



Kathy Kirkland, left, and Elizabeth Talbot found a silver lining in a pertussis scare.

1,300 in a month and a half,” says Dr. Gregory Tsongalis, DHMC’s director of molecular pathology. “We were getting frequent pleas from the leadership to turn these tests around as quickly as possible, because so many people presented for care that we were in danger of not having enough staff to run the institution.” Luckily, 90% of the screened employees tested negative for pertussis. The other 10% had either equivocal or positive findings and so had to be treated. “Equivocal results are typically associated with individuals who have low levels of infection that may not be clinically significant,” Tsongalis explains.

PCR tests are highly sensitive and can detect tiny numbers of bacteria even if the patient has no active infection. But they may be positive in cases where older methods do not detect disease, and the import of a positive result is not always clear.

“In any of these PCR tests you start out with what’s called a primer—that is, a short length of DNA that is meant to mimic the DNA that would be found in the bacterium you’re trying to identify,” says AuBuchon. The bacterial DNA binds to the primer DNA, and the enzyme systems

“identify this coupling and then produce more DNA that ultimately gets amplified and identified.” DHMC’s assay has 50 to 100 copies of the DNA target per bacterium. The CDC used an assay with only one target per organism. “So,” says AuBuchon, “it was easier for us to find [pertussis] because of the 100-fold natural amplification.”

Pseudo-epidemics of pertussis have occurred elsewhere, including Children’s Hospital Boston; definitive tests failed to confirm the illness there, too. The molecular pathology community, which has used PCR-based pertussis testing for over 10 years, is working to further develop the tests and their interpretation. For example, DHMC is “sending blinded, unknown samples of pertussis . . . to 30 labs around the country,” says Tsongalis, who is president-elect of the Association of Molecular Pathology.

**Screen:** DHMC learned a lot from the experience. “We were able to aggressively screen our health-care worker population,” Kirkland says, giving her “hope for the potential for controlling the next unknown epidemic, whether that’s pandemic flu or the next SARS or whatever.”

Laura Stephenson Carter

## Around the world in 80 (or so) minutes

If “geography class” conjures up images of memorizing capital cities and principal products, think again. A course called Global Health and Society is one of the popular offerings of Dartmouth College’s Department of Geography. This winter, some 50 Dartmouth undergraduates signed up for the course, which is taught by Drs. Lisa Adams and John Butterly, members of the Medical School faculty. An outgrowth of Dartmouth’s Global Health Initiative, the course explores the epidemiology and social impact of infectious diseases in the developing and developed world. Think AIDS and Ebola instead of Cairo and cotton.

Adams’s own interest in international health had its roots at DMS, where she earned her M.D. in 1990. She did a primary-care elective at a Navajo reservation in Tuba City, Ariz. Then, during her residency at Harvard’s Cambridge Hospital, she did an elective at a Navajo reservation in Shiprock, N.M.

“That started the spark,” says Adams, who at the time thought that a career with the Indian Health Service was probably in her future. She loved working in different cultures and even intended to learn the Navajo language. But later she decided to explore international health. A third-generation Albanian, she managed to set up a six-week elective on the cardiology unit of a hospital in Albania.

“That was the life-altering experience. I said, ‘This is what I

want to do,’” she recalls. Soon after completing her residency in the mid-1990s, she worked on tuberculosis-prevention projects in Kosovo, Albania, Bulgaria, South Africa, Tanzania, and other countries. Then for a couple of years she ran a TB-control program in New York City, while continuing to do international consulting work.

**Trips:** Along the way, she reconnected with DMS faculty doing international health work. In 2003, she was hired as the coordinator of Dartmouth’s Global Health Initiative and as the program director of DMS’s DarDar pediatric HIV treatment program in Tanzania. She makes several trips there each year and continues to consult on international TB projects, too.

She teaches at DMS as well, including an elective that “encouraged students to think beyond the health concerns of the United States,” says second-year medical student Dan Kaser. “Dr. Adams is a dynamic teacher,” he adds. She also works with the Dartmouth International Health Group, helps bring in speakers on international health topics, and mentors students who travel abroad.

In the undergraduate course, “we focus on infectious diseases, so [students] . . . understand the key causes of global morbidity and mortality,” Adams explains. The topics on the syllabus range from the “micro”—basic concepts of epidemiology—to the “macro”—the political, economic, and ethical aspects of provid-



**RISKY BUSINESS:** DMS Drs. William Black and John Baron wrote an editorial in the *Journal of the American Medical Association* about a study—on the value of routine CT scans for those at risk of lung cancer—that has drawn a lot of media attention.

ing health care on a global scale.

