The Magazine of the Johns Hopkins Bloomberg School of Public Health

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NEXT ISSUE THE BODY’S FRENEMY

THREATENED BY AN INVADE like the flu virus, the human body marshals an inflammatory response. It’s a vital defense mechanism, but scientists now link inflammation to cancer, COPD and other diseases. More about our foe/friend in the Fall 2012 edition.
Special Section
To solve the darkest public health issues—suicide, sexual abuse, obesity and chronic disease—researchers see the light of day in adolescence, childhood and the womb.

Reason versus Rage
“…this is a field that needs the surgeon general as well as the attorney general.”
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Beginnings
Bright and Dark
THE SEXUAL VICTIMIZATION OF CHILDREN is a subject so horrifying that it’s difficult even to address. As a society, we approach it from two extremes. Most of the time we avoid it. When forced to confront it, we run to the opposite extreme, flying into a rage, voices full of fury.

With that said, it’s time to face up to another fact: Rage is not an emotion associated with clear thinking and sound public policy. Child sexual abuse is not a subject that lends itself to the sort of rational, dispassionate decision making so essential to scientific practice. Instead, it’s a subject where the playing field seems always tilted toward punishment rather than prevention.

This is the challenge that the Bloomberg School’s Department of Mental Health is now taking up. William Eaton, PhD, the Sylvia and Harold Halpert Professor and chair of Mental Health, says the decision to do so is based not only on alarming numbers—80,000 confirmed cases annually, tens of thousands more unreported—but also on the devastating impact these incidents have on victims for decades after the crime.

“One thing that has come as a surprise to me is the way people with a history of being abused sexually as a child have a much higher risk going forward of so many major mental disorders,” Eaton says. He ticks off a list: depressive disorders, personality disorders, drug abuse, schizophrenia, suicide and more.

“This is one of the leading risk factors for the entire range of mental disorders,” Eaton says.

Worst of all, these crimes can fuel a brutal cycle, as victimized boys are at higher risk for becoming sex offenders themselves. Fred Berlin, MD, the founder of the Johns Hopkins Sexual Disorders Clinic, has seen this cycle play out in his four decades of work in this area as a psychiatrist at the School of Medicine. A mother whose son was victimized angrily confronted Berlin in a courtroom. “Years later I get a call from this same mother. Her son had now committed a sex offense, and she was wondering if there was something I could do to help. There is just so much tragedy in this.”

With the help of private donors, Eaton’s department has sought to bring public health expertise to bear on child sexual abuse. It established a partnership with Berlin and then in 2011 hired researcher Elizabeth J. Letourneau, PhD.

Letourneau and Berlin took time recently to discuss the road ahead as they
seek to move prevention-based strategies and policies to the forefront. One big challenge: combating the myths that have come to dominate public discussion of the topic.

The work will not be easy—and it might be controversial at times. But Eaton is confident that the effort will have results. “We will never eliminate child sex abuse from the picture altogether,” he says, “but I believe there are opportunities out there to lower the rate of it—and perhaps lower it by a lot.”

**MYTH #1**
**OUR SOCIAL POLICIES AIM TO PREVENT THE INCIDENCE OF CHILD SEXUAL ABUSE.**

In recent years, researchers have set out to dig past the 80,000 annual cases confirmed by the U.S. Department of Health and Human Services and gauge the real extent of child sexual abuse in this country.

On the lower end of the spectrum, a review of 16 studies published in *Child Abuse and Neglect* estimated that 7 percent of boys and 14 percent of girls in this country are sexually victimized as minors. A *Psychological Bulletin* article that averaged the results of 23 studies estimated 17 percent of boys and 28 percent of girls were victims.

Such numbers signal a public health problem of the first order, especially considering the mental health problems victims might endure in later life, problems that spread to the lives of countless siblings, spouses, future children and sometimes even whole communities, as recently demonstrated by the child sexual abuse scandal at Penn State University.

Seated in her tidy office at Hampton House during an interview, Letourneau reviews the extent of this wreckage and makes the case that society’s current response to it is out of balance. On the one hand, there is the criminal justice system, where expensive policies are increasingly the norm—things like maintaining vast online databases of sex offenders and seeking extended civil commitment in specialized mental health facilities for some convicted offenders who have completed prison terms.

“We don’t put anything like those resources into prevention,” Letourneau says. “There’s virtually no money for this stuff. This is a field where it’s a big deal if the Centers for Disease Control puts out a single $1 million grant every couple of years for work on prevention.”

A few days later in his Mount Vernon office, Berlin says he shares Letourneau’s frustration on this front. His work with sex offenders has stirred occasional controversy over the years. Some have worried that his efforts to better understand offenders, their mental states and their behaviors might have the effect of destigmatizing—or “normalizing”—their abnormal behaviors, though Berlin has never suggested decriminalizing harmful sexual acts.

Questions have also arisen over his support for limited use of testosterone-reducing medications that induce “chemical castration.” In recent years, however, the use of such medications to help individuals maintain control of their sexual desires has gained increased acceptance.

“We cannot legislate this problem away, and we cannot punish it away, but that’s all we keep trying to do,” Berlin says. “That’s not the right approach here any more than it is with problems like alcoholism or drug addiction. We need a law enforcement...
component, yes, but this is a field that needs the surgeon general as well as the attorney general.”

MYTH #2
CONVICTED SEX OFFENDERS NEVER STOP BEING A RISK TO CHILDREN.

Monsters exist, to be sure. But researchers who have studied this issue say that the serial-offender pedophiles who garner media attention are more the exception than the rule.

The Department of Justice regularly runs statistical comparisons of different categories of criminal offenders, and its data indicate that sex offenders have a comparatively low rate of recidivism.

Much of Letourneau’s research focuses on young offenders—boys between 12 and 14, who are at the peak age of risk for engaging in sexual misbehaviors with younger children. Such offenders don’t fit the “monster” profile.

“They are acting oftentimes out of a lack of knowledge and with a lack of adult supervision, or sometimes their behavior is basically experimental,” Letourneau says. “Rarely are they acting out of genuine sexual interest in children, though that can happen and we know it does happen on occasion. But in reality, the vast majority of these kids—something like 95 percent of them—are simply not going to re-offend.”

This trend in recidivism data applies to adults as well as children. One of Berlin’s research projects involves tracking outcomes for more than 400 adult male offenders diagnosed with pedophilia, a strong sexual preference for children. Over the first five years of the study, the recidivism rate for this group was less than 8 percent. Among the pedophiles who were generally cooperative with terms of treatment and parole or probation, the rate was less than 3 percent. Berlin’s team is now tracking this same group on a 15-year time frame, and preliminary data show no shift toward increasing rates of recidivism as years go by.

These numbers can be imprecise, given how many offenses in this category go unreported, but Letourneau expresses confidence in the quality of the research. “For younger offenders, if you follow them for 10 years, you’re going to have a very good understanding of how many are re-offending,” she says. “You might not know how often they’ve re-offended, but if they’re re-offending with any frequency over a 10-year period, at some point a victim will come forward. The same is true of adults. If you follow them out 20 years, you’ll have caught pretty much everyone who’s committing offenses.”

Moreover, she adds, rigorous, randomized controlled clinical trials have repeatedly demonstrated that even high-risk youth and—importantly—their families can succeed with treatment.

In essence, most sex offenders are not serial predators. Both Letourneau and Berlin believe that prevention strategies must include both treatment for convicted offenders and outreach to potential offenders.

This is a bridge that it took Kathy Headley a long time to cross. Victimized in her youth by a pedophile grandfather, the Indiana resident has joined with her siblings (including Stephen Moore, MD, MPH ’93) to fund Letourneau’s position for a three-year startup period—and perhaps beyond.

Headley and Moore spoke about the long-term impact on victims and their families at an April 27 symposium, “Child Sex Abuse: A Public Health Perspective” at the Bloomberg School.

“One of the things we were asking about in our meetings is whether there is any possible way of getting to offenders before they offend and ruin children’s lives—and ruin their own lives for that matter,” Headley says. “That’s been hard for me, to get past the feeling that you should just lock them up and keep them there. But I’ve come to see that if it helps keep one person from becoming a victim, then that’s what we have to do.”

MYTH #3
ONLINE OFFENDER REGISTRIES HELP COMMUNITIES KEEP THEIR CHILDREN SAFE.

Google the topic of online sex-offender registries and you’ll arrive soon enough at this sort of proclamation: “Online sex-offender registries are an essential resource.”

Minnesota was the first state to launch a registry, in 1991. That move came in the aftermath of the disappearance of an 11-year-old Minnesota boy, Jacob Wetterling, who has never been found. Three years later, the feds upped the ante, requiring states to maintain online registries that are open to the public. That requirement is often called “Megan’s Law,” as it went on the books after the rape and murder of a 7-year-old New Jersey girl, Megan Kanka, whose killer was both a neighbor and a twice-convicted sex offender.

