# Newsbytes

## How a project team streamlined an immunology lab workflow

April 2022—Michelle Stoffel, MD, PhD, supports the use of Excel spreadsheets in some areas of laboratory medicine, but not necessarily as a laboratory workflow tool. It's a realization she came to when, as a clinical informatics fellow at the University of Washington School of Medicine, she led the charge to revamp the workflow for the immunology laboratory's Merkel cell antibody panel.

"I think in any lab you'll find at least one of these very work-intensive, low-technology processes going on for which a full-automation solution might be unattainable in the near future," she says.

Fully automating UW Medicine's highly specialized, multi-step Merkel cell antibody panel, which tests for antibodies to the Merkel cell carcinoma oncoprotein, would have been a lengthy project and require extensive information technology resources, Dr. Stoffel explains. Therefore, she and her colleagues took a different approach, targeting smaller, semi-manual Excel spreadsheet-based processes within the workflow that were cumbersome to perform. "Cumulative inefficiencies within your workflow can really add up," she says.

In late 2019, immunology laboratory decision-makers, medical laboratory scientists, and members of the pathology and lab medicine informatics team met to kick off the workflow project, says Dr. Stoffel, who gave a presentation on the project at the 2021 Pathology Informatics Summit. The core informatics team that worked on the project included Patrick Mathias, MD, PhD, associate medical director, informatics division, Department of Laboratory Medicine and Pathology, who helped guide technology decisions; data scientist Nathan Breit, who handled the programming for the project; and Dr. Stoffel, who spearheaded the project and was the primary liaison with the immunology laboratory, where the tests are performed.

Dr. Stoffel

The bulk of the time spent on the project was dedicated to the analysis phase, during which Dr. Stoffel made site visits to the immunology lab to map the assay workflow by sitting with medical laboratory scientists and observing each step they performed. Process mapping, says Dr. Mathias, was critical to helping the informatics team understand the pain points the lab was experiencing.

"It's really important to have informaticists play that role of translator between the two sides," he explains. "Being able to understand what the lab needs and help develop the requirements for the solution and then go back and forth [between the informatics and lab teams] is a very valuable experience."

Ironically, when Dr. Stoffel shifted to observing the panel's workflow through Zoom meetings during the pandemic, the process mapping became more efficient. During the Zoom calls, she recorded the dozens of steps the medical laboratory scientists performed. Afterward she played back the recordings slowly to make sure she captured all of the information.

"I could ask questions in a more targeted way because I had a little time to think about it," Dr. Stoffel says, adding that the in-person visits were still valuable for getting to know medical laboratory scientists and assessing unusual cases.

The informatics team identified two processes within the Merkel cell antibody panel workflow that could benefit

from automation—patient lookup and curve fitting. The patient look-up process was an Excel spreadsheet-based system the lab had created to search for patients' past tests. Excel spreadsheets are widely used in clinical labs because they are easy to create and manipulate, Dr. Stoffel says, but these same characteristics make it easy to inadvertently alter the data, compromising the integrity of the document. Excel spreadsheets can also have reporting and formatting limitations, she adds.

The immunology lab had created the Excel spreadsheet-based patient lookup because the pathology department's lab information system uses a sample-centric rather than a patient-centric identification system, Dr. Mathias says. This is because the pathology lab performs reference testing on hundreds of thousands of samples submitted from outside the health system. Tracking specimens using a specimen-based code rather than a patient code saves the time of creating a patient record, he notes.

The immunology lab can process samples more efficiently if it doesn't have to consider previous results, Dr. Mathias explains. "You can bring in a sample and test it without taking extra steps to register the patient." But the immunology lab needed to track past samples to give ordering providers not just the current assay results but a historical perspective on which direction the patient's results were trending, he says.

Laboratorians had been cutting and pasting testing data from a weekly LIS report into an Excel spreadsheet and using the spreadsheet as a database of test samples. The immunology lab also had created a type of unique patient identifier for every Merkel cell antibody panel test sample and was using that identifier to search the Excel file for records of patients' past tests. The process was time-consuming and required extra steps to minimize the risk of cutting and pasting errors, Dr. Stoffel says.

Dr. Mathias

What the lab needed instead was an application for searching LIS data in a customized way. And it turned out the laboratory informatics department had already built a tool with this functionality for another internal specialty lab, which the immunology lab could deploy with minor modifications. The existing search application—developed in the R programming language, with a graphical user interface written in R Markdown—is one of many applications the lab informatics department had built to obtain information from the lab's data warehouse, Dr. Mathias explains.

Because the existing application was so similar to what the immunology department needed, it was easy to deploy. Once the programmer understood the immunology lab's data requirements, it took only about 10 to 15 minutes to set it up, Dr. Mathias says.

The search application operates like a dashboard, Dr. Stoffel adds. It refreshes daily with information from the data warehouse, eliminating the need for the immunology lab to copy and paste data from weekly LIS reports into Excel spreadsheets.

The informatics team demonstrated the tool to the lab via Zoom, but Dr. Stoffel found that an in-person site visit was more effective for facilitating the rollout. "I had followed up and saw they hadn't gotten a chance to use it, so that's when I used a hybrid model of following up the Zoom call with a lab visit," she says.

The second process the informatics team targeted for automation—curve fitting—also involved manually cutting and pasting data into Excel spreadsheets and invited similar opportunities for pasting errors, Dr. Stoffel says. The immunology lab had been taking output data from lab instruments and entering it into Excel spreadsheets to format it for use with commercial graphing software.

