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

Celebrating our centennial

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

"Because I could not stop for Death"

The poetry of life
MATERNITY'S THIN LINE

What separates mothers who die from those who survive?

Story by Cathy Shufro  Photography by Nana Kofi Acquah and Cathy Shufro
Waiting to deliver, Veronica Arhin joins new mothers in a maternity ward in Ghana, where maternal mortality is 22 times higher than in developed countries (January 9, 2013).
Eventually, she says, a doctor passed by, saw the blood and rushed her to the ultrasound room. She remembers nothing further until she woke to find that her baby had been delivered by cesarean section and that the baby was dead. Her husband and his father buried the child, a boy. She never got to see him.

“God gives and God takes away,” she says.

If Seidu had followed her son to the grave—and she came close—she would have been among the hundreds of thousands of women whose deaths cut a red swath across the world map in a recent *Lancet* assessment of maternal mortality. UN Millennium Development Goal 5 calls for a 75 percent reduction in maternal deaths between 1990 and 2015. The red on the *Lancet* map indicates countries that, at current rates, won’t reach that goal by 2015, or by 2025, but rather after 2040. Red covers most of Latin America and the Arabian Peninsula, much of Central and Southeast Asia, and nearly everywhere in Africa south of the Sahara. More than half the women who die from pregnancy-related complications worldwide are Africans, according to WHO.

In narrowly avoiding death, Seidu became what researchers call a “near miss”—a woman who nearly dies because of complications of pregnancy or birth. While the study of maternal death has long been a public health priority, researchers are increasingly studying near misses. They hope this research will help forestall severe complications, improve care when complications do occur and increase their understanding of what leads to deaths.

“Maternal mortality is ‘the tip of the iceberg,’” says Michelle Hindin, PhD ’98, MHS ’90, an associate professor in Population, Family and Reproductive Health (PFRH) at the Bloomberg School. “Women who nearly die but survive are much more common, and their needs are not being addressed.”

Near misses almost always occur in clinics and hospitals; medical interventions are what prevent crises from becoming deaths. However, the health care facility is a “black box,” says Özge Tunçalp, MD, PhD ’12, who studied near-miss cases globally and in Ghana for her doctoral work with Hindin.

Near-miss researchers look inside that box both to suggest improvements as well as learn about maternal mortality. The circumstances and events that lead to a near miss resemble those that end in death, says Tunçalp, who now works for WHO in Switzerland. A woman in a life-threatening condition will become either a maternal near miss or a maternal death; the distance between the two is “a thin line,” says Tunçalp.

Numbers for near-miss cases also can serve as “proxy indicators” for maternal mortality, which is likely underestimated because one in three women in developing countries gives birth without medically trained attendants, and deaths at home often go unreported. Because near misses occur in clinics and hospitals, however, researchers capture them all.

Although interest in near-miss research dates back to the 1990s, it wasn’t until 2009 that WHO defined a near-miss case as “a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy.” Linda A. Bartlett, MD, MHSc, an associate scientist in International Health, served on the WHO working group that defined near miss. She also helped develop the WHO data collection form for near misses. And Tunçalp was one of the first scientists to use the tool in sub-Saharan Africa.

Tunçalp did her research at Korle Bu Teaching Hospital in Accra, the capital of Ghana. The relatively prosperous West African country reduced its maternal mortality ratio per 100,000 live births from 550 deaths to 350 deaths from 2000 to 2010. Still, Ghanaian women face a risk of maternal death 22 times that of women in developed countries.

“Even though the numbers are going down, we are still losing a number of women,” says Tunçalp’s Ghanaian colleague, Kwame Adu-Bonsaffoh, MD, a senior obstetrician at Korle Bu. He, Tunçalp and colleagues prospectively analyzed medical records for 3,438 pregnant women who passed through...
Even though she went to a referral hospital for delivery of her fourth child, Amina Seidu is lucky to have survived.
Korle Bu during five consecutive months beginning in fall 2010. They found that 94 of those women were near misses (while another 37 died). Of the 94 women who nearly died, 29 suffered from severe pre-eclampsia (pregnancy-induced hypertension coupled with protein in the urine). All but one of the women who developed eclampsia received the recommended treatment, magnesium sulfate.