Today, different states handle these registry requirements in different ways. The most aggressive require registration for a broad range of offenses and keep even one-time offenders listed for life. Others limit registration to offenders deemed especially dangerous.

Letourneau worked previously at the Medical University of South Carolina, where she conducted a series of studies seeking to measure the impact of that state’s aggressive approach to registration. Early on, she measured whether the registry law achieved its primary goal of reducing the number of offenders who commit new sex crimes.

The answer was no. Recidivism rates showed no significant change as the state adopted its registration law and then again as the online registry went public.

Letourneau’s follow-up work on this topic is fascinating, demonstrating that the registry has had significant unintended consequences. First, she conducted a pair of studies showing that prosecutors changed their approach to juvenile sex crimes after the registry requirement went into effect.

The first study showed that prosecutors became less likely to move forward with sex-crime charges once the registry was in place—cases were simply dismissed or diverted. The second study concluded that when prosecutors did move forward on cases, they became more likely to permit defendants to plea bargain into the assault category and out of the sex-crime category.

In both cases, Letourneau’s hypothesis is that prosecutors came to regard lifelong registration as a draconian penalty that didn’t fit the crime in a significant number of cases with youthful offenders. One important concern she voices about this finding is that the offenders end up receiving...
no follow-up or treatment geared specifically to their actual crimes.

Letourneau next looked at the outcomes of cases involving adult offenders that went to jury trials after the registry was launched. These are the cases, she says, that prosecutors tend to regard as slam-dunk wins as they head to trial. But she found that conviction rates in these cases declined after the public online registry was established.

“I’ve had prosecutors and attorneys of all stripes tell me about cases where the jury was deliberating and they asked the judge, ‘Will he have to go on the registry? Or will he just face time?’ It’s a punishment that’s just so harsh—juries were modifying their behavior. So we’re now setting some of these guys free—they’re completely exonerated. It’s unbelievable, but we have a policy that increases the likelihood of letting adult sex offenders go.”

Letourneau plans to build on this work at Johns Hopkins. Studies of the impact of registration in other states have yielded varying results, an outcome likely related to the different approaches taken. She is preparing to compare the results of juvenile registry policies in three states—one that aggressively registers a wide swath of offenders (Texas), one that takes a middle-of-the-road approach by giving discretion to prosecutors and judges (Maryland), and one whose conservative approach reserves the registration requirement for a very few offenders judged to be high risks (Oklahoma).

Letourneau raises one other question surrounding offender registries that deserves more attention going forward: What impact does being on a public registry have on the lives of ex-offenders, especially the ones sincerely trying to steer clear of future trouble?

“It can be very difficult for known sex offenders to maintain stable living conditions and stable jobs while on these registries,” Letourneau says. “And when you don’t have stable living conditions and stable social connections, it makes it more difficult to re-integrate into society.”

Berlin feels that registries are a prime example of what’s wrong with the way society is dealing with child sex abuse. “The goal is right—we need to protect these children,” he says. “But we need to do it in a way that’s going to work, a way that’s based on data, a way that’s cost-effective. We’re not doing that. What we’re doing instead is reacting to the emotion of the moment, and as understandable as that emotion is, it’s just not the right way to go. Effective public policy should be based upon evidence about what works best.”

MYTH #4
THE JERRY SANDUSKY CASE AT PENN STATE WILL DRIVE SOCIETY TO DEVELOP BETTER POLICIES.

The media explosion set off last year by allegations of serial sexual abuse of young boys over the course of years by Jerry Sandusky, a former assistant football coach at Penn State University, has focused sustained attention on a topic that society might otherwise avoid. Peter Pelullo, the leader of a foundation devoted to supporting victims of child sex abuse, says he’s hopeful the case will help the public grasp the true costs of sexual abuse.

“This thing has just rocked the country,” he says. “It presents a great opportunity to really put the focus on these young boys—and especially on the fact that they’re going to be living with this for 40 or 50 or more years.”

A successful music-industry executive, Pelullo is a former victim himself. His book, Betrayal and the Beast, recounts his journey from being raped repeatedly at age 7 by older neighborhood children to his still-in-process recovery as a 50-something adult. In between, Pelullo battled multiple addictions and endured an inability to establish bonds of trust and intimacy.

In going public as an abuse victim, Pelullo launched his Let Go … Let Peace Come In Foundation. In March, the foundation reached an agreement with the Bloomberg School to help fund research by Letourneau, Eaton and other department colleagues aimed at preventing abuse.

“To truly study this as a public health issue, that’s something that just hasn’t been done,” Pelullo says. “It’s a mammoth task, considering that this is an area where we have a hard time just engaging in a conversation.”

If the focus stays on victims and how to help them, the Sandusky case might indeed turn out to be a positive. But as Letourneau points out, we’ve seen “monster” cycles play out before—and the results have not always been productive.

“These blowups always center on the most sensational type of offenses,” Letourneau says. “If these allegations against Sandusky are true, think about it this way: How many guys go out and set up a not-for-profit agency to serve as a feeder system to satisfy their urges?”

She rates it a one-in-a-hundred-million
event. “We’re going to base policy on that?” she asks. “When you base it on the rarest, most unique, most bizarre case, you’re not going to get good policy.”

Berlin has a friend who once joked that no laws should ever be adopted in the immediate aftermath of any 60 Minutes broadcast. He feels the same way about cases like Penn State. “We tend to legislate in response to the emotion of such moments,” he says. “Let’s just say that in my opinion this does not ensure that we will get effective public policy based on data and careful thought.”

There’s another danger to this “monster” cycle as well. Since cases like these are often the only ways the general public and political leaders learn about child sexual abuse, they tend to fuel the misconception that all offenders are serial predators.

“The reality is, most offenders are people we know and even people we like,” Letourneau says. “They are people in our families, in our communities and in our social circles. What we’ve got to do as a society is figure out a way to talk about these offenders in a way that doesn’t always evoke the monster. We’ve got to get to a place where people can stand up and say, ‘I’m a little worried about my friend Jim. He’s having some troubles in his life right now, and I think he might be spending too much time with one of his young volunteers. I’m worried he might make a mistake, and I’d like to get him some help.’”

Berlin draws analogies here to alcoholism—a condition that not so many decades ago was regarded as a matter of personal weakness and shoved under the rug in family life and civic affairs. “If we ask the question, ‘Who is the person who gets involved sexually with children?’ It’s actually a lot like asking, ‘Who’s the drunk driver?’” he says. “There’s a tremendous spectrum. On one end is the chronic alcoholic who might always pose a threat to others. On the other end is the guy who wants to quit but needs help.”

Berlin surveys the landscape today and sees a balanced approach to alcoholism—one that encourages people to seek help and one that steers clear of blanket demonization while also delivering the needed criminal justice component. “With alcoholism today, we recognize that decent people can be struggling,” he says. “We see that Aunt Jane or Uncle Harry has a problem. We recognize that they could get in a car and kill somebody. But we also see them as human beings we care about and want to help.”

By contrast, the demonization of child sex offenders allows no room for such consideration.

“We hear all the time—if you are depressed or addicted or have anorexia, please come in so we can help you,” he says. “As I speak, there are some 16- or 17-year-olds out there who are privately aware of the fact that they’re sexually attracted to children. And because of how we’ve demonized people in this area, the last thing they’re going to do is raise their hand and ask for help—which is exactly what we should be encouraging them to do.”

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**School**

Much of Letourneau’s research focuses on young people between 12 and 14—a time of peak risk for sexual misbehavior with children. Here, a public health approach might target prevention of sexual harm with strategies modeled after successful anti-bullying programs.

**Offender**

What makes some men pedophiles? Surprisingly little research has been done to gain even the most basic information about pedophilia. Recent studies suggest that some men might be born with sexual attraction to young children. To evaluate this hypothesis, William Eaton and Letourneau will partner with Denmark’s National Centre for Register-Based Research to use population-level data to evaluate the relationship between early risk factors such as obstetric complications and later abuse of children.

**Organization**

This is a growth area right now, with numerous projects under way across the country to develop policies and procedures for youth-serving organizations that can help them reduce the likelihood of hiring employees or using volunteers who abuse children.

—JD

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**Learn about family-based prevention strategies**

[link: magazine.jhsph.edu/extras]
YOUFA WANG has witnessed obesity's global surge firsthand. As a boy in China in the 1970s, access to food was the problem. Now, when he returns home, he is astonished at the number of obese kids as well as the McDonald's ads in apartment elevators. To get ahead of worldwide obesity (which has doubled since 1980) and to stem burgeoning rates of diabetes, hypertension and heart disease, Wang founded the Johns Hopkins Global Center on Childhood Obesity (jhgcco.org) with a $16 million-plus NIH grant. A fast-talker with a computeresque command of complex data, Wang, MD, PhD, recently led Johns Hopkins Public Health editor Brian W. Simpson on a brisk tour of the global child obesity epidemic and the Center’s quest for solutions.
Eat less and exercise more are pretty simple messages. Why can’t we fix the child obesity epidemic?
That’s a good question, but a very tough one. Studies show about 70 percent of variation in obesity is due to genetics. But over the past two to three decades in the United States and many other countries, prevalence has been increasing even though people’s genes have not changed. We published a study in 2006 based on data from over 60 countries. Almost all of them saw an increase in obesity among children. That clearly suggests the environmental, behavioral triggers rather than genetics, though some will argue the gene-environment interactions are the determinant of obesity.

