

Students trade their glass slides for images on a computer screen

Is there anyone who doesn't recall twiddling the knurled knob of a microscope in science class to bring a specimen on a glass slide into focus? Certainly medical students spend many an hour peering through microscopes at tissue samples—but not as many hours as they used to.

Virtual microscopy—the examination of digital images on a computer screen, rather than of glass slides through a microscope—is quickly replacing conventional microscopy at medical schools across the country. Dr. Brent Harris, the co-coordinator of pathology in DMS's second-year Scientific Basis of Medicine curriculum, made the leap into the new technology four years ago. He was impelled by the fact that he faced an expensive prospect—the need to replace the class's old teaching slide sets. Over the years, many slides had been cracked, broken, or lost. It seemed like a good time to try virtual microscopy (VM).

Focus: Now, a single slide of any given biopsy specimen can be scanned and posted on a website, where all the students in the class can view it. Students can focus in and out on the image and move it around, just like a glass slide on the stage of a microscope.

Harris has long since become a believer. The benefits are many: no slides to lose or break; reduced need to service student microscopes; reduced cost to pre-

MEDIA MENTIONS: DMS AND

Among the people and programs coming in for prominent media coverage in recent months was a Dartmouth expert on biological clocks. “Researchers have long known that bacteria, flies, worms, flowers, oak trees, and human beings all



have tiny internal timepieces that keep them on a roughly 24-hour cycle, the time it takes the Earth to spin once on its axis,” reported the *Miami Herald*. “Biological timekeeping is a core property of life on a revolving planet,” said Dr. **Jay Dunlap**, a biochemist at Dartmouth and the author of a book on the subject. “Time organization is a vital part of the . . . normal functioning of every species.”

Dr. Dean Ornish wrote in *Newsweek* about a recent study by Dr. **Lisa Sutherland**, a Dartmouth nutrition researcher. “I’d throw myself in front of a train if I thought it would save my son. Almost any parent would,” Ornish wrote. “If that’s true for you, then the results of a new study from Dartmouth might change your life, or at least your lifestyle. Researchers



there used a toy grocery store to find out which foods preschool children would select when given a range of options. They found that children begin to assimilate and mimic their parents’ food choices at a very young age (2!), even before they are able to fully appreciate the implications of these selections.”

There is renewed talk nationally about health-care reform and thus increased coverage of the



work of the Dartmouth Institute for Health Policy and Clinical Practice—including in the *Wall Street Journal*. “There’s a growing sense of crisis that health care will be unaffordable . . . and that the little insurance we have will be increasingly worthless,” said Dr. **Elliott Fisher**, one of the main forces behind the *Dartmouth Atlas*, the bible of U.S. health-care irrationality.” One reform effort should be aided by the economic stimulus bill. The *Charlotte Ob-*

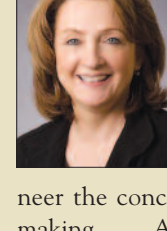
server reported that “some [stimulus funds] will be used for clinical trials making head-to-head comparisons of different treatments. . . . Dr. Elliott Fisher of Dartmouth Medical School said that new money would help researchers try to answer questions like these: Is it better to treat severe neck pain with surgery or a combination of physical therapy, exercise, and medications? What is the best combination of ‘talk therapy’ and prescription drugs to treat mild depression?”

The Associated Press (AP) talked to Dartmouth’s Dr. **David Axelrod** about a recent study showing that the nationwide liver-transplant system may favor



men over women. “The new system is based on three lab tests. Results are combined as a score that predicts a patient’s risk of death within three months. . . . ‘One of the lab tests in the score may underestimate the severity of illness in women because of their smaller average size,’” Axelrod told the AP. “‘With a relatively minimal change, we can deal with that,’ Axelrod said, suggesting a different weight-adjusted measurement.”

The AP turned to another Dartmouth surgeon for a different story. “Patients often are ill-equipped to weigh increasingly complex medical options. Now there’s a small but growing movement to get unbiased reports of the pros and cons of different tests and treatments into patients’ hands,” the AP reported. “‘No matter how hard I tried’ to be objective, ‘inevitably my personal biases got involved,’ recalls breast surgeon Dr. **Dale Collins** of Dartmouth-Hitchcock Medical Center, which helped pioneer the concept that it calls shared decision-



making. . . . At Dartmouth, every woman diagnosed with early-stage breast cancer now sees a . . . decision-aid video before meeting a surgeon.”

