Asthma's Inner World

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Are you up for changing the world?
We live in a sea of chemicals.

Synthetic organic chemicals make modern life possible, prevent injury and treat disease. When humans are exposed to them in ways not originally intended, however, they may have consequences that are not so beneficial. And exposure is exactly what is happening; these chemicals permeate daily life. They occupy the air we breathe, the water we drink, the food we eat, the clothes we wear and the toys our children play with.

The proof is in our blood. Exquisitely sensitive modern analytic techniques can detect more than 200 chemicals in human umbilical cord blood—evidence that mothers share more than essential nutrients with a developing fetus. Because the prevalence of childhood conditions such as asthma, food allergies and autism spectrum disorders is increasing markedly, the role of fetal exposure to a variety of chemical compounds clearly is cause for concern. Is this increase linked to chemical exposures? We do not know. Given the beneficial effects of chemicals, it’s hard to imagine living without them. However, until we know the risks of exposure, we cannot make informed decisions about their use.

This issue of Johns Hopkins Public Health highlights work by the Bloomberg School’s Janet DiPietro and her colleagues on the effects of exposure to organochlorines—insecticides, polychlorobenzenes and other synthetic compounds—during fetal development. This pilot study, the first of its kind to measure maternal chemicals at the same time that fetal behavior is measured, suggests that organochlorines may affect fetal movement. This is crucial research, and the next step is to determine whether children’s long-term health is affected. (For more about this research, read the fascinating story on page 4.)

Much more research on the developing human fetus is necessary to fully understand the impact of chemicals on human health, individually and in mixtures. It’s an incredibly difficult area of study requiring new modes of measurement and analysis. Children and babies are also of special concern because their organ systems are still developing, which puts them at high risk.

One need only look at the sad history of lead exposure to observe the damage chemicals can inflict on young lives. Lead was once ubiquitous in our society, showing up most notoriously in gasoline and household paint. Children who ingested lead paint suffered intellectual disabilities as well as an increased risk of hypertension, cardiovascular disease and kidney disease. Generations suffered exposure before long-delayed removal of lead from paint and gasoline resulted in a dramatic fall in lead intoxication, lead poisoning and the resultant harmful effects. Even so, far too many children still have dangerous blood lead levels.

The larger question for us today is, what other “leads” are out there? Is exposure to synthetic organic chemicals also having deleterious effects on human health and development? Which chemicals pose the greatest threats? Does the interaction of exposure to multiple chemicals magnify their effects?

In addition to being critical public health questions, these issues have been a matter of great personal importance to me. My daughter, Sarah, was diagnosed with an autism spectrum disorder in 1995 at age 5. My late wife Wendy devoted her life to making sure that Sarah reached her maximum potential. After Wendy’s death in 2006, family and friends gave generously to a memorial fund in her memory that enabled us to support students to study developmental disabilities. We are now building on these activities to create the Wendy Klag Center for Autism and Developmental Disabilities at the Bloomberg School.

The Center, led by Mental Health chair M. Daniele Fallin with associate dean for Research Janet DiPietro as associate director, officially launches on October 15, 2013. It has a bold mission that includes identifying the etiologies of developmental disabilities like autism, devising the best possible treatment and prevention programs, and advancing policies that maximize health and minimize harm.

To accomplish this ambitious agenda, we intend to take advantage of the depth and breadth of expertise in the Johns Hopkins environment to create new synergies that will more effectively address the issue of developmental disabilities. We will bring together epidemiologists to assess and track prevalence of conditions in populations, geneticists to identify candidate genes, laboratory scientists to measure chemicals and other prenatal exposures, developmental psychologists to assess cognitive and other impairments, biostatisticians to develop new methods of detecting important signals in huge amounts of data from brain imaging tests and genomic analysis, experts to devise optimal policies to care for and support individuals with developmental disabilities, and clinicians at the cutting edge of screening and care to develop new strategies for early detection—all working on a common problem.

By bringing the best and brightest together, the Wendy Klag Center will catalyze research that has a purpose: to identify what may be harming our children and to protect the next generation.
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By Jackie Powder

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Expectant mothers often experience equal parts joy and anxiety as they count down the months to baby's arrival. The concern: Are they doing everything possible during pregnancy to ensure the long-term health of their child?

A researcher and an expectant mom in 2003, Tatiana Prowell volunteered for a study on pregnant women, and relished the opportunity to see her baby developing so much that she signed up twice more, during two subsequent pregnancies.

She continues to stay involved through follow-up questionnaires about her three children's development and personalities. “Those are the things I’m going to be most interested in long term,” she says. “The relationship between something I did or didn’t do, or something that happened or didn’t happen during my pregnancy, and will that affect my kids’ outcomes long term? It’s so fascinating.”

Those studies were among an ongoing series that Janet DiPietro, PhD, associate dean for Research at the Bloomberg School, and her team have been carrying out since 1991. She was then one of the first researchers to simultaneously measure both maternal and fetal indicators like heart rate and motor activity. Interested in documenting normal development before birth, DiPietro has measured the same core indicators on 11 cohorts of 950 total mother-fetus pairs, and continues to follow the development of the resulting children. That data set—unique in the field—allows DiPietro’s team to explore the real-time interactions between the “intrauterine milieu” and the fetuses’ activities, and track later development against that early information.

In a February 2013 article in the *Journal of Exposure Science and Environmental Epidemiology*, DiPietro unearthed some fascinating (and worrisome) findings about chemicals like PCBs and DDT, which have been banned for more than 30 years but do not break down easily. They therefore can accumulate in fat in our bodies mainly through pesticide residues in food. The study shows a link between pregnant women’s higher levels of these organochlorines and more frequent and vigorous movements in the fetuses they carry. At the same time, the accompanying heart rate acceleration typically indicating the baby is doing well is not always present.

What that increased activity means is hard to say. No one knows how much fetal movement is optimum, and there is wide variation between fetuses. So movement is viewed more as part of a developing temperament. While one study has suggested a link with attention deficit hyperactivity disorder, DiPietro cautions that too little informa-
tion is available to make this leap. However, since motor activity and heart rate offer insight into a fetus’s development, the findings are concerning,” she says.

“All I can say from the study is that motor activity is affected,” DiPietro says. “And since spontaneous motor activity is generated by the brain, that means the nervous system and brain are affected by exposures. What the implications are after birth is really unknown.”

She adds: “I think it might indicate that it alters the trajectory of development for that child.”

In DiPietro’s research space in the Johns Hopkins Hospital, the standard protocol begins with a brief ultrasound, but instead of focusing on anatomy, the team looks for fetal behaviors—sucking, for example—as well as measuring amniotic fluid and fetal heart rate. Meanwhile, the mom’s heart rate and skin conductance (an indicator of emotionality) are also evaluated.

In the recent pilot study, DiPietro’s team found organochlorines in all 50 Baltimore-area women participating. There were slightly higher levels among women of higher socioeconomic status. That the levels were associated with fetal movement and heart rate does not indicate the need for any specific medical intervention, DiPietro says, but does suggest a public health application of her body of work on normative fetal behavior.

“My feeling is the fetus is the canary in the coal mine, and if something is altering fetal behavior, the chances it’s doing so by affecting the nervous system are pretty high, and we should pay attention,” DiPietro says.

DiPietro’s research is widely noted for the way it frames the important questions in developmental and health research, and for providing quantitative insight into the fetal environment and which components affect developmental trajectories, says William Fifer, PhD, professor of Psychiatry and Pediatrics at Columbia University and associate director of the Sackler Institute of Developmental Psychobiology.

This study, he adds, provides a crucial window into the developing brain. “These results are going to help us focus our investigative lenses in important new directions … to help tease apart exactly how exposure is affecting brain behavior development,” Fifer says.

For DiPietro, the next step is a larger version of the same study, which will allow her team to examine different mixtures of contaminants and explore the interactions between them.

—Rachel Wallach

Fetuses whose mothers have higher levels of PCBs, DDT and other organochlorines have more frequent and vigorous movements. Exposure to such chemicals might alter “the trajectory of the child’s development.”

TARGETING NEWBORN INFECTIONS

Sommer Scholar alumna Grace Chan, MD, PhD ’13, MPH ’06, and colleagues have filled in some gaps. According to the study, published in *PLOS Medicine* in August, newborns of infected mothers were six times more likely to acquire an infection compared to infants whose mothers were infection-free. Infants born to mothers with bacterial colonization (in the reproductive tract) were nine times more likely to become infected.

Investigators from the Bloomberg School and Brigham and Women’s Hospital analyzed 83 studies published between 1960 and March 2013 on maternal infection and neonatal infection, only seven of which were from areas with high neonatal mortality.

Researchers point to the need for further studies in developing countries to determine whether interventions that target high-risk pregnant women—those with infections and colonization—can reduce neonatal infection rates.

“Often, by the time a newborn is identified as sick, it’s too late to treat them,” says Chan, a former associate in International Health now at Harvard. “We need better diagnostics that are fast, cheap and highly sensitive, and we need to reach these newborns sooner.”

—Jackie Powder

Globally, more than three million newborns die each year, many succumbing in the first week of life to bacterial infections such as sepsis, pneumonia and meningitis.

In high-income countries, maternal screening and early diagnosis have been highly effective in reducing neonatal infection deaths. However, in many developing countries little is understood about infection risk factors and methods of transmission.
Almost 40 years after Lyme disease emerged, scientists are still unraveling the mysteries of *Borrelia burgdorferi*, the tick-borne bacterium that causes the illness. The pathogen, which is tricky to cultivate in laboratory settings, uses a huge array of defenses to protect itself against the human immune system.

A fuller blueprint of *B. burgdorferi* might bring some relief to the roughly 25,000 Americans who are diagnosed with Lyme disease each year. (The disease is also a global problem, with a particularly high incidence in Eastern Europe.) When left unchecked, the infection can cause joint inflammation, cardiomyopathy and facial paralysis. Now two Bloomberg School scientists believe they have found important new avenues for understanding the disease, and in May they each received grants from the Lyme Research Alliance to support their work.

Ying Zhang, MD, PhD, a professor of Molecular Microbiology and Immunology, has a hunch that pyrazinamide—a drug that has been used for more than 60 years to treat tuberculosis—might have some effect against Lyme disease. “It’s a very curious drug, but an amazing drug,” Zhang says. “Most antibiotics work only against bacteria that are growing, but pyrazinamide works against ‘persister’ tuberculosis bacteria that are in a dormant, non-growing state.”

That’s an uncontroversial statement when applied to tuberculosis—but Lyme disease is a different story. The very idea that *B. burgdorferi* might have a “persister” form is hotly debated. Many scholars and practitioners insist that Lyme can always be treated with a relatively short course of antibiotics. The practice guidelines of the Infectious Diseases Society of America, for example, declare that there is no evidence that anyone has suffered significant chronic *B. burgdorferi* infection after the standard treatment. But some scholars and patient advocacy groups disagree, asserting that even after standard antibiotic treatment, *B. burgdorferi* can persist in a difficult-to-detect form, causing chronic neurological problems.

Zhang is in the latter camp. He suspects that under certain conditions, *B. burgdorferi* might change to an unusual form known as L-forms, one type of heterogeneous persisters. In the L-form state, bacteria lack cell walls—a major target of most commonly used antibiotics. Pyrazinamide, however, targets different sites (energy production and protein degradation) in the cell, and Zhang’s lab has demonstrated that the drug is uniquely effective against tuberculosis bacteria that have transitioned into a dormant “persister” state and are tolerant to most antibiotics.

Might pyrazinamide (or a similar compound) have the same kind of power against Lyme disease? That is what Zhang hopes to learn in the next several years. His lab’s early studies have been promising. He and his colleagues have already found that the active form of pyrazinamide—pyrazinoic acid—has some effect against *B. burgdorferi* in vitro. Now they are preparing to test the drug’s power against *B. burgdorferi* in mice.

Zhang and his team also will test hundreds of different medicinal compounds to see if they have any in vitro effectiveness against the dormant form of the bacterium.

Valeria Culotta, PhD, a professor of Biochemistry and Molecular Biology, is following a different strategy. Her lab has been using biochemical and spectroscopic methods to study the unusual ways in which *B. burgdorferi* metabolizes metals.

Most microorganisms need to acquire iron for survival, but scientists discovered several years ago that *B. burgdorferi* is almost uniquely indifferent to iron levels. (That property leaves it invulnerable to one of the body’s basic immune responses, which involves starving pathogens of iron.) Culotta and her colleagues recently discovered a possible explanation for how *B. burgdorferi* functions with such indifference to iron: It has an extremely strong capacity to take up manganese, an element that, like iron, can be used to power bacterial enzymes.

Culotta hopes that this insight might someday lead to new molecular targets for anti-Lyme medications. In the meantime, however, Culotta cautions that Lyme patients should not try to starve themselves of manganese. “This organism has such a high capacity for taking up manganese that even if you removed it from your diet, it would still find an adequate amount,” she says.

The drug therapies that might emerge would target the unique metallo-enzymes that bind with manganese, Culotta says. “We still have a great deal to learn about this organism,” she says. “I’m hopeful about new therapies, but they would come way down the line.”

—David Glenn
Untangling the MERS Outbreak

Trish Perl had just picked up a colleague at the Baltimore train station when her cell phone rang. Saudi Arabia’s deputy minister of health was on the line.

He wanted to know if Perl, MD, MSc, senior epidemiologist for the Johns Hopkins Health System, could travel to Saudi Arabia to assist with an investigation of a hospital-based MERS (Middle East respiratory syndrome coronavirus) outbreak.

Perl, who holds joint appointments in Medicine and Epidemiology, arrived four days later, on May 11, and working with colleagues from Toronto’s Mount Sinai Hospital and the University of Colorado, Denver, assembled a who-what-when-and-where database to determine how the virus spread through four hospitals in eastern Saudi Arabia, infecting 23 people and killing 15, between April 1 and May 23.

Back in Baltimore, Perl and colleagues worked with Epidemiology associate professor Derek Cummings, PhD, to untangle the disparate data strands and reconstruct the transmission network of the first large MERS cluster since the virus was identified in September 2012.

The resulting report, published June 19 in the online New England Journal of Medicine, produced early answers to fundamental questions about MERS, which has now infected 114 people and killed 54, with most cases in the Middle East. MERS has also been confirmed in Europe and Tunisia.

Investigators into the Saudi Arabia outbreak determined that the infection spread easily within hospitals, from person to person in dialysis facilities, intensive care units and inpatient wards, and in transport between hospitals.

