

In surgical services, stewardship steps reduce lab orders

Anne Paxton

February 2023—Consensus on the best ways to stem unnecessary laboratory testing, and spare health care systems and patients its negative effects, is still elusive. But a few years ago, when the team behind the University of Washington Medical Center's Transforming Care Practice Initiative was looking for innovative ways to optimize the value of care provided within the health system, UW laboratory leaders saw an opportunity to collect new evidence on the proper role of laboratory stewardship.

"We realized we could study a more systematic approach by looking at a package of different interventions around laboratory stewardship," says Patrick Mathias, MD, PhD, assistant professor and vice chair of clinical operations and associate medical director of the Informatics Division, Department of Laboratory Medicine and Pathology.

By measuring the outcomes of a multicomponent laboratory stewardship intervention on a defined patient population of surgery patients over a two-year period, the study team proposed to find out whether such a stewardship program could reduce laboratory testing without negative effects on patient care. The five components of the intervention were stakeholder engagement, provider education, computerized provider order entry modification, performance feedback, and culture change.

The findings are reported in a recently published study (Mathias PC, et al. *Arch Pathol Lab Med*. Published online Oct. 26, 2022. doi:10.5858/arpa.2021-0593-OA). The research team found that its stewardship intervention, as implemented with the UW Medical Center's cardiac and thoracic surgery services, resulted in a decrease in laboratory test use—to the tune of 1.5 to two fewer tests ordered per patient day on each service. This amounted to an estimated 20,000 fewer tests performed across both services during the intervention period with no negative impact on length of stay, readmissions, or mortality.

The research team chose to focus on interventions in the cardiac and thoracic surgery divisions because of their high use of laboratory testing, Dr. Mathias says. "We knew that awareness of laboratory stewardship was less prominent across surgical services," he says. "It was clear that both cardiac and thoracic surgery had a significant amount of improvement that was possible. They were ordering laboratory testing very frequently—more frequently than some of the other surgery services."



Dr. Mathias

"The nice thing about the data is that we were able to monitor a couple of years before and a couple of years after the interventions," Dr. Mathias says. The two years pre-intervention spanned January 2015 to Feb. 12, 2017, and the two years of intervention began Feb. 13, 2017 and ended in February 2019. The data source was a database that contains administrative, demographic, and lab use information.

The study is not as rigorous as, say, a randomized controlled trial, which is difficult to do in these contexts, Dr. Mathias says. "But it at least gives us some idea of how we can take the data and statistically scrutinize it to say, yes, there was a difference in these aspects before and after an intervention."

Dr. Mathias and colleagues used the difference-in-differences analytic approach to compare intervention services

to control surgical services caring for similar patient populations.

“There are approaches you can take that are less rigorous, looking at before and after. And I think the point of this is there needs to be more difference-in-differences analysis applied in these types of interventional studies in the laboratory setting.”

The multicomponent intervention study is not the first test of stewardship interventions at UW, Dr. Mathias says. The Patient-centered Laboratory Utilization Guidance Services program, known as PLUGS, was founded about 10 years ago at Seattle Children’s Hospital and has the aim of “helping our clinical colleagues select the best tests and better take care of their patients,” he explains.

That’s a concept that has long resonated with him. Late in his training as a clinical pathology resident at UW in 2014, he participated in a project led by Geoffrey Baird, MD, PhD, then director of chemistry at Harborview Medical Center (now chair of UW’s Department of Pathology and Laboratory Medicine), in which “internal medicine residents were essentially given report cards that included grades on how often they were ordering common tests like metabolic panels, CBCs, magnesium, and phosphate.”

For him, the main lesson of that experience was that there’s sometimes a culture of being on autopilot when ordering tests for inpatients. “Is that laboratory test really going to change how you manage the patient? Obviously, that should be a conscious decision. You may not want to miss a diagnosis of something for a patient, but there are many other cases where you order tests unnecessarily and by statistical chance it’s outside the reference range. Then you end up chasing down something that was not clinically meaningful. So you have to strike a balance,” he says.

The UW team studying the surgical services didn’t intend to do a thorough study at first. “It was going to be more around providing education and supporting our educational mission,” Dr. Mathias says. But before launching the study, he and the surgeon lead for the project, Farhood Farjah, MD, MPH, associate professor of surgery and associate medical director of the UW Surgical Outcomes Research Center, began to consider a set of simultaneous interventions. “The goal wasn’t necessarily to systematically study each individual intervention we put in place. It was more around what’s an effective collection of interventions that we can put together, that we can tailor to a service, and use to drive improvement in laboratory test ordering.”