What concerns you most about the global child obesity epidemic?
The scope and its serious health and financial consequences. For a big country like the U.S., already one-third of the children’s population is overweight or obese. In China, the rate in the major cities is already 30 percent, though it was less than 3 percent in 1985. There are so many other countries that suffer from such a high prevalence and also an increasing rate.

If you can prevent a child from becoming obese, are you preventing her from becoming an obese adult?
Yes. In general, one-third to two-thirds of overweight children will remain overweight when they become adults. I should also say, though, that many obese adults were not obese when they were children.

Is each country’s obesity epidemic unique?
Yes, each country has its unique challenges, but we also see some common patterns. In developed countries, we know that people with higher income, better education are less likely to be overweight or obese. But in most developing countries, it’s the opposite: People who are richer have better access to energy-dense food, processed food and can afford to have more sedentary lifestyles. They are more likely to be overweight and obese. We also see considerable differences between gender, age and ethnic groups within countries.

Can you compare China’s developing obesity epidemic to the U.S. epidemic?
In the United States, [it began in] the early ’80s. Since the mid-2000s, the data suggest a plateau. In China, the rapid increase started [in] the early 1990s. The rate of increase in China has been much faster than in the United States—about double—due to China’s remarkable economic development and social-environmental changes, which have profound impacts on people’s lifestyles and health.

Are there countries that have both rapidly developed and escaped this problem?
No, but some countries have relatively low obesity rates. South Korea is an example, though obesity has become a public health threat in recent years. The other model country is Japan, which has the best longevity worldwide.

What’s their secret?
One thing is traditional culture. Compared with China, they did a much better job preserving their traditions, including their traditional diet. In Japan, they do not use so much cooking oil or sugar, and their portion size is very small. The second part is culture. I think in the United States in general people value individualism. They value today, and they value the joy of life. But some Asian societies, influenced by Buddhism and other religions and culture values, not only look at current life but also future life and the larger population. They take a longer view. When you think about future generations, you have to control yourself.

Tell us about some of the Center’s projects.
Our Center has four key research projects and will support about 20 to 25 small-scale studies in the next five years to study the environmental, policy drivers of the obesity epidemic and find sustainable solutions. In a local study, we will [examine] the interaction between genetics and the environmental factors for the risk of obesity. Another key project is a Baltimore-based intervention study of modifying the food system.

This epidemic is global and entrenched. How could you have an effect?
It may be difficult to measure the effect this Center will bring in the next two years to five years, but we feel confident there will be several indicators people can see [after that]. One example is how many research programs our Center will be supporting in different countries, which then will result in potential policy programs. That’s what we really hope is the effect of this Center. We really hope the kind of people our Center trains—people who have systems thinking—will influence the obesity prevention effort in multiple countries.

What made you dedicate your career to childhood obesity?
I feel children, especially young children, are very vulnerable. They need care. They need support. There should be adults around them who can make a big difference in their lives. I want to become one of those adults, not only for my own children but for other children, even worldwide.♣
SHE WAS FULL-TERM AT BIRTH. Back in 1962—the Year of the Tiger—preemies simply didn’t survive.

Her given name, Fenxi, translates to “Work Toward Hope.” It came to her mother in a dream and alludes to a mandate from her parents whose firstborn son had died in infancy. Auspicious though it was for a future physician-scientist, the little girl considered it “too big and not pretty” and dropped it in favor of “Xiaobin.” The nickname stuck. In years to come, it would appear on a passport and accumulate a series of academic degrees: MD, MPH, ScD. Most recently, it acquired two new titles that identify her as the Zanvyl Krieger Professor in Children’s Health and director of the new Center on the Early Life Origins of Disease at the Bloomberg School.

That her parents were pioneers who raised her in Inner Mongolia, on China’s frontier, seems relevant to Xiaobin Wang’s future as a clinician doing groundbreaking research. Her aim: to end chronic disease and fundamentally change the practice of public health and medicine in the 21st century. She is focusing on preconception, pregnancy and early childhood as the critical time windows to address diseases where multiple genes and environmental factors contribute to risk. It’s a radical notion: preventing adult hypertension or diabetes in infancy or in utero—or perhaps even before that—as opposed to waiting for symptoms to manifest many decades later. Her work was stimulated by the Barker Hypothesis, which, after being ignored and maligned for a dozen years, has given rise to a burgeoning field known as the developmental origins of health and disease, or DOHaD. Its tenets—that poor fetal growth and small size at birth are followed by increased risk of coronary artery disease, stroke, hypertension, type 2 diabetes and osteoporosis—are now espoused by an enthusiastic cadre of scientists worldwide. Bernard Guyer, for instance, Wang’s former doctoral advisor and the inaugural Zanvyl Krieger Professor in the Department of Population, Family and Reproductive Health, cites a Barker study on hypertension that made use of life-course data sets showing that specific increments in blood pressure were related to specific increments in birth weight. Most compelling, Guyer says, was the precision of the quantitative relationship between low-birth-weight babies and obese males.

If the concept of early origins of disease sounds pessimistically deterministic—
like we’re pretty much doomed by the age of 2—consider this, Guyer says: “One of Xiaobin’s brilliant lines is, if we know gene-environment interactions can increase our risk of diseases, then we should be able to find gene-environment interactions that reduce the risk. If there’s an interaction, it doesn’t have to go always in one direction. We should be able to think about how we can make it go in the other direction.”

**ANIMAL STUDIES HAVE SHOWN** that a number of environmental triggers, such as poor nutrition or exposure to bisphenol A (a chemical found in plastic), alter the protein production of genes at critical times by turning them on, off, up or down; and that these “epigenetic” changes get passed down from mother to baby and even into the next generation. A striking example involves research using mice that, despite being genetically identical, are either small and brown, or obese and yellow (and prone to diabetes and cancer as adults), depending on whether or not a particular gene is activated by a simple change in their mother’s diet. Exposures in the womb get biologically embedded just when the developing nervous, immune and metabolic systems are most susceptible to being modified, essentially programming these systems early on.

“Those signals from the environment apparently echo far into the future, “which is why we’ve got to take seriously the public health aspects of food choices by girls and women,” says David Barker whose 1995 paper, “Fetal Origins of Coronary Disease” in the *British Medical Journal*, gave rise to the Barker Hypothesis.

A physician and professor at the University of Southampton Medical School in the U.K. and at the Oregon Health and Science University in Portland, Barker offers up a body of research suggesting that hundreds of millions of people need not have type 2 diabetes, for instance; that this and other chronic disease epidemics can be traced back to the placenta and are, he says, “unnecessary.” Prevention is simple but not easy, he explains: It requires improvement in the nutrition of girls and young women.

“Chronic disease isn’t about abnormal things happening to adults who then need fixing,” Barker says. “It’s about variations in key systems during development, which in turn cause wide variations in how well a baby is nourished. The ability of a mother to nourish her baby in the womb reflects her own lifetime nutrition, beginning when she herself was in the womb. To say ‘don’t drink, don’t smoke,’ is not enough. We’ve done that; we need to move on from merely limiting damage to building better people.”

Using good nutrition to build healthy people is hardly a new idea. (The Bloomberg School’s David Paige—decades before he taught Wang when she was a doctoral student here—developed a food voucher program in Baltimore that later served as the model for WIC.) What is news: the extent to which a developing baby’s or young child’s environment plays a role in chronic disease by silencing or activating genes. That’s why the heavy emphasis by Barker and his acolytes on birth weight: In addition to being a measure of pregnancy outcome, it’s an indicator of fetal nutrition, of whether an individual’s in utero experience was harsh or benign. Birth size implies potential in terms of metabolism, cognition and endocrine function.

If the early-origins framework that Barker built still rankles some scientists, it’s because the mechanisms remain elusive. Associating a prenatal exposure with the heart disease of a middle-aged man is one thing; directly linking the two is quite another. Lots of other potentially culpable stuff also happens in the intervening decades, muddying up the path between cause and effect. Which is why Wang is collaborating with a vast network of scientists and clinicians around the world as she leads comprehensive long-term studies into the early life precursors for pediatric and adult diseases including preterm birth, food allergy, obesity and metabolic syndrome. In Wang’s purview, the futile nature-versus-nurture debate morphs into verifiable questions with measurable answers: What environmental and social factors consort with which genetic factors; how, when and to what degree? Is the net effect a risk for disease—or resilience?

