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IT staffing considerations for the NGS laboratory

For the past five years, the University of Washington Department of Laboratory Medicine has been expanding its next-generation sequencing capabilities, adding the latest technologies and offering new tests in genetics, cancer, and infectious disease—and honing its information technology staffing skills along the way. As an early adopter of NGS, the department needed to develop software and devise strategies and procedures, conceptualizing and building a data-analysis pipeline from the ground up.

Through this process, the lab has learned myriad lessons about hiring bioinformatics and software engineering staff members and integrating them with medical laboratory scientists and other personnel, says Colin C. Pritchard, MD, PhD, associate director of UW Medicine's clinical genetics and solid tumors laboratory.

A lab that's considering next-generation sequencing must have a leader with training and experience in bioinformatics and computer programming, Dr. Pritchard insists. "A laboratory that doesn't have anybody at the faculty level with experience in programming will have a hard time in hiring because he or she won't be able to identify the skill sets needed for the tasks."

Fortunately, says Dr. Pritchard, the University of Washington found the right combination of medical and bioinformatics knowledge in Noah G. Hoffman, MD, PhD, a clinical pathologist who co-directs UW's next-generation sequencing analytics lab with Stephen Salipante, MD, PhD.

Unfortunately, observes Dr. Hoffman, IT functions are becoming centralized at the facility-wide level at many academic medical centers. "I've spoken to people at institutions that have had their lab IT staff replaced by hospital IT staff," he says. "Nobody has anything nice to say about that process because you need to have a lot of lab-specific domain knowledge to support laboratory operations from an IT perspective. And in the case of NGS assays, you have very, very specific needs that are very unlikely to be met by a hospital IT group."

To determine its IT staffing needs, Dr. Hoffman continues, an NGS lab must first decide whether it will buy off-the-shelf applications or develop its own. Because commercial software development may not keep pace with very recent genomic discoveries or new technologies, he adds, labs that want to develop NGS tests may be forced to build some, if not all, of their bioinformatics infrastructure.

But labs that opt to buy all of their software may still need a dedicated staff with bioinformatics and computer science training. "Even if you buy everything off the shelf, there will be places where the systems touch each other, and you're going to need skilled IT staff to manage those integrations," Dr. Hoffman explains. "You are never going to escape the reality that most lab staff do not have the background to handle the complexity of the data and the integrations between those systems."

A complex next-generation sequencing operation requires two types of professionals with extensive IT knowledge: bioinformaticists and software engineers. Typically educated to at least the master's degree level, bioinformaticists have interdisciplinary training in mathematics, biology, computer science, and engineering. As a vital part of the NGS laboratory, these professionals design and build pipelines to manage genetic data, write scripts for the pipelines, and interpret the data. "You need to find people with training in the execution and interpretation of tools specifically for analyzing biological sequence data," Dr. Hoffman says.

"Software engineers, usually with a BS or MS in computer science, but often without a biology background, may also have a role," he adds. "If you want to create your own infrastructure that can manage large amounts of data and present it in concise, easy-to-manage ways for your pathologists to sign out, then having software engineers who can build Web applications and database applications is a must."

Yet hiring software engineers and bioinformaticists on a university laboratory's budget is a challenge because it's a sellers' market for people with these skill sets, Dr. Hoffman points out. The competition for IT talent is especially fierce in the Seattle area, where Amazon, Google, and Microsoft woo software engineers with high salaries and signing bonuses. "What it boils down to is finding people who have an interest in the clinical service component because obviously we can't compete on salary," he says.

NGS labs will benefit by identifying potential employees who would be excited to play a key role in the delivery of personalized medicine, adds Dr. Pritchard. "There are people out there who have these great skills and really want to make a difference in terms of patient care. And that's something they can do in a very tangible way in the clinical laboratory, particularly with regard to the cancer-based testing we are doing now and the positive impact this is having in terms of giving patients more options for therapy."

In hiring bioinformatics staff, UW's NGS analytics lab gives more weight to the informatics component than the biomedical component, says Dr. Hoffman. Job interviews thoroughly assess candidates' technical knowledge, and candidates are required to provide code samples. Consequently, the bioinformaticists and software engineers hired by UW arrive with varying levels of biomedical science knowledge, as well as an appreciation for the rigors of clinical laboratory work.