The purpose of the stakeholder engagement intervention was to make sure people are aware stewardship is important, not just for the financial effect but also for patients by, among other things, reducing the number of blood draws, he says. “Education goes hand in hand with that. And then making changes to order entry or to the electronic health record was a critical structural change. We looked comprehensively at the routine order sets they’re using more and more of the time and asked, Do these labs need to be in this order set? Should the default be that you get a lab test? Or should the default be that you make a decision about getting a lab or not?”

Performance feedback data were presented at monthly division meetings. For culture change, division and section chiefs asked attending physicians to “support a culture of thoughtful laboratory ordering,” particularly for those in training, the study says.

“Regardless of whether you’d like to perform a more formal academic study or you want to do a local quality improvement study around stewardship, this is a relatively versatile set of interventions that you can kind of bundle and ask questions about, such as ‘How do I tailor each of these to my setting and then help drive improvement in my local practice?’ The approach should not be a kind of blunt force tool across multiple specialties,” Dr. Mathias says, “but a conscious decision to look at these five elements and how they work for a specific group of clinicians, nurses, and other individuals.”

Secondary outcomes in the UW study were the number of blood draws per patient day, total lab-associated costs, length of stay, discharge to a skilled nursing or other facility, 30-day all-cause readmissions, and inpatient deaths. The latter four outcomes did not change significantly across the services in the post-intervention period.

For blood draws and costs, the outcomes data were mixed. On the thoracic surgery service, blood draw numbers declined, with 1,300 fewer draws predicted per year. In cardiac surgery, although the total number of lab orders declined, the number of blood draws did not. For this service, which is a user of a large volume of lab tests, “the testing that was not ordered in the postintervention period was likely to be drawn alongside other important tests,” Dr. Mathias and coauthors wrote.

On the thoracic surgery service, the decline in costs was not significant, the authors reported. In the cardiac surgery service, lab costs per encounter rose in the post-intervention period, but the authors said inspection of the time series data revealed the increase occurred pre-intervention and was driven by a rise in intraoperative blood gas testing pre-intervention. The authors wrote, “[E]ven relatively small increases in blood gas use can overwhelm significant decreases in the use of other labs.”

Dr. Mathias has been encouraged by the continuing effects of the multilevel interventions even beyond the study period. The UW Medical Center’s inpatient EHR system was switched to Epic in 2021 and that might have contributed to a slight increase in testing across the two surgical services, he says. But “overall the services are still ordering testing at a lower rate than they were before we started the intervention. So some elements of what we did have stuck through this time period, despite our no longer continuing to follow the program” designed for the study.

Most helpful to Dr. Mathias as an informaticist was the focus, “with fresh eyes across a service,” on order sets and electronic health record builds. “When these order sets are being put together, it isn’t necessarily with the idea of promoting the optimal test ordering for a set of patients. They may be put together because of someone’s personal preference or ‘because that’s the way I’ve always done this thing.’”

The pathology department next plans to circle back with internal medicine and focus on stewardship there. “We will still have the opportunity perhaps to do a local difference-in-differences analysis as we come back, but I think we’re going to apply the same combined strategy of feedback, changes in the electronic health record, engagement, education, and top-down leadership influence to the resident services at our hospitals as well. Our internal medicine services cover such a broad patient population, and this work has been critical to the educational content of their program. We’re reengaging with the chief residents on those services and trying to get these efforts started back up.”

The pandemic and the electronic health record change may have disrupted trends and resulted in the internal medicine services returning to order more tests than needed, he says. “So we have the opportunity to do kind of a reset, a structured intervention, and then measure the difference in test ordering to measure our impact more clearly than we had the opportunity to do before.”

Dr. Mathias says there is a vast, untapped stewardship gap but no one-size-fits-all way to implement a stewardship program. “The devil is in the details in terms of how you apply stewardship to each of the services. One of the challenges with stewardship,” he says, “is that different services and different settings require a different toolkit. There’s value in having the faculty or laboratory directors and staff who have a skill set to almost be like a Swiss army knife and help different services solve their stewardship problems. In a targeted fashion, you can identify specific problems and then work with your colleagues to figure out how best to handle them.”

Speaking as an informaticist, Dr. Mathias says, “I have a very strong interest in lab stewardship. It’s tempting to say ‘I know better and we need to make these changes,’ and try to push it through. But it’s critical to talk with the clinicians and understand what their issues are in terms of interacting with the EHR and try to find a mutual set of goals that will help steer the EHR builds for clinical decision support in the right direction.”

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