“Aching backs . . . cost Americans more than \$80 billion in health-care costs, time off from work, and other expenses,” noted the *Los Angeles Times*. Surgery is a common treatment, the *Times* said,

DHMC IN THE NEWS

but “many physicians and surgeons are concerned that some of their colleagues may push expensive procedures because they have a stake in companies that produce the necessary equipment or devices,” the paper said. “Dr. **James Weinstein**, a spinal surgeon at Dartmouth, cites as an example the metal cages for spinal fusion that came onto the market in 1996 and were touted to doctors in an aggressive ad campaign. Surgery rates soared.”

“Prolonged use of low-dose aspirin or other non-steroidal anti-inflammatory drugs (NSAIDs) appears to reduce the risk of precancerous lesions that can lead to colorectal cancer,” noted *U.S. News & World Report*. “It’s increasingly clear, and arguably proven, that NSAID drugs do interfere with the development of cancer in the large bowel,” said study coauthor Dr. **John Baron** of Dartmouth. “‘And this study . . . shows two things: One, if you take the NSAID drug for a while and then stop, you won’t get a big rebound in terms of adenoma tumor risk. And two, if you don’t stop taking an NSAID, but instead continue its use over time, the protective benefit will continue.’”

U.S. News & World Report also spoke—on the subject of preventive screenings—to Dartmouth’s



Dr. **H. Gilbert Welch**, the author of *Should I Be Tested for Cancer? Maybe Not and Here’s Why*. “Experts generally agree that certain screening tests improve the overall health of the population; blood pressure testing is one example. But there’s controversy over the value of other tests.” Welch told the magazine that “screening can, paradoxically, ‘make the population less healthy because it leads to so many more diagnoses and to overtreatment.’”

Drs. **Lisa Schwartz** and **Steven Woloshin** were interviewed by the *Chicago Tribune* regarding their efforts to help the public understand health statistics. Schwartz told the newspaper that “drug ads and public service announcements often make ‘strong claims about weak science. . . . People assume that whatever is being promoted works incredibly well, and that the problem is both common and dangerous.’” The Dartmouth researchers were also

guests on National Public Radio’s *Talk of the Nation* to promote their new book, *Know Your Chances: Understanding Health Statistics*. “We want you to understand what the numbers are behind the [health] message,” Schwartz told host Ira Flatow, “and whether you should believe the numbers.”



As runners from across Florida prepared recently for the Miami marathon, the *Miami Herald* wondered why anyone would voluntarily engage in 26.2 miles of vigorous exercise: “Isn’t running a marathon a giant insult to the human body and mind?” The *Herald* spoke to “Dr. **Kristine Karlson**, of the Dartmouth-Hitchcock Sport Medicine Clinic,” about some of the risks involved. “Runners who drink too little during a race can become dehydrated, which, at the extreme, can shut down a runner’s kidneys, often with fatal results, says Karlson. ‘It can also cause heat exhaustion.’” But, the article went on, “as counterintuitive as it seems to those who don’t indulge, doctors, physiologists, and runners agree that the effects of marathon running are mainly positive. . . . ‘Running is good for the heart and lungs because exercising any muscle makes it stronger,’” Karlson said.



The *New York Times* tapped Dr. **Sohail Mirza**, an orthopaedic surgeon, for comment on an increase in scanning. “In what is often an irresistible feedback loop,” noted the *Times*, “patients who are in pain often demand scans hoping to find out what is wrong, doctors are tempted to offer scans to those patients, and then, once a scan is done, it is common for doctors and patients to assume that any abnormalities found are the reason for the pain.” But some doctors have begun to include epidemiological data with scans. Mirza was quoted as saying that this is “very helpful information to have when talking to patients and very helpful for patients, to help them understand that the abnormalities were not catastrophic findings.”

pare slides; increased ability to use very small biopsy specimens, since a single slide can be digitized for the whole class; and increased uniformity, since students all view the same slide.

VM also allows students to study pathology at home without having to lug a heavy microscope with them. Another advantage is that several students and instructors can look at the same image at the same time on their individual laptops, while comparing notes about what they see.

Sharp: There are also a few downsides, including the need for enhanced technical support and infrastructure. The first time Harris tried out the new system in class, the server crashed. And VM images aren’t quite as sharp as conventional slides, though Harris says they have gotten much better in the past few years. “This technology will be used more and more in clinical applications, very similar to the transition that radiology has gone through. By exposing students now to this important innovation, we are getting them ready for the digital future of pathology,” he explains.

Microscopes are still used in some courses, Harris adds, and they retain some advantages in clinical applications—including speed, since it takes time to get a slide scanned. But the days of twiddling a microscope knob may be numbered.

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For several **WEB EXTRAS**, including some actual virtual microscopy slides, see dartmed.dartmouth.edu/sp09/we01.