# With lab informatics, better to give than to receive

## Anne Ford

**March 2014—If you had a colleague who was brilliant,** experienced, and insightful, but who for some reason didn't volunteer helpful information, you might agree with the assessment of Michael Laposata, MD, PhD: "If you only wait for people to ask you a question, that's crazy."


For clinical laboratory test results, he says, "We sit and wait and say, 'Oh, if you have a question, we'll do our best to answer it for you.' And fewer than one percent of all the questions out there get asked. Most clinicians just guess at what test results mean, at what test to perform next." That's why, he argues, more laboratorians need to seek out and implement informatics solutions that make their expertise automatically available to ordering physicians.

Dr. Laposata, the Edward and Nancy Fody professor of pathology at Vanderbilt University School of Medicine and soon to be chair of pathology, as of July 1, at the University of Texas Medical Branch in Galveston, is one of more than three dozen speakers who will share their thoughts May 13–16 at Pathology Informatics 2014 in Pittsburgh. Sponsored by the Association for Pathology Informatics and co-directed by J. Mark Tuthill, MD, of Henry Ford Health System, and Ulysses J. Balis, MD, of the University of Michigan Health System, the meeting will feature clinical and anatomic tracks, four workshops, short abstract presentations, lectures, and a hands-on digital pathology activity that will allow participants to perform real exercises on digital pathology systems.

It will also, of course, feature more of Dr. Laposata's thoughts on informatics as it applies to ordering and interpreting laboratory tests. In his view, most, if not all, institutions are using systems that not only allow for, but contribute to, errors in test ordering. Take the von Willebrand factor activity test. "It has about 10 different names and five different abbreviations," Dr. Laposata says. "If you train in one hospital, it's called ristocetin cofactor. If you train in another, it's called factor VIII-related activity. I can give you 25, 30 examples like that." The trouble arises when a clinician who knows the test by only one name encounters an ordering system that lists it by only another name. "What should happen is that the doctor enters, say, 'ristocetin cofactor,' and a screen pops up that says, 'These are the 10 possible names for this. Are you sure you have the right test?' It sounds so simple, but nobody's doing that. Nobody."

Another common informatics challenge: outdated decision support screens. "They're often written and then not maintained. Two months later, the clinical situation is now different, but the same old screen appears. Nobody owns them," he says. "Doctors write them, but then they're in the hands of IT, not medical people."

Dr. Laposata offers an example from his own institution regarding coronary artery stents. "What Vanderbilt did was decide that since your genetics play a role in how well you metabolize Plavix, which keeps the stent open, it would be important to do a genetic test to make sure you can metabolize Plavix correctly," he says. "So in the event you have the genes that show you don't metabolize Plavix correctly, you need a different drug. For a while, the only other drug that did what Plavix did was prasugrel. But prasugrel has a fair amount of bleeding associated with it.

So a new drug appears, ticagrelor. Ticagrelor is probably a better drug, but our info screen was forcing people to choose between Plavix and prasugrel. The very first day that ticagrelor appeared, we should have had a new screen."

He'd like to see the elimination of canned comments in test ordering. "If you have a positive test, you get five sentences about it. But whether it's a 26-year-old woman with a stroke or a 98-year-old woman with a heart attack, you'll get the same five sentences," he says. "They just don't apply in both circumstances. They're so uninformative that they cloud the medical record."

Then, too, Dr. Laposata would like to see the widespread adoption of informatics systems that allow pathologists to search the medical literature in real time and obtain the answer to a question about a possible diagnosis. "For example, I had a question at coag rounds several months ago, where I was looking at how people treat patients who have a blood clot on one of the superficial blood vessels," he recalls. "That treatment protocol has changed significantly over time. I wanted to know: What is it today?" So he turned to Vanderbilt's team of information scientists.

"They will take our questions and search all 63,000-plus medical journals, write a paragraph you can read in two minutes, and put links to the papers inside that paragraph so you can click on them," he says with delight. "I can get virtually every question answered within 12 hours, and I can then forward the answer to the physician who ordered the test. I think Vanderbilt has pushed itself to the front of the line on this."

Finally, Dr. Laposata calls upon pathologists everywhere to use informatics to show the success of their consultative activity. "If we do something so that people stay in the hospital one fewer day, then we need to be able to mine that data and show it to others," he says, "so they say, 'Wow, you pathologists did that?'"