Care was not as good for women with life-threatening bleeding or infections. Of the 121 women with severe postpartum hemorrhage, Tunçalp found that only 67 percent got medications like oxytocin that can slow or stop bleeding. She also found that among 32 women with sepsis, a life-threatening response to infection, only 40 percent got intravenous antibiotics. Fewer than half survived. “Even the doctors at the facility didn’t realize that there was such a big issue with sepsis,” says Tunçalp. “If you look at cases one by one and then don’t look at the aggregate data and the trends, it’s really easy to miss even if it’s happening in front of you.”

When women endure a near miss, Hindin says, “it impacts their whole life: their family life and their ability to work. It may impact their future childbearing. Women who experience near misses often have serious complications that have long-lasting physical and mental health outcomes. These women need health care services, and monitoring near-miss rates will help governments and ministries of health plan better.”

Qualitative studies can help with this, particularly because women who survive life-threatening complications live to tell the tale. Tunçalp and Adu-Bonsaffoh interviewed 32 of the women from the larger study. “At first they are very happy and very grateful because they are alive,” recalls Tunçalp. “But then you probe them and ask them how they were treated, and all the staff-related issues or physical environment issues come out.”

The women’s testimony pointed out both interpersonal and structural problems not evident from morbidity and mortality data. Some women complained about disrespect from the hospital staff. A 36-year-old woman who nearly died described being ignored by the midwives: “They don’t attend, even when you are crying and the baby’s head is coming. They’d be sitting down and chatting and laughing at you.”

A 34-year-old woman who lost her baby and whose uterus ruptured after a 24-hour labor didn’t find out until 12 days later that she’d had a hysterectomy. As a physician told her, she began to cry, fearing her boyfriend would leave her because she could no longer have children.

Several women objected to recovering from surgery while lying on a mattress on the floor. (Patients often outnumber beds and end up on the floor.) One woman was incredulous that the ward had no water. (While Tunçalp was at Korle Bu, the water in the maternity block stopped working for several days.)

Tunçalp’s next step is to return to Ghana and share her results with the managers of the ob-gyn department at Korle Bu. She will recommend that they audit near-miss cases to assess the quality of care and solve problems. Whereas most U.S. hospitals schedule frequent morbidity and mortality conferences, the only systematic assessment of maternal care at Korle Bu is a monthly review of deaths. Discussions of near misses have the advantage of being less fraught than discussions of deaths, says Tunçalp. “It’s easier to talk about what went wrong when you know at the end of it the woman actually survives,” she says.

Tunçalp will also recommend that the hospital work to improve the system for referring and transporting women to Korle Bu from other facilities. Ghanaian public health researcher Easmon Otupiri, PhD, MPH, MSc, agrees that delays in referrals constitute the biggest barrier to good emergency obstetric care in Ghana.

Several roadblocks (besides the rough roads themselves) stymie efforts to move a woman with a complication from a local health post to a referral hospital with specialists and a blood bank. The most obvious problem is a lack of ambulances...
staffed by skilled technicians, says Otupiri, a professor of community health at the medical school at Kwame Nkrumah University of Science and Technology in Kumasi (and a former Gates Visiting Scholar at the Bloomberg School). Another challenge: communication. When a patient with complications is moved to a higher-level hospital, doctors and nurses must use their personal phones to call an acquaintance at the destination hospital. If the colleague’s phone is out of credit, the call doesn’t go through.

And women facing life-threatening emergencies sometimes wait on gurneys in the hallway while less-urgent cases enter the OR, Otupiri says, adding “we don’t seem to have a well-organized system of who goes in when.”

Complicating triage is “a mal-distribution of cases,” says Roderick Larsen-Reindorf, MD, an ob-gyn at Kumasi’s main referral hospital, Komfo Anokye Teaching Hospital. “We have a huge mix of normal labors that a midwife could have handled in an outside hospital, combined with a huge number of complicated cases. Our midwives can be overwhelmed with numbers,” says Larsen-Reindorf, adding that five midwives sometimes must manage 25 women in labor.

PFRH associate professor Cynthia Stanton, PhD ’96, MPH, points out that the “brain drain” contributes to a shortage of midwives. “Particularly in Anglophone countries [which include Ghana], the U.S. and the U.K. have been poaching nurses for many years,” says Stanton. “It’s really a crisis in many countries.”