“I think that one of the most important things to come out of this is that we’re dealing with a coronavirus infection that’s very similar to SARS,” says Perl, referring to severe acute respiratory syndrome, which caused more than 750 deaths in a 2003 epidemic.

The findings emerged from the close collaboration between Cummings and his on-the-ground investigators in Saudi Arabia, with the two camps communicating daily.

Perl and her colleagues dug into hospital patient records and ministry of health reports to collect the details—room numbers, bed assignments, patient/health care worker interactions—that Cummings required to track the outbreak through space and time.

“The tricky part is figuring out the specifics on where people were and who they could have interacted with,” says Cummings. With the data in hand, he was able to calculate an incubation period of 5.2 days and a serial interval [the time between cases in a transmission chain] of 7.6 days. The information is critical to establish protective measures in a disease outbreak, including quarantine guidelines.

Perl has briefed the CDC on the Saudi Arabia investigation and continues to monitor MERS developments globally.

With the exception of the Saudi Arabia outbreak, MERS cases have tended to be sporadic in nature, and a WHO committee ruled in July that MERS is not a global health emergency. At this point, says Perl, it’s unclear why MERS has not spread widely in the general population.

Much about the virus remains unknown—including the extent of transmission in communities and whether seasonal variations affect the virus’s ability to spread—and vigilance is necessary, according to Perl and Cummings. A virus can “sputter along in fits and starts,” before it becomes a significant disease risk, says Cummings.

“With any of these novel pathogens that are emerging, our resources are much better spent to stop them at the earliest stages,” he says. “If they start to spread widely, then you have a much larger task ahead.”

—Jackie Powder
In the ongoing battle between man and microbe, the antibiotic vancomycin is a last line of defense, the drug to turn to when few others will work.

The existence of a vancomycin-resistant strain of enterococci (VRE), therefore, spreads fear among hospital administrators. An outbreak of this “superbug” in one facility quickly can become a problem for other hospitals.

“A VRE outbreak is a horror show for a hospital,” says Bruce Y. Lee, MD, MBA, an associate professor in International Health. “Infections can be very stubborn, taking weeks, months or even years to eliminate.”

Lee’s analysis drew upon real patient data from 29 hospitals in Orange County, California. His study shows that a mere 10 percent increase in VRE at a single hospital can produce a nearly 3 percent increase in every hospital countywide.

Hospitals and health care facilities often transfer patients for reasons that range from specialized care to insurance considerations. Lee’s study even took into account patients discharged at one facility before being readmitted by another. More than half of the patient transfers in his study fell in this largely overlooked category.

The researchers found additionally that in an outbreak, infection control specialists declare victory too soon, cutting short important control measures—such as heightened surveillance, contact isolation and better cleaning—that could halt the cascade of the infection surging through a region. “The health care community needs to realize how hospitals are interconnected via sharing patients and, in the event of an outbreak, to expand vigilance and control efforts much wider and for potentially longer periods of time,” Lee says.

One easily overlooked weapon against VRE is better inter-hospital communication, he says. Currently, hospitals know too little about the facilities they share patients with, and region-wide computer databases do not exist. Incentive programs for cooperation could help, as well.

“VRE control is every hospital’s concern. As long as one hospital in your region is struggling with VRE control, your hospital is at risk,” Lee says.

While Lee was at the University of Pittsburgh, he established a collaborative team at the Pittsburgh Supercomputing Center and University of California, Irvine, to develop the computational modeling software platform known as Regional Healthcare Ecosystem Analyst (RHEA). RHEA simulates health care facilities in a region and patients flowing among them and surrounding communities, allowing researchers to infect virtual patients with VRE.

“While this sort of computational modeling is fundamental in finance, meteorology and other fields, it is relatively new in public health,” says Lee, who joined the School’s International Vaccine Access Center in July as director of Operations Research.

“Improving the way health care products and services are administered can improve the lives of millions of people.”

—Andrew Myers
In Liquor Lyrics, Singers Know Jack

From that tear in Hank Williams’ beer to the tiny bubbles in Don Ho’s wine, the mention of alcohol has long been a staple of popular song.

In recent years, however, songs have shifted from mentioning beer, wine or whiskey to naming specific brands of alcohol.

In a new study that systematically measures mentions of alcohol brands in song lyrics, researchers at the Bloomberg School and Boston University have demonstrated how pervasive the relationship is.

The study, published online in *Substance Use & Misuse* in August, examined 718 songs in genres ranging from urban and pop to country and rock between 2009 to 2011. It found that just four names accounted for more than half of all mentions of specific brands in song: Patrón tequila, Hennessy cognac, Grey Goose vodka, and Jack Daniel’s whiskey.

In 2009, for instance, the popular singer Ke$ha sang of Jack Daniel’s in her chart-topping single, “TiK ToK”: “Brush ma teeth with a bottle of Jack / ‘Cuz when I leave for the night I ain’t comin’ back.”

“The predominance of so few brands suggests a potential deeper relationship between marketers, the performers and the young audiences of popular music,” says David Jernigan, PhD, director of the School’s Center on Alcohol Marketing and Youth (CAMY) and an associate professor of Health, Behavior and Society. “This relationship needs closer examination by public health researchers.”

The study mentioned by name examples of direct sponsorship of music by alcohol manufacturers, including a Jack Daniel’s party at the 2011 Nashville Songwriters Association International and a $100 million marketing deal between Sean “Diddy” Combs and Diageo, maker of Ciroc vodka.

The researchers also found that the overwhelming majority of alcohol references, branded or otherwise, were positive. Only two of the songs in the study referenced negative consequences of alcohol use. According to the CDC, alcohol kills some 4,700 people under the age of 21 in the U.S. each year.

“Like product placements in the movies, alcohol brands are showing up in popular songs associated with lifestyles that glorify drinking. It is now common practice that, even when not directly promoting their brands, companies monitor and tacitly endorse how their brands are portrayed,” says Michael Siegel, MD, MPH, a professor at Boston University, referencing a practice known by those in marketing circles as “brand safety.”

Jernigan adds: “More study is clearly needed into the consequences of such exposure for youth drinking behavior, but if it is influencing kids to drink, then we in public health will have to reduce or mitigate the effects.”

—Andrew Myers

Sad refrain: About 80,000 alcohol-related deaths occur annually in the U.S.
Imagine a room full of 100 middle-aged and older Americans. How could you predict which of them will be hospitalized or enter a nursing home within the next two years? You might ask them about well-known risks like heart disease or diabetes. Do they smoke or is their household income relatively low? But you might not think to ask how well they sleep.

Poor sleep quality is a powerful predictor of health care utilization among Americans aged 55 and older, above and beyond whatever other risk factors they might carry, according to a recent analysis by Bloomberg School researchers and others. Older Americans who report having two or more symptoms of insomnia have 46 percent greater odds of being hospitalized during the subsequent two years than people with no insomnia symptoms.

Many studies over the last two decades have found that roughly half of older Americans sleep poorly, says Christopher N. Kaufmann, a Mental Health doctoral student. But older patients may not recognize the role sleep plays in their overall health, and may underreport sleep difficulties when they speak with their doctors.

For the paper published online in May in the *Journals of Gerontology Series A: Medical Sciences*, Kaufmann and his colleagues drew on data concerning more than 14,000 older Americans tracked by the Health and Retirement Study, a federally funded longitudinal study.

When asked about their sleep quality in 2006, 41 percent of the participants reported at least one symptom of insomnia. When asked two years later about their recent use of health services, the participants with poorer sleep quality were significantly more likely to report having been hospitalized, using home health care services or having entered a nursing home.

The pattern remained significant for hospitalization and home health care use even after Kaufmann and his colleagues controlled for demographic factors and for histories of cancer, diabetes, heart attack, hypertension, osteoarthritis or stroke.

“Treating sleep disturbances might be a way of not only promoting health but decreasing health expenditures as our population ages,” says Adam P. Spira, PhD, a Mental Health assistant professor and senior author on the study. (Other authors include Ramin Mojtabai, a Mental Health associate professor, and postdoc Sarah L. Canham, as well as researchers from three other universities.)

Spira has led several studies of insomnia among older adults, including research in which participants wear wrist devices that can provide objective data about sleep quality.

Curing insomnia is, of course, easier said than done. Several organizations have recently raised warnings about certain medications that are often prescribed to improve older adults’ sleep. Those medications too often cause drowsiness and light-headedness, raising the risk of falls and hip fractures. For his dissertation, Kaufmann plans to analyze data from a large, nationally representative pool in order to gain a deeper understanding of those safety risks.

Spira, for his part, hopes that more health providers will be trained in non-pharmacological strategies for improving older patients’ sleep, including models of cognitive-behavioral therapy that have proven effective among older adults.

One such technique is sleep-restriction therapy, in which patients go to bed and rise at scheduled times, and spend no other time in bed. “Older people who develop chronic insomnia often try to compensate by spending lots of time in bed,” Spira says. “But they end up dissociating sleep from their beds. If you restrict people’s time in bed to the time they’re able to sleep, you can start to build much healthier sleep patterns.”

—David Glenn
Putting Health Behind Bars

Gabe Eber, a staff attorney with the ACLU’s National Prison Project, pulls a report from his files.

The inmate, an older man suffering from diabetes and hypertension, was admitted to a Mississippi prison infirmary in a weak and confused state. In his medical record, Eber says, the prison doctor described the man as manipulative and likely malingering. After six days of worsening health, he was transferred to a hospital where he was treated for a myocardial infarction, dehydration and renal failure. He died two weeks later.

“The patient’s death wasn’t even documented in his medical record,” says Eber, JD, MPH ’02, who recently made a temporary move from the courtroom to the classroom to join the teaching team of the weeklong Health in Prisons course, which debuted this year in the School’s Summer Institutes.

Eber, who helps to prepare class action suits to improve medical and mental health services for prisoners, sees some of the worst health care in the U.S.

“Putting people in a closed stressful environment and ignoring their health needs is a recipe for death and, frankly, death through great suffering,” he says. “Imagine being in a cell, denied your insulin, and as a diabetic, knowing exactly what’s going to happen to you.”

For Eber and course organizers—faculty Gilbert Burnham, MD, PhD, MS, and Leonard Rubenstein, JD, LLM—prison health care is a public health crisis that has been ignored for too long.

“We’re talking about a population with very limited autonomy and high exposure to risks being cared for in a fragmented and disorganized system,” says Burnham, International Health professor and co-director of the Center for Refugee and Disaster Response.

The Geneva-based International Committee for the Red Cross (ICRC), which collaborates with Burnham on the Health Emergencies in Large Populations (HELP) courses, approached him with the idea of developing a course about providing health care in prisons for professionals in the corrections field and for public health professionals interested in working in this field.

He and Rubenstein, a senior scientist at the Center for Public Health and Human Rights and faculty member at the Johns Hopkins Berman Institute of Bioethics, hope that the course is a first step in raising awareness of the issue in the public health community. They say that the class is the first of its kind in a school of public health.

The challenges are urgent and daunting—especially in U.S. prisons and jails, which hold 2.2 million prisoners and detainees, more than 20 percent of the global prison population: caring for an aging prison population with complex health conditions, chronic disease management, mental health diagnoses, inconsistent health care standards, massive overcrowding and health concerns in connection with solitary confinement and hunger strikes.

Rubenstein and Burnham say that the problems demand public health expertise—surveillance, data collection and analysis, and monitoring and evaluation—to develop health protocols and policy reforms, and address serious medical ethics issues.

The course attracted 19 students from 10 countries and examined prison health from domestic and international perspectives. Instructors included medical and legal experts in prison health care from the ICRC, Hong Kong, Finland, Germany, India, Canada, Israel, Switzerland and the U.S.

Discussions of foreign prison systems revealed fundamental differences with the U.S. in the provision of health services.

Instructors from Israel and Switzerland explained that unlike the U.S. model, prison health care workers in their countries report to government health officials, not corrections supervisors. This clear separation of roles helps to avoid ethically questionable situations that often arise in U.S. prisons concerning the force-feeding of hunger strikers and solitary confinement cases.

“Medical participation in force feeding undermines the doctor/patient relationship and involves health professionals as adjuncts to security officials who want to end what amount to political protests,” says Rubenstein. “Medical care for hunger strikers should be based on … independent medical judgment and respect for patient autonomy.”

While the Health in Prisons course was developed primarily as a continuing education course for corrections health care professionals, organizers hope to soon adapt the class for the MPH curriculum. Long term, they envision a professional track in prison health as part of a degree program.

“Improving health in prisons in the U.S. and the world calls for the same levels of expertise and resources and commitment that the public health community dedicates to other issues,” says Eber.

—Jackie Powder
Growing up in India, a country where drug manufacturing plays a prominent role in the national economy, MPH/MBA student Gaurvika Nayyar had long been fascinated by the pharmaceutical industry. As a recent NIH research fellow, she focused on the emergence of drug-resistant malaria parasites in Southeast Asia. But it wasn't until she read a paper about counterfeit medicines—a report that included the death of a child—that Nayyar and her NIH mentors put all of those pieces together and began investigating the devastating impact of poor-quality antimalarial drugs in the developing world.

Her *Lancet* paper reviewing multicountry studies on the packaging and chemical content of antimalarials in Southeast Asia and sub-Saharan Africa found more than one-third of all sampled drugs from both regions failed chemical analysis, and 36 percent of Asian drugs and 20 percent of African drugs were classified as fake.

Poor-quality medicines fall into two principal categories: substandard drugs that are manufactured legitimately but contain inferior ingredients, or too much or too little active ingredient; and counterfeit drugs that contain no active ingredient or the wrong one, according to Patrick Lukulay at the United States Pharmacopeial Convention, which sets quality and safety standards for drugs around the world.

While poor-quality medicines also plague HIV/AIDS and tuberculosis sufferers, they have been studied most extensively for malaria, which kills 660,000 people each year. Nayyar and her colleagues found that 15 percent of the antimalarials from sub-Saharan Africa that failed chemical analysis had low levels of an active ingredient, while 34 percent of those from Southeast Asia contained no active ingredient at all.

