation of the heart muscle and can progress to chronic heart failure several months or years later.

“When you hear about an athlete who went for a run or went swimming, then dropped dead, often autopsy results show it’s due to myocarditis,” says Fairweather, an assistant professor in Environmental Health Sciences. The absence of obvious symptoms frequently means that the disease remains undiagnosed and, in the acute state, physical exertion becomes dangerous.

Currently, a heart biopsy is the most reliable method to diagnose myocarditis but it is an invasive and risky procedure, Fairweather says. It’s one reason why her work to identify biomarkers for earlier detection is critical in preventing myocarditis deaths.

“In animal models we have found a marker that can detect inflammation using noninvasive imaging techniques and are beginning a small clinical trial at Mayo Clinic to test it,” says Fairweather. “We’re trying to get our data in animals published now, and with the results from the trial will apply for NIH grant money to perform a larger study in patients.”

A Myocarditis Foundation board member, Fairweather says families always want to know what they could have done to prevent a child’s death. “There are all the regrets that come with a sudden loss,” she says. “Someone is ripped away before they’ve had a chance to live life.”

—Jackie Powder
Our Most Intimate Adversary

My father William, my brother Spearman, my uncles Jesse, David, James and Tom, my aunt Mercy, my father-in-law John, my grandparents Walter and Elnora and Jesse and Sarah, my childhood friends Clay and Darren …

Death claims ever-widening circles of family, friends and acquaintances until it envelops us. It is inescapable, inevitable and irredeemably sad. So why would we want to devote an entire issue to death?

I began to ask that question myself on Monday, December 3rd at 10:30 a.m. Art director Robert Ollinger, designer Konrad Crispino, photographer Chris Hartlove and I were in the Office of the Chief Medical Examiner (OCME) of Maryland in West Baltimore. We were there for the photo shoot for our “Lessons from the Dead” story (page 36). Robert had chosen one of the main autopsy theaters for the photo because it appeared empty from our vantage above the room. After we had corralled our live subjects for the photo, however, we discovered two autopsies were under way.

An OCME staffer asked renowned injury prevention expert Susan Baker if she would be comfortable walking past the autopsies. Not particularly eager myself to witness the bodies in various stages of forensic investigation, I hoped she would balk at the prospect. But the 82-year-old Baker, who spent the early years of her remarkable career in the ME’s office, didn’t hesitate. She said, “Sure, let’s go” and walked nonchalantly past the cadavers. As we walked through the room, I kept my eyes keenly focused on Konrad’s heels.

“Death is very democratic,” the staffer told us, nodding toward the autopsies. His point was that rich or poor, big shot or average Joe, everyone ends up the same. He’s right. One way or another, we will all be there. The breath will stop. The blood will stop. The spirit will depart. All that’s left behind will be muscle, bone, sinew, organ.

After a while, curiosity trumped queasiness. I stole a few glances at the autopsies in progress. Now, I see that moment as instructive. I wanted to avoid death and its unpleasant reality. However, that’s not what public health is about. Public health is not about flowers and sunshine. It’s not about eyes averted. Its purpose is not to avoid but engage with our most intimate adversary—to stare, to probe, to investigate, to understand, and then to fight. All with the promise of making a difference and saving lives.

Public health has delivered on this promise again and again. From safe drinking water to vaccines, vitamin A, smokefree public places and many other hard-won successes, public health has extended lives and secured health for millions of people.

And, as this special issue of the magazine demonstrates, still more thrilling work is being done. The stories gathered here (and in the powerful essays and poems by our alumni at magazine.jhsph.edu/extras) tell us more. They also demonstrate how final and personal death is.

Cousins Jim and Bill Krantz (above) know this as well as anyone. They count 13 of their 18 family members have been diagnosed with cancer. Like many others in Frederick, Maryland, they blame the nearby Army base that developed bioweapons and buried chemical waste. They quite reasonably want to know what killed their loved ones and how others can be spared in the future. Untangling genetics, behavior, exposures from decades past, and other factors in cancer represents one of the great challenges of public health. Armed with science, data, knowledge and intuition, researchers and public health professionals peer into that blackness, seeking light.

At some point after my visit to the medical examiner’s office, I had an enlightening (and lightening) conversation with my son. I often ask him big questions out of the blue to gain insight into a 7 year old’s world. I asked him what he would like to do with his life. He thought a moment and then said, “Spend more time with it.”

Yes! That’s what it’s all about. The hard work of public health, the experiments, the slow accumulation of knowledge, the journal articles, the grant applications, the meticulously planned interventions—all seek to ensure people have enough time in their lives to work, to add something to the world, to live to their potential, to realize their dreams.

To spend more time with life.

Brian W. Simpson
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Poetry is both the most and least abstract of the literary arts. It paints the human condition in broad strokes, and yet it can’t do so without recognizable faces. Among the many subgenres of poetry, the elegy is, to me at least, among the most consoling. The beauty of the poem’s form itself, its diction, its music, help the reader’s or listener’s soul to make something, add something concrete to the sum of the world. The poem is not the same thing as what was lost; but it is something, and it suggests thoughts and feelings beyond its own boundaries. Though much elegiac poetry is religious, it needn’t be religious to begin redressing a loss. What Dickinson’s poem adds to the sum of the world is a strange, indeed unique, mixture of effects. Her poem is funny: Death is your polite Saturday night date with his own set of wheels. Her poem is Gothic and creepy. It’s a mystery, an allegory, a singsong ballad, a hymn. It dares to be everything, to cover a single, final day and all of experience. Even at funerals we find it permissible to laugh a little. America’s hermit poet is being social with us here, inviting us to smile even at the thought of our own demise.

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Because I could not stop for Death—
He kindly stopped for me—
The Carriage held but just Ourselves—
And Immortality.

We slowly drove — He knew no haste
And I had put away
My labor and my leisure too,
For His Civility—

We passed the School, where Children strove
At Recess — in the Ring—
We passed the Fields of Gazing Grain—
We passed the Setting Sun—

Or rather — He passed Us—
The Dews drew quivering and chill—
For only Gossamer, my Gown—
My Tippet — only Tulle—

We paused before a House that seemed
A Swelling of the Ground—
The Roof was scarcely visible—
The Cornice — in the Ground—

Since then — ‘tis Centuries — and yet
Feels shorter than the Day
I first surmised the Horses Heads
Were toward Eternity—

—Emily Dickinson