Better family planning could reduce maternal mortality. As Larsen-Reindorf puts it, “If a woman doesn’t get pregnant, she doesn’t die of it.” Tunçalp reports that although most women she met wanted contraceptives, many went home without them. That’s what happened to Amina Seidu in Kumasi. Not only did she leave the hospital without contraception, but she was told that she could try to conceive again in six months.

Seidu’s situation disturbs Amy Ong Tsui, PhD, MA, director of the Bill & Melinda Gates Institute of Population and Reproductive Health, on two counts. First of all, “she should have left with some kind of contraception, that’s for sure,” says Tsui, a PFRH professor. The story does not surprise her, however; only 23 percent of Ghanaian women use modern contraceptives, including condoms.

Second, Tsui would recommend that Seidu wait four times longer before conceiving again: A woman can improve her odds of a healthy pregnancy if she waits at least 27 months between pregnancies. If a new pregnancy follows too quickly, says Tsui, the mother may be nutritionally compromised and therefore more vulnerable to infections and to anemia.

Tsui says that in much of sub-Saharan Africa, couples once abstained from sex for several months after a birth. “You weren’t supposed to resume sex until the baby reached a certain milestone of growth, usually when it could sit up or walk. Sitting up is six months, walking is 12 months.” Nowadays, she says, fewer Africans follow the custom of postpartum abstinence.

What Tunçalp has initiated in Ghana

What Tunçalp has initiated in Ghana is what WHO advocates worldwide: that clinics and hospitals track and analyze maternal near misses, determine what might prevent them, make changes and then repeat the cycle.

Tunçalp says that the near-miss approach is gaining traction. “More and more articles are being published in journals, and the majority of these are coming from low- and middle-income countries. At the most recent [international ob-gyn] conference I attended, there were many oral presentations and sessions on near-miss morbidity and near-miss audits.” Paradoxically, she says, “when you start improving maternal health, you might actually start getting more near misses because you are preventing deaths.”

Meanwhile, the nurse-midwives at Komfo Anokye hospital in Kumasi keep patient records by hand, entered into the bound logbooks. They record vital signs in the left column and progress notes on the right. In each book, more than once, a midwife has drawn a cross in red ink at the end of a patient narrative, with a woman’s name and this inscription:

“May her soul rest in perfect peace.”
Death is a frequent visitor. It stalks your family, your neighbors—everyone—especially infants and young children. From your parents, you inherit a kind of fatalism, a resignation to death’s commonness as God’s will.

When a family member dies, you prepare the body in your own home. You plan for an elaborate last photograph. You carefully arrange her clothes and hair so she appears to be sleeping. Like many people of your era, you weave a wreath of her hair to keep as a constant reminder. If your child dies, you pay for the gravestone to be adorned with a lamb, a daisy, a vacant chair or other Victorian symbol for children.

By the turn of the century, however, this romantic view of death was about to be swept away.

Change came slowly at first. Public health reformers in the U.S. began to systematically collect statistics on births, deaths and disease. Their data exposed the appalling scope of disease and death. In 1885, one in every four infants born in New York City died before their first birthday. In Atlanta in 1900, an astonishing 45 percent of African-American infants died before age 1. And that year, one in every 500 Americans died of tuberculosis.

At the same time, mass sanitation, modern water and sewer systems, and immunization programs began slashing rates of the deadliest infectious diseases. By the 1920s, vaccines against diphtheria, tetanus, typhoid and other diseases had begun to make a difference. The combined result was extraordinary. From 1885 to 1915, New York City cut its infant mortality rate by two-thirds. Such statistics fueled public health efforts to convince the public that disease was preventable, death not inevitable. State health departments sent “health trains” into the countryside extolling the benefits of window screens, hand washing and safe food handling. Lantern slide shows and a circus midway atmosphere attracted crowds eager to hear the gospel of public health.

Reflecting the era’s growing confidence, the great health reformer Hermann Biggs proclaimed in 1911, “Public health is purchasable. Disease is largely a removable evil.”

The public health revolution, while amazing, was far from equitable. People in cities enjoyed nearly twice as great a reduction in mortality as rural residents. Whites in Northern cities benefited most of all. In the South, poverty and the lack of access to health care ensured that diseases like malaria, dysentery, typhoid, influenza and tuberculosis flourished. It would take World War II’s economic boom and government programs by leaders like U.S. Surgeon General Thomas Parran to push Southern mortality rates close to the national average.

