



Driving Value Through Pathology Innovations and Improvements

Laboratory tests have long been integral to disease diagnosis. Now, with the development of precision medicine, pathology is also intricately involved in determining the right treatment, predicting genetic disease risk, and determining how well a therapy is working. Because laboratory testing is interwoven throughout a patient's journey, pathologists are uniquely positioned to help health care organizations improve the quality of patient care and reduce costs. By investing in innovative laboratory technologies and improving pathology-related processes, hospitals and health systems are seeing sizable advancements on both fronts.



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Patrick Godbey, M.D., FCAP, laboratory director, Southeast Georgia Regional Medical Center; CEO and medical director, Southeastern Pathology Associates; and president-elect of the College of American Pathologists who was sworn in as president in September 2019

Because much of laboratory medicine takes place away from the bedside or exam room, pathology’s function in patient care can be overlooked. But it became clearly evident during a July 2019 AHA Executive Forum with pathologists and clinicians that pathology’s role in ensuring high-value care is not only critical but also expanding exponentially.

Four hospitals and health systems were represented at the executive forum: AMITA Health St. Francis Hospital, Evanston, Ill.; Moffitt Cancer Center, Tampa, Fla.; Southeast Georgia Health System in Brunswick; and University of Utah Health, Salt Lake City.

When asked about the connection between pathology and value, attendees described three primary ways that laboratory improvements can drive down the total cost of care and drive up care quality and patient satisfaction.

1 Improving Care Delivery With Pathology Innovations

Thanks to advances in molecular pathology, pathologists now are able to run sophisticated laboratory tests on blood and tissue samples to pinpoint specific proteins, genes, and other molecules associated with certain strains of diseases, cancers, and infections. This expanding science is fueling the growth of precision medicine, or the provision of targeted treatments tailored to a patient’s unique genetic and clinical profile.

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For instance, pathologists work with oncologists to determine whether a patient would benefit from chemotherapy, immunotherapy, or another treatment as well as the specific drugs to use given the subtype and stage of cancer the patient has. “By using the laboratory more and more, patients win and hospitals win,” Godbey said. “You have fewer patients who are exposed to the side effects of treatments that would not provide any benefit, which can also save money.”

Many payers are also tying provider reimbursement for some treatments to the presence of laboratory results that indicate that a particular therapy would help the patient, Godbey said.



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Marilyn Bui, M.D., Ph.D., FCAP,
section head of sarcoma pathology,
Moffitt Cancer Center

Advanced laboratory techniques are also dramatically decreasing the time it takes to turn around pathology results. For instance, a laboratory method called polymerase chain reaction (PCR) can provide rapid diagnoses on a wide variety of diseases, including sepsis, influenza, and *Clostridium difficile*. The advantage of PCR techniques is that clinicians no longer need to wait days for laboratory cultures to grow so pathologists have a big enough sample to make a diagnosis. PCR tests create millions of copies of a gene within hours.

“Time is muscle,” stresses pathologist Janis Atkinson, M.D., FCAP, medical director of the laboratory at AMITA Health Saint Francis Hospital. “We just brought in a high-sensitivity cardiac troponin assay, a marker that allows us to rapidly rule in or rule out acute myocardial infarction in our patients. That helps us to move patients through the system if they need further treatment.”

Laboratory innovations are also helping to ensure diagnostic accuracy during high-pressure situations. For instance, during cancer surgery, surgical oncologists take a biopsy of suspected tissue and pause the operation until pathologists can determine whether any cancer is present, which guides the rest of the surgery. Traditionally, pathologists use a technique called frozen section for intraoperative diagnoses, which involves freezing the sample. The frozen-section approach allows pathologists to give a rapid “yes” or “no” on the cancer question. But it is not specific enough to determine the type of cancer in some situations.

This is problematic when patients have pathologic bone fractures that could be sarcomas, bone and soft tissue malignancy. “The management is totally different,” explains Marilyn Bui, M.D., Ph.D., FCAP, section head of sarcoma pathology, Moffitt Cancer Center. “If it’s not a sarcoma, the [surgeon] can put a rod in [to treat the fracture]; but if you put a rod in a sarcoma, you help the tumor spread.” In this situation, simply giving a malignant diagnosis is not enough. The surgeon needs to know on the spot if it is a sarcoma or not.