Poor-quality drugs prolong illness, cause unnecessary deaths and impose a heavy economic burden on developing countries by raising health care costs and eroding productivity. They also damage the credibility of health care systems, which can in turn compromise vital public health initiatives like vaccination programs. Moreover, by exposing parasites to inadequate doses of the drugs that are meant to kill them, poor-quality antimalarials threaten to drive selection of resistant strains. That is especially worrisome since *Plasmodium falciparum*, the parasite species responsible for the bulk of malaria-related deaths, has already shown resistance to artemisinin-based drugs on the Thai-Cambodia border. The WHO currently recommends artemisinin-based combination therapy for *P. falciparum* malaria, and there are few alternatives on the horizon.

Nayyar, who is the director of Global Network for Access to Medicines, a student group affiliated with the Bloomberg School's Center for Drug Safety and Effectiveness and the Department of International Health, recommends a multipronged approach to the problem. It includes educating the public and identifying technologies that can help developing countries test for poor-quality medicines. Above all, she argues for a better global regulatory framework—one that would replace the existing hodgepodge of definitions and regulations that allows counterfeiters and purveyors of substandard medications to evade prosecution. She and her colleagues would like to see counterfeiting designated a crime against humanity, and they are working on a paper to promote an international treaty or convention that would crack down on poor-quality antimalarials worldwide.

Grand as those policy goals might be, however, Nayyar hasn't lost sight of the basic human tragedy that first caught her attention. “As we’re talking about this,” she says, “people are dying.”

—Alexander Gelfand
A Better Test for Schisto

Diagnosing intestinal schistosomiasis is tough business.

Identifying an infection of the parasitic worm requires collection, transport and examination of stool that must be immersed in formaldehyde to prevent decomposition in the intense heat common in counties where the parasite is most prevalent. Even then, it is not unknown for a sample bottle full of gases from decomposing feces to explode in a lab researcher’s hand.

The two most common tests for the disease, known as Kato-Katz (KK) and circulating cathodic antigen (CCA), are plagued by inaccuracies and false results. Needless to say, public health officials have yearned for an alternative.

In a July article in the *American Journal of Tropical Medicine and Hygiene*, a team of Bloomberg School researchers has demonstrated a polymerase chain reaction (PCR) genetic test to detect worm DNA in patient urine. The PCR test has proven not only vastly more accurate than earlier tests, but it makes handling of specimens much easier and safer, as well.

“This is the first time PCR has been used to diagnose parasitic diseases in urine that were previously only detectable in feces,” says postdoc Nilanjan Lodh, PhD, first author of the paper. “PCR allows us to test without collecting stool.”

In comparing all three diagnostic techniques, the researchers discovered that KK and CCA often led to less-than-optimal results, especially in low-level infections. More than half of the individuals who tested negative by KK and CCA were, in fact, found to be positive by PCR, an indication of PCR’s high sensitivity to infections.

“For health officials, PCR’s sensitivity and specificity are pretty impressive, but as one who has done arduous fecal tests in the field, I can tell you, from personal experience, that the sample stability issue is a big deal,” says Clive Shiff, PhD, an associate professor of Molecular Microbiology and Immunology, who directed the study. “Urine does not decompose like feces and is much easier to collect and transport,” he says.

Current collection methods require long drives to test locations, disseminating sample bottles, returning the next day to retrieve them, immersing each sample in formaldehyde, and delivering them to the lab.

“Collection takes time, and gasoline in Zambia runs about $2 a liter. With urine sampling, you can collect and return in a single trip. If you add in the cost of the KK and CCA tests, PCR starts to look very cost competitive even at a relatively expensive 50 cents per test,” Shiff says.

Next, the researchers are seeking funding to test a less-expensive PCR method known as loop–mediated isothermal amplification (LAMP) that can be powered by a 12-volt car battery. LAMP could be used in rural areas where electric power is absent or intermittent.

—Andrew Myers

In Memoriam

Ruth H. Singer, MD, MPH ’72, a retired physician and Maryland state health administrator who also worked in HIV/AIDS treatment at a community health center, died May 27, 2013, at age 69. A longtime supporter of the School and former president of the Society of Alumni, she chaired the Health in Asia colloquium in 1993, the first international meeting of the Society of Alumni in Seoul, South Korea.

Richard H. Morrow Jr., MD, MPH, an internationally recognized expert on the epidemiology and prevention of type 2 diabetes, died August 17, 2013. He was 81. Formerly a professor at the Harvard School of Public Health and a director of Tropical Disease Research and Training at WHO, Morrow was widely known as an expert in quality assurance, epidemiologic methods for field trials and disease burden measures.

Frederick L. Brancati, MD, MHS ’92, an internationally recognized expert on the epidemiology and prevention of type 2 diabetes, died May 14, 2013. He was 53. Brancati, whose research changed the understanding of type 2 diabetes, joined the Johns Hopkins School of Medicine faculty in 1992 and later became the director of the Division of General Internal Medicine. He was named a Johns Hopkins University Distinguished Service Professor of Medicine in 2012.
In 2003, Judy O'Neill had her first “spell”—intense chest pain, shortness of breath, a shooting pain in her left arm and vomiting. It marked the beginning of seven years of regular trips to the emergency room, countless tests and procedures—and, at times, dismissive attitudes from her doctors.

Eventually, the 69-year-old O'Neill reached cardiologist Pamela Ouyang, MD. Ouyang, director of the Johns Hopkins Women’s Cardiovascular Health Center, diagnosed coronary vasospasm (a coronary artery constriction). More common in women, the condition causes some of the classic symptoms of heart disease, but tests don’t necessarily show severe coronary artery atherosclerosis causing obstruction to blood flow, which is more often found in men.

It’s not uncommon for clinicians to fail to recognize that women can experience heart disease—and many other medical conditions—differently than men. This fact highlights the need for research with a women’s health focus, say members of the Women’s Health Research Group (WHRG) at Johns Hopkins. Ouyang and her WHRG colleagues are committed to bridging the research gaps in women’s health. From the schools of Public Health, Nursing and Medicine, this band of scientists seeks to discover the health implications of fundamental sex-based differences and to better understand health issues unique to women.

“We know there are mechanisms impacting health differently for the sexes, and this makes it important to study health in women as well as men.”
—Karen Bandeen-Roche

“Our group represents diversity—from policy and behavior to cancer, immunology, infectious disease and other aspects of women’s health,” says Sabra Klein, PhD, MS, an associate professor in Molecular Microbiology and Immunology. Klein’s own investigations into the ways that male and female hormones affect susceptibility to infection have gained national attention.

The group’s interests include reframing pregnancy as an opportunity to shape a woman’s long-term health, diagnosing and preventing frailty, and discovering how basic physiological sex differences affect diseases of the immune system.

WHRG’s research reflects the slow evolution of women’s health science beyond a reproductive focus. “When our office was formed in 1990, women’s health was really viewed as ‘bikini medicine,’” says Janine Clayton, MD, director of the Office of Women’s Health Research at NIH, explaining that decades of women’s health research often led by men focused primarily on the areas of the body covered by a bikini.

It wasn’t until 1990 that Congress mandated that women be adequately represented in NIH-supported research. Until then most clinical trials only enrolled men, assuming that the findings applied equally to both sexes—when the reality was quite different.

Morgana Mongraw-Chaffin, PhD ’13, MPH, a cardiovascular epidemiologist and WHRG member, says she has benefited from the WHRG’s collective experience and support. She wants to see sex-based research evolve from its status as a growing field to standard practice.

“My hope is that at the end of every talk I go to, I won’t have to raise my hand and say, ‘That’s great, but did you look at the differences between men and women,’” says Mongraw-Chaffin. “It should be as standard as any of the other research methods we use.”

WHRG members investigate a wide range of issues related to women’s health. Following are some examples.

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Look for Depression Early to Prevent It Later
During puberty and adolescence, young people transition from the highly structured childhood years to the exhilarating and sometimes frightening first years of independence. The transformation brings challenges and occasional turbulence. Social relationships, concerns with body image and self-identity begin to take on increasing importance for the young.

Recent research indicates that it's also a time when girls begin to show increasing rates of depressive symptoms, says Donna Strobino, PhD, a professor in Population, Family and Reproductive Health (PFRH). Until puberty, the rates for depression are similar for both sexes, says Strobino.

A greater understanding of this early vulnerability could prove valuable in the prevention, diagnosis and treatment of depression in young women, a group that experiences higher rates of the disorder than men.

“Recognizing the divergence gives us a window into identifying risk and identifying it really early,” says Strobino. “Early identification is particularly important because one of the strongest risk factors for major depressive disorder in adults and postpartum is a history of depression.”

Can Pregnancy Lead to a Healthier Life?
For WHRG director Wendy Bennett, MD, MPH, the postpartum period is a “window of opportunity” to motivate women to make smart choices about food, exercise and healthy behaviors, particularly women who experienced complicated pregnancies.

There's an increasing recognition that preeclampsia, gestational diabetes or other pregnancy-related conditions put women at greater risk for developing chronic diseases later in life, says Bennett, an assistant professor in General Internal Medicine with a joint appointment in PFRH.

“It’s not just a matter of telling women, ‘You delivered your baby, you’re fine.’ We need to discuss ways to prevent diabetes and heart disease,” she says.

Bennett and her colleagues are designing a pilot project, based at Johns Hopkins Bayview Medical Center, to better understand how to broaden postpartum care. Researchers plan to recruit women from East Baltimore to receive postpartum care that not only includes the relevant medical care, but offers additional health screenings and education.

“It’s not just thinking about a one-time intervention,” says Bennett, “but how to influence the next stage in life.”

Taking Care of Mom, Too
Depression in a new mother can disrupt a child’s well-being from the earliest days of life. Mothers who suffer from the disorder may be overly anxious, reserved emotionally and less likely to play with their babies—all factors that can impact a child’s early development.

“If a mom is depressed it’s really difficult for her to be present and responsive to an infant,” says Tamar Mendelson, PhD, an associate professor in Mental Health.

Based on recent findings by Mendelson and her research partners, a group-format, mental health program to prevent postpartum depression—the Mothers and Babies Course—shows promise in helping pregnant women and new mothers at risk of depression. In a randomized trial led by S. Darius Tandon, PhD, an associate professor in the School of Medicine, the cognitive-behavioral intervention was delivered to low-income women receiving home-visitation services.

Researchers showed that the intervention could be effective in the context of home-visiting programs and reported a significant reduction in depressive symptoms among women in the study group. Equally important, the women showed continued progress at a six-month follow-up.
Planning for Safety

Family planning clinics offer a range of services to women—access to contraceptives, cervical cancer screenings and HIV testing, to name a few.

Michele Decker, ScD, MPH, assistant professor in PFRH, is exploring whether the clinics can also serve as effective entry points to educate women about physical and sexual abuse and link them with support services.

“Evidence increasingly shows that young women bear the brunt of partner violence, and violence is associated with unintended pregnancy as well as other aspects of poor sexual and reproductive health,” she says.

In a pilot study at four Northern California family planning clinics, Decker and colleagues found significant declines in reports of reproductive coercion at clinics that screened for abuse. Reproductive coercion by a partner includes preventing a woman from using contraception or sabotaging her birth control method.

The study used “enhanced” screenings that emphasize education about abuse and referral to services. Clinicians also distribute wallet-sized “safety” cards to all women, listing hotlines, shelters and other resources.

“It removes the burden on the patient to disclose violence in that moment,” says Decker, who is working on a larger study to advance the pilot findings.

Comparing Apples to Pears

When it comes to matters of the heart, cardiovascular disease is not created equal.

“Heart disease in men and women looks different, and we’re not sure why,” says Morgana Mongraw-Chaffin.

While pain is a common heart attack symptom in both sexes, for example, women are more likely to experience atypical symptoms, including abdominal stress, back pain or shortness of breath—sometimes in the absence of chest discomfort.

“The way women put on fat is subcutaneous, whereas men put on fat more viscerally,” reflected in the traditional apple and pear shapes in men and women, explains Mongraw-Chaffin, whose research focuses on possible connections between sex hormones and body fat composition in men and women.

“Why do they put on fat differently, and does that help explain some of the differences we’re seeing in cardiovascular disease later in life?”

Mongraw-Chaffin hopes that her work can contribute to the development of more precise body mass index classifications in both men and women and among different racial groups.

“If we can better understand differences in risks, we can better tailor research and population-level interventions to the people who need it most,” she says.

Holding Back Frailty

Geriatricians have long known what frailty looks like: hunched posture, halting movements, a slow gait and the loss of muscle mass.

However, instead of viewing frailty as separate symptoms, the Women’s Health and Aging Study (WHAS) team defined it as a syndrome and developed precise metrics (a frailty assessment) to identify it.

WHAS research, conducted at Hopkins from 1991 to 2011, has important implications in caring for a rapidly aging population—particularly for women who are disproportionately affected by frailty, says Karen Bandeen-Roche, PhD, Biostatistics chair. Frailty, for example, is associated with more severe responses to falls and other stressors.

Bandeen-Roche and WHAS colleagues Linda Fried, MD, MPH ’84, dean of Columbia University’s Mailman School of Public Health, and Jeremy Walston, MD, a professor of Medicine, hope to see the assessment adopted more widely as a diagnostic tool by clinicians.

Researchers now are exploring the biological determinants of frailty, which could lead to treatments to delay its onset.

“The key idea is that it doesn’t result from a single insult to the body, but from widespread dysregulation in the system,” she says.
SUCCEED
AMERICAN INDIAN KIDS, PRO ATHLETES AND A HOLLYWOOD STAR
HAVE A BALL AT NATIVEVISION SUMMER CAMP
Suddenly, several thousand pounds of ice seems insufficient; 14,532 water bottles, a drop in the desert.

It’s nearing noon on the first Sunday in June: kick-off time for the 17th annual NativeVision Camp. Already, the contingent of coaches has broken a collective sweat that’s likely to last for the next three days, through Tuesday’s farewell ceremony. Rap music thrums as hundreds of flushed kids pour into “the Pit,” a polished basketball arena that’s the heart of Shiprock High. More stream out of buses encircling the front football field where a lone sprinkler struggles to keep the New Mexico desert at bay.

Here in the Navajo Nation, water flows only occasionally in the arroyos, and not at all in many of the run-down trailers and farms tucked into this landscape’s volcanic folds. Homes in this community, like those on other reservations across the country, often lack plumbing as well as electricity. Poverty gnaws at American Indians, especially the young. Compared with other children and teens nationwide, they have the highest rates of mortality, suicide, drug and alcohol use and dropping out of school.

As principal of Shiprock High, NativeVision volunteer Rick Edwards bears witness to the broken homes, domestic violence and self-destructive behaviors that plague his students. He holds out hope because he knows them; and because he knows them, he loves them. He tells them so every day, including today, as he waves them into the Pit.