Public health’s success in raising life expectancy by 20 years in most Western countries during the first half of the 20th century spurred efforts to extend those gains globally in the century’s second half.

Once again, public health would have to change attitudes toward death to save lives. Carl E. Taylor, later chair of the School’s Department of International Health, argued in The Atlantic in 1952 that adequate family planning would be a boon to maternal and child health. But he knew it wasn’t feasible to work on lowering the birth rate without also addressing the death rate. In India, for example, 45 percent of children died before age 5 in the early 1950s. Until parents could be assured that more of their offspring would survive, they would never accept birth control. This insight became an essential tenet of the child survival revolution, which began in the 1980s and would achieve historic reductions in infant and child mortality.

While public health still has much work to do, death is more of a stranger to us than it was to our ancestors. We can rejoice with public health pioneer Charles V. Chapin who wrote in 1921: “Figures do not measure the terror of epidemics, nor the tears of the mother at her baby’s grave. …To have prevented these not once but a million times justifies our half century of public health work.”

NO DEATH, NO LIFE

In the secrets of cells, J. Marie Hardwick discovers philosophy
Apoptosis, the genetically instilled suicide of cells, offers a brutally clear lesson in survival. It has also yielded other valuable discoveries to J. MARIE HARDwick, PHD, who has probed cells and extracted their secrets to existence for more than a quarter century. Along the way, the David Bodian Professor of Molecular Microbiology and Immunology acquired a new appreciation of the importance of cell death to creatures both great and small.

By illustrating just how essential the purposeful suicide of individual cells is to life, Hardwick has shed light on the life-giving nature of cell death. (Without apoptosis, unfettered proliferation can lead to cancer in complex organisms, and to wholesale population loss in simple ones.) Her work has led her, in spare moments away from the bench, to muse on the apparently universal phenomenon of altruistic self-sacrifice and the implications it may have for society.

Is apoptosis really so important? What would happen if we eliminated it?
It’s crucial. The death of cells is required for the survival of organisms. We can make mutants of any complex organism, like a fly or mouse, and inhibit this natural process of cell limitation, and the outcome is either early mortality, or some drastic malformation, or cancer.

Why must cells die?
We need to have new cells born all the time—to repair wounds, to recover from an infection—but we also need to have a secure method for eliminating them after they’ve done their job. If there weren’t a balance between proliferation and death, things would rapidly get out of control.

Is it true that even single cell organisms like yeast kill themselves for the greater good?
There is still some disagreement about [this], but I think it’s pretty clear that even for single-cell species to survive, some of the individual cells need to die: the infected ones, the less fit ones, the ones that in cases of overpopulation would otherwise consume all resources and cause the entire population to die. If you have a death-resistant population of yeast, they’re less likely to survive in the long run; if you have a death-prone population, they’re much more likely to do so. It’s the opposite of what you’d expect, but it just speaks to the importance of altruistic death.

Your studies into cell death in yeast yielded some unexpected results, didn’t they?
We thought that some of the genes found in both yeast and humans might have some role in regulating cell death. But whenever we removed one of those genes from yeast, a mutation cropped up in another, different gene. We didn’t predict that, and we think it is a model for how cancer tumors form: You have one mutation [i.e., a deleted gene] that drives the creation of another mutation, and another, and another.

Then we discovered a family of human genes that are similar to the mutated yeast ones and related to human disease: Several of them have shown up in cancer, and one of them is a new epilepsy gene.

Something similarly unexpected cropped up in an apoptosis study involving a genetically engineered mouse.
There’s a protein called Bcl-xL that normally inhibits apoptosis, but when it’s cleaved by a protease called caspase, it becomes a killer and triggers cell death.

We engineered a mouse to prevent Bcl-xL from being cleaved, and shared it with collaborators at Yale University and Albert Einstein College of Medicine, who used the mouse to study strokes. And they found that the mice with uncleavable Bcl-xL protein were strikingly resistant to neuronal death after a stroke.