To reduce the learning curve of these new hires and foster their commitment to the lab's mission, it's important to integrate them into the clinical laboratory team, Dr. Pritchard says. Naturally, bioinformaticists and software developers spend most of their time at computers, "but it's important that they not be siloed off in the corner of the lab doing programming day in and day out," he emphasizes. "It's really critical to have them interact with the pathologists, the medical laboratory scientists, and other lab professionals, such as genetic counselors."

In addition to periodic formal all-staff meetings, the NGS analytics lab holds clinical huddles at least weekly, in which bioinformatics staff members interact informally with the lab directors, medical laboratory scientists, and laboratorians doing the benchwork. "Having very frequent team meetings promotes their integration with the rest of the staff and helps them understand what we're doing and why we're doing it," Dr. Pritchard says. "It also promotes job satisfaction, efficiency, and a greater commitment to patient care."

Drs. Pritchard and Hoffman have no formula for determining the number of each type of professional needed in a well-run NGS lab. At UW, the next-generation sequencing staff grew organically as NGS applications were developed incrementally. Today, the bioinformatics component of the laboratory includes seven people, and IT staff turnover has been minimal.

The IT staff "feel very involved and invested in the mission," Dr. Hoffman says. "Their perception of the utility and the meaning of their work is key to their retention because these are highly marketable people. As long as they are interested in the work for its own sake and in what they are able to contribute to patient care, they don't feel the need to look elsewhere." —*Carolyn Schierhorn*

Meaningful use to end as EHR incentive programs revamped

The federal government announced, last month, plans to discontinue the meaningful use health care information technology program in its present form. But until that happens, health care providers must adhere to meaningful use regulations.

Speaking at the annual J. P. Morgan Healthcare Conference, in January, CMS acting administrator Andy Slavitt said the federal government has the opportunity to sunset provider reporting programs such as meaningful use and the Physician Quality Reporting System and “align them together in a single new program. That program needs to be streamlined and simple to use so physicians can focus where they need to—on their patients.”

A week later, Slavitt and the ONC’s national coordinator for health information technology, Karen DeSalvo, MD, released a blog post discussing the future direction of the EHR incentive programs, in which they said the federal government will be “allowing providers the flexibility to customize health IT to their individual practice needs.” The meaningful use program, they explained, has helped the health care field, but “it has also created real concerns about placing too much of a burden on physicians and pulling their time away from caring for patients.”

With more than 97 percent of hospitals and three-quarters of physician offices “wired,” Slavitt and Dr. DeSalvo posted, the Centers for Medicare and Medicaid Services can change its focus from rewarding health care providers for using technology to rewarding providers for the positive patient outcomes they achieve by using technology.

The program would also level the technology playing field for start-up companies and others foraying into the health care marketplace by focusing on the use of publicly available application programming interfaces. “This way, new apps, analytic tools, and plug-ins can be easily connected to so that data can be securely accessed and directed where and when it is needed in order to support patient care,” Slavitt and Dr. DeSalvo wrote. At the same time, interoperability will continue to be a high priority for CMS and the Office of the National Coordinator.

The decision to end the meaningful use program was, in part, based on passage of the Medicare Access and CHIP Reauthorization Act of 2015, or MACRA, which determines Medicare physician payments based on measures of quality, cost, use of technology, and practice improvements.

“While MACRA also continues to require that physicians be measured on their meaningful use of certified EHR technology for purposes of determining their Medicare payments,” Dr. DeSalvo and Slavitt wrote, “it provides a significant opportunity to transition the Medicare EHR Incentive Program for physicians towards the reality of where we want to go next.”

Proposed regulations will be rolled out this spring, according to the blog post.

ONC releases interactive compendium of health IT policies by state

The Office of the National Coordinator for Health Information Technology has added to its Health IT Dashboard a compendium of state health IT-related policies linked to an interactive map of the United States.

The new feature displays 32 health information technology policies in a drop-down menu and more than 300 examples of how states are using them to promote IT and advance interoperability.

Users select a policy from the drop-down list on the ONC site and then hover over each state to obtain additional information, including the number of related activities the state had undertaken. Corresponding information is also provided by state in a table below the map.

Visiun adds test utilization to cloud-based analytics system

Visiun has added test utilization to the cloud-based version of its Performance Insight laboratory analytics system.

Using Performance Insight in the Cloud, lab managers and supervisors can access their test utilization metrics via mobile devices such as tablets and smartphones. Users of the cloud-based system can also retain and analyze years of test utilization data.

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