Of many adverse influences that can pull a trigger cocked by genetics, poor nutrition is a biggie. But brutal neighborhoods also belong on that list, according to Wang, as well as vicious domestic situations: “Violence is to mental health as cigarette smoking is to cancer,” says Barry Zuckerman, MD, chief of pediatrics at the Boston Medical Center and a mentor of Wang’s since she was a resident there in the late 1990s. While Zuckerman and his protegés are focused on discovering those factors contributing to low birth weight, they also are keen to identify biologic interventions and social strategies that could preempt or at least buffer the detrimental effects of environmental influences. Zuckerman’s Reach Out and Read program, for instance, goes beyond the scope of conventional pediatric practice, using literacy as “medicine” to immunize kids against the power of poverty and violence; he says that primary care practitioners must encourage parents to read aloud to babies and preschoolers.

**AT ABOUT THE TIME** when Xiaobin Wang was starting to read and ready to enter school, China’s educational system ground to a halt as a result of the Cultural Revolution.

While her classmates languished in illiteracy, Wang devoured state-approved biographies of great scientists like Marie Curie. Her parents, neither privileged nor wealthy, delighted in their daughter’s intellect. So did teachers who had few reasons to find joy in their profession. Her mastery of lessons elicited praise, which in turn accelerated Wang’s learning. She skipped the sixth grade; then the 12th. In 1978, China started reforming education just in time for Wang to distinguish herself on a national exam that landed her at Beijing University where she started medical school at the impressionable age of 16.

How had Wang mustered both physical and intellectual fortitude in an impoverished and corrosive environment while others around her withered? Posing that question—why does one baby, one child, one adult, have a markedly different outcome from most others despite all else appearing equal?—ultimately became central to her research.

First, she wanted to know why some women who smoke have low-birth-weight babies, while others who smoke have...
normal-sized babies. Next, she wanted to understand why so many minority women living in poverty have preterm births while others living and working next to them have healthy, full-term babies.

As she investigated what part genes contributed to the puzzle and what part environment, she became convinced that there is crosstalk among dozens if not hundreds of factors—nutrition and smoking and genetic variables, just to name a potent few. Each single threat to health and well-being is difficult enough to study on its own. A “real-world” assessment involves the complication of a multitude of other threats that may exacerbate that original threat. And an even more accurate measure involves accounting for buffers that may temper some threats. Not one to shy away from seemingly insurmountable challenges, Wang insists on considering all the in utero variables she can conceive of—whether bad or potentially beneficial—no matter that this exponentially complex task has required her to devise novel methods of research.

It’s good science that compels her to consider the oft-neglected protective factors that engender resilience in the face of harsh societal or environmental factors. And it’s something more, something personal. If you

**Worldwide, 15 million of the 135 million babies born in 2010 were premature. — “Born Too Soon,” a UN report released May 2**
talk to Wang for any length of time, you’ll be impressed by the force of gratitude that gushes from her for her parents and school-teachers as well as the likes of Guyer and Zuckerman, whom she describes as lifetime mentors. “From my elementary school to now, I have been extremely fortunate to have so many wonderful teachers, mentors and role models,” she says. “Their vision, leadership, knowledge, guidance and encouragement have greatly influenced my pursuit for education, training and research in medicine and public health.”

The mentor who awaited Wang when she entered Beijing University was Professor Gongshao Ye, a preeminent pediatrician who established the field of maternal-child health in China and authored a definitive textbook used for 30 years. “She told me that one ounce of prevention was worth more than 10 ounces of treatment,” Wang says. She also told Wang to head to the U.S. after med school for further training. That advice set the young woman on a trajectory

The average rate of premature births has doubled since 1995 in 65 developed countries. — “Born Too Soon” report
NEVER IN HER LIFE had Wang seen such a tiny baby. Born at 26 weeks—three months early—the preemie’s reluctant first breath required intubation and chest compressions. If, because of the marvels of life-support technology and her colleagues’ considerable skills, this infant survived the week—and even if, in months to come, this fragile being was able to “graduate” from the neonatal intensive care unit and go home (likely with a feeding tube and oxygen)—its translucent skin seemed to Wang to be a window into a future of suffering. Prematurity is a challenge to the brain as well as the lungs. Common, chronic complications of preterm birth include brain bleeds, blindness, hearing loss and lung disease.

As a resident in a hospital that served a low-income minority population, among which almost 20 percent of births are preterm, Wang was keen on learning from the attending physicians how to rescue babies weighing in at just over a pound. But as the preemies kept on coming, she felt responsible, not only for them but also for their disenfranchised parents who were at a loss for how to care for such medically, emotionally and economically demanding newborns. Wang couldn’t imagine how even she, a trained pediatrician, would cope as the mother of such a preemie. Empathy and indignation moved her to tears and moved her to act. There had to be something she could do in addition to saving these lives, here and now. Something preventive.

The first thing she did was to author an elegant analysis that appeared in 1995 in the New England Journal of Medicine, demonstrating the finding that low birth weight and preterm birth repeated from one generation to the next. The next thing she did was conceive the idea for the Boston Birth Cohort.

She sensed that the complex causes of preterm birth might begin to be teased apart if she could compare a sizable population of mother-preemie pairs against a population of healthy mother-baby pairs, with all coming from similar circumstances. Bleak as the NICU was, Wang recognized it as the ideal place to start to understand why some babies ended up here, connected to tubes and wires, while another group landed safely in the “happy” nursery down the hall. A multitude of risk factors necessitated a large number of cases (preterm births) as well as controls (full-term births). Mothers would need to agree to be interviewed, allow medical records to be scrutinized and contribute samples of maternal blood, cord blood and placental tissue.

With a small seed grant and encouragement from her professors Barry Zuckerman and Howard Bauchner, MD (currently editor-in-chief of JAMA), she set out on what now is a massive, 14-year-old project involving 7,600 mother-infant pairs, 60 percent of whom are black and 25 percent Hispanic. To date, analyses of the data have generated more than 30 publications; notably, Wang pioneered the genetic study of preterm birth. With a landmark article in JAMA in 2002, her group demonstrated how smoking mothers with certain genotypes had a 10-fold higher risk of preterm birth over smoking mothers with other genotypes, revealing a synergistic effect between a genetic and an environmental factor. A finding like this paves the way for “biologic hotspotting,” a strategy that identifies genetic vulnerabilities so that individualized interventions can be targeted at a particular behavior or specific biologic variable.

Wang’s Boston Birth Cohort comprises an extensive collection of epidemiological and clinical data as well as biospecimens housed in more than a dozen freezers near her new lab space in the Wolfe Street building. This rare resource allows Wang and her collaborators to investigate environmental, genetic and epigenetic influences on mothers, infants and children. Few, if any, prospective birth cohorts in the nation are so well positioned to answer “why” in the context of a minority, high-risk population bearing a disproportionately high burden of chronic conditions and diseases such as preterm birth, obesity and allergies. Because the study spans decades, researchers may check back with the subjects to ask new questions and look at disease progression.

With that cohort still actively recruiting, Wang and colleagues have built two more: The Chicago Family Cohort, focusing on food allergies, involves 4,000 subjects from 1,000 families; and the Chinese Twins cohort involves 2,000 pairs of twins and probes the precursors of obesity and metabolic syndrome. All three studies are churning out data.

“From the Boston Birth Cohort, we have data showing that by age 6, over 45 percent of the children in the study—no kidding!—are overweight/obese,” Wang says. “Fifty percent of the mothers were overweight/obese at the time of conception. Let’s not wait until these kids walk into the doctor’s office as obese adults.”

Statistics like that one are guiding Wang’s latest efforts to corral Johns Hopkins faculty from the schools of Public Health, Medicine and Nursing for investigations into the early life precursors of intergenerational obesity. One NIH grant application involves nutrition expert Laura Caulfield, PhD, and Mei-Cheng Wang, PhD, a biostatistician, both from SPH; Tina Cheng, MD, a professor of pediatrics in the SOM; and mental health expert Deborah Gross, PhD, and Sarah Szanton, PhD, a health disparities researcher, both from the SON. Among Szanton’s contributions is a “society-to-cells” resiliency model that provides a holistic context for understanding health differences and guiding interventions at six different levels. Each one of the levels, Szanton says—society, community, family, individual, physiological and cellular—represents an opportunity to exert positive change.

It’s impossible to resist applying this frameworkContinued on page 46
Protecting health care workers in armed conflicts has been a veritable black hole of human rights.

Julian Goklish (top) strives to keep his "heart clean and live life"; Apaches gather for a young girl's traditional "sunrise ceremony."
IT IS A LAND OF WONDERS AND ECHOES.

From the center of the White Mountain Apache Reservation, the tribe’s four sacred directions stretch across high desert, silent canyons and sere grasslands to touch their four sacred mountains blanketéd with píñon pine, Ponderosa pine and spruce. Mountain snowmelt feeds creeks that tumble into the White and Salt rivers. Elk, deer, wolves and black bear wander remote forests, while eagles glide above rust-colored cliffs. In lower elevations, dark canyons suddenly carve into rolling forests.