That generated some interest because there’s a drug that inhibits Bcl-xL that’s now in clinical trials to kill cancer cells—if you inhibit this normally protective protein with the drug, the tumor cells die. So we used that same drug [the one that kills cancer cells by inhibiting Bcl-xL] to treat mice after a stroke, and it turns out that it protects against cell death in the brain.

Therefore, this drug can inhibit both the survival form and death form of Bcl-xL, and applying this drug to those specific conditions like cancer and stroke is beneficial.

That’s a pretty cool idea: A chemotherapeutic agent might be beneficial in protecting neurons in the brain. I got a few phone calls from excited colleagues about that one. There are diseases like Alzheimer’s where we suffer a lot of neuronal loss. I think if we could improve the survival of neurons in Alzheimer’s, we could improve quality of life.

So will this drug work in Alzheimer’s patients? Or could it be helpful to people with other types of neurodegenerative processes?
[That] is not known. Many different mechanisms can cause neuronal loss, and we are currently seeking [funding] to identify the culprits responsible.

Ours is a great example of how pure basic science leads to important findings for human health.

What does it mean that the same molecule can either kill cells or preserve them?
Evolution has put into place the best security mechanism: What better way to link cell proliferation to cell death than to use the same molecule? Bcl-xL inhibits death, and if it does that too much, you have cancer; but cleave it with caspase, and you can make it kill.

How have these discoveries affected your outlook on biology, and on the balance between life and death in general?
One, death is a good thing because it’s required.

Two, maybe we are like these yeasts that have begun to deplete their resources and are going to have to make some tough choices … like slowing population growth, reducing wasteful practices and cutting excesses to preserve remaining resources.●
When Sydney Dy, MD, MSc, arrived a decade ago at the Bloomberg School, she wondered how her work as a hospice physician and end-of-life researcher would fit in. “I could see how some people in public health might look at what I was doing and end up feeling it wasn’t about getting people healthier,” she says.

Then she looked at the question through the lens of her clinical work with inner-city patients. “I’d find myself caring for a family member, and in the same house you’d have a teenager with a baby and a partner in prison,” says Dy, now an associate professor in Health Policy and Management (HPM). “Everyone is wondering who’s going to help take care of the child after this patient dies. The end of this one life was a really important piece of the whole situation for the family—everything was interrelated.”

Few people in the U.S. die quickly and unexpectedly. For more than four in five of us, the end comes after one or more diagnoses and plays out over weeks, months or years. As Dy observed in those inner-city households, this is not a journey we make alone—loved ones are along for the ride as well, managing their own issues and stresses.

In medicine, end-of-life issues are the focus of more and more attention. Not long ago the vast majority of Medicare patients who died did so in the hospital. Today, about 45 percent choose hospice—and that number is rising.

Palliative care is growing nearly as fast. This field moves hospice concepts upstream, with the goal of helping patients be healthier throughout a serious illness. Two-thirds of U.S. hospitals now have palliative care...
Good Endings

I met a patient I’ll call “Hazel” in the 1970s. She was like the grandmother I wish I’d had, so caring and thoughtful. Hazel went from one major catastrophe to another until she told me she no longer wanted further treatment. She wanted to be allowed to die.

I reported that to the ICU team. The next morning on rounds, doctors stood outside her room, presented her case and then went on their way. They didn’t even say hello. The chaplain stopped them and said, “She doesn’t want treatment, and now we don’t even say good morning to her?”

They all went back and said hello, but I remember thinking, “There has to be a better way.” That’s how I got interested in end-of-life care.

I’ll give you another story. “Anne” was really worried that she’d be forgotten after she died. We talked about things that were important to her, and one turned out to be a collection of beautiful scarves. She went home and attached to every scarf the name of a loved one who cared for her. After she died, we talked about things that had meaning to her.

Helene Goldberg, MPH ’81, RN, CS-P, has worked with dying patients since the 1970s and is now a nurse psychotherapist specializing in loss and grief.
NO. 1 TOP KILLER

CARDIOVASCULAR DISEASE As a killer, cardiovascular disease (CVD) is in a class by itself: Worldwide, it's responsible for 30 percent of all deaths—about 17 million a year. In developed countries, it's the principal cause for half of all deaths.