“These kids have giant hearts and giant souls and just the kind of grit and fortitude it takes to overcome obstacles most of us never saw,” he says.

NativeVision’s capital is a real-world positive focus embodied by Edwards, one of 100 volunteers making sure that meals get served three times a day, and that the first-aid kits are stocked with sunscreen and the Porta Potties with TP. Volunteers, staff and
professional athletes—all are in on the not-
so-secret secret: NativeVision is a life-skills 
camp camouflaged in balls and lacrosse 
sticks, conducted on fields instead of in 
classrooms, led by big-time coaches instead of 
teachers. Their universal take-away message 
is simple: Stay in school. But nobody lets 
that get in the way of the fun. As a result, 
the camp appeals to kids spanning grades 
3 through 12, and representing a diverse 
collection of tribal communities, including 
Navajo, Zuni Pueblo, Tohono O’odham, 
Hopi, Sioux, Jicarilla Apache, Dine, Santo 
Domingo Pueblo, White Mountain Apache, 
Laguna Pueblo, Cheyenne-Arapaho and 
Cochiti Pueblo.

Among the return campers arriving 
today: Robyn Soriano of Gila River, 
Arizona. The 17-year-old—her hair tinged 
with henna and her tank top proclaiming, 
“I STAND FOR MY REZ”—has attended 
for the past three years. This time, she’s 
convinced her 10-year-old sister Nikki to tag 
along. With other nonlocals, the two will 
camp out in tents on Shippock High’s front 
lawn after spending their days on the back 
fields, playing lacrosse—one of the camp’s 
five sports. As the camp motto suggests, 
maybe they’ll be inspired at some point to 
“stride, soar, succeed”—and not just in their 
chosen sport (indicated by a color-coded 
wrists band).

Like the Soriano sisters, 8-year-old 
Nicole Martin wears a green wristband. And 
like them, she is trying a game that’s foreign 
to her. By dinnertime, she’ll announce to 
everyone packed in the cafeteria: “I love 
lacrosse as much as I love my puppy!”

Nicole’s animated and incessant 
chatter contrasts starkly with her hovering 
mother’s reserve. Ursula Bedah, who lives 
overnight camping for her girl!

As a cornerstone of camp, football 
maintains an important presence here. It 
was 1996 when the NFL Players Association 
and the Nick Lowery Charitable Foundation 
joined forces with the Johns Hopkins Center 
for American Indian Health (CAIH) to 
mobilize professional athlete mentors in a 
youth development initiative they dubbed 
NativeVision. This annual summer camp, 
led by Bloomberg School experts and to 
date attended by 9,500 kids, is its flagship. 
In addition, NativeVision now offers year-
round programs in a number of tribal 
communities. In 17 years, it has served more 
than 25,000 Native Americans, according 
to CAIH deputy director Allison Barlow, 
MPH ’97, co-founder of the camp along 
with former NFL players Clark Gaines and 
Nick Lowery.

“NativeVision is magic. It springs from 
each person giving all they have of raw 
talents, passion and life story,” Barlow says. 
“At camp, a thousand lives and a million 
details get sorted into a simple daily routine 
of working side by side in a common rhythm 
toward shared well-being; toward the goal 
that Native children will gain a vision for 
who they are and what they will achieve.”

It costs the kids nothing to come to 
camp. NativeVision has a diverse funding 
stream to cover its annual $250,000 cost 
but relies heavily on an annual gala that this 
year will be held November 22 at the Italian 
embassy in Washington, D.C.

“This NativeVision is a big thing,” 
Ursula Bedah marvels, eyeing the hundreds 
of campers, most of whom appear 
attractively intimidating compared to her 
wispy, glasses-wearing daughter. She’s 
impressed but fretting about whether Nicole 
will be safe for a few hours—will be here 
when she returns at 4:30 to pick her up. No 
night camping for her girl!

An obvious irony seems lost on Bedah: 
Every summer when she was growing up, 
her parents deposited her and a few of her 10 
siblings in the mountains nearby, leaving the 
Kids to fend for themselves for months while 
shepherding the family’s goats and cows at 
the cooler elevations. Come fall, the family 
would regroup on the farm in time for 
school to start. Though Bedah’s mother had 
no formal education and spoke only Dine— 
the language of her people—she instilled 
in the children a love of learning. Bedah 
graduated from Shiprock High, went on to 
earn a college degree in education and today 
teaches language arts in this district—the 
second-largest in the country serving Native 
American students. “I am glad,” she says, “I 
was raised the way I was.”

Escaping her mother’s nostalgia, Nicole 
threads through a throng of teens and joins 
dozens of girls with like-colored wristbands. 
At the center of that swarm is first-year 
NativeVision volunteer Janine Tucker, head 
coach of Johns Hopkins women’s lacrosse. 
Already latched tightly onto Tucker, 8-year-
old Kalani Williams reveals that she used to 
play softball.

“Did you like it?” Tucker asks.
“No,” Kalani confides. “They say the 
ball is soft, but it isn’t.”

Like so many of the kids here, Kalani 
wants someone to trust, no matter what 
play they happen to teach. And, like all 
the coaches leading clinics, Tucker’s main 
mission over these next few days isn’t honing 
any one particular athletic skill set; it’s 
building relationships, one-on-one.
RUNNING INTO JERROD
Sunday, June 2 / Day 1
Hundreds of kids are packed onto the bleachers in the Pit, fanning themselves throughout the sweltering welcoming ceremony. Lenes Hopkins-Chery notices someone pointing at him. He can’t quite make out the face, but senses a familiar energy—a memorable presence—and suddenly recognizes exactly who it is: “Oh yeah! That’s Jerrod!”

Two years ago at NativeVision, Hopkins-Chery first noticed Jerrod Noble, a 15-year-old Navajo who, given a couple years of maturation and training, would be a valuable asset to any university track team.

“He’s strides,” Hopkins-Chery recalls, “were amazing … I mean, just smooth.”

A straight-A student athlete, Jerrod stood out not only for his natural sprinting ability but also for the intelligent questions he asked about track and field, a sport largely foreign to him. All he knew about running was that he was good at it—as in, always the fastest kid at school. Golf was his main sport, however. His grandfather had taught him that. Jerrod also played basketball, mainly because everyone else did; his own mother had been a hoops standout when she was a student.

“Play golf,” conceded Hopkins-Chery, a former runner for Park University in Parkville, Missouri, and now a manager for an international trading company. “But you should be running as well.”

Hopkins-Chery no sooner arrived back home in Kansas City after NativeVision 2011 when Jerrod texted him: “Hey Coach, what do I do to get better?”

Hopkins-Chery sent him weight-training workouts that featured lots of reps, especially leg curls.

“I didn’t know then that hamstrings were important for sprinting,” Jerrod says.

The coach advised him about diet, suggesting he drink potassium-rich coconut water to help him recover quicker after a run in the desert heat.

“He told me to work out in the mornings,” Jerrod says, “which, you know, it was just awful for me to get up. He told me to take a morning jog, and during it, to enjoy nature, and my whole town; to just enjoy living.”

A sunrise run, Hopkins-Chery persuaded Jerrod, should be nothing short of sacred; a teaching wholly aligned with traditional Native American culture.

“The spiritual part,” the coach explained, “is that with every step that you take, you’re breathing in what the earth has given you, and then releasing positive energy back to the earth.”

Blessings come back three-fold to those who respect the world around them, according to Hopkins-Chery. He revealed to Jerrod that while running, he intentionally breathes for somebody who struggles to breathe naturally: someone using an oxygen tank or confined to bed. He admitted that early in his career, he ran for himself; to better his own times. Then, when his mother became sick, he began to understand how he could bless somebody else when he ran: “I ran for my mom every day,” he told Jerrod. “I ran hard. I ran strong. I ran until I was exhausted.”

He ran until he had no breath left. Then, he logged another five miles. His mother’s health improved. “And I thought, ‘Mom, you just don’t know… I just ran 20 miles for you today! I ran for you because you aren’t able to do it,’” Hopkins-Chery said.

Jerrod is a quick and eager learner. Hopkins-Chery notices that this year he looks more relaxed when he runs; like he’s running for something beyond himself.

“I want to give back to my community,” Jerrod confirms. “I want to make them proud about what I do, how hard I want to work for them.”

As much as Hopkins-Chery hopes Jerrod might head to Park University and run for his alma mater, he holds another dream even dearer: “I told Jerrod yesterday that I cannot wait for his first year of college to be over; then he’s going to come back [to NativeVision] and be a coach. It’s going to be amazing.”

RODNEY STEPS UP
Monday, June 3 / Day 2
With five sports—basketball, football, track, volleyball and lacrosse—going on at once, and compressed into a frenetic few days, NativeVision seems at times to be a sprint and an endurance contest. Mercifully, a number of breathers are interspersed among the clinics. Longtime NativeVision basketball coaches Nadine Caron and Joe Meriweather look forward to these scheduled small-group chats for the chance to lift campers up and expand their perspectives beyond life on the Rez.

Meriweather, a fatherless black kid-turned-NBA-star, and Caron, a Native American surgeon in British Columbia, stand in front of their group, poised to talk candidly about the adversity they have faced, and reveal how they—to this day—apply lessons learned on the court to life’s challenges.

That’s when Rodney Dazen steps up. A shy 17-year-old Apache wearing electric-blue Nikes, he had attended camp the year before and heard these same coaches
In Miracle Russell’s family, all are focused on football and basketball. She says she is the “weirdo-sore-thumb-sticking-out kind of kid” who prefers acting to athletics. “Not everyone plays sports,” the 16-year-old Shiprock High student shrugs. And not everyone holds their own—on stage with actor Martin Sheen—while making their acting debut. Miracle is among a dozen American Indian kids whose inner artists were unleashed during camp by NativeVision volunteer Vaz Santosham. The professional actor-turned-drama-coach organized them into a company of actors self-assured enough to write and perform (opposite Sheen, no less) a series of comedic skits aptly described as Saturday Night Live on the Rez.

“I’ve been very lucky with these kids; they’re very receptive,” Santosham says. “With Miracle, all I had to do was open the door just a crack and then all of a sudden it was like, ‘WHOA! Hi, I’m HERE!’” NativeVision this year expanded its programming beyond sports to add the acting workshop largely because Sheen, a fundraising spokesman for the camp, proposed a new, hands-on volunteer role for himself. He had met Santosham and become aware of NativeVision a few years ago when the two were working together in India on a yet-to-be-released movie. (Santosham’s father, Mathu, directs the Center for American Indian Health, of which NativeVision is a flagship initiative.)

The performing arts, they agreed, should be represented at NativeVision. This year, as linemen completed tackles and hurdlers hurdled under the New Mexico sun, Santosham’s troupe sweated under the spotlights in a theater adjacent to Shiprock High’s football field and track. Acting, they learned, is less about adding something or trying to change than it is about opening up and exposing what’s already inside.

“If you had seen Miracle before… she wouldn’t have been able to do this,” Santosham says. “But now she trusts herself.”

Then, last June at NativeVision camp, he met Coach Caron of the Ojibway Tribe, First Nation. The former basketball standout at Simon Fraser University had finished at the top of her class in 1997 to become the University of British Columbia’s first woman aboriginal medical school graduate. Her success—in the face of challenges that he now realized were not unique to him—had a powerful effect on him, Rodney says. Suddenly, he knew in whose footsteps he wanted to follow. When all the other kids swarmed the college coaches and former pro players to sign their camp shirts, he approached Caron and asked her to autograph his beloved blue athletic shoes.

“I would never let Michael Jordan sign these over you,” he told her, “because I’ve never seen a Native American go farther than you have.”

**A MIRACLE FOR MARTIN SHEEN**

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“Not everyone plays sports,” the 16-year-old Shiprock High student shrugs. And not everyone holds their own—on stage with actor Martin Sheen—while making their acting debut.

Miracle is among a dozen American Indian kids whose inner artists were unleashed during camp by NativeVision volunteer Vaz Santosham. The professional actor-turned-drama-coach organized them into a company of actors self-assured enough to write and perform (opposite Sheen, no less) a series of comedic skits aptly described as Saturday Night Live on the Rez.

“I’ve been very lucky with these kids; they’re very receptive,” Santosham says. “With Miracle, all I had to do was open the door just a crack and then all of a sudden it was like, ‘WHOAH! Hi, I’m HERE!’”

NativeVision this year expanded its programming beyond sports to add the acting workshop largely because Sheen, a fundraising spokesman for the camp, proposed a new, hands-on volunteer role for himself. He had met Santosham and become aware of NativeVision a few years ago when the two were working together in India on a yet-to-be-released movie. (Santosham’s father, Mathu, directs the Center for American Indian Health, of which NativeVision is a flagship initiative.)

The performing arts, they agreed, should be represented at NativeVision. This year, as linemen completed tackles and hurdlers hurdles under the New Mexico sun, Santosham’s troupe sweated under the spotlights in a theater adjacent to Shiprock High’s football field and track. Acting, they learned, is less about adding something or trying to change than it is about opening up and exposing what’s already inside.

“If you had seen Miracle before… she wouldn’t have been able to do this,” Santosham says. “But now she trusts herself.”

That was obvious from the moment she appeared before the community-wide audience that packed the performing arts center for NativeVision’s premier one-night show. She played a wacky talk show host opposite Sheen, who played himself, in a comedic skit written and produced during NativeVision. With her brimming talent and Sheen’s graciously supportive, her willowy presence stole the spotlight. Nobody was more impressed by Shiprock’s breakout talent than the Hollywood mega-star in their midst.

“Her name is Miracle,” Sheen declared, “and she is a miracle.”

—**MY**
The quote that Caron scrawled on his shoe—Do or Do Not, There is No Try—ultimately saved his life, he says. It had been a very tough year. He was sick, and sinking dangerously low. At a desperate moment, he noticed Caron’s handwritten message on his shoe. It empowered him to not give up, he says: “The sickness brought me down, but I didn’t let it take me down forever.”

Tears in her eyes, Caron softly interjects, “You said you were going to try to finish high school. Where are you now?”

“Senior year.”

“And you’re looking forward to it?”

“Yes, I am.”

BENCHING DOM
Monday, June 3 / Day 2

“Finish! It’s all about finishing,” Ron Pritchard yells across the expanse of turf, an anomaly of green in an otherwise parched landscape.