“There is a strong magnetism to this land,” says Ronnie Lupe, the charismatic, longtime tribal chairman. “We are part of the land. We are with the land, the rivers, the trees and all.”

Married with the landscape are stories. Places—this bend in the river, this arroyo, that mountaintop—have stories attached to them that contain ancient wisdom, collective history and ethical guidance. Some tales reach so far back in time that the landscape has changed—a spring gone dry, a tree disappeared. “The world is constantly changing,” says Lupe. “That’s the way we live. That’s how we live.”

Over the last 150 years, life for the White Mountain Apaches has changed much faster than the land. During the relentless American push westward in the latter 1800s, invaders killed many Apaches and sundered their traditional ways. Children were wrenched from families and sent to boarding schools under U.S. government assimilation policies. “Since that happened, we started to lose our identity as far as who we were,” says Ramon Riley, the tribe’s cultural resource director. “To sum up the story, it’s historic trauma. Our people have gone through many things like genocide … just like the Holocaust. Our ancestors suffered. Our grandparents suffered. We suffered and now our kids don’t know who they are. They don’t speak our language. They are not connected to the natural world like we once were.”

The tragic legacy still echoes today. The unemployment rate is more than 70 percent. High rates of suicide, alcoholism, drug abuse and other ills follow in poverty’s wake. The social and economic hardships have rent the Apache’s social fabric, leaving young people with few options. Some live and work on the reservation or in nearby towns like Pinetop. Some leave for college or jobs in Phoenix or Tucson. Others, particularly those from dysfunctional families, survey their dismal prospects and can’t imagine any way out.

ON HER ARMS, SHE HAS MORE THAN 50 CUTS, ELBOWS TO WRISTS. She knows the times and dates for each one.

The girl lives in turmoil. Last year, her father and a grandfather died. Then a friend died by suicide. Her home life is upended by alcoholism. She finds temporary refuge in school. After her classes end, she walks … anywhere but home. Late in the evening, she slips into her house to go to sleep, says Melanie Alchesay, a community mental health specialist for an innovative suicide prevention program developed by the tribe and the Bloomberg School’s Center for American Indian Health (CAIH).

Alchesay once asked the girl why she engages in cutting, a risk factor for suicide. “It’s because of my home situation, because of my family,” the girl replied. “Woman, I’m so stressed out!”

She is 14 years old.

“I wish I had a house to provide her,” says Alchesay. “I wish I could hug her and tell her you’ll be okay. I wish I had a big house. I’d take them all in.”

The suicide rate among young people ages 15 to 24 on the White Mountain Apache Reservation is among the highest in the U.S.—13 times the U.S. average, according to a 2009 American Journal of Public Health article by CAIH authors, including Apaches and Baltimore-based researchers. From 2001 through 2006, 25 people on the reservation under the age of 25 died by suicide—a devastating toll for a community of 15,500. And for every suicide, there were
36 attempts. More than 200 attempts were recorded annually in 2005 and 2006; two-thirds of the attempts were by young people under 25. (In the U.S population, suicide peaks much later in life.)

“There are certain ills, certain challenges out there that we thought we would never see,” says Lupe. “But we know how to saddle up and ride and see what it looks like in that challenge.”

Even a single youth suicide is ineffably sad, but the issue requires perspective, says David Yost, MD, clinical director at the Indian Health Service hospital who has worked on the reservation for 22 years. “We always have to remember the overwhelming majority of our young people are healthy,” Yost says. “It is important not to judge the community by what shows up in our emergency room.”

At the same time, many in the community have been touched by suicide in one way or another.

The tribe and CAIH confronted the issue by creating the Celebrating Life program that works to reduce the suicides one youth, one family, one community at a time. Every day, the program’s staff—all Apaches—help young people overwhelmed by daunting economic, historical, social and interpersonal issues.

**“THEY JUST FOUND HIM. I don’t know if they have a pulse. They are working on him now.”**

Novalene Goklish talks urgently on her cell phone to a colleague on a March afternoon, in Apache and English. A young man on the reservation has attempted suicide. Goklish stands on the porch of CAIH’s headquarters. It is in a portable building behind the Indian Health Service hospital in the town of Whiteriver, near the center of the 1.6-million-acre reservation. Behind her, a bright noon sun casts short shadows on the Ponderosa pines of Gold Butte.

Usually quick to joke or share an ironic aside, the senior field program coordinator for Celebrating Life has gone quiet. Her face is stilled with concern. Between calls, she confides, “Right now you’re hoping for the best. They’re doing everything they can to save him.”

As Goklish leaves to take another call, Francene Larzelere-Hinton sits pensively. The director for the White Mountain Apache site of the Native American Research Centers for Health, Larzelere-Hinton had expected a joyous day; she is going to a traditional ceremony in the evening, part of the multi-day “sunrise dance ceremony” that marks an Apache girl’s transition to womanhood.

“You can feel heaviness,” she says. “I don’t know if you can tell, but you can feel the heavity.”

Concern for the young man weighs on them. So does worry that the suicide attempt may lead to others. Suicides can erupt like contagions, as happened here in the early 1990s when 11 young people died by suicide in less than a year. In response, some tribal elders were mobilized to visit people who were suicidal. The elders would talk and pray with them, staying at their homes for days, if need be, to guide them out of danger. The group was formally known as Apaches Helping Apaches, but people called them the “ghostbusters.”
Tribal leaders knew more was needed so they turned to a friend they could trust.

Back in 1980, a young pediatrician and researcher named Mathuram Santosham had arrived in the dry, manzanita-dotted valley surrounding Whiteriver. Lupe and the tribe were wary; they had been burned before by researchers who took grant money, gathered data and then just left.

Santosham earned the tribe’s trust by confronting a lethal epidemic of diarrheal disease. “Truly, kids were dying of diarrhea just like in developing countries,” says Santosham, MD, MPH ’75, and now a professor of International Health. The tribe embraced his recommendations for widespread use of oral rehydration solution. Diarrheal deaths soon fell almost to zero.

Next, with the Apaches’ help, he proved the effectiveness of vaccines against Haemophilus influenzae type b (a leading cause of meningitis) and later, rotavirus (a cause of diarrhea), quelling epidemics and saving more young lives. Data from these efforts helped transform health care standards in the U.S. and the world. Along the way, Apaches received public health training to help their neighbors.

So when the suicides erupted in the 1990s, the tribe drew on Santosham and the CAIH. Apache leaders came to Baltimore to meet with researchers, and together they devised a public health answer to prevent more young deaths. They would train Apaches as paraprofessionals who would specialize in community mental health and preventing suicide.

Tribal leaders and the CAIH team (including Santosham, John Walkup, MD, Raymond Reid, MD, MPH ’81, Larry Wissow, MD, MPH ’84, Allison Barlow, MPH ’97, and others) knew they needed data and an understanding of the problem’s root causes. So the tribe mandated in 2001 that all suicide attempts, completions and even ideation be reported by first responders. Later, the reports were collected in a central registry. It is the first community-based suicide surveillance system in the U.S. “The tribe is very innovative in their thinking. They say, we are not going to stand for this suicide epidemic,” says Barlow, now a CAIH associate director. “They treat suicide as an infectious agent that is foreign to their community and have directed their collective will around containing it and getting rid of it.”

In 2004, the tribe and CAIH researchers began to regularly analyze data from the suicide registry, helping them uncover valuable information: The suicide rate is highest among the 15- to 24-year-olds, with 128.5 suicides per 100,000. (The all-ages U.S. suicide rate is 10.7.) Although Apache males and females attempt suicide at roughly the same rate, males are five times more likely to die. Hanging is the primary method of suicide, followed by firearm and overdose. Saturday is the most common day for suicide deaths.

“Suicide seems scary, a mystery, an unapproachable topic to many people, but we know it is a preventable public health problem,” says Barlow. “No one in the U.S. is addressing it with more courage and science than the White Mountain Apache people.”

In 2010, the Celebrating Life team collected 543 surveillance reports. Each
yellow report triggers a visit to the young person by an Apache community mental health specialist trained by CAIH, who verifies what happened, begins a dialogue and refers the youth to Apache Behavioral Health Services for counseling. The specialist also gets young people to recognize what upsets them and to create a “safety plan” of actions to take when they are upset. Together, they also brainstorm ways to overcome barriers to counseling like transportation or privacy concerns. The specialists try to stay in touch with the young people, sharing advice and lending a sympathetic ear.

“We have taken an important leap to train native community mental health specialists to do diagnostic screening and crisis management,” says Barlow. “Local people are more credible and more compassionate to the youth and their families.”

With NIH and Substance Abuse and Mental Health Services Administration support, the Apache-Hopkins research team is assessing Celebrating Life by following more than 30 Apache adolescents who attempted suicide and then enrolled in the program. Initial results are encouraging. Youth in the program have reported fewer depressive symptoms, a reduced negative outlook and an increase in peer social support.