There's an irony about this apex killer: Mortality from CVD is down by 50 percent over the past several decades. "Heart disease is definitely an amazing success story," says Josef Coresh, MD, PhD '92, MHS '92, an Epidemiology professor and director of the George W. Comstock Center for Public Health Research and Prevention. Changes in diet and exercise as well as the use of statin drugs have sent rates of fatal heart attacks plummeting.

STATS Women are more likely to die of heart disease than men. That's partly because women live longer than men, increasing their chances of dying from this persistent killer.

TRENDS CVD mortality rates have declined dramatically in white men and women; less so in black women and least of all in black men, according to Coresh and others. Why? Half a century ago, it was a disease of affluence, says Coresh, when affluence was associated with excessive smoking and eating, and little exercise.

FINAL TAKE "In terms of survival, we in the U.S. have been doing better for the past 40 years when it comes to heart disease. Not so for those who are now behaving like we once did—eating high-fat diets, moving less, smoking more. Heart disease is a growing problem in Eastern Europe, China and the Middle East."

MOST UNDERESTIMATED

DIABETES When it comes to top killers, diabetes is the most underestimated. The chronic disease underlies a significant percentage of fatal heart attacks and strokes, says Elizabeth Selvin, PhD '04, MPH, associate professor, Epidemiology.

STATS Worldwide, 347 million people have diabetes, and diabetes deaths globally will increase by two-thirds between 2008 and 2030, according to WHO. Overweight and obesity are now linked to more deaths worldwide than is underweight, WHO reports. Some developing nations are dealing with dual epidemics; malnutrition/famine and obesity/diabetes, Selvin says, adding: "Diabetes and obesity start among the well-to-do, then settle in the middle- and low-income classes."

TRENDS Selvin is amazed—and alarmed—by data from the National Health and Nutrition Examination Survey that compares the body mass index of Americans today with that of just three decades ago: "It's remarkable to see such a complete and dramatic shift of distribution of body fat, indicating a tremendous increase over just these past 25 years of people who are overweight or obese." Especially sobering: In the 1970s, about 5 percent of American kids were overweight or obese; now, almost 20 percent are.

FINAL TAKE "It's scary to think that the obesity/diabetes epidemic potentially could, in the near future, impact life expectancy by wiping out some major gains we've made in cardiovascular disease."

By Maryalice Yakutchik
Illustration by Dung Hoang
**DEADLY DUO**

**PNEUMONIA/PREMATURE** Staggering numbers of young children die preventable deaths. Of the 7.6 million worldwide who died in 2010 before reaching their fifth birthday, 1.4 million succumbed to pneumonia. Prematurity, the next leading cause of death in children, takes the heaviest toll on neonates and babies up to about 6 months, says Robert Black, MD, PhD, chair and the Edgar Berman Professor of International Health.

**STATS** Pneumonia deaths of children are declining faster (3 percent) than deaths from preterm birth complications (2 percent). Although Black’s most recently published data suggest a decline in the total number of deaths between 2000 and 2010, it’s not sufficient, cautions the researcher, to reach Millennium Development Goal 4, seeking by 2015 to cut child mortality by two-thirds.

**TRENDS** Local community health workers bearing antibiotics now are treating and diagnosing much of the world’s pneumonia and diarrhea cases. India has upward of 600,000 community health workers, and Ethiopia, 20,000, according to Black.

**FINAL TAKE** “We don’t yet have good interventions to reduce the rates of premature birth. But we can address some complications resulting from prematurity [with kangaroo-care which promotes immediate breast feeding and skin-to-skin contact with the mother] as well as mortality from pneumonia [with newly implemented vaccines, for instance, and cook-stoves engineered to reduce indoor air pollution].”

**BEST DRESSED**

**TOBACCO** Joanna Cohen, PhD, MHSc, collects cigarette packages. With beveled edges and holograms, some exude sophistication. Others, named “Long Life” or branded with panda bears, convey health and innocence. “They don’t look like death,” observes Cohen, who holds the Bloomberg Professorship in Disease Prevention. Tobacco will claim 1 billion lives in the 21st century if current trends continue, says Cohen, director of the Institute for Global Tobacco Control. Smoking, she says, is a major underlying risk factor for death from heart attacks, strokes and cancers, to name-drop a few of the primary killers appearing on people’s death certificates.

**STATS** Worldwide, almost 6 trillion cigarettes are produced— and consumed— annually. Every six seconds, someone dies because of tobacco products.