“This course [provides] a lot of the basic background information that needs to be understood before entering the world of global health,” observes freshman Frances Vernon, who hopes one day “to help shape future public-health policy in developing countries.”

Senior Brian Christie, who is also interested in a career in international health, adds, “I had no idea that so much about global health is prevention.” After graduation, he plans to work in a small village in Kenya, helping to create a self-sustaining community of AIDS orphans and their elders; he expects eventually to attend medical school.

Adams’s enthusiasm for the course is infectious. “I’m really excited,” she says, “that John Butterly and I, as Medical School faculty, are able to cross over and do teaching at the undergraduate level. It’s nice that this kind of cross-fertilization happens at Dartmouth.”

Laura Stephenson Carter



Adams, shown in Kosovo in 1996, today teaches global health at Dartmouth.

## A NOTES-worthy sabbatical in London

When DARTMOUTH MEDICINE last visited Dr. Richard Rothstein, in 2005, he was sitting at a computer console at DHMC, manipulating a robot to perform virtual incisionless surgery on a research model.

**Actual:** Today he sits 3,300 miles away, at the Royal Veterinary College in London, performing actual incisionless surgery on pigs. The chief of gastroenterology at DHMC, Rothstein is on sabbatical, he explains by e-mail, to immerse himself “in the field of NOTES, to identify those emerging technologies that will have applicability to future human clinical work back at Dartmouth.”

NOTES stands for Natural Orifice Transluminal Endoscopic Surgery. It means running an endoscope with miniature surgical tools through a natural opening in the body to reach an internal organ. For example, entry via the mouth and esophagus makes it possible to pass through the stomach wall to reach the abdominal cavity. Or the pelvic region can be reached via the penis, vagina, or anus.

So an operation that required an incision measured in inches when done by open surgery, then only a half-inch “band-aid” incision for laparoscopic surgery, may soon require no external incision at all. The reason for the evolution? Less pain, shorter recovery, and no visible scars.

In London Rothstein is “concentrating on identifying the most successful methods of endoscopic sewing.” That, he says,

is key to the acceptance of NOTES. “There are many hurdles for natural orifice surgery,” he adds, including prevention of infection, visualization of the operative field, and control of hemorrhage. But “the show-stopper,” he believes, will be “reliable closure technique—a tight seal is the key to surgical success. This is the reason for a focus on sewing devices and techniques during this sabbatical.”

Why Royal Veterinary? He chose it, Rothstein says, “so that I could work with Professor C. Paul Swain, a long-time friend and academic gastroenterologist.” Swain’s team has been a pioneer in NOTES and in developing devices, including an endoscopic sewing machine.

**Cavity:** Describing his sabbatical work, Rothstein says that “after cutting an entry hole into the abdominal cavity through the stomach or colon, via natural orifices, we pass the endoscope into position to manipulate, biopsy, remove, or join various organs and structures.” Then, because successful closure of the divided tissue is paramount, he is assessing the accuracy, ease, and effectiveness of various sewing devices and techniques.

U.S. surgeons have yet to perform a NOTES procedure on a human, but physicians in India and Brazil have. In India, Rothstein reports, “the patients did fine,” though the devices and techniques proved difficult to use, so the clinicians imposed a moratorium on further procedures pending improvements.



LIA ROTHSTEIN

Rothstein in repose in Trafalgar Square.

When asked how long he thinks it will be before NOTES is approved in the U.S., Rothstein looks to the past: “When laparoscopic surgery emerged as an alternative to open procedures, there was a great deal of skepticism, derision, and disbelief on the part of practicing surgeons.” But the “patients pushed the skeptics, and the outcomes convinced everyone.” The evolution of NOTES, he opines, will take a similar path.

Whatever the timing, he says that DHMC offers “a superb environment for the development of NOTES” and that his colleagues are “most supportive.”

Rothstein serves on a national oversight committee called NOSCAR (Natural Orifice Surgery Consortium for Assessment and Research). “Dartmouth was an early entrant into the field,” he says, and has collaborated with institutions in Texas, England, Germany, and Sweden. As the discipline develops further, he adds, it will be important to continue “to promote collegiality and minimize competition.”

JAMES DiCLERICO