During the first or second visit, a specialist will try to help the youth understand the seriousness of a suicide attempt by playing a short, gender-specific video. In the video for young men, a teenage boy responds to a break-up with his girlfriend by hanging himself, but is saved by his mother. Tribal elders, speaking in Apache with English subtitles, share the tribe’s beliefs about the sacredness of life and each individual’s responsibility to the Apache web of life.

The team also offers a nine-session program for youth that helps them with conflict resolution and problem-solving and coping skills. In addition, more than 120 teachers, coaches, parents and others have taken two-day workshops that train them to recognize those at risk and help them effectively. An outreach program called Family Spirit gives teen mothers and fathers skills to help them raise healthy, emotionally resilient children. Another program called NativeVision enrolls third to fifth graders in afterschool classes in fitness, healthy lifestyles and tribal culture. The team also has led eight prayer walks with spiritual leaders to call attention to the suicide problem.

Lupe recalls addressing a sea of young faces in a school gymnasium after a recent prayer walk in his home community of Cibecue. He told them the ancient story of a young White Mountain Apache boy. Guided by a voice and helped by a spider and a gopher, the boy gathered an eagle feather, sinew from an elk, a stick, obsidian and other materials and made the first bow and arrow. “I want them to understand that we depend on the young generation,” Lupe says. “I want them to know that they have a responsibility. They can create a weapon for us. They can create motivation where the White Mountain Apache tribe can be so strong and so powerful.”

For their innovative approach, the Apache’s suicide prevention team was honored in October by the American Psychiatric Association with a bronze Psychiatric Services Achievement Award.

Despite their remarkable efforts, however, sometimes they still must deal with the sorrow of a suicide death. A little while after the first flurry of phone calls about the suicide attempt on that March afternoon, Goklish gets bad news. The young man has died.

Goklish and Larzelere-Hinton get in a blue Ford Escape and pull away from the hospital complex and head south on Arizona 73. They are driving to the family’s home to offer what comfort and counsel they can—and hopefully prevent any spark spreading from the first suicide of 2012.

FOR ALIDA ANTONIO, SUICIDE IS A SPIRIT.

The spirit has stalked her family since January 14, 2005. That day her 14-year-old niece took her own life. Grieving, Antonio retrieved her niece’s pictures, books, knickknacks and souvenirs. Some possessions, in the Apache tradition, went into the grave with her; the rest were stored in her daughter’s room. “We didn’t have an elder to tell us to not keep it in the house,” she recalls.

Nine days later, Antonio’s daughter, distraught by her cousin’s suicide, started drinking and, later, throwing her cousin’s pictures in her room. Antonio called the

“We’re there to listen, to make sure at-risk individuals are safe and to let them know that we care.”

—Novalene Goklish, with Francene Larzelere-Hinton
police. When they arrived and peered in the bedroom window, they saw her hanging. She was alive but would never regain consciousness. She died in a Phoenix nursing home three years later.

Then late in 2011, Antonio’s 13-year-old son attempted suicide. He survived and later said he did it because he “just got so mad” at his brother. Suicides by young people are often precipitated by emotional conflicts.

Meeting with a Celebrating Life team member and watching the video had a strong impact on her son, says Antonio. He also has been getting counseling. “It’s opened up his eyes to a lot of things,” she says. He says he will never again try to kill himself. But she still checks on him when he goes to his room. “I always have to worry,” she says.

Antonio has shared her experience with others in hopes of preventing future suicides. She urges parents to talk more with their children and reminds young people how suicide hurts families and the whole community. “The ones who are here afterwards … we are the ones who suffer,” Antonio says. “I just pray it doesn’t happen to anyone again.”

At some point Antonio realized her niece’s books and pictures had been moved into her son’s room. She worried they carried the spirit. “The books, I burned, but the pictures I saved are not in my house. They are outside,” she says.

A spirit, a dark figure, a dark force … the idea of a malignant being behind the youth suicides comes up frequently in conversations here. Outsiders may be tempted to label it a manifestation of depression or a reflection of emotional disturbance, but that assumption is wrong, says Goklish, who has led the suicide prevention team for eight years.

“You tend to expect certain things when you live in an area where there was bloodshed a long time ago,” she says. She recalls a fourth-grade girl who told her a nightmarish story. The girl said that while she was walking near her home, a dark figure in a black jacket appeared beside her and told her to walk to a nearby mountain where she would find a playground that she had never seen before. There, the figure told her, she would always be able to play and would never have to worry or be sad ever again. But first, the figure said, she would have to kill herself. The girl bolted, ran home and later told her teacher. The school nurse alerted the Celebrating Life team.

Johns Hopkins researchers take such reports very seriously. “In the communities we serve, the spiritual realm is important,” says Mary Cwik, PhD, a child clinical psychologist and a CAIH assistant scientist. “Maybe that dark force has always been around but in past times, the Apache people and other Native Americans were much closer to their original way of life. And built into that were things that discourage the [bad] spirit.”

Goklish says her Apache ancestors had many ceremonies and prayers that were woven into daily life. “You were told to get up in the morning and do prayers. If you are not feeling right, or out of balance, you were told to pray,” she says.

Some believe a return to traditional beliefs and ways is the answer. Others think suicide prevention starts with listening. Novalene Goklish’s son Warren, 14, may have saved a friend’s life. A target for bullies, the friend talked about feeling worthless and contemplating suicide. Warren broke up one bullying incident and counseled his friend against even thinking of suicide.

Sitting in his aunt’s house in Whiteriver, Warren stares at his hands, his fingers interlocked as if in prayer. “I told him there are always people who will be there for you. I told him suicide is not the answer,” Warren says quietly. “I guess I helped him. I guess it turned around for him.”

His older cousin, Julian Goklish, helps his own friends and has warned them about cutting: “You know what happens if you hit the main vein? You’re going to go black. You’re not going to see your family no more. You’re not going to have a joyful life with friends. You’re not going to see them all no more. You’re just going to see yourself in hell.”

Julian, 20 years old and taking online classes in computer technology, says he lives

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“**We live and breathe knowing there’s tons and tons of work to be done yet.**”

—Ronnie Lupe, tribal chairman
La Familia Gilman
A Prof’s Protégés Save Lives in Peru

Over the past 28 years that Bob Gilman, MD, has spent in Peru, the international health professor and his colleagues have accomplished a lot. They’ve developed a new test for tuberculosis that dramatically shrinks the time and sample size needed to reliably detect even drug-resistant strains that other tests are hard-pressed to identify—a boon for the tens of thousands of Peruvians struck with tuberculosis each year. They’ve identified city drinking water as an important source of Helicobacter pylori infection in Peruvian children, and thus a way to prevent widespread gastritis and ulcers. They’ve also discovered previously unknown bacteria and protozoa that are causing emerging infections, including cyclospora, a protozoa that causes diarrhea.

His work in Peru has resulted in more than 400 papers in prestigious journals. He even learned to live well there as a foreigner, raising two kids with his wife, Jo Gilman, and residing in the country throughout the uprising by the Maoist insurgent group, the Shining Path.

But the accomplishment that seems to matter the most to Gilman is the strong

“These people are completely able to do everything without...” —Bob Gilman
network of research colleagues and trainees that he’s strung together across this country.

“If I had to say what I’ve been really good at doing, it’s bringing Peruvians to the U.S. for training and getting them back to Peru to build what I hope is a sustainable operation,” he says. “The people here need me like a hole in the head. My goal is to build a sustainable unit that doesn’t depend on me in most ways.”

By choosing smart junior colleagues and students and giving them responsibility for projects, Gilman empowers them to eventually become leaders in their own fields. Later, after many of these young researchers pursue further training in the U.S. and other countries, they come back to launch their own labs—taking Gilman’s philosophy to a new generation.

Gilman’s trainees stretch across Peru like “a giant fan,” he says, sometimes working individually on their own projects and grants, sometimes coming together to pool their expertise.

“These people are completely able to do everything without me,” he says, “and that’s what I’ve always wanted.”

Four members of the vast Gilman network share their stories on the following pages.
WHY WAIT? APPLY NOW!

Willy Lescano, PhD ’08, MHS ’02
I basically consider Bob to be a second father. I have worked with him for more than two decades. He has guided and assisted my personal and professional growth since I entered the health field.

When I was in engineering school, I did a small mathematical modeling project on malaria transmission. Hugo [Garcia] found out about this—he’s my first cousin. He’d been working with Bob for a few years, and he wanted me to show my project to him. When I did, Bob was very enthusiastic, and I went on to work with him on various projects. Eventually his wife hired me to do data analysis work for her NGO. The best part was being around to continue to work with Bob and his students.

Eight years later, I was looking for the next step. I knew that Bob had helped several of the young people he worked with go to Hopkins to get their PhDs, including Hugo, but I thought it was something I might be ready for in five years or so. Bob said, “Why don’t you apply now?”

I went to Hopkins, and it changed my life. A year after I returned to Peru, an opportunity at the U.S. Naval Medical Research Unit No. 6 in Peru opened up. Now I’m head of the Department of Parasitology here, and I also run the Public Health Training Program that, among other activities, has a master’s in epidemiology [program] as a joint project between Universidad Peruana Cayetano Heredia and the U.S. Navy.