Because of her training in advanced laboratory testing and the drive to provide state-of-the-art care for the patient, Bui developed a new approach for diagnosing sarcomas quickly. By using the combination of cytology, immunohistochemistry, and a molecular test called fluorescence in situ hybridization, or FISH. “I validated these tests for sarcoma, especially Ewing sarcoma,” she said. “I am able to give the surgeon a definitive answer on the spot and direct immediate management, in addition to triaging the sample for further testing to direct targeted therapy.” Bui said.

The approach also can reduce the burden on the patient. With a specific diagnosis of sarcoma, surgeons know the next treatment step will be chemotherapy and can implant the port while patients are on the operating table, saving patients from a second procedure.



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Brian Jackson, M.D., FCAP, clinical pathologist, University of Utah Health’s ARUP Laboratories

2 Educating Clinicians and Patients About Complex Laboratory Tests

The complex molecular insights uncovered through medical laboratory tests can be difficult for both patients and many clinicians to understand. Ideally, pathologists prepare reports with two users in mind: “One is for the patients, so they know what’s wrong,” Bui said. “The other is for the clinicians, so they know what to do with it.” The digital pathology reports incorporate links and QRL codes to additional educational information (e.g., pathology images, videos, explanatory text).

In some cases, clinician education also needs to occur on the front end of laboratory testing, said Brian Jackson, M.D., FCAP, clinical pathologist, University of Utah Health’s ARUP Laboratories. “Genetic testing has massively increased the complexity of the ordering decision because there are so many ways that you can test for a particular gene: You can look for a single nonmutation, you can conduct noninvasive mutation analysis, etc. Well-meaning clinicians often don’t place these orders correctly because they are not highly familiar with that particular area of testing.”

To address this issue, genetic counselors at University of Utah Health’s ARUP Laboratories manually review all complex genetic testing orders. “They track down the ordering physician to get the patient history,” Jackson said. “One-third of the time, that conversation leads to a change in the order. This not only takes a lot of dollar waste out of the system, it reduces the risk that the doctor may be misled by a test that was the wrong test to order in the first place.”

A personalized-medicine tumor board, made up of pathologists, oncologists, and other specialists, reviews all complex molecular findings at Moffitt Cancer Center to ensure that patients are matched to the drug that can target their cancer. “The pathologist is, first, an integral member of the clinical team and, second, the consultant to the treating physician,” said Bryan McIver, M.D., Ph.D., Moffitt’s deputy physician in chief. “In the field of cancer, this has been exemplified dramatically in the era of genetic and genomic testing. The interpretation of these tests is something that most physicians are not going to be able to deal with on their own. Our pathology group helps to interpret those genetic test results and identify care options, including clinical trial options and off-label options.”



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Janis Atkinson, M.D., FCAP, medical director of the laboratory at AMITA Health Saint Francis Hospital

3 Enhancing Quality While Reducing Total Costs

Because pathology tests and resources are integral to the diagnosis and treatment of patients, hospitals are finding that they can simultaneously improve quality of care and reduce costs by decreasing unnecessary testing and blood use. Here are two examples:

- AMITA Health Saint Francis Hospital reduced duplicate orders of 20 common laboratory tests by 40% by adding an alert to the electronic health record (EHR). When physicians order tests that have already been ordered within a specified window of time (that may vary from test to test), a prompt pops up that says “Potential duplicate orders found” and gives the doctor the option of cancelling the order or placing the order again.
- Southeast Georgia Health System saved \$300,000 over one year in blood transfusion costs by developing clinical protocols to guide clinically appropriate blood use. “Through teamwork, our clinicians are rewriting the protocols for the usage of blood products,” Godbey said.

In other instances, wise pathology spending can translate into lower total costs for a patient, as well as other desired outcomes. “It’s well known that the vast majority of actionable information in the hospital chart comes out of the laboratory,” Godbey said. “But what is often not fully appreciated is that the number of dollars spent on high-quality patient care is determined in large part by the laboratory.”

