Nostalgic about calculating statistical probabilities on a slide rule. Eager to immerse an avatar surgeon in a virtual operating room. More than two dozen JHSPH alumni share their visions from the nexus of technology and public health in personal essays and photos.

www.jhsph.edu/techessays

How do you protect the boys of Touba, Senegal and the rest of the country’s population from malaria? Defense may be the best offense against humanity’s perennial enemy. The Johns Hopkins Center for Communication Programs and its NetWorks project aim to cover every sleeping space in the country with a mosquito net.

next issue  it takes a network
In early January, I attended a function at the Peabody Library, a beautiful building given to the people of Baltimore by philanthropist George Peabody. When the library building opened in 1878, access to information was difficult. Peabody knew that by collecting books in one place, he would be promoting the educational, economic and social development of the city that had helped him build his financial empire.

When I was a medical resident in the early 1980s, information accumulation and sharing wasn’t much different from Peabody’s day. I went to the library, photocopied journal articles and organized them to create ready access to the latest information.

Since then, of course, the digital revolution has changed everything. Better technology has flooded us with data. We have oceans of data from genomic, epigenetic and proteomic analyses. We have second-by-second data on how the brain functions during sleep. And we gather libraries worth of data from imaging studies, laboratory analyses and other sources.

Of course, extracting knowledge from the profusion of data represents a huge challenge. That’s why we depend on biostatisticians to develop new methods of analysis—data are useless until we separate signal from noise. With the right statistical methodologies, we can better understand the architecture of sleep, uncover the links between air pollution and mortality, and discover disease-gene associations that heretofore were undetected.

The pervasiveness of technology hits me in the face whenever I travel to low-income countries. Because of the lack of preexisting infrastructure, many have leapfrogged over us. I have written before about HIV clinics in Africa that use text messages to track prescriptions, for example. And our faculty bring technology with them. In Macha, Zambia, and Rakai, Uganda, for example, our researchers utilize advanced equipment to generate laboratory data in the field. The miniaturization of lab equipment and training of local technicians and investigators has allowed us to do research in situ while building the capacity of local scientists and technicians. At the same time, we avoid the difficulty of shipping specimens and dealing with export restrictions and cold-chain transport.

Such technology is a huge benefit, but only successful if it is socially and culturally appropriate. Let me give you an example. A longtime staple of malaria diagnosis is the blood smear. You draw blood from a febrile person and examine the blood under the microscope for malaria parasites. It’s straightforward, but in some African cultures people resist a blood draw, worrying their blood could be used in witchcraft. Thus, a simple technology may not be culturally appropriate. (Two of our investigators at the Johns Hopkins Malaria Research Institute, Sungano Mharakurwa and David Sullivan, are working to solve this problem with saliva- or urine-based alternatives.) Similarly, you also see lots of devices that are used in wealthy countries without a second thought, but they’re not appropriate in many places because they require sustained electrical power.

Technology also has permeated our educational mission. Thanks to the Web, we now can bring the School’s storehouse of knowledge to thousands of students, working professionals and others worldwide. In our MPH program, 250 students learn face-to-face here in Baltimore, while more than 400 have joined our Internet-based, part-time program. Over the past 15 years, our School has pioneered innovative ways to teach public health, allowing us to reach people in ways never before possible. Distance Education courses offer flexibility and are of such quality that more than 40 percent of the enrollment in online courses is by full-time students. As the demand for public health education grows, distance education will help to fill that need.

Technology offers incredible opportunities to improve public health—as attested by the articles in this special issue. That said, new technology alone will not solve the world’s health problems—effectively managed programs, serious political will and sufficient money also are needed to save lives.

So how we use new tools is what matters: We must continue to gain insight into determinants of health, design cost-effective studies, test innovative interventions and develop rational policies based on evidence. When we employ technology this way, it will help us dramatically advance our public health mission.
The Human Touch

There is a boy in Philadelphia who, despite his age and considerable physical challenges, can write two poems in French and one in English. He patiently scribes them in flowing calligraphy. He also has a repertoire of four drawings—one of a Chinese temple.

