Asthma's Inner World

Researchers follow the disease’s roots not to the lungs, but to the gut

Pakistani children sharing naan / Shehzad Noorani
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.

“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.
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.

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.

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.
Stride Soar
Succeed
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
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 athletically 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 overnight 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 sport 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 Jerrord!”

Two years ago at NativeVision, Hopkins-Chery first noticed Jerrord 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.

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

A straight-A student athlete, Jerrord 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. Jerrord 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 Jerrord 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,” Jerrord 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,” Jerrord 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 Jerrord, 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 Jerrord 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 Jerrord. “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.

Jerrord 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,” Jerrord 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 Jerrord might head to Park University and run for his alma mater, he holds another dream even dearer: “I told Jerrord 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

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.”

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 gracious support, 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."
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.”

BENCING 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?”

“Senior year.”

“And you’re looking forward to it?”

“Yes, I am.”

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. Somewhat. 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.

“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, 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.”
“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

When Marsha Wills-Karp organized the Microbiome Interest Group in early 2012, one of its first tasks was to ascertain Johns Hopkins’ resources and what it needs to advance microbiome research.

Germ-free mice were one item on that list. For them, she looked to Daniel Peterson, MD, PhD, an assistant professor of Pathology, and a small windowless room at the School of Medicine. The room houses 300 very special mice. The animals do not look unusual—just your average furry black creatures with large ears and perpetually twitching whiskers. But their microbiology tells a different story: It doesn’t exist.

A normal mouse harbors trillions of bacteria, in its gut, skin and other tissues. These germ-free, or gnotobiotic, mice possess none. Bred in sterile environments, they are an invaluable tool for microbiome researchers like Peterson.

As microbiological blank slates, the mice offer researchers a way to study how the microbiota affects health and disease and to parse the role of individual members of the microbial horde. “Our main question is understanding how different microbes influence the development of the immune system,” says Peterson.

“We begin with a clean palette,” he explains. “We then can add a single type of immune cell and a single species of bacteria. Then we see how the two interact.” He adds, “I am really obsessed with reductionism.”

Another key approach to microbiome research is metagenomics. In contrast to Peterson’s reductionist approach, metagenomics surveys all the microbial DNA in a particular environment, such as the gut. To acquire this genomic gestalt, scientists use next-generation sequencing tools, which can isolate and sequence tiny amounts of DNA.

Some scientists call these new tools “a new type of microscope,” just as transformative as the microscope that Dutch tradesman Antonie van Leeuwenhoek developed in the 17th century. Today’s methods show a human body swarming with 100 times more microbial life than previously recognized, a finding that has inspired a new vocabulary to describe the total package of human + microbes: Each of us is a “metaorganism,” a “super-organism,” a “vessel” for microbes.

Metagenomics generates tons of data—reams of DNA sequences. “How to analyze that data is the biggest hurdle,” says infectious disease researcher Richard Markham, MD. Bioinformatics specialists can apply analytical tools to such sequences to discover the identity of the microbes and clues about its role in health or disease.

“In some ways it’s analogous to the problem the NSA faces in data captured from phone calls,” says Markham. In trying to find a clue to terrorist activities, “how do you pick out the critical phone call?” —MH
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)
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 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 rein 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 “groom price.”

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 Subratikaan, 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.
“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 with nowhere else to go, Meera remains with her abusive husband. Every day she lives in fear.
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