The kid did everything right—almost. He plowed his way in, created space and made an interception, but in the end, neglected to yell “DEVIL!”

“You want to alert your teammates that you’ve caught the ball, so they know they have to make a transition now from defense, right Dominique?”

Seventeen-year-old Dominique Yazzie limps back into line, eager to have another chance at perfecting this dig-and-drift zone technique. His impaired gait concerns Pritchard, a former NFL linebacker who now coaches at a private school in Scottsdale, Arizona.

When the guys break for lunch, he finds Dominique to ask what’s going on: “Where are you hurt at Dom?”

Squinting up at coach, Dominique says: “In my groin.”

“I would rather have a calf pull or a tear in my thigh,” Pritchard says, “because when the groin is torn, it’s very, very sore, and hard to heal.”

Dominique admits he’s not sought any treatment yet.

“If I were you,” Pritchard says, “I wouldn’t play in the game today. How do you feel about that? Or do you feel like you must play?”

Dominique nods. His habit is to play through pain: “I love the game, and want to help my teammates out.”

“Typical warrior,” Pritchard responds. “Absolutely typical. The highest-level athletes think the same way. They feel responsible not only for themselves but their teammates. That’s the scary part, because some injuries you can’t play through.”

Pritchard bides his time before putting his foot down, before insisting that safety come first. He wants Dominique to assume responsibility for taking care of his own body.

“I’m telling you,” he says. “If you play it would be a foolish thing. You could put your senior season in jeopardy.”

Dominique appears convinced. Somehow, Pritchard asks if he plans to play after high school, and Dominique says he likes Oregon, adding that he’d need a scholarship to go play for the Ducks.

“When they first met, 11-year-old Alaira Kisto of Gila River, Arizona, told Janine Tucker that she likes basketball best—all the camp kids are crazy about basketball—but wanted to try something new.

Tucker offered an enthusiastic high-five for that.

Now, three days later, as campers drag sleeping bags and backpacks into buses and vans for the trip home, Tucker finds Alaira and pulls her aside.

“You seem very interested in learning and growing and pushing and challenging yourself,” Tucker begins. “You were very kind to the younger girls and very respectful to the older girls.

“Are your grades good? What’s your GPA? Anytime we can get a guy who can play football and also have the desire to develop academically, that’s the best match,” Pritchard says. “That’s the perfect storm.”

Stanford football alum and former NFL linebacker John Olenchalk—a NativeVision coach since 1997—declares the break over and sends the guys back out from the sidelines for more drills before a long-awaited scrimmage.

Pritchard puts a hand on Dominique’s shoulder: “With your speed, and how you cut, you could rip that groin in half and you may never get over that one. Honestly. So you got to think a little bit in the future.”

A four-year veteran of NativeVision, Pritchard describes these guys as his “three-day family.” In their short time together, he seizes opportunities to dig deep and reach these kids’ hearts and souls. If he can do that, he knows they are going to trust him. And with trust, miracles can happen. He’s seen them happen—in these kids’ lives as well as in his own.

Still sensing that Dom is teetering, Pritchard poses a rhetorical question: “Are you coachable? Yes you are. So you’re not playing today. How ’bout that?”

“Sounds good to me,” Dominique agrees.

Now it’s Pritchard who needs convincing: “You trust me?”

“Yes, sir. I do.”

SEE YOU NEXT YEAR
Tuesday, June 4 / Day 3

When they first met, Alaira Kisto of Gila River, Arizona, told Janine Tucker that she likes basketball best—all the camp kids are crazy about basketball—but wanted to try something new.

Tucker offered an enthusiastic high-five for that.

Now, three days later, as campers drag sleeping bags and backpacks into buses and vans for the trip home, Tucker finds Alaira and pulls her aside.

“...
“I brought something special with me that I want to give to you because all of those qualities are so important as you go through life.”

Tucker presents the girl with a treasure from Johns Hopkins Women’s Lacrosse: a Blue Jay team stick.

“I want you to break it in just like you did your NativeVision stick and make it your own. This is for you,” she says.

A glaring midday sun notwithstanding, Alaira beams.

Tucker expects to see Alaira back at NativeVision Camp next year, she says, adding she can’t wait to see how good she’ll be then at the stick tricks they practiced so hard these past few days. “I think that you’re going to go really far,” the coach confides.

“I’m going to finish my school and then go on to college,” Alaira insists.

“That’s my girl,” Tucker says. “That’s what I want to hear. I’m going to keep my eye on you.”

"NATIVEVISION IS MAGIC. It springs from each person giving all they have of raw talents, passion and life story.”
—Allison Barlow

“I THINK YOU'RE GOING TO GO REALLY FAR.”
—Janine Tucker, with Alaira Kisto

Crazy as they are about basketball, these Native American kids learned that lots of court skills translate directly to the lax field—as well as to life.
“When you want wisdom and insight as badly as you want to breathe, it is then you shall have it.”

—Socrates
Asthma's Inner World

Clues to the three-decade surge in asthma rates may be found not in cells of the lung, but among the universe of bacteria in the gut.

Story Melissa Hendricks Joyce
Illustration Michael Glenwood
It began as a mystery.

For years, Marsha Wills-Karp, PhD, had used the same strains of laboratory mice to study the molecular mechanisms of asthma. And for years standard tests had shown that one commonly used strain, A/J mice, was susceptible to asthma, while another standard strain, C3H mice, was resistant to the disease.

That changed when Wills-Karp moved her lab from the Bloomberg School to the Cincinnati Children’s Hospital Medical Center 13 years ago. Suddenly, the A/J mice were less asthmatic, while the C3H mice were more susceptible to the disease.

“We were baffled,” says Wills-Karp.

Other than geography, nothing had changed. The mice were the same genetic strains she had always used, ordered from the same company she had always patronized. Even the scientists handling the animals were the same—graduate students who had accompanied Wills-Karp to Cincinnati.

The mystery renewed in 2012 when Wills-Karp returned to the Bloomberg School to chair the Department of Environmental Health Sciences and continue her asthma research. And the mice have resumed their old patterns: A/J’s are susceptible to asthma and C3H’s are resistant.

Wills-Karp’s group spent hours brainstorming what might account for the differences, and they painstakingly devised new protocols to adjust for the changes.

The mercurial mice had the potential to turn into “a big headache,” says Wills-Karp during a June interview in her seventh-floor office on Wolfe Street. “Sometimes, however, a big headache can turn out to be exciting because we can use it for our own devices.”

In this case, Wills-Karp says, the headache has helped her recognize a new paradigm for asthma, a model that could help explain some of the disease’s unsolved puzzles.

New ideas, new insights are welcome in a field that has seen asthma rates skyrocket over the past 30 years. Worldwide prevalence is now 300 million, with cases projected to reach 400 million by 2025. Genes and the environment clearly factor into asthma’s development, but cannot explain everything about the disease’s development or its rise. Severe asthma—the source for most asthma-associated hospitalizations, deaths and health costs—presents another conundrum. According to the CDC, asthma in the U.S. is responsible for 1.9 million emergency department visits per year and $56 billion in health costs and lost productivity. Why some patients develop severe forms of the disease while others experience only mild cases is not known.

Its symptoms—inflamed bronchi, wheezing, coughing, labored breathing—clearly mark asthma as a lung disease. Yet the mystery presented by the furry A/J’s and C3H’s has led Wills-Karp to focus on a different organ system: the gut. Specifically, she’s targeting the horde of bacteria that reside there. Known collectively as the intestinal microbiota, these microbes help us digest our food, metabolize certain vitamins and keep disease-causing bacteria in check. A growing body of evidence also links disruptions in the microbiota to a host of diseases. Asthma, says Wills-Karp, especially severe asthma, may be one of those diseases.

She now believes that different intestinal microbiota accounted for the discrepancies in asthma between the Baltimore and Cincinnati mouse colonies. Different types of feed in the two animal houses may have facilitated the growth of different microbiota, says Wills-Karp, a hypothesis she will examine in future studies. In the meantime, the unexpected discrepancy has given Wills-Karp the opportunity to understand the microbiota’s possible role in asthma.

The Disease Connection

Research on the microbiota and microbiome (all the genes of the microbiota) has grown exponentially in recent years. Scientists funded through NIH’s Human Microbiome Project are studying everything from the urethral microbiome of adolescent males, to the role of the gut microbiota in obesity in the Amish and the skin microbiome associated with acne. And at Hopkins, Wills-Karp has organized a Microbiome Interest Group, which includes more than 100 scientists from diverse disciplines (see sidebar).

“We’re born alone, we live alone, we die alone,” Orson Welles once lamented. Not from a biological perspective. Microbiome studies make it increasingly clear that we move through this world in congress with trillions of microbial companions—in our intestines, on our skin, in our eyes, and on every surface of the human body.

And some studies are beginning to produce tantalizing results showing microbial patterns that correlate with certain diseases. For instance, Cynthia Sears, MD, a Microbiome Interest Group member and professor of Medicine, has shown in mice that certain toxin-producing microbes are associated with colon cancer. When these microbes colonize the gut, they may induce conditions that cause or exacerbate colon cancer. Her findings and those from other labs are early but tantalizing, says Sears.

“They raise real hope there is a bigger story and also hope that the microbiome will be manipulable in ways that help treat or diagnose disease,” she says.

The big question, though, is what the findings mean. To date, researchers have been charting the organisms that make
“Everything you'll ever need to know is within you; the secrets of the universe are imprinted on the cells of your body.”
—Dan Millman
up the microbiota, says Jonathan Braun, MD, PhD, a professor of Pathology at the UCLA School of Medicine whose research involves the microbiome. Now, he says, “we’re moving from cartography of the microbiome, finding out what [microbes] are in there, to finding out what do they do and what to do about it, what parts are useful and what parts are scary.”

Scientists might exploit such knowledge to develop microbiome-based diagnostic tools or microbiome-targeted therapies. Braun envisions, for instance, a home test kit that measures the metabolic products of a person’s gut microbiota. The results might be used to help consumers adjust their diet to reduce their risk of certain diseases.

But some scientists caution that we are not there yet and that it’s important not to oversell the microbiome. “I think it is very likely that microbiomes are involved in an incredible diversity of host phenotypes—including health, disease, etc.,” says Jonathan Eisen, PhD, a professor of Medical Microbiology and Immunology at UC Davis. “I also think largely because microbiomes are the hot thing, that there is a massive amount of overselling.”

Seeking Asthma’s Switch
Wills-Karp’s interest in asthma grew out of research she conducted in 1986 as a postdoc at Yale, where she studied the effects of aging on the muscles that control the lung’s blood vessels. A prominent theory at the time held that children with asthma outgrew the disease as their lungs matured. Wills-Karp and her colleagues set out to look for an “aging component” responsible for that effect. They never found one, but their studies piqued her interest in the immune system’s role in asthma.

That work led her to take a close look at the hygiene hypothesis, which posits that being exposed to a wide variety of microorganisms in childhood helps program the immune system, and that the hygienic Western lifestyle deprives children of this important driver of immune development.

“In the developed world, we’ve reduced microbial exposure in early life in children,” says Wills-Karp. The widespread use of antibiotics, a high rate of Cesarean section deliveries (which prevents the newborn from being exposed to the vaginal canal’s microbiota), a low rate of breast feeding, migration from rural areas to cities, and other factors that go along with economic development reduce the variety of microorganisms children encounter. Without a rich microbial “education,” the regulation of the immune system becomes skewed in a manner that makes it more sensitive to certain antigens, according to the hygiene hypothesis. This imbalance leads to a heightened risk for asthma and allergies, as well as autoimmune disease.

Indeed, as childhood has become less germy in the last 30 years, rates of asthma, type I diabetes, Crohn’s disease and certain other chronic illnesses have climbed. Zeroing in on asthma, Wills-Karp calls up on her computer screen a color-coded world map showing asthma prevalence. As the map’s colors reveal, rates vary dramatically from country to country. For instance, the United States, United Kingdom and Australia are colored fire red, the shade for...
countries in which more than 10 percent of the population has asthma. Russia and China, on the other hand, appear as pale green, signifying asthma prevalence of 2.5 percent or less.

Other observational evidence supports the hygiene hypothesis as well, says Wills-Karp. Scientists have shown, for example, that people in developing countries have a more diverse assortment of microbiota in their GI tracts than people in developed countries. Other studies show that children with a lot of siblings, or people who live on farms, have lower rates of asthma, endorsing the view that encountering a panoply of germs in early life reduces asthma risk.

One piece missing from the hygiene hypothesis, though, has been a plausible biological mechanism. Which microbes and which immune pathways incline a child toward developing asthma? Scientists have proposed many theories, says Wills-Karp, but none has held up to close scrutiny. “It’s still an open question.”

In 2001, Wills-Karp published a review of the hygiene hypothesis in *Nature Reviews Immunology*. The prevailing model for asthma focused on two subclasses of immune cells, T-helper cell 1 (Th1) and T-helper cell 2 (Th2). Reduced exposure to germs early in life skews the immune balance toward producing more Th2 and less Th1. But Wills-Karp suggested that there might be more to the story and proposed that immunologists consider a broader model.

A breakthrough on this idea began in 2008, when Wills-Karp read a journal article by immunology researchers at New York University. The scientists had noticed something strange. They had purchased the same strain of mice from two different popular vendors, Taconic Farms and Jackson Laboratory. But even though the mice were genetically identical, their small intestines contained dramatically different levels of a recently discovered immune cell called T helper cell 17. Taconic mice had a high level of Th17, while the Jackson mice had a low level—a difference reminiscent of Wills-Karp’s Baltimore and Cincinnati mice. In both cases, genetically identical groups showed surprisingly dissimilar results in a health parameter. Some difference in the facilities (Baltimore vs. Cincinnati; Taconic vs. Jackson) must underlie the inconsistent results.

As it happened, Wills-Karp had recently published the results of her own study in mice related to Th17 cells. “We found that Th17 had some connection with severe forms of asthma,” she says. “The more Th17, the more severe the asthma.” She suspected that the Taconic mice would have more severe levels of asthma; studies in her lab confirmed this hypothesis.

Research in people echoed the mouse results, further evidence that an overzealous Th17 response might underlie or augment severe asthma. But that still left a question: What would cause Th17 cells to spike in one mouse and not in its genetically identical cousin?

Around the same time, several studies began to suggest that the answer had something to do with the microbiome. Further studies by the NYU group pointed to one microbe in particular, an elusive bacterium that has not been definitively classified but may belong to the *Clostridium* genus.