**The roles of pathology informatics,** biomedical informatics, and data analytics in the laboratory will be the subject of a talk by Michael J. Becich, MD, PhD, professor of biomedical informatics, pathology, information sciences, and telecommunications in the Department of Biomedical Informatics at the University of Pittsburgh. "I'm calling for pathologists to realize that the age of computational pathology is upon us," Dr. Becich says.

What does he mean by "computational pathology"?

"It's the analytics of lab data," he says, "combining different types of data sources on a patient generated by the laboratory and perhaps other health care sources, and really deeply interrogating genome data, imaging data, and what I'll just loosely call phenotype data—the age at which you got a disease, the other diseases you have, your family history, all the things that EMRs are supposed to intelligently manage but, sadly, don't." Those are what computational pathologists want to use to add value to personalized medicine through big data, he says. "And the solution to that, for me, is not just pathology informatics, but computational pathology. It's not just about delivering the data and getting it in the hands of the clinician. It's about analyzing that data and the complex variations in that data."

Unfortunately, Dr. Becich adds, far too few pathologists are trained in computational pathology. "What we want," he says, "are pathologists who don't just crank out tests in a laboratory, but who can manage large, complex databases; do deep interrogation against those databases to take data and turn it into knowledge; and master complex software tools that enable this deep discovery of data. This kind of pathologist is one part computer software savvy physician, one part molecular genomicist, and one part pathology informatician, deeply familiar with the lab information system."

In his view, training is the principal challenge. "There are no computational pathology fellowships anywhere in the country," he points out. "We've trained about six or seven here at Pitt, but we've done it by cobbling together resources for people who were largely doing the interface between genomics and informatics. And those people are wildly successful and highly sought after, and are successful both in small business as well as in pathology. If I had 50 people like them right now, I could find them all jobs immediately. So how do we scale up the training?"

Another challenge, Dr. Becich adds, is that in many institutions, anatomic and clinical pathology operate separately. “That isn’t gonna work in this new world of computational pathology,” he says. “Merging AP and CP, and having good systems that manage data from both sides, is going to be critical.” Then, too, he says, “pathologists will have to begin truly integrating themselves into the diagnostic care of patients with complex diseases. We’re going to have to get out of our basements. We’re going to have to actually be doctors and understand treatments and therapies and phenotypes, or we’re going to lose this opportunity to genetics, to oncology, to folks in internal medicine. It’s a call to arms.

“There’s tremendous opportunity for pathology,” he adds, “but it does require change, and in this restricted financial environment.” The “winners,” he says, are those who will see “it’s time for radical change in the laboratory and focus on solving these important issues.”

**Another speaker, Robert Michel,** will focus, in his words, on “the financial lay of the land in the health care industry.” In the view of Michel, who is editor-in-chief of The Dark Report and president of The Dark Intelligence Group, five major sources of change are driving the evolution of health care and laboratory medicine in the United States: changes in the money that pays for health care; the end of the fee-for-service era; the end of the private-practice model; the dawn of personalized, proactive, genetics-informed medicine; and the adoption by providers of quality management systems.

“The first big ‘Aha!,’” Michel says, “is that the federal government now funds more than half of the more than $3.8 trillion spent on health care annually in the United States. It’s not just the Medicare program. The federal government is insuring millions of employees, it’s insuring all the active-duty military, all the VA vets, and then, through Tricare, all of the military dependents. With a $600 billion deficit this year and a $17 trillion national debt, the federal government does not have ample funds to sustain the current level of spending on health care.”

Employers are in a similar position. “They’re not capable of absorbing a regular five to seven percent per year increase in their health benefit costs. In and of itself, that should inform the strategic planning that laboratories do about how they’re going to deliver clinical services and maintain financial sustainability.”

As for fee-for-service, Michel predicts that in its place will arrive a transition period of sorts. During that time, he says, ACOs, for example, will be paid a discounted fee for service, and then at the end of each year, based on the actual reduction in the cost of care, they will share in a bonus: “Gang, instead of paying you 100 percent of today’s fee for service, we’ll pay you 80 percent, and if you save money like we think you will, we’ll split that 20 percent between us as a bonus.”

Furthermore, he says, the last six years have seen the end of the private-practice model, which has large implications for laboratories. “A large number of medical groups have sold themselves to hospitals, health systems, and insurance companies, and the same doctors are continuing to practice medicine, but they’re now employees.” And the new owners of the medical groups are going to decide which laboratory or AP provider to use, he says. “It’s a safe assumption to say that in many settings, the hospital or health system would like the lab work to be sent to the hospital’s or health system’s laboratory.”