The informatics team found a readily available solution for automating this process as well, but this time the solution was online. “There were open-source widely available Python libraries that you could use for that curve-fitting function,” Dr. Mathias says.

The tool that the team constructed looks like a Web page to the user, but it is a Web application that formats the data output from the analyzers and delivers it to the graphing program. Users need only drag and drop a data file into a field on their screen to obtain curve fit graph results, he explains.

The informatics team has thoroughly tested the application and demonstrated it to the immunology lab, but, unlike with the patient look-up process, the immunology group has yet to begin using the graphing functionality, Dr. Mathias says. “One of the challenges is, when you take a process that is manual and everyone understands the steps, it takes a certain level of buy-in from the laboratory to put their faith in more automated solutions that are not as transparent to them,” he notes.

Before using a new tool, specialty labs typically need time to test it in edge cases to feel confident that the automated solution will produce the same results as the manual process in any scenario, Dr. Mathias explains. But due to staffing challenges, the immunology lab has not had time to complete such testing. The informatics team plans to continue to work through that process with the lab in the months ahead, he adds.

Longer-term, the informatics team would like to evaluate “bigger picture” tools that could further streamline the workflow for the Merkel cell antibody panel. For example, there may be a better way to use the LIS to manage the patient-identity issues that made it challenging to group tests from the same patient, Dr. Mathias says.

However, he admits, creating a single-patient identity within the LIS for the Merkel cell antibody panel and other common outreach lab tests “might be a little bit more challenging to implement in our situation of receiving a large volume of individual, unrelated samples.” Yet it’s an idea the informatics team wants to evaluate down the road, he adds.

Drs. Stoffel and Mathias realize that UW Medicine is fortunate to have a large enough staff of programmers to build and maintain customized tools. Dr. Stoffel, who completed her fellowship last year, says her current institution only writes custom software for reports. Still, she notes, the Merkel cell antibody panel project yielded lessons that she can apply to her new role as associate chief medical informatics officer for laboratory medicine and pathology at M Health Fairview, in Minneapolis.

Among them, using process mapping to make a case for moving to a different software system. Furthermore, she adds, the concept of breaking a large workflow into smaller components could help hospitals with fewer IT resources better match their commercial products, reports, or other functionality to their specific needs.

“Even though we couldn’t fix everything right away,” Dr. Stoffel says, “we could go from doing nothing to doing something. I think this demonstrates that making incremental improvements can make a big difference, and there are always opportunities to do that.” *—Renee Caruthers*

## ABP granted extension of practice pathway for clinical informatics certification

The American Board of Medical Specialties has approved the American Board of Pathology’s request to extend the practice pathway for the clinical informatics subspecialty through 2025.

The practice pathway allows physicians with substantial experience in clinical informatics but who have not completed an Accreditation Council for Graduate Medical Education-accredited fellowship in clinical informatics to apply for the clinical informatics certification exam. The exam is a collaboration between the American Board of Pathology and the American Board of Preventative Medicine.

As a member of the American Board of Medical Specialties, the American Board of Pathology establishes certification and continuing certification standards and assesses the qualifications of individuals seeking to obtain

voluntary certification in the specialty of pathology.

Additional information about the practice pathway extension is available at www.abpath.org/images/booklets/ABP_BOI.pdf.

## GoMeyra LIMS targets COVID-19 testing

GoMeyra is marketing the cloud-based GoMeyra laboratory information management system, which was created to increase COVID-19 test-processing productivity.

The software has tripled COVID-19 testing capacity in select laboratories and allows labs to provide same-day, direct-to-patient results reporting, according to a company press statement.

The GoMeyra platform includes a private nationwide laboratory network that allows client labs to move COVID-19 test orders from one lab to another to accommodate overflow testing and patient requests. Using a single portal, labs communicate with each other to manage high daily order volumes and guard against test-processing bottlenecks.

"This allows small, independent labs—regardless of location—to team up, take on more business, and compete with larger diagnostics companies," GoMeyra reported.

The GoMeyra LIMS package includes two mobile apps that can be used with Apple or Android devices. The GoMeyra Collect app for SARS-CoV-2 allows laboratorians to scan samples, track and address tests remotely, monitor operations, and review data from anywhere. The GoMeyra Scan app allows school and business administrators to scan an individual's QR code or badge to verify that they have undergone the requisite COVID-19 testing to return to school or work.

*GoMeyra, 702-846-3962*

## Inspirata gets FDA clearance for digital pathology system

Inspirata has received FDA clearance for its Dynamyx scanner-agnostic digital pathology software, allowing the open platform to be used for primary diagnosis.

The company sought regulatory clearance for the software despite the FDA's temporary waiver of 510(k) requirements for such products during the COVID-19 pandemic. "Inspirata recognizes our customers' desire to have the assurance of an FDA market clearance," said Mark Lloyd, Inspirata's executive vice president and founder, in a press statement.

Inspirata struck a distribution deal for Dynamyx with Fujifilm in 2020.

*Inspirata, 813-570-8900*

## Siemens expands into digital pathology market via deal with Proscia

Proscia and Siemens Healthineers have entered into an agreement under which Siemens will offer Proscia's Concentriq Dx digital pathology platform in combination with its Syngo Carbon enterprise imaging system as a best-of-breed solution.

"With Proscia's Concentriq Dx platform, Siemens Healthineers is entering the digital pathology market to satiate the rampant demand and expand its enterprise imaging offering with industry-leading technology to realize the full value of digital pathology operations," according to a press release from Proscia.

*Proscia, 215-608-5411*

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