These clostridia-related bacteria live in the small intestine of mice and various other species where they burrow deep inside the epithelial lining. Scientists have not succeeded in replicating this specialized environment in a culture dish, so these bacteria, like many other microbiota members, can’t yet be cultured.

In recent studies, Wills-Karp examined whether the clostridia-related bacteria could indeed be driving the immune change behind severe asthma. Because of the (Continued on page 46)
An advocate with a passion for evidence, Jose "Oying" Rimon II leads the world's largest family planning conference.
The population of Ethiopia's capital city will suddenly surge on November 11. More than 3,000 researchers, government ministers, students and NGO leaders from 100 countries will gather in Addis Ababa for the 2013 International Conference on Family Planning (ICFP). It's yet another sign that family planning—once relegated to the global agenda's hinterlands—is back. Two previous conferences led by the Bloomberg School's Bill and Melinda Gates Institute for Population and Reproductive Health (Kampala in 2009 and Dakar in 2011) helped restore the field's prominence. Then, at last year's London Summit, governments and NGOs committed to delivering contraceptives to an additional 120 million women by 2020, and donors pledged $2.6 billion to do so.

**Orchestrating the Addis conference’s 750 presentations in 150 panels, and hundreds of parliamentarians and policymakers, is Jose “Oying” Rimon II, MA, Gates Institute deputy director. Rimon returned to the School in 2012 after five years at the Institute deputy director. Rimon returned to the School in 2012 after five years at the Bill & Melinda Gates Foundation. Dubbed a “positive disruptor” by a former boss, Rimon is an exuberant, outspoken advocate with a passion for evidence. He recently shared his vision for ICFP 2013 and his thoughts on global family planning with Johns Hopkins Public Health editor Brian W. Simpson, MPH ’13.**

**How do you plan a conference of this size?**
You need vision and logistics. If it’s all vision without logistics, it’s going to fail. If it’s all logistics without the vision, it will just be another meeting.

**Why does the field need another conference after the success of the London summit?**
There’s some momentum after London, but that momentum needs to be substantive in terms of, is the money that the donors pledged actually flowing and how is that money going to be used. And on the other side, are the developing countries owning this issue and allocating the right resources or implementing the right policies to their own situation. That's still needed in a big way.

220 million women who do not want to become pregnant are not using contraception. What are the barriers to fulfilling this unmet need?
One is supply, the other one is demand. On the supply side, how do you make sure that the contraceptives that are needed for both spacing and limiting are actually available to the people who want them, when they want them? That means making sure that the stock-outs [when facilities run out of contraceptives] don't occur as often as they do. In her field visits, Melinda [Gates] was surprised to observe that while there are no stock-outs for HIV/AIDS drugs or for vaccines, you have stock-outs for contraceptives. There’s something wrong with that picture, you know?

What’s the solution?
The tech experts call one solution the informed push model. That’s a complicated way of describing the Coca-Cola model: There is an established supply, and the suppliers just go and restock to the level determined for that area. If a store is supposed to have 1,000 bottles of Coke and there are only 400, they just stock it up to 1,000 and keep moving. It’s not rocket science.

And how do you address the demand side?
Especially in sub-Saharan Africa, there are still many countries where there is demand for high fertility among mothers and fathers. So Africans themselves have to work on educating people in terms of their options. And in virtually all of these countries, the desired number of children by mothers is almost always below the actual number of children in the family. Wouldn’t it be great if mothers could actually have the number of children they want? So behavior change, educational programs, outreach and counseling are key to addressing the issue of demand, the issue of misinformation and misconceptions, the fear of side effects, and oftentimes just the ignorance of where to go to get services.

How does a conference like the ICFP really effect change?
At many levels. When there is no sense of a community and there’s a feeling of abandonment, it’s like we can’t achieve anything. So this conference changes that perspective. It also brings in the exchange of best practices: What did Ethiopia do? Why are they successful? The reason we picked Addis is that we want to celebrate a little this time around. Ethiopia from 2005 to 2011 had an increase of almost 100 percent of their CPR [contraceptive prevalence rate]: Modern methods went from 14 percent to 27 percent.

How did Ethiopia achieve this?
They did this by political commitment at all levels, delivering services through a powerful health extension workers program and shifting tasks so a health extension worker can provide a contraceptive injection. It doesn’t have to be a nurse or a physician.

What do most people not understand about global family planning?
When I was at the Gates Foundation, we commissioned a series of surveys [of Americans] on international family planning. One of the major conclusions was that if you are advocating for family planning as an end to itself—that family planning is good—it doesn’t resonate as well with the American public because they think you have a hidden agenda like population control. But if family planning is positioned as reducing maternal mortality, infant mortality, unintended pregnancies and abortions, if you put it in that context, boom! Then all of a sudden you have overwhelming support.

So the field should be doing more to emphasize that family planning prevents maternal and child mortality?
Oh yeah. That’s the main argument now based on evidence. In *The Lancet* special issue on family planning last year, Saifuddin Ahmed [an associate professor in Population, Family and Reproductive Health] was the key author of a research paper that essentially said that satisfying the unmet need for contraception can prevent an additional 29 percent of maternal deaths per year. Other studies document a 19 percent reduction in infant deaths. It's huge. I mean what other low-cost intervention could do that?
Chaos and opportunity. The digital revolution has spawned both.

A 1,000-foot wave moving at 1,000 miles an hour, the Web/mobile technology/social media surge has upended industries, academia, government, cultures and the entire global economy in its head-long rush to the future. It has ceded broadcast rights to everyone and shattered (and often shuttered) the traditional media. Numbers tell the story: 1.1 billion Facebook users, 400 million tweets per day, 6 billion hours of YouTube videos viewed each month (almost an hour every month for every human being).

Like everything else, global health communications—how we gather data and stories about public health, convey discoveries and persuade others to act—has not been exempted. Traditional journalists have lost the financial model that supported global health reporting, while researchers, practitioners and advocates have embraced the possibilities of connecting directly with their communities through social media. And for their part, experts in behavior change communications now work in a wholly new world with a bewildering array of media and platforms through which to channel their messages.

For better (mostly) or worse, we live in an era rife with change. Based on interviews with journalists, communications experts, and others, here are five key lessons for the new world of global health communications.
It’s Time to Adopt New Models

In the last decade or so, newspapers like the Boston Globe, Miami Herald and Baltimore Sun closed their international bureaus. More than a third of U.S. foreign correspondent positions were shed between 2003 and 2011, according to the American Journalism Review. With them went many of the opportunities for the general public to encounter stories about malaria, AIDS, tuberculosis, and other health issues outside the U.S.

To ensure that global health issues still make it to the mainstream media, journalists have found support from the Bill & Melinda Gates Foundation and other organizations such as the Pulitzer Center on Crisis Reporting. (The Bloomberg School recently partnered with the Pulitzer Center on a student reporting fellowship. See the resulting article on page 38.) Beginning in 2010, the Gates Foundation has supported a global development news section in the U.K. newspaper The Guardian. Recent stories supported by the Pulitzer Center have appeared in The Economist, The New York Times, The New Yorker and in other venues.

Financial support from foundations and other organizations is a new model for journalists. “The bottom line in the global health reporting community is there’s no other money to do this with, so we have to make sure we are very careful to report what we see and not let where the money comes from influence us,” says Joanne Silberner, who used a Pulitzer Center grant to report on cancer in Uganda, India and Haiti for Public Radio International’s The World. “This is new so it’s concerning. I think the firewalls are being constructed.”

Information Needs to Lead to Motivation

Like nature, the Web abhors a vacuum.

The digital revolution has empowered NGOs, universities, government agencies and foundations to fill the void in global health information left by old-school media.

The Gates Foundation, Population Services International, and many others daily post articles, videos, photo galleries, and podcasts about global health issues related to their efforts. One powerful example of the possibilities of new media happened in August 2012. The UN Foundation filled the traditionally slow news month with “Blogust”—a relay of blog posts about vaccines by top “mom bloggers.” Each day, a different blogger took up the topic and touted vaccines’ importance to her legion of followers. The effort raised $200,000 and attracted more than 29 million page views, according to the Foundation. “[The UN Foundation has] worked with [the moms] since to great effect,” notes Kate James, the Gates Foundation’s chief communications officer. “They are building this group that wouldn’t automatically be engaged to be real champions around vaccines.”

The Gates Foundation itself recently partnered with social media companies like Tencent and Sina Weibo in China and with China’s Ministry of Health on a successful tuberculosis prevention campaign, she says. They followed that with a campaign on tobacco control in 2012 and raised awareness of the dangers of passive smoking from 5 percent to 19 percent, James says.

The greater challenge for global health organizations, says James, is to push beyond awareness. “The big shift now is how to move from output—the sheer number of articles about an issue—to outcomes, in terms of commitment to investment and [other] worthwhile things,” she says.

Use Social Media’s Brilliant Feedback Loop

Traditional media relies on the “blunt instrument” approach, says Christy Feig, MPH ’08, director of Communications for WHO.

The story is researched, written and published—and then readers and viewers may or may not understand it.

Social media is more of a conversation, says Feig. “With social media, you put something out, and the thought process people go through is live. You can add more information and modify and refute misinformation—all while the thought process is going on,” Feig says.

As an example, she points to her teams’ efforts after Japan’s Fukushima nuclear disaster in March 2011. In the days after the damaged plant’s release of radiation, her team discovered rumors circulating in social
media. Some messages circulating in China advised people to consume large amounts of iodized salt to protect themselves. (The rumors had a kernel of truth: Potassium iodide, taken in proper amounts at the right time, can prevent radioactive iodine from being absorbed by the thyroid, according to the CDC.) “We instantly jumped in there and said... ‘Don’t eat excessive amounts of iodized salt. There’s not enough iodine to protect you, and too much salt can be toxic,’” Feig recalls.

WHO’s messages were picked up and circulated through social networks and mainstream media. Iodized salt stopped flying off store shelves. Three days after the initial rumor, Agence France-Presse ran a story with the headline “Chinese seek refunds as salt panic subsides.”

“I think the days of just putting information out there are long gone,” Feig says. “With social media we can get a real quick look at whether or not people are hearing our message the way we need them to. It’s a brilliant feedback loop.”

There’s Still a Place for Skepticism

In the eternal quest for attention and support, many NGOs emphasize the positive and trumpet success rather than acknowledge nuance and the messy complexity of real life.

Missing from this mission-driven media is journalism’s skeptical filter. Reporters seek out more than one side of a story and report on failures in the belief that it’s as worthwhile to learn what doesn’t work as much as what does.

“I am very happy to write about success [but] I’m just concerned that within global health we should not assume that all is always for the best, just because our intentions are good,” says Sarah Boseley, a Guardian editor who runs its global health blog. “I think journalists should approach everything with a critical eye and seek more than one point of view, if there is such.”

She adds: “I think if we only ever write the upbeat and positive stories, we will cease to be believed, because life is not like that.”

Indeed, as traditional media and its skeptical oversight has pulled back, communicators within NGOs, agencies and other organizations need to ensure their leaders stay honest in their messages, says Dick Thompson, a former TIME magazine correspondent and communications advisor to the WHO director-general.

Leaders need to realize that credibility is their most important resource, says Thompson, now a senior advisor to the Pulitzer Center. And internal communications teams should be responsible for reining in claims that could endanger the organization’s reputation. He adds: “People responsible for communications [within organizations] have to be very aggressive and sometimes have difficult relations with people in their programs.”

For Best Results, Mix Media

The profusion of communication channels has made it much harder for any organization to hold readers’ and viewers’ attention—this is especially true for programs advocating behavior change. Susan Krenn, director of the Johns Hopkins Center for Communication Programs, says things were simpler when she started at CCP in 1985. Then, CCP teams could put their behavior change messages on a country’s single television station or one of its few radio stations, and be assured of a significant audience. (Often, they could barter for airtime with a box of sorely needed new video or audio tapes.) Now, they must deal with dozens of channels and stations, as well as investing in social media and other efforts.

Still, she believes that today’s tools are pretty amazing. By tying mobile health efforts with traditional media, CCP can achieve powerful synergies in disseminating their message. For example, in Tanzania, they used an ongoing family planning mass media campaign to promote a text message service that dispensed information on family planning methods, services, etc. They increased the number of hits on the service’s website from 5,000 to 100,000 per month.

By harnessing old and new media, her team was able to tame the chaos and maximize the opportunity.
A BROKEN PROMISE
DOWRY VIOLENCE
IN INDIA

The paint on the wall behind her is peeling. She sits in a blue plastic chair in the village women’s cooperative. As she looks out the window, the afternoon sun’s rays illuminate the left side of her body. The skin on her face and upper body is mottled, paper thin and covered with hyper-pigmented scar tissue. “I don’t look like this because of an accident,” she says. Twenty years ago her husband told her she hadn’t paid an adequate dowry, threw a bucket of kerosene on her and set her on fire.

Meera remembers burning until she fell unconscious.

Story Varsha Ramakrishnan
Photography Arjun Suri

A Special Report from the Johns Hopkins-Pulitzer Center Global Health Reporting Fellowship
Her husband then took her to the hospital. He gave her a choice—tell the truth and lose your children or lie so you can see them again. Meera lied.

Meera, 43, comes from a small village called Rajokri outside Delhi. It is a rural iron ore worker community of 12,800 people. She is a statistic who has not been counted—a sequestered victim of “dowry violence” or “bride burning.”

I witnessed the results of this violence firsthand seven years ago during my surgical rotation at a government hospital in Karnataka as a second-year medical student. The female burns ward was always full. The smell was unmistakable—a combination of betadine, silver sulfadiazine and burnt flesh. While dressing wounds, I heard stories of women immolated by their husbands or their in-laws because of an inadequate dowry or “bride burning.”

I witnessed the results of this violence firsthand seven years ago during my surgical rotation at a government hospital in Karnataka as a second-year medical student. The female burns ward was always full. The smell was unmistakable—a combination of betadine, silver sulfadiazine and burnt flesh. While dressing wounds, I heard stories of women immolated by their husbands or their in-laws because of an inadequate dowry or “bride burning.”

The memory of that ward and the violence that these women suffered never left me. After earning my MPH last spring, I returned to India to unearth the stories of dowry violence victims. I traveled to the cities of Delhi and Mumbai and spoke to survivors, lawyers, NGO workers, doctors and patients to try to understand the problem and hopefully find seeds for its solution.

