Cancelled lab tests—study analyzes why

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September 2013—A handful, a fraction of a percent, a tiny portion. In most institutions, that's about how many tests are cancelled after they've been ordered and a specimen has been sent to the laboratory. But even that small number can have significant quality implications. The authors of the Q-Probes study, "Reasons for Test Cancellation," looked at more than a million specimen accessions at several dozen institutions, to get a fix on why tests are being cancelled and to gain insight into how laboratories can bring that number down. As the study makes clear, there is definitely room for improvement.

This Q-Probes study came about for a couple of reasons, says study coauthor Teresa P. Darcy, MD, medical director of laboratory services for the University of Wisconsin Hospital and Clinics and associate professor of pathology and laboratory medicine, University of Wisconsin School of Medicine and Public Health. "We are always looking for opportunities to help labs and many labs have been struggling for years with specimen identification. The College has done Q-Probes and quality studies around identifying patients, making sure specimens are labeled, and so on, but with this study I was interested in helping laboratories find ways to improve the collection process and to streamline the utilization of tests."

Participants in the study, 52 institutions of varying sizes, prospectively monitored all blood specimens accessioned in the laboratory, with the exception of blood cultures, on all shifts for six weeks, or until 75 test cancellation events were identified. (Add-on test orders, orders received without a specimen, and specimens received without a test order were excluded.) Most cancellations occurred in the laboratory (90.4 percent), with 9.6 percent cancelled by the ordering source.

The two main reasons for test cancellation are problems with the order and preanalytical problems with the specimen. In this Q-Probes study, 38 percent of the total cancellations were related to the test order and included the most frequent reason for cancellation—duplicate test (22.5 percent)—followed by incorrect test ordered (8.2 percent), test no longer indicated (5.3 percent), test not allowed by utilization policy, test frequency limitation exceeded, or test ordered on the incorrect patient. Nearly 52 percent of test cancellations were related to preanalytical problems—the quality or quantity of the specimen collected or the transport or processing of the specimen.

For the institutions participating in the study, the overall rate of rejected specimens was 3.1 per 1,000 accessions. "I didn't think that was so bad," says Dr. Darcy, a member of the CAP Quality Practices Committee. "But what was very surprising was the range of performance. It was much wider than I was expecting. Some institutions were really good, cancelling just 1.11 tests per 1,000 accessions, but at the 10th percentile, the rate was 28 per 1,000. That means some labs should recognize they have a lot of effort going into not producing tests."

The study found the high frequency cancellation reasons in the preanalytical area were, first, hemolysis (14.2 percent), followed by clotted specimens (13.8 percent), insufficient quantity of specimen (13.3 percent), incorrect container (3.8 percent), and specimen contaminated by IV fluid (2.8 percent).

Dr. Perrotta

"Normally what we'd see is that a lot of problems are related to the preanalytical phase of testing, and actually

labs tend to focus on tracking those areas. It's relatively easy to see if a specimen is clotted or hemolyzed or there is not enough of it," says coauthor and Quality Practices Committee member Peter L. Perrotta, MD, medical director of clinical laboratories at West Virginia University Hospital and professor of pathology, West Virginia University School of Medicine.

But he is not sure things are improving, despite labs looking at their processes and workflow more closely. "Even with all the automation we have and the training of phlebotomists, I really don't think it has gotten a whole lot better. How do you make improvements in the level of cancelled tests? I'm not exactly sure. I know in our lab we look at this data month after month and it just seems like it never changes. It might get a little worse in particular areas of the hospital, and we make a little improvement and get back to our baseline. But it seems very hard to get test cancellations below that level."

This Q-Probes study's findings go beyond what the CAP laboratory inspections are able to uncover, Dr. Darcy says. "In the quality plan for labs, as inspectors we're looking for them to be monitoring indicators that are important like identification and hemolysis rate. But I haven't seen a lot of labs monitor the overall roll-up of all rejections."

She and Dr. Perrotta recommend in the report of the study's results that participants determine the overall time of day that specimens are received in their laboratory and compare it with the frequency of cancellation events by shift. "The lab has to look at why tests are being rejected and then start pulling on the strings to find out: Is it a particular location or kind of person doing the collection?"

Her lab follows hemolysis, particularly in the ER and in the cancer center where many lab tests are being drawn at the same time, as an IV is being started. "And we have specific targets, so if our ED hits a certain hemolysis rate, we call and find out what's going on." That's a practice that may not be all that common, she notes, but it is one that laboratories should consider adopting.