**TRENDS** More than 40 countries now require graphic pictures on packages that convey tobacco’s dangers. The U.S. is a different story. Tobacco companies have sued over new package picture-warnings, which Cohen considers wholly inadequate to warn U.S. consumers.

**FINAL TAKE** “Public health is hard enough; convincing people to change behaviors that may result in AIDS, for instance, or malaria, is difficult, despite [the fact] that no one’s cheering for the virus or financing the mosquito. With tobacco, we have multinational companies, the top six of which had combined profits upward of $35 billion in 2010, pushing to sell the products that kill one out of every two of long-term users.”

**MOST DETERMINED**

**SUICIDE/OLDEST OLD** Worldwide, the highest suicide rates occur among those over the age of 75—one of the fastest growing age groups.

Having examined suicide trends among the old (65 to 79 years) and the oldest old (80-plus years), Annette Erlangsen PhD, adjunct assistant professor, Mental Health, says that certain life events, such as illness or losing a partner, are associated with increased suicide risk. In fact, the oldest-old men who had been hospitalized had the highest suicide rate among the elderly. Her research suggests that hospital staff could help identify those at risk.

**STATISTIC** Using national data from Denmark, Erlangsen discovered that about half of the oldest old who commit suicide are not receiving antidepressant medication though it might be indicated.

**TRENDS** The number of suicides among the oldest old is likely to increase as more people live longer. New prevention efforts need to address the fact that suicide among the oldest old is rarely impulsive. In fact, more than half of older adults who die by suicide have mentioned their plans to others.

**FINAL TAKE** “It’s very peculiar that people who are approaching the natural ends of their lifespans are very carefully and determinedly planning to take their own lives. We need to address the issues that make life no longer worth living.”
DOVE in the Time of Cholera

The more things change, the more they stay the same.

Epidemic cholera has been eliminated from Europe and North America, and rehydration therapy and antibiotics have significantly reduced mortality rates in Africa and Asia. Yet International Health Professor David Sack, MD, estimates that Vibrio cholera still infects more than 2.5 million people each year, killing more than 200,000. (The disease causes diarrhea so severe that death by dehydration can result in a matter of hours.)

While inexpensive oral vaccines are available, they have yet to be widely used—a situation Sack hopes to remedy through a new project, Delivering Oral Vaccine Effectively (DOVE), which recently received nearly $5 million in support from the Bill & Melinda Gates Foundation.

Sack helped run the initial field trials for the vaccines, which require two doses, back in the mid-1980s. Despite offering 70 percent protection with no known side effects, adoption has been slow. Some have held out for a live, single-dose vaccine or questioned the utility of vaccines with less than 85 percent protection. To Sack, who directs the Enterics Laboratory of the Center for Immunization Research, this represents a clear case of “the ideal being the enemy of the good.”

“Public health benefit is not measured by efficacy,” he says. “Public health benefit is measured by the number of deaths averted.” And with a disease as common as cholera, even 70 percent protection will save many lives.

DOVE will therefore help governments and health agencies deploy the existing vaccines as effectively as possible. With funding from the Gates Foundation and help from organizations like the International Vaccine Institute; the International Center for Diarrhoenal Disease Research, Bangladesh; and WHO, DOVE will document the implementation of pilot programs in places such as Haiti, India, Bangladesh and Africa. The goal is to learn how best to include the new oral vaccines in an integrated strategy for cholera control.

—Alexander Gelfand

A Simple Solution for Saving Infants

Some of the most gratifying experiences in public health come when years of research yield effective new policies and programs. That moment came last fall for Joanne Katz, ScD ’93, MS, professor in International Health (IH), when representatives from several South and Southeast Asian countries met in Nepal to recommend the application of the antiseptic chlorhexidine to infants’ umbilical cords after delivery in their countries.

The recommendation follows two studies conducted from 2002 to 2005 by Katz and her colleagues in IH, associate professor Luke Mullany, PhD ’05, MHS ’02, and Professor James Tielsch, PhD ’82, MHS ’79. The researchers were working in a field site in Nepal where most babies are born at home. Infant mortality due to sepsis was high, with cord infections posing a particular challenge. The team hoped that chlorhexidine—affordable and widely available as a liquid or ointment—would act on a series of pathogens entering the infants’ bloodstream through the open portal.