The practice of paying dowries in India is based on ancient tradition. It was originally a Hindu religious requirement in the Manusmriti, a text dating to 1500 BC that delineated the way of life and laws for Hindus. Among the ancient Hindus, presenting gifts to each other during a wedding was a required cultural practice. The daughter’s father was expected to expensively clothe and bejewel his daughter, and a son’s father was expected to give the bride’s family a cow and a bull.

Over time, when a woman left for her husband’s home, she was given money, jewelry and property (referred to as stree-dhan) to help ensure her financial independence after marriage. However the practice of dowry devolved from a means of financial emancipation for a bride to a modern system of transactions and groom prices, says Anjali Dave, an associate professor of Women’s Studies at the Tata Institute of Social Sciences (TISS) in Mumbai. “The woman has been disallowed control over the finances that she brought with her to the marriage,” Dave says. “Marriage is like a livelihood for [today’s] Indian woman.”

During negotiations between the groom’s and bride’s families, the “price” is agreed upon verbally and never as a written contract. (The practice of paying a dowry in India was outlawed in 1961.) Although the amount is paid to the groom’s family at the time of marriage, the demands often increase after the bride arrives at her husband’s home. If the demands are not met, the bride may suffer. “The violence ranges from brutal beatings, emotional torture, withholding money, throwing them out of the house, keeping them away from their children, keeping mistresses openly,” or in extreme cases, “burning the wife alive,” says Savra Subratikan, a helpline worker at a women’s rights organization in New Delhi.

The National Crime Records Bureau of India reported 8,233 dowry deaths in 2012—in other words, one wife is killed every 60 minutes. However, since social and cultural taboos discourage women from reporting cases, the 8,233 cases represent only the tip of a predominantly submerged iceberg.

Metropolitan Marriage Markets

In New Delhi, I met a woman named Pooja who wanted to tell me her story. We met on a Saturday in her office in a sleek multistoried, glass building in the heart of New Delhi’s business district. Pooja sat in her office dressed in a button-down professional shirt and tailored pants. After looking down at her hands for a few minutes, she looked up and smiled. She was ready to tell her story.

In 2011 her parents arranged a “match” for her. She was to be married to one of her distant relatives whom her family had known for the last 20 years. Her fiancé was an educated city man with a good job in New Delhi. Pooja was 24, had just completed her master’s in business administration at the Indian Institute of Foreign Trade and was working at a prestigious health insurance firm. The wedding was typical of her family’s Marwari traditions—loud, large and expensive. The joy did not last.

Note: The last names of some of the women in this article have been omitted to protect their privacy.
“You know, girls in India have a dream boy in their head which never becomes a reality,” says Pooja.

It is common for a bride to move to her in-laws and husband’s house after marriage as part of an extended family. Eight days after the wedding, Pooja began to feel uneasy entering her new home. Her husband would shout at her for no reason, her in-laws would leave her no dinner when she came home from work, and eventually her in-laws stopped speaking to her. “I never realized what the problem was. I don’t like to cause problems,” she says.

The basis of her “problem,” Pooja found out later, was the inadequacy of the dowry that she had brought with her. She learned indirectly through her relatives that her mother-in-law had told them that she “hadn’t brought sufficient things from [her] family.” She told herself that her husband would support her. But shortly into the marriage, as he was driving her to work, he threw her out of his car and told her to get her parents to buy her a new car. “A person whom you have entrusted your entire life to, doing this and abusing you in public makes you feel terrible,” she says.

Pooja realized that her in-laws had asked for her hand, not because she was a suitable bride but because her salary and net worth were high. “The entire intention was to extract my salary,” she says. The jewelry that she had brought with her at the time of marriage was locked away by her mother-in-law. She was made to give up her savings and to be a co-borrower for her husband’s student loan. In spite of all that she had paid, she finally came home one day to find that she had been thrown out of the house. With nowhere else to go, she turned to her parents.

“Returning to your parents’ home after marriage is still a big stigma in India,” she says. But she didn’t know what else to do. Fortunately, her parents took her back. She had been aware that the dowry issue still existed for many brides in India, but she didn’t think she, an educated city girl, would fall victim to it.

“When someone is parting with their daughter, he is giving you the most precious possession of his life. Why should dowry come into the picture?” Pooja asks.

How Much Is the “Right” Price?

The going rate for a dowry in today’s Indian marriage market varies according to one’s socioeconomic position. “Society decides and confirms the dowry rates,” says Pratibha Gajbhiye, a program coordinator with TISS for the rural “women’s cells” in police stations in Maharashtra state. The dowry amount in rural areas depends on the education level of the prospective groom. If the groom is a doctor or engineer, the dowry could be 5-7 lakhs (about US$7,900 to US$11,000), she says. A 70-year-old village woman in Rajokri proudly announced to me that she had given her daughter a motorcycle, half a kilo of gold and a bed as a dowry.

Less wealthy grooms demand smaller dowries, but still it’s a hardship for poor families. Another Rajokri resident told me that the cheapest motorcycle costs 50,000 INR (about US$800)—an astronomical price for the average family of five, which daily earns about 100 INR (US$1.58).

So how do parents manage to raise the money? “People sell land and get bankrupt after marriage,” notes Dave, the TISS professor. “Dalit communities [lower caste in India] lease their sons into bonded labor to get money for their daughter’s wedding. In Vidarba, Maharashtra, where cotton farmers were committing mass suicide because of failing crops, research found that their debt had accumulated because of the increased price of dowry.”

The societal affliction of dowry colors the life of an Indian woman not only at the time of her marriage but throughout her life. A girl is seen as an encumbrance to the family. The birth of the girl child more often than not warrants judiciously saving for her future marriage. Parents take loans, sell land and fall into deep debt in order to save for their daughter’s dowry. Many girls are killed at birth because of the dowry’s financial burden.

And for those who survive, poor nutrition, abuse and illiteracy remain problems in rural areas especially.

Rashmi Misra, the founder of a woman’s empowerment- and education-centered NGO in New Delhi, explains how girls are denied food so that their brothers will have enough to eat. They are also discouraged from going to school because they are usually married off early. “I remember speaking to two slum girls in Delhi and they said to me, ‘We’re girls. We don’t need to go to school. Only boys should go to school,’” she recalls.

Prospects of emancipation that come from a young girl’s education are lost, making her financially dependent on her future husband.
A Means to an End

In talking with Pooja, Meera and others, I could not understand what would lead a husband or his family members to attempt to kill a bride by burning her.

At Mahila Panchayat, the women’s cooperative in Rajokri, Anjali (no relation to Anjali Dave) gave me two answers: Power and greed.

“Both play into the violence. The husband and in-laws, after repeatedly abusing the wife, ultimately try to kill her and burn her to death so that once she dies the man can marry again and receive a new, adequate dowry,” Anjali told me. Since a huge social stigma is attached to divorce in India, she explained, some husbands would rather kill their wives than divorce them.

Dowry violence in India is not limited to the uneducated or the poor; it infects all socioeconomic strata. Among the wealthy, the “market value” of grooms is paid via cash, commodities and property. “The richest in Delhi pay for their daughter’s husband in the form of a Mercedes, furnished apartments and hard cash,” explains Misra.

Adds Dave: “Globalization and the market economy have escalated dowry prices to an amount that you and I can’t comprehend.”

On July 6, 2013, the Times of India reported that a former Miss World winner, Yukta Mookhey, accused her husband of dowry harassment, saying she had only received 2 lakhs (US$3,200) of the 2 crore (US$317,000) that she took as dowry. She told the Times that she left him when “he was threatening to take my child away from me, was threatening my life.”

Less than two weeks later another woman, Gitanjali Garg, was found dead in a park, beaten with sticks and shot three times. She was the wife of an influential and wealthy chief judicial magistrate of Gurgaon, a city 30 kilometers south of Delhi. An attempt was made to cover up the case as a suicide—leaving Gitanjali’s family to ask why she would shoot herself three times if she wanted to commit suicide. The family has now booked a case of dowry violence against Ravneet Garg (Gitanjali’s husband) and his parents.

The dowry included two cars: a Skoda Laura gifted at the time of wedding, and after more demands and harassment, a Skoda Superb.

Missing Numbers and Criminal Laws

Meera, the victim from Rajokri, had done everything she could. She and her family paid a dowry at the time of marriage. She sold her jewelry at her husband’s request and even tried to raise more money for him.

When she returned from the hospital six months after her husband immolated her, she found him living in their house with another woman. But she has nowhere else to go, so she remains there. Her husband periodically throws her out of the house, sometimes even in the middle of the night. Every day she lives in fear.

Still, she is reluctant to tell the truth about what happened the night he set her on fire. “What will my children think of their father and of me? What will society say about me?” she says.

Like Meera, many survivors attribute their burns to accidents or attempted suicide. Societal norms, the “sanctity” of marriage and a lack of personal income prevent rural women from telling the truth.

Even when doctors find evidence to support an act of dowry violence, many do not report it, says Manoj Ahire, a senior lecturer and senior surgical resident at the Lokmanya Tilak Municipal Hospital in Mumbai. In many cases doctors find that the pattern of burns does not match the woman’s claims, but they are not expected to report this. In a court of law, doctors are only asked to comment on whether the patient was fully conscious and able to make a statement to the police.

Urban women have their own challenges. Subratikaan, with the women’s rights organization, says: “The [urban] cases who call come from very poor slum areas and very rich people as well. The only difference is that the rich live in big houses where the screams can’t be heard, and the poor live in small chawls [slum tenements] where everyone knows when a woman wails. The rich have society constraints where they don’t want to come forward until they have suffered extreme violence. The calls that come in usually are frustrated women who don’t know where to turn, or who have been turned away by the police.”

When it comes to reporting the crime, women face great hurdles. Pooja says she was harassed by female police at the women’s cell in New Delhi. They mocked her and told her
to withdraw her case because that would be better for her reputation. When she finally filed her First Investigative Report (FIR), the police delayed taking the case to court.

Pooja told me that she would talk about this issue publicly but doesn’t see the point. The law is not on her side, and neither is society. “I was tormented, but my tormentors are allowed to walk away freely. How is this justice?” she asks.

The legal system in India technically has multiple provisions to deal with dowry giving and the violence associated with it. In 1961, the Dowry Prohibition Act made demanding or giving a dowry as a precondition for marriage unlawful. Sections 498a of the Indian Penal Code (IPC) decrees that any death of a woman within the first seven years of the marriage will be considered by default to be because of dowry harassment; and Section 304b IPC deals with cruelty against the bride. Both laws were meant to serve as preventive measures—but the chasm between legal policies and implementation remains large and difficult to cross.

The disconnect between the reality in India and the laws is evident in the construction of the seven-year time frame for penalizing dowry crimes. Dave says, “How was the number seven [years] in section 498a arrived at? Dowry violence continues throughout a woman’s married life in many cases.”

This is true of Saraswati, another resident of Rajokri village. Saraswati was married at the age of 16 and endured physical and mental abuse because of dowry extortion for 23 years. At the end of the 23 years of marriage, her husband walked out on her, leaving her alone to fend for herself and their three children. “How will I go to a lawyer?” she says, “I have to work seven days a week for my family to live hand to mouth and going to the courts requires me to take a whole day off from work.”

Women like Saraswati deal with dowry violence in two ways, says Winnie Singh, the cofounder of Maitri, an NGO in New Delhi: “They either never report it because of societal pressures, or report it and have to deal with the incompetency of the police force and the legal system in India.”

Addrs Monica, a pro-bono lawyer who works with her and does not use a last name as a personal statement against patriarchy: “The laws are biased toward men because of the patriarchy that is entrenched in Indian culture. The laws are in place but the onus of trying to prove that a woman was harassed or killed because of a dowry is on the woman or her family.”

The dowry tradition impacts a woman’s health through all her life stages. Before birth, it comes in the form of sex-selective abortions. During the first few years of her life, it manifests itself in infanticide, malnutrition, illiteracy and abuse. As adolescents, girls are often overworked and not given opportunities because they are considered a financial burden. Once married, many women have to deal with the physical, emotional or financial violence that can lead to mental health issues.

**A Mystery Still Unsolved—Solutions**

So entwined in modern culture, so steeped in history, the dowry tradition and its too-frequent violence seems almost ineradicable. At the root of dowry violence is the perception of a woman and her worth in India. The ideology of women’s subservience permeates all social classes.

It will be impossible to stop dowry violence until there is a “substantial shift in gender norms,” says Vijayendra Rao, PhD, a lead economist at the World Bank who has worked extensively on dowry violence and gender equity. Providing women with options outside of marriage, he argues, would form a strong foundation for increasing their social perception in India as one of value. Female education, reducing gender discrimination in the workplace and providing child care could be a few steps to help this process along, Rao says. The persuasion of community leaders that dowries are bad and unnecessary, too, will help. Legal and policy reforms are also necessary, including the use of special teams in police departments that work to reduce dowry violence, he says.

“A combination of changing mindsets through persuasion, changes in incentives via policy action, and outside enforcement of laws is required to stop dowries and violence against women in India,” Rao says.

Varsha Ramakrishnan, MBBS, MPH ’13, a physician from India, is the inaugural Johns Hopkins-Pulitzer Center Global Health Reporting Fellow. More information: jhsph.edu/pulitzerfellowship
Steven S. An, PhD, associate professor, Environmental Health Sciences (EHS), was elected program chair-elect of the Respiratory Structure and Function Assembly of the American Thoracic Society.

Carolyn Cumpsty-Fowler, PhD, MPH ’96, assistant professor, Nursing and Health Policy and Management (HPM); Andrea Gielen, ScD ’89, ScM ’79, professor, Health, Behavior and Society (HBS), and the current director of the Johns Hopkins Center for Injury Research and Policy; and Susan P. Baker, MPH ’69, professor, HPM, and founding director of the Johns Hopkins Center for Injury Research and Policy; and

Timothy D. Baker, MD, MPH ’54, professor, International Health (IH), received the Baltimore City Medical Society Lifetime Achievement Award.

Chris Beyrer, MD, MPH ’91, professor, Epidemiology, and director of the Center for Public Health and Human Rights, has been named International Chair of the 8th International AIDS Society Conference on HIV Pathogenesis, Treatment, and Prevention, to be held in 2015 in Vancouver.

After a 21-year absence from the Bloomberg School, Karen Davis, PhD, says that the timing of her return couldn’t be better.