I’ve learned so much from Bob, and it would be presumptuous to say I’ve taught him much. But from me, I’m sure he’s learned that people can be very stubborn. He thought starting this master’s program was a very ambitious task—not that we couldn’t do it but that we might be aiming too high. But we stuck to it, and it’s really paid off. We’ve trained over 100 junior scientists to do research in our own country. They’re Peruvians committed to solving Peruvian public health problems.

Whenever I introduce myself, I say I’m a “Gilmanite,” one of the children of Gilman, and now the students I work with are the third generation in this family.

BEST INVESTMENT EVER

Hugo Garcia, MD, PhD ’02
Around 1988, I was doing my MD thesis work on cysticercosis—a neurological infection caused by a tapeworm that spends part of its lifespan encysted in pig muscles—at the time when Bob was starting new research on the subject.

We knew that cysticercosis caused a significant number of epilepsy cases in Peru, but no one knew how important it actually was or how we might be able to prevent or best treat new cases. Bob spoke to my thesis advisor, and then contacted me to see whether I’d be interested in helping him. At the time, research was quite an unusual activity in Peru, so it was an interesting prospect.

Bob intrigued me in many ways—it takes an out-of-the-box personality to go to a developing country, find your staff there and devote your life to infectious disease research. Bob behaves as a Peruvian, but he doesn’t speak as a Peruvian. Let’s put it this way: His Spanish was a driving force for us to learn English.

But he’s also influenced me in many ways. When you’re a junior researcher, you usually begin working under other people, doing their research for them. But the process with Bob was completely different—with that first project, he asked me to lead. He even asked me to write the paper, which was something completely unheard of. He never behaved like a boss, more like an equal.

Now I’m a full-time researcher and professor of microbiology at Universidad Peruana Cayetano Heredia, and it’s all Bob’s fault that I ended up here. Through my work with students—who I’m training with Bob’s methods—we have discovered an antiparasitic treatment that can reduce the number of seizures in individuals with cysticercosis. We’ve also developed better ways to diagnose this condition so patients can start treatments faster.

I’ve continued Bob’s tradition of sending students abroad for training so they can come back and lead. It’s a very expensive investment, but it’s paying off with these developments and interventions that are improving the health and welfare of this country.
**THE SECRET OF TEACHING**
*Manuela Verastegui, PhD ’10*

When I was in the beginning of getting my master’s degree in microbiology from Universidad Peruana Cayetano Heredia in 1984, Dr. Gilman came to Peru wanting to do research on giardia, an intestinal parasite that causes diarrhea. When Dr. Gilman asked if he could work with some students, my mentor volunteered me. That was very lucky because in Peru it’s very difficult to do research since we don’t have much funding.

Dr. Gilman encouraged me to get a PhD in microbiology in Peru, and then used a training grant so I could get a second PhD in public health from Johns Hopkins. I’m now an associate professor at Universidad Peruana Cayetano Heredia. I would never have been here without his encouragement. Here, I’m part of a team doing cellular and molecular biology work to help improve our understanding of a variety of tropical diseases. For example, we recently published a paper about a mechanism that *Taenia solium* larva use to adhere to host tissue, findings that help us understand the mechanism this parasite uses to cause cysticercosis.

For a good researcher, it’s important to do not only research but also to teach. Not all researchers have this mentality, especially in my country. But Dr. Gilman says that he doesn’t keep secrets from anybody—he loves sharing everything. Now, I advise students in the same way that Dr. Gilman taught me, teaching them everything they want to learn and encouraging them to leave and teach others. Something very peculiar is that Dr. Gilman is always motivating people to continue to prosper in their careers, to learn to write articles and grants. He is also a very kind person because he always cares about the welfare and the personal life of each person working with him.

I’ve known Dr. Gilman now for nearly 28 years, and over all that time he’s never gotten tired of working, and he has an incredible memory—even though he might have been away from Peru for two months, he’ll remember everything that people said at the last meeting. I tell Dr. Gilman that he’s younger than all the young people around him! He has so much energy.

**FOLLOW THE LEADER**
*Angela Bayer, PhD ’08, MHS ’04*

I came to Peru when I was a master’s student in the Department of Population, Family and Reproductive Health to intern at the International Planned Parenthood Federation and research adolescent sexuality. Eventually I was looking for a place to do my research, and a colleague said I should talk with Bob. Bob said he didn’t know anything about my topic, but he told me to come work at his study site, and we’d take it from there. Even though supposedly he didn’t know anything about adolescent sexuality research, he was frequently trying to connect me with other people who could further my work or tell me about related research that was going on elsewhere in Peru.

Part of his extraordinary body of knowledge might come from how Bob operates. Peru, like all of Latin America, has a very divided society. You can stay in nice neighborhoods and not see anything beyond those, but that’s definitely not how Bob works. He’s out at study sites, talking to the people who live there, finding out how things really work. It’s incredibly rare.

Years later, when I was preparing the final defense for my PhD dissertation, Bob came to me with a proposition. Chagas disease was spreading in Peru, and he wanted me and another student to take over and use our analytical methods to collect information. We ultimately gathered evidence that migration might play a big role—people were moving from small towns to big cities, and vice versa, bringing with them the parasite that causes this disease.

Many researchers would think it’s crazy to hand over a project to someone who doesn’t even have her PhD yet, but that’s not Bob. He thinks if you give people some training and some tools and tell them you believe in them, they get things done. Now, that’s the role I take when I lead a study. I think of the way Bob does things, and then I try to follow that as closely as possible. I’m very junior, but if I have the opportunity to reach out to other people and help them in their careers, I strive to do that. ♦
Social Forces

During my first weekend in Bamako, I learned that in Mali, music means a lot more than Top 40. It’s a way of life. And the people who make music—including traditional West African storytellers, called griots, and the more recent wave of pop music stars—can be powerful agents for change.

Riding the capital’s dusty red dirt streets on a motorcycle one Sunday afternoon, I soon witnessed the griot tradition. Under a white tent spanning the middle of a residential block lined with mango trees, a local griot serenaded wedding guests, accompanied by several djembé, or Malian drums. The bride and guests laughed at the teasing story she sang about their families and origins, which she surmised partly from their names (akin to how we know baking professionals lie somewhere in a Baker family’s ancestry).

Societal changes of the last two decades have blurred the line between traditional griots born into the tradition by family, and others who choose to be musicians by trade. The professional musicians bring in new styles from jazz, blues and Latin music, but still perform traditional songs with griots at weddings and naming ceremonies.

Woven together with the playful banter, skewering satire and sage advice that these honey-toned singers have passed down for centuries are new messages—messages aimed at saving lives across West Africa. With the help of Voices for a Malaria-Free Future, a project of the Bloomberg School’s Center for Communication Programs active in four African countries, the singers have become the newest foot soldiers in the battle against malaria. They are reaching out with their artful blend of song and storytelling to galvanize public and private resources against a disease that claims nearly 700,000 lives a year, most of them in Africa and most of them children, according to WHO. (A February Lancet article offers a direr estimate, placing global malaria deaths in 2010 at 1.2 million.)

In malaria, the griots face a foe as adept at improvisation as they are. The constantly shifting malaria parasite can acquire drug resistance quickly, and a vaccine has remained elusive. That’s why Voices for a Malaria-Free Future, with Gates Foundation funding, has combined national dialogue and local action to change people’s behaviors. Claudia Vondrasek, who heads the project, told me they adapt their strategy to social forces already present in each country. Malians have used mosquito nets for decades, but typically only during the rainy season. So the project made a strategic choice to focus on widening net use for prevention. (According to WHO, full use of insecticide-treated mosquito nets in sub-Saharan Africa could reduce child mortality by 18 percent on average; that would save more than five lives per year for every 1,000 children under 5 who are protected.) The project also chose the cultural resources available in traditional griots and popular music as a key channel for behavior change communication (BCC).
Musicians showed the practical power of Mali’s music culture when the project started in 2006.

A bureaucratic logjam had kept nets warehoused in the capital for months. So the Voices staff mobilized a group of high-profile advocates—including top musicians, legislators and health officials—to film public service announcements, explains Mali country director Djiba Kane Diallo.

Salif Keita, Mali’s first world music superstar, brought results immediately. “We went together to the Ministry of Health and filmed,” recalled Diallo. “[Keita] stood in front of the Ministry of Health and said, ‘It’s almost the rainy season, so we need to give nets to people and alert them to use them.’ We made the PSA and aired it. A day or two later the Minister of Health herself called and said, ‘Okay, what do you need?’”

From that came an annual distribution of nets at the district and community levels, with more nets provided by the Global Fund to Fight AIDS, Tuberculosis and Malaria and the President’s Malaria Initiative. After the 2007 campaign provided treated nets to more than 2.8 million children, a survey showed that 80 percent of households with children under age 5 had treated nets. The next question: Would they use them?