“Our primary interest was to see whether we could reduce infectious mortality in infants,” Katz says.

The researchers conducted a randomized trial of 15,804 newborns who received varied care from community-based research workers: either a 4 percent chlorhexidine solution, soap and water, or dry cord care. Mortality in the group receiving chlorhexidine was 24 percent lower than those receiving dry cord care, and if the antiseptic was applied within the first 24 hours of birth, the mortality reduction was 34 percent. Severe cord infection was reduced 75 percent.

The striking results have sparked several replication studies using slightly different designs. Studies have been completed in Pakistan by Aga Khan University and in Bangladesh by IH Professor Abdullah Baqui, MBBS, DrPH ’90, MPH ’85, and IH associate professor Luke Mullany PhD, ’05, MHS, ’02. Those studies had “comparable effects,” according to Katz. Other studies are under way in Africa.

—Rachel Wallach
Treat, Don’t Accept Kidney Disease

The role of chronic kidney disease (CKD) in deaths among older adults has been a source of controversy in the medical community.

The debate: Is this a treatable disease process that puts those 75 and older at a greater risk of death than other seniors, or is kidney damage simply a natural part of the aging process?

Research by Bloomberg School scientists leading the global Chronic Kidney Disease Prognosis Consortium, resolved the issue with definitive findings published December 12, 2012, in *JAMA*. In older adults, CKD increases the risk of death, according to the study, which implies a call to action by researchers and clinicians.

The refuted view attributes CKD to so-called “normal aging,” citing the prevalence of this disease that affects 54 percent of adults ages 75 and up. “That certainly is not the case,” says Josef Coresh, MD, PhD ’92, MHS ’92, the Consortium’s principal investigator and an Epidemiology professor. “We have assembled the world’s data and the data spoke clearly.”

The study analyzed data from more than two million people ages 18 to 108 participating in 46 cohort studies conducted from 1972 to 2011.

Coresh, Kunihiro Matsushita (right), MD, PhD, and other investigators determined that in a comparison between two groups of 1,000 people 75 and older—one group with CKD, the other without—27 more people will die in the first group than in the second. The excess risk is present in all age groups but actually increases with age.

The study calls for increased attention from health care providers in identifying and managing CKD in older patients, who may be more vulnerable to adverse drug interactions—and are at greater risk of complications from conditions such as high blood pressure and diabetes.

“With kidney disease, risk of many causes of death is higher at every age,” says Coresh. “It’s important to address this higher risk.”

—Jackie Powder

The Health in Mental Health

Schizophrenia isn’t fatal. Depression itself won’t kill a person. In fact, psychiatric illnesses are altogether absent from official lists of top causes of death.

Then why do people with severe mental illnesses have a 25-year shorter lifespan than the general population? That question has driven longstanding research by William Eaton, PhD.

“Repeatedly, we find that people with schizophrenia have higher rates of mortality; but they’re not dying from schizophrenia. They are dying from failing to present with, and get treatment for cardiovascular disease, cancer and diabetes,” says Eaton, PhD, the Sylvia and Harold Halpert Professor and Chair in Mental Health.

Eaton reviewed a quarter-century’s worth of literature on four common mental disorders and summarized their effects on mortality for the 2012 book *Public Mental Health*. Depressive disorder, he reveals, raises the risk for mortality by 70 percent. “Our research was among the first to show in population-based samples that a history of depressive disorder was associated with a raised risk for Type-II diabetes, cardiovascular disease and stroke,” Eaton says.

Eaton describes all-too-common scenarios. An individual with schizophrenia consults with a psychiatrist about his mental disorder instead of visiting a primary care physician who would diagnose and treat his hypertension. Likewise, a patient with major depressive disorder who has suicidal ideation might not be asked by her primary care practitioner if she is taking her cholesterol medication.

Both depression and schizophrenia are known to influence behaviors associated with risk factors for a range of chronic medical conditions. For example, a lack of regular exercise combined with psychoactive drugs can lead to weight gain and contribute to obesity and diabetes.

The bottom line: Even though individuals with mental illness have high suicide rates, especially those with depressive disorders, most die from largely preventable diseases, and die earlier from those diseases than others.

—Maryalice Yakutchik