For example, AMITA Health recently made the decision to adopt a PCR influenza test for the emergency department to help clinicians rapidly and more accurately determine if a patient has the flu. The Influenza PCR test costs several times more than the non-PCR test. Past research has shown that bringing high-quality laboratory testing closer to patients can save hundreds of dollars per patient in unnecessary ancillary testing (e.g., X-rays) and unnecessary hospital admissions.

“We need to be advocates for the right laboratory tests,” Atkinson said. “They may cost more in our silo, but the impact will be worth it.”

Pathologists also are devoting time to correcting problems that arise after the implementation of new technologies or laboratory tests. For instance, University of Utah Health saw patient satisfaction with outpatient phlebotomy decline after the health system installed a new EHR, causing issues in test order flow. “The health records system threw off the ordering process and created some challenges,” Jackson said. A cross-discipline effort has since worked to correct the problem and cut the average wait time for an outpatient phlebotomy test in half, and patient surveys have shown significant improvements in both phlebotomy wait time and courtesy score.



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Mary Haak, director of quality and patient safety, AMITA Health St. Francis Hospital.

In another example, AMITA Health saw a spike in false-positive *C. difficile* diagnoses after rolling out a PCR test for the infection. “We were getting patients who do not have *C. difficile* colitis, with positive *C. difficile* results, and they’re getting treated for the infection, which is inappropriate,” Atkinson said.

To improve diagnostic accuracy, a multidisciplinary team of pathologists, infectious disease specialists, quality experts, and CMOs reviewed available clinical guidelines and rewrote the algorithm that informed how the *C. difficile* test was conducted. As a result, the hospital conducted 23% fewer tests with 40% fewer positives.

Turnaround times for the *C. difficile* results also improved. “Average turnaround times dropped from 16 hours to about 2 hours,” said Mary Haak, director of quality and patient safety, AMITA Health St. Francis Hospital. “That’s a huge productivity savings when you think of the number of times every person who goes into that [isolation] room has to don a gown for a patient who we think might have *C. difficile* but does not.”

Improving Patient Satisfaction With Pathology

For most patients, the only time they come face to face with the laboratory is when they get stuck with a needle by a phlebotomist. Needlesticks cause anxiety in many people, which makes it challenging to have a positive impact on patient satisfaction. A 2018 study found that 20%-30% of adults ages 20 to 40 are afraid of needles. The percentage is higher in children and lower in older people.

To address this issue, medical laboratories are trying to make the patient experience as seamless and comfortable as possible.

Many hospitals measure patient satisfaction with the Press Ganey survey, which includes questions that relate to the laboratory, such as how long patients wait for laboratory tests.

To receive more specific information on their phlebotomy service, AMITA Health Saint Francis adopted a survey tool called Happy or Not.

The advantages to this survey tool are that patients can be surveyed immediately after their service was provided and Saint Francis Hospital can differentiate their levels of satisfaction between the phlebotomist and the registrar. The survey is conducted on a touch screen at a kiosk located within the service area and uses four faces ranging from a grinning, happy face to a miserable-looking unhappy face. The survey takes less than two minutes to complete, and AMITA Health Saint Francis Hospital has almost 100% patient participation in the survey.

“We had a theory that patients were lumping together their experiences with registration and phlebotomy,” said Atkinson. “This tool allowed us to tease that out, and we were able to see not only that there was a problem with registration, but which registrar was problematic.”

Key Takeaways

1

Innovations in laboratory testing are driving the growth in personalized medicine. Using advanced testing procedures, pathologists are able to make more accurate and specific diagnoses and identify targeted treatments tailored to a patient's unique genetic and clinical profile.

2

As pathology testing has become more complex, laboratory staff are devoting more time to educating physicians about which tests are the right ones to order for patients as well as how to interpret test results and determine the next steps for the patient. Education is being provided face to face in detailed laboratory reports and through guidance provided in EHRs.

3

Because laboratory testing is essential to making numerous patient care decisions, hospitals can simultaneously reduce the total cost of care while improving quality and patient satisfaction by focusing on improving pathology-related processes and investing in innovative laboratory testing.

About the College of American Pathologists

As the world's largest organization of board-certified pathologists and leading provider of laboratory accreditation and proficiency testing programs, the College of American Pathologists (CAP) serves patients, pathologists, and the public by fostering and advocating excellence in the practice of pathology and laboratory medicine worldwide.

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