In addition, "We look at the overall distribution of specimens coming in on the first, second, and third shift, and then we look at the cancelled tests. And if we get 10 percent of our specimens on our third shift but 26 percent of our rejected specimens there, then we have to focus our attention on the units, the collectors." For instance, it may be that there are a lot of travelling nurses and perhaps more training is needed.

"We made some changes in who could draw blood off a line and we saw a spike on three of our nursing units in specimens that were rejected because they were contaminated with IV fluid. So now our policy is that every time contamination occurs, we give feedback right away to the nursing manager on who collected the specimen, to find out if retraining is needed or if there are other problems."

It's possible that utilization concerns rather than preanalytical problems were driving the high cancellation rates at some institutions in this study, Dr. Darcy says. But that doesn't mean the rate of test cancellation is somehow not a quality indicator, she cautions. "Let's say it's all related to much stricter utilization. Even so, there's the opportunity to go back and find out why people are ordering inappropriately. It's a problem, I think, no matter what the reason is."

The study found two statistically significant associations: Lower test cancellation rates occurred in larger institutions and in laboratories that received fewer blood specimens from inpatients.

Dr. Darcy

It's not quite clear why larger institutions had lower test cancellations, Dr. Darcy says. "Large institutions

seemingly would have more different people collecting, but we didn't collect this data. Could it be that larger institutions have more lab-collected specimens, or is it that they have more rigorous training programs for collectors? We'd have to dig deeper to find out."
The study authors were less surprised by the finding that outpatient specimens tend to lead to few test cancellations. This may be due to the complexity of orders for inpatients, the difficulty of collecting a quality specimen from inpatients, or the competency of the collector.

Says Dr. Perrotta: "When you deal with more inpatients, a lot of the time you'll have more nurses drawing specimens because phlebotomists may not draw ICU patients or certain pediatric patients. Then the cancellation rate goes up because of the preanalytical phase." Nurses might think they are doing the patient a favor by drawing a small sample, for example.

The study found 2.7 percent of test cancellations were due to "sample identity suspect"—even though patient identification is the Joint Commission's No. 1 patient safety goal. "It's disappointing that the specimen identification problem rate is still too high," she says, noting that it seems to be a problem more or less across the board, not just with a few outliers.

Dr. Perrotta calls it "a little discouraging" that even with bar coding and other electronic systems, labs still cancel a significant number of tests because they're not sure they are drawn from the correct patient. "That is worrisome. Some other countries may be a little ahead of us in terms of linking the specimen at the time the sample is drawn, and having solid electronic links right from the time of the draw to when it gets to the instrument."

On the bright side, the Q-Probes study did find that a high percentage of laboratories (80 percent) require phone notification of test cancellation when it is due to preanalytical error. "That's good, because we've heard from lots of clinicians and it drives them bananas to be looking for a result and to see 'test cancelled by laboratory' on the screen," Dr. Darcy says. "If they're expecting a result in an hour and then find out there's no result, they want us to be communicating, and to be transparent and specific. There's sometimes an impression that we're willy-nilly cancelling things, and that's not the case."

Phone notification is important, Dr. Perrotta agrees. "The perception at a lot of institutions is that the lab just capriciously cancels their test for no good reason at all and they don't understand. So our policy is that we never cancel a provider's order without notifying them, because it also gives them the chance to address the situation earlier. A lot of times they'll say, 'Gee, if I'd known you didn't have enough sample I would have done something differently, maybe get the patient back or change the treatment.' So this is just another part of closing the loop by maintaining communication with providers, and making sure the cancellation is not unjustly labeled as the lab's fault."

Every test that has to be cancelled, for whatever reason, represents a wasted resource for the lab, Dr. Darcy points out. "Every lab can look at why they're rejecting tests and then focus on places where they have the opportunity to improve."

"Maybe it's less waste to cancel something than it is to do a test that isn't needed. But where there's a patient and a specimen has to be re-collected because of a preanalytical issue—it was drawn incorrectly or didn't get transported right away or doesn't have a label—each of those has a potential impact on patient care. Maybe the patient is not available to have the specimen re-collected, or maybe it causes a critical delay in their care. So if it's inappropriate orders, work on that. If it's poorly collected specimens, work on that. If it's still specimen ID issues, that's important to work on, too."

Dr. Perrotta hopes that this Q-Probes study will help laboratories share successful approaches in dealing with the persistent problem of test cancellations. "If there would be some way to tease out what are the more effective strategies labs use, that would be very helpful to people in laboratories that have tried many different things to get at these issues."

Anne Paxton is a writer in Seattle.