Among the hurdles to fighting malaria, the biggest may be long-standing public acceptance of the disease. You need a powerful message to tackle a mountain that people have come to accept as part of the landscape.

Abdoulaye Diabaté, one of Mali’s most popular musicians, said, “I suffered too much from malaria.” He recalled the high fever and headaches, the vomiting and diarrhea and the repeating cycle of shivers and sweats through the night. “It was not just me, it was all children my age, catching the same illness,” he said. “We grew up that way, accepting the disease. We didn’t know it could be different.”

First, Voices of Mali enlisted top health officials to articulate the message to policymakers. These champions included Ogobaro Doumbo, who heads the Malaria Research and Training Center at the University of Bamako. Doumbo helped Voices sensitize legislators from Mali and 17 other countries across West Africa to how they could help, starting with increasing the proportion of national budgets devoted to health.

One evening at Point G, a century-old hospital on a bluff overlooking the capital, Doumbo explained this high-level advocacy. To motivate public figures, Doumbo said, “you have to use an exact but simple message.” Malaria is a specific fever, he explains, and by improving diagnosis and prevention it can be beaten. Then he marshaled a compelling comparison: “This is equal to three to four tsunamis happening every year to African kids.

“Africa has lost a lot of Einsteins, a lot of Pasteurs because of malaria.” — Ogobaro Doumbo
A Grassroots Shift

After focusing their message on national decision makers, Voices advocates needed to inform the public of policy changes and persuade them to adopt preventive care for pregnant women and appropriate malaria treatment. In 2009, the second phase launched the BCC component. Increasingly, Voices of Mali involved griots and popular stars to take the message to village-level action. Again, project staff trained the champions to deliver key messages in concerts and on radio spots. For example, for World Malaria Day they worked with Diabaté on the message that pregnant women need to get prenatal care. The lyrics of one song urged, “Pregnant women, please get your consultation prenatal, to be sure you receive your nets.” Local NGO affiliates created watchdog committees, with women and a representative each from schools and health agencies—six or seven people per village. The committees organized town meetings focused on how to avoid mosquito bites and the proper use of nets. “They also go gate by gate, family by family,” Diallo said, encouraging people to use their nets nightly, stressing the importance for children’s health.

Next door in Senegal, a national net distribution campaign coupled with BCC—led by a coalition of the National Malaria Control Program (NMCP), the Peace Corps and other organizations, including NetWorks, a CCP project—yielded big gains. By January 2012 the campaign covered 10 of Senegal’s 14 regions and distributed more than 3.8 million nets. It had received a boost two years earlier from Youssou N’Dour, a Senegalese world music star, who grew up in a griot family and has crossed over with songs that weave in outside influences. “In Senegal, everybody knows Youssou N’Dour’s songs by heart. If you can get 8 million people to memorize these songs, we should be able to lead to a change in behavior,” observed Yacine Diop Djibo, who heads the NGO, Africa Speak Up. A song that N’Dour recorded with Viviane Chedid, titled “Our Society,” aired frequently on radio stations for months, with a refrain that N’Dour’s songs by heart. If you can get 8 million people to memorize these songs, we should be able to lead to a change in behavior,” observed Yacine Diop Djibo, who heads the NGO, Africa Speak Up. A song that N’Dour recorded with Viviane Chedid, titled “Our Society,” aired frequently on radio stations for months, with a refrain that in the Wolof language sounds danceable: “Our society is booming/ We stand strong and proud/ We fight malaria/ To finally kick it out of Senegal.”

As one of the key partners in the Senegal coalition for distributing the bed nets and getting people to use them consistently, NetWorks operates differently from the Mali CCP program, explains Joan Schubert, NetWorks team leader based in Dakar. With funding from the President’s Malaria Initiative, NetWorks has developed technical strategies for logistics, communications, and monitoring and evaluation, says Schubert. To monitor overall progress, NetWorks will track indicators annually, including the percentage of households with one or more insecticide-treated nets and the percentage of people who slept under nets the previous night. During home visits a week after the distributions, outreach workers look at how many nets were properly hung and used the night before. NetWorks also launched a 24-month qualitative study in January on the culture of net use; the study will help refine future communications work.

Senegal has seen a steep drop in malaria, from 1.5 million cases in 2006 to 175,000 in 2009, according to a 2010 NMCP study. Improved diagnosis (determining other causes of fevers) accounts for a large share of that decline, but the public campaigns appear to be having a remarkable impact. By January, more than 13,400 health workers and more than 1,200 traditional health workers were working on malaria prevention.

The Art and Science of Communication

"Build it and they will come" doesn’t always work in public health.

“You can have all these great solutions to public health problems, but they’re not solutions unless they’re adapted, adopted and utilized,” says Susan Krenn, director of the Center for Communication Programs, which designs and deploys strategic communication programs to educate and influence health behaviors.

Established in 1983 and now housed in the Department of Health, Behavior and Society, CCP has more than 60 active projects in nearly 30 countries and a staff of nearly 600. Its health communication programs address a broad range of health issues, including HIV/AIDS, reproductive health and family planning, malaria, water and sanitation and tobacco control.

The Center is a leader in the use of entertainment as a vehicle to deliver health messages to large audiences. There’s Bol, the Pakistani feature film about family planning and maternal health that has grossed more than any movie in Pakistan’s history; Chenicheni N’chiti, a radio program in Malawi that addresses HIV/AIDS issues; and Intersexions, the Peabody Award-winning South African television series, which traces the HIV virus through a network of sexual relationships.

“All of our entertainment education programs combine quality production and engaging stories as well as vitally needed health messages,” she says.

Krenn says that one of CCP’s great strengths is that the creativity of the work is grounded in communication research and theory.

“We use a proven process to get to something that’s going to address key issues, to resonate, to be relevant and to get the population to take up behaviors that will help them and change their lives,” she says.

—Jackie Powder
Communicators had received NetWorks training on the message, “All the family, all year, every night.” In French it is known as the Trois Toutes campaign: *Toute la famille, Toute l’année, Toutes les nuits.*

In Mali, griots with Voices incorporated the message into their traditional performances. Performing at a wedding, they’d interrupt singing to say, “I need to talk with you about malaria.” After the wedding, where gifts can include a mosquito net, the griot would urge, “Now please sleep under the net because it’s important.”

After I peppered Diallo with questions about griots, she called Abdoulaye Diabaté. “Bonjour, Papa,” she said, then eased into Bambara (another West African language). She succeeded in getting me an interview with this nationally famous musician for the very next day.

The next morning outside the Voices office I heard Diabaté bantering with the staff well before I saw him. Then the man with the resonant voice moved into the office with an easy grace, garbed in a flowing white robe and fez-like hat. Diabaté, who comes from a long line of griots, says: “A griot is someone who retains a lot in their head. For changing people’s thinking, you need people who retain a lot.”

He nodded toward the laptop nearby and his own two cell phones. “Now we have computers, we have phones, we have machines. Before, it was only the griot who had that function.” Yet even with these new technologies, he said, the griot retains authority as “the mouth of the people, the ear of the king.”

Like N’Dour, Diabaté straddles the line between griot and pop artist. His songs have long addressed social themes including illness, inequality and the role of science. He became involved in the fight against malaria through songs about his experiences growing up in the countryside, where, like other children, he suffered from malaria.

One night soon after, Diabaté deployed his charismatic blend of griot and Afropop rhythms at a fundraiser for a local youth association. He connected with his audience, young and old, as they shouted the lyrics to his driving song “Sere,” which addresses adolescent health and possibilities for the future.

As the hot season steamed into April 2011, Voices ratcheted up the awareness campaign leading to net distributions in western villages near Kayes. I found glimmers of the campaign in a bus station four hours east of the capital, where the lettering on one young man’s shirt read, “Free Africa from Malaria Now.” In a rural clinic several hours away, Dr. Karamako Nimaga explained that malaria was still the main reason for clinic visits during the rainy season.

As Mali emerged from a scant rainy season last November, Voices received Gates Foundation funding to focus on advocacy and private sector partnerships. In Mali, the high-end Azalai hotel chain committed to promoting use of mosquito nets among its employees and hotel guests; and Orange, a major cell-phone carrier across Francophone Africa, sponsors soccer tournaments to promote awareness in the countryside.

“For me, a Mali without malaria will bring a blossoming of cotton, millet and rice,” Abdoulaye Diabaté told me. Now I understood: Malaria strikes not just individuals but entire communities who manage the fields and run the fishing boats in the season when the haul is most fruitful.

Diabaté said this was more than simply a fight to end an illness, as important as that would be. “People who are completely free of malaria can work in their fields, they can fish.” Then he added ruefully, “I don’t want my children to suffer from this disease and say, ‘Abdoulaye didn’t do anything.’ ”

“A Mali without malaria is an abundant Mali,” he said. “That’s the hope.”

David Taylor traveled to Mali in 2011 with support from the International Reporting Project.