The new director of the Roger C. Lipitz Center for Integrated Health Care predicts that the Center can play a key role as the U.S. health care system readies to meet the needs of the aging baby boom generation.

“As the boomer generation moves into their 70s and starts to deal with more health issues, we really want to identify innovative models of integrated care and delivery that work for patients, family members and caregivers,” says Davis, the Eugene and Mildred Lipitz Professor in Health Policy and Management (HPM).

Davis, who returned to the School in January after two decades as president of the Commonwealth Fund, is up to the challenge.

Kay Dickersin, PhD ’89, MA, professor, Epidemiology, was awarded the 2013 Valkhof Chair at Radboud University Nijmegen Medical Centre in the Netherlands.

Fang Han, PhD candidate, Biostatistics, received a 2013 Global Google PhD Fellowship which recognizes innovation, creativity and leadership in promising young academics.

D.A. Henderson, MD, MPH ’60, University Distinguished Service Professor, and Dean Emeritus of the Bloomberg School, was presented with the Order of Brilliant Star with Grand Cordon by Ma Ying-jeou, President of the Republic of China (Taiwan).

Sheppard G. Kellam, MD, professor emeritus, Mental Health (MH), was elected a Society for Prevention Research Fellow for lifetime contributions to prevention science.

Michael J. Klag, MD, MPH ’87, Dean of the Bloomberg School, was named a 2013 “Kidney Champion” by the National Kidney Foundation of Maryland for his contributions to the prevention and epidemiology of kidney disease.
Before leading the Commonwealth Fund, she held high-level positions in the U.S. Department of Health and Human Services and chaired HPM from 1983 to 1992.

“When Washington has questions about health insurance models, they look to Karen’s research for answers,” said HPM chair Ellen MacKenzie, PhD ’79, MSc ’75, at Davis’ May installation as the Lipitz Professor. “Her focus on patient-centered care, creating a data-driven voice and building a high-performance health care system has changed the way people think about health policy.”

In July, Davis received the American Hospital Association’s 2013 TRUST Award for vision and leadership in improving health care quality and practice. Davis looks forward to close collaborations with colleagues at the schools of Nursing and Medicine and at Johns Hopkins Bayview who are designing clinical care models to help older people maintain their independence.

She points out that Medicare does not cover some key services that could make this happen—social worker home visits to help with dementia care and home safety renovations, for example. “What the Lipitz Center brings is the economic analysis to show that it really pays, in terms of reducing hospital stays and delayed admissions to nursing homes, if these types of services are in fact covered,” Davis says.

“It’s analysis that can effect policy change, she says, and turn a pilot study into standard practice throughout the Medicare program.”

—Jackie Powder

Anthony K.L. Leung, PhD, assistant professor, Biochemistry and Molecular Biology, is a finalist for the 2013 Agilent Early Career Professor award for original research contribution enabling measurements of importance.

Dan Morhaim, MD, associate, HPM, received the New York Medical College Jackson E. Spears Community Service Award for his long tenure as a physician/member of the Maryland legislature.

George Rebok, PhD, MA, professor, MH, spoke at a White House meeting on Psychological Science and Behavioral Economics in the Service of Public Policy; and became an American Institutes for Research (AIR) Institute Fellow.

Anne W. Riley, PhD, professor, Population, Family and Reproductive Health (PFRH), has had a student fellowship named in her honor to support students to work at Maryland Advocates for Children and Youth in legislative advocacy and evaluation.

Noel R. Rose, MD, PhD, professor, Pathology, Molecular Microbiology and Immunology (MMI), and director, Johns Hopkins Center for Autoimmune Disease Research, was elected to foreign membership in the Polish Academy of Sciences.

Alfred Sommer, MD, MHS ’73, University Distinguished Service Professor, and Dean Emeritus of the Bloomberg School, was honored as a 2013 Dan David Prize Laureate and shared the $1 million prize for “his unexpected and striking discovery in demonstrating that vitamin A has the power to save children’s lives.”

Adam P. Spira, PhD, assistant professor, MH, received the 2013 Barry Lebowitz Early Career Scientist Award from the American Association for Geriatric Psychiatry, and the 2013 Insomnia Section Investigator Award from the American Academy of Sleep Medicine.

Moyes Szklo, MD, DrPH ’74, MPH ’72, professor, Epidemiology and Medicine, received the Robert S. Gordon Jr. lectureship award from NIH, and was selected to present the 157th Cutter Lecture on Preventive Medicine at the Harvard School of Public Health. He also received a special award from the Brazilian Minister of Health during the 12th Brazilian ExpoEpi on Successful Experiences in Epidemiology, Prevention and Disease Control.

Maria Trent, MD, MPH, associate professor, PFRH, and Pediatrics, received the 2013 National Medical Association Council on Concerns of Women Physicians (CCWP) Research Award.

Laurie Schwab Zabin, PhD ’79, professor emeritus, PFRH, and founding director, Bill and Melinda Gates Institute for Population and Reproductive Health, received the American Academy of Pediatrics’ 2013 Founders of Adolescent Health Award from the Section on Adolescent Health.

Jonathan Zenilman, MD, professor, PFRH, MMI, IH and Epidemiology, received a Distinguished Career Award from the American Sexually Transmitted Diseases Association.
In one experiment, for instance, her team called upon a Japanese company that had developed special mice that have absolutely no germs in their bodies except for the clostridia-related bacteria. They collected fecal material from the mice and shipped it to Wills-Karp’s lab. Presumably, the fecal material would contain the clostridia-related bacteria. Wills-Karp’s team transplanted the fecal material into a common breed of laboratory mice that scientists had shown were free of the clostridia-related bacteria. They then compared the rate of asthma symptoms in those mice to a comparable group of mice that had not received the fecal transplants.

“I know it sounds strange,” says Wills-Karp, “The things scientists do.”

Strange or not, the experiment proved useful. The mice receiving the fecal transplants went on to develop severe asthma, a finding that, along with other results, provided strong evidence that this member of the microbiome may drive severe asthma.

Further studies revealed another interesting aspect of this process. “In mice, this bacteria is cleared during weaning or maturation,” says Wills-Karp. Her initial experiments involved young mice, those still colonized by the clostridia-related bacteria. So her group did a series of experiments to determine whether the immune changes brought about by the bacteria endure.

Indeed they do, her studies showed. “We see that past the time of clearance of that bacteria, this Th17 response persists,” says Wills-Karp. “Whatever happens is changing the immune response indefinitely.” Her studies suggest that the presence of the bacteria in the guts of young mice gets communicated to the bone marrow, the site of immune cell production. This information skews the immune system’s normal balance, biasing it in favor of the production of Th17 cells.

It’s easy to see how the same scenario might occur in people, says Wills-Karp.

“The going assumption with asthma is that the first year of life is critical to the establishment of the disease,” she says. Certain events early in life can disrupt the gut’s normal microbial balance. If a child receives repeated courses of antibiotics, for example, those medicines might skew the balance in a way that allows a clostridia-related species to flourish. As in the mouse, that information would get telegraphed to the immune system, and so on.

A Proof of Concept

Wills-Karp’s findings demonstrate something that no scientist has shown before, says Richard Markham, MD, a Bloomberg School professor of Molecular Microbiology and Immunology and an expert in sequencing technology essential to much microbiome research.

“They suggest for the first time that the presence of a single species of bacteria has influence on whether an individual can develop asthma,” he says.

Markham and Wills-Karp add that asthma may not be the only disease that follows this pattern. Th17 cells have also been associated with arthritis, multiple sclerosis, Crohn’s disease and other autoimmune conditions. The microbiota may underlie those diseases as well.

Her results, says Wills-Karp, “are proof of concept.” One big unknown is whether the human disease truly does parallel the mouse pattern. Patients with severe asthma do have elevated levels of Th17 cells, scientists have found. But no one has shown that the clostridia-related bacteria underlie those cases.

Wills-Karp is starting to address this question in a study with Stacey Burgess, PhD, a former student and now an infectious disease researcher at the University of Virginia. The pair will examine whether the clostridia-related bacteria are more prevalent in children with asthma. This and Wills-Karp’s other studies could help guide the way toward new asthma treatments—perhaps a drug that dampens or eliminates the clostridia-related bacteria or a new and improved probiotic.

Of course, preventing asthma in the first place would be even better. Here, too, growing knowledge about the microbiome might offer some guidance. Research implies that microbially rich environments reduce asthma risk. So does it make sense to raise your kids on a farm or simply not wash off the pacifier after it falls on the floor, five-second rule or no? The New York Times Magazine recently ran a story on the microbiome; the opening photo showed a baby slathered in mud, mouthing a grimy toy car that was clenched in a dirt-encrusted fist.

Wills-Karp won’t go so far as to endorse muddy playtime, although she observes that there is an evolutionary argument to be made for this practice: “Kids when they are young touch everything and put it all in their mouths. Maybe there’s a reason for that.” She would, however, advise germ-phobic parents to temper their fear, saying, “I would tell parents not to go overboard with the hand sanitizers. Babies do need some kind of exposure to the environment.”

Greater understanding of the microbiome’s role in asthma may help scientists refine such prevention strategies, as well as develop new treatments for those already afflicted. The microbiota may contribute a little or a lot to asthma, says Wills-Karp. “We don’t yet know. Microbiome research is in the early stages.”

The microbiome mystery continues.
A Great Journey

One evening in late March 2009, I started on a journey.

That evening, I listened to my first lecture in a graduate public health course, Public Health Biology. David Sullivan, an associate professor in Molecular Microbiology and Immunology, and guest lecturers led the class through a fascinating tour of bacteria, viruses and parasites, and their pernicious effects on human health.

I was hooked. I took more courses as a nondegree-seeking student, then as part of a certificate program. Environmental health. Biostats. Epi. Health and human rights. Human physiology. (Sweat literally beaded on my forehead when I saw the final exam’s first question.) Then I was accepted to the part-time MPH program. I loved the intensive problem-solving course that MPH students start with—a kind of public health boot camp.

Each course, led by the Bloomberg School’s terrific faculty, enthralled me and helped me in my goal of mastering the fundamentals of public health. As part of my MPH capstone, I worked with colleagues to interview Frederick, Maryland, residents and public health experts about a cancer cluster investigation there. (You may have read our article in the special 2013 issue on death, “It Would Break Your Heart.”)

The MPH was one of the most rewarding challenges of my life. I spent a lot of hours at home hunkered over my laptop, reading, studying and participating in online “live talks” for courses. My wife and kids patiently respected Dad’s study times on weekends and weekday evenings. I won’t kid you, it was hard—especially for a former journalist and English major more familiar with Tom Wolfe and Wallace Stevens than John Snow and Sir Richard Doll—but I savored the bracing intellectual challenge.

On May 21, 2013, I found myself in Joseph Meyerhoff Symphony Hall for the School’s convocation. (In front of me sat Varsha Ramakrishnan, our inaugural Johns Hopkins-Pulitzer Center Global Health Reporting Fellow. She wrote the remarkable story about dowry violence in India on page 38.)

On that day last May, 535 very happy people walked the stage and graduated from the School. I’ll always be proud that I was one of them. When Dean Klag shook my hand and gave me my diploma, I knew a great journey was both ending and beginning.

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Letters to the Editor

Crediting Carl Taylor
I very much enjoyed the 2013 Special Issue of Johns Hopkins Public Health. Of special interest to me was the article “Speak and Save” on verbal autopsy by Richard Byrne. The Department of International Health, at the time chaired by Carl Taylor, was very much involved in the development and, I believe, first use of the method back in 1971. That information was missing in the story, and I think it should have been part of it, if only to give credit to Dr. Carl Taylor, under whose guidance highly motivating working and research conditions were provided in the Narangwal Rural Health Research Centre in 25 villages in rural Punjab, North India.

Ardy Kielmann, MDCM, DrPH
Cotignac, France

Defining Public Health
To assert that the practice of surgery equals the practice of public health (“Operation Health,” Spring 2013) brings the meaning of the words “public health” even closer to oblivion. The cover artwork and cover story blur distinctions that need to be made in order to keep the public aware of what the practice of public health is and what it has done for them.

A surgeon saved my life once and I thanked him. Public health practitioners save my life every single day and I don’t know whom to thank. The growth of public spending on clinical care while public health budgets stagnate suggests that our fellow citizens are only capable of thanking the life-savers they can see. Promoting the image of the heroic surgeon as the face of public health worsens confusion over what it means to create health at the population level. A circumcision program is public health, a circumcision is a surgery.

Words matter. Your magazine is one of few places where one expects to find clear words about what is involved in the practice of public health. Equating surgery and public health was a setback.

David Bishai, MD, PhD, MPH, Professor, Population, Family, and Reproductive Health, Bloomberg School

But What About Those Masks?
I enjoyed the article “Operation Health” in the recent magazine, but I wanted to comment on the photo of the two surgeons. The purpose of the surgical mask is to cover both the nose and the mouth. In the photo one of the surgeons has his nose exposed. I doubt this is a lesson Hopkins wishes to exemplify.

N. Lynn Eckhert, MD, DrPH, MPH
Partners HealthCare International
Boston, Massachusetts

[Adam L. Kushner, MD, MPH, associate, International Health, and faculty, Center for Refugee and Disaster Response, responds: I agree that this is certainly not behavior to condone; the photo in fact demonstrates not only a lack of proper procedure, but also shows that the nurse is not wearing appropriate eye protection. Studies have shown that as few as 18 percent of hospitals in developing countries have proper eye protection. The photo was meant to highlight that there are many deficiencies in operating rooms in developing countries [ranging] from knowledge and use of proper techniques to proper safety precautions and resources. It is hoped that by bringing attention to the need for improving surgical care, additional resources can be devoted to the safety of patients and providers.]
Females everywhere, of all ages—including displaced mothers and daughters traveling by donkey in Darfur (above) as well as three generations of Tajik women in Afghanistan—stand to benefit from a new, nontraditional focus by scientists on sex-based research. (See page 14.)

Photos: Shehzad Noorani
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MAGAZINE IDEAS? SUGGESTIONS?
Contact editor Brian W. Simpson at editor@jhsph.edu.

NEXT ISSUE FOOD
What’s in a public health magazine’s food issue? Think industrial agriculture, MRSA, allergies, ethics, caffeinated foods, Nepalese nutrition, urban gardens, oyster aquaculture, famine, faith and a full menu of all things edible—and a few inedible—all around the globe.

(And Cheetos, too.)

Pakistani children sharing naan / Shahzad Noorani