Personalized and proactive medicine, too, has enormous implications for pathology, Michel continues. The shift from acute care and toward proactive care, he says, is measured by a recent decline in inpatient admissions nationally and across many states, and the consequence is that a larger proportion of specimens will come from outpatient and ambulatory care settings.

“What happens for laboratories is that clinicians are going to want to do more testing that allows them to make earlier and more accurate diagnoses, particularly for patients suspected of having chronic diseases, and the system’s going to encourage doctors to do more testing to monitor those patients,” Michel says. “And at the same time, we continue to learn more about how to use DNA analysis, RNA analysis, proteomic analysis for making diagnostic, therapeutic, and monitoring decisions. The net effect is that the laboratory is going to have a higher contribution to make and be the source of a relatively large amount of data, which the informatics systems need to

accommodate. So the need for large amounts of data storage and software tools to analyze large amounts of data is going to increase steadily."

Finally, quality management systems will become more important, he says: "The demand for higher quality is likely to outrun the capabilities of existing QA and QC methodologies to keep up with it."
In sum, Michel says, "All of these things are going to call upon the informatics capabilities of a laboratory."

**Speaker Lewis A. Hassell, MD,** associate professor of pathology and director of anatomic pathology at the University of Oklahoma Health Sciences Center, will address the subject of data-driven management for the laboratory and practice. As a start, he suggests that laboratories expand the utility of their real-time process data by, as he says, "providing more ongoing, real-time look-ins, sort of like watching a speedometer." He suggests, too, that labs decide how they want to address more controversial issues, such as economic utilization rates.

"Let's say you want to look at a pathologist and find out his frequency of using immunohistochemical stains, or the average cost of his diagnosis on a patient compared to his peers. Those kinds of benchmarking statistics could come out of this approach," he says. "And it's a controversial topic because physicians are fairly sensitive to being de-listed based on their utilization patterns, and because it's easy for someone to say, 'Well, I get all the hard cases, so I have to do x number of stains per day.' But better, timely data can drive better practices here."

Past attendees of the conference will note a few changes this year, says Dr. Tuthill, head of the Henry Ford Health System Division of Pathology Informatics. First, the conference has moved from fall to spring. Second, he says, "We're looking to have the meeting be more reflective of the desires of the membership of the Association for Pathology Informatics, so a component of the meeting will be based on request for proposals as opposed to handpicked speakers." To that end, "We've added a third track that's going to be populated by speakers we select based on short abstracts and scientific poster submissions—what we call e-posters—and we will offer them 30-minute slots to present from the podium. It's a way for up-and-coming people to get slots based on their merit and not necessarily their name recognition."

Of the lineup of speakers and topics, Dr. Balis, professor in the University of Michigan Department of Pathology and director of the Division of Pathology Informatics, says, "There is a groundswell of interest in technology deployment in the collective anatomic and clinical pathology subspecialties, such as seamless workflow with the use of digital whole slide imaging and precision treatment models as enabled by next-generation sequencing. This year's speakers and topics were selected carefully to canvass this important content."

He describes the conference as well-timed in light of the recently established subspecialty boards in clinical informatics, for which pathologists can apply by experience or training. "It was timely to provide an overview of this exciting development," he says.

A third change in this year's conference may not be apparent to the average attendee, but it marks the end of an era for this conference. For the first time, Bruce Friedman, MD, emeritus professor of the Department of Pathology at the University of Michigan Health System, will not have a formal role in the summit's organization.

In the early 1980s, Dr. Friedman, who will be an attendee at this year's summit, began a conference called Automated Information Management in the Clinical Laboratory, which ran until the late 1990s before it changed names and became the Laboratory Information Technology Summit. In 2010, the summit merged with the Anatomic Pathology Imaging, Informatics, and the Internet conference; was renamed the Pathology Informatics Summit; and began to be managed by the Association for Pathology Informatics.

"Dr. Friedman was the first to put together a meeting that focused on laboratory computing," Dr. Tuthill says. "He coined the term 'pathology informatics,' and he started the first meeting. And he did this for almost 30 years, and he very wisely recognized the need to merge these important meetings and get them supported by a national association. That's had a major impact on the generations of informaticists who follow him."

Dr. Balis credits Dr. Friedman and the late William Dito, MD, with co-founding the informatics subspecialty: “Both of them made contributions of incalculable value in the field’s earliest days.”
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