The boy is 2 feet tall and 200 years old. He is an automaton designed by a Swiss watchmaker named Henri Maillardet. An ineffably complex series of levers, rotating brass disks and wind-up motors choreographed by Maillardet allow the boy to write and draw so precisely, as a recent New York Times story explained.

The boy, who inspired the movie Hugo and "lives" in the Franklin Institute in Philadelphia, must have wowed the early 19th-century crowds who came to see him. Even by today's standards in technical innovation, it's impressive to watch a mechanical boy write poems in elegant longhand. Like the amazed automaton-watchers, we are enthralled by the technology that our digital age produces with ever-increasing speed.

Public health is not exempt. In this special issue, we describe some ways that high- and low-tech tools are revolutionizing public health: the possibilities of mHealth, the power of big data, the some adaptive responses.

It's easy to get carried away with nifty gizmos that offer solutions to our many problems. So, in addition to reporting on some stunning applications of technology to health, we've spiced this issue with a healthy dollop of skepticism. (Technology, after all, has given us nuclear weapons and spam.) Environmental health expert Ellen Silbergeld, for example, warns us about rushing to use nanoparticles without first investigating potential health risks. And when we sought the perspectives of some public health legends (Edyth Schoenrich, D.A. Henderson and Al Sommer), a surprising theme emerged. In our haste to invest in wondrous technologies, they point out, it's too easy to forget human beings. People know the right questions to ask, people find meaning in raw data and people still can communicate with a simple touch.

Technology alone will take us only so far. We also need to invest in people who imagine, create, teach, research, collaborate, evaluate and care. We have the inside track, after all, on what it means to be a human being full of messy complexities. And, with technology's help, we can best help others find their way to health.

Brian W. Simpson
Editor, Johns Hopkins Public Health bsimpson@jhsph.edu

Letters to the Editor

Soliciting Solutions

This article ["Tough Oil," Fall 2011] provides an excellent overview of how peak oil impacts public health. However, I am surprised and disappointed that there is little or no mention of how the field of public health should respond. As a master's student at JHSPH working in Bangladesh, and part of the Social Science and Sustainability Working Group, I see environmental vulnerabilities impacting population health in real time. We scientists, trained to protect health and save lives, can't stop at pointing out the problem without suggesting some adaptive responses.

Kristy Solawetz
Dhaka, Bangladesh

The Environment of International Health

It is surprising that the field of International Health makes virtually no mention of water, sanitation and hygiene ["International Health at 50," Fall 2011]. Is the ultimate message of IH that prevention is a waste of time and curative approaches are the only viable ones? International Health needs to understand environmental health.

Martin, France
via Magazine Comments

Three Thumbs Up for Taylor Video

I took as many courses from Dr. Taylor as I could [Online Extras, “Origins of International Health,” Fall 2011]. He has had a huge influence on my life. Thank you for presenting him on video.

Cheryl Polansky Baraty
Milwaukee, Wisconsin

I vividly recall Dr. Taylor sharing his thoughts on our trip to the villages of Himalayas, India. He made it clear to the village headman that in order to progress, it is very important to empower the woman. His gentle but persuasive way made it possible for many to catch his vision.

Dinesh Taylor
Philadelphia, Pennsylvania

The 7 Billion

It is true that all countries, especially developing nations, need to focus on educating girls to prevent early pregnancies and early marriages, engaging more males in family planning methods and addressing cultural issues that favor having numbers of children among some tribes. ["Global Health Snapshot/Population," Fall 2011]

Eluildi Eliakimu
Dar es Salaam, Tanzania

Intrigued? Irate? Impressed? Send us your comments: editor@jhsph.edu.
The Fire Inside

Eight-year-old Aqila courts lung disease as she lights a brush fire in her family’s kitchen stove in the Afghan village of Ragshad. Indoor cooking using biomass (plant materials or animal waste) has been implicated in increasing environmental lung diseases among rural people in developing countries. Innovative cookstove technologies could improve the health of the more than 3 billion people exposed to high levels of indoor air pollution. “Since exposure occurs primarily during cooking, women and their children are at the highest risk,” says Shyam Biswal, PhD, Environmental Health Sciences professor and director of a new Indo-U.S. Center for Environmental Lung Diseases.

Photo: Shehzad Noorani