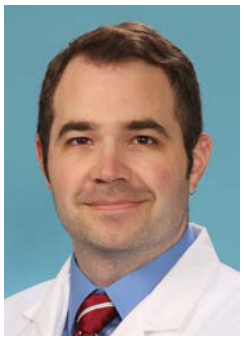
Clinical Chemistry

Once-Per-Visit Alerts: A Means to Study Alert Compliance and Reduce Repeat Laboratory Testing



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Guest: Dr. Ronald Jackups is an Associate Professor of Pathology and Immunology at Washington University School of Medicine in St. Louis, Missouri and serves as Chief Medical Information Officer for Laboratories at Barnes-Jewish Healthcare.

Bob Barrett: This is a podcast from *Clinical Chemistry,* sponsored by the Department of Laboratory Medicine at Boston Children's Hospital. I am Bob Barrett.

Overutilization of inpatient laboratory testing is a significant and increasing problem. Frequent and unnecessary testing causes patient discomfort, strains hospital resources, and increases health care costs. Blood draws for unnecessary testing also contribute to hospital acquired anemia and any false positive results from unnecessary testing can trigger wasteful or harmful interventions.

Overutilization of laboratory services is an important unresolved issue in health care. A recent study that appears in the September 2019 issue of *Clinical Chemistry* attempts to address this issue. That paper titled " Once-Per-Visit Alerts: A Means to Study Alert Compliance and Reduce Repeat Laboratory Testing," examined reorders of a laboratory test within the same admission. We're pleased to have the senior author of that paper as our guest in this podcast. Dr. Ronald Jackups is an Associate Professor of Pathology and Immunology at Washington University School of Medicine in St. Louis, Missouri, where he serves as Chief Medical Information Officer for Laboratories at Barnes-Jewish Healthcare.

So, Dr. Jackups, let's start with this. What is clinical decision support (CDS)? And how is it used in healthcare today?

Dr. Jackups So, clinical decision support is the use of information technology to improve the ability of health care providers to make beneficial decisions in a patient's care. The most commonly discussed format of CDS is the interruptive or sometimes called pop-up alert that appears in electronic ordering systems in response to a provider making a potential ordering error. But CDS really includes many more types of interventions that providers may not even realize are changing their behavior.

For example, electronic order sets are designed to make it easier to place the desired orders and harder to place undesired orders. Similarly, patient results are displayed in the medical record in a way to highlight actionable information among a sea of less useful information. So, all of these should be considered effective means of CDS in use today.

Bob Barrett: How can clinical decision support be used to improve lab test utilization?

Dr. Jackups So, that's an important question because I feel there's a lot of untapped potential for clinical decision support to affect lab test utilization. Lab medicine education is not highly emphasized in most medical school curricula. So, physician ordering behaviors tend to be stagnant despite an increasing body of literature showing that many lab tests are overutilized, underutilized, or incorrectly utilized and this can lead to waste and even patient harm. Many institutions has implemented some simple CDS alerts to target low hanging fruit like the duplicate lab order, which is the alert that we reviewed in our study. But I think fewer hospitals take advantage of other effective interventions like reflex test algorithms and order set design. This gap provides laboratorians an opportunity to demonstrate the value that our expertise has in improving patient care.

Bob Barrett: Why is it important to monitor CDS interventions and what are the consequences of poorly implemented CDS?

Dr. Jackups That's a great question. It's very tempting to implement a CDS intervention and expect it to be successful but on closer inspection, we often find that it didn't meet our expectations and sometimes had no useful effect at all. This can lead to two major negative outcomes. The first is what we call alert fatigue, in which providers who are assaulted by dozens of ineffective alerts everyday eventually begin to ignore all alerts, even the useful ones, and resist the implementation of new CDS measures.

The other negative outcome is what some people call "de-skilling." Essentially providers may simply submit to whatever recommendations are presented to them rather than apply their knowledge and experience in situations where the CDS tool may be giving bad advice. Unfortunately, health care systems may be willing to put in the resources to build CDS tools but might not provide the means to study their effectiveness after implementation. I think we should view CDS as a cycle of continual improvement rather than a series of one-off fixes to specific problems, and that's why we felt that was important to review the way providers reacted to our duplicate test order alert.

Bob Barrett: Well, on that note, I noticed that provider compliance with your alert was highest on day four rather than day one. Can you explain that?

Dr. Jackups: Yeah. That was an unexpected finding of our study but I think it provides important insight in the way providers interacted with the alert. It makes sense that compliance would decrease over time. Patient's health status may change over the course of an inpatient admission inducing their physician to repeat previously ordered tests and look for a cause of that change.

This isn't always a defensible practice particularly for orders like hemoglobin A1c that we know are stable over the course of a few months. However, it might make sense for a test like ferritin when a rare diagnosis like macrophage activation syndrome is suspected. However, what we didn't expect was that peak compliance with the alert didn't occur on day one.

Sometimes, providers bypass the alert on tests that were ordered only within a couple of hours or even minutes of the previous duplicate test. We think this may reflect perhaps the flurry of activity that occurs in the first hours of an admission, or it may be due to providers who order tests before the previous test has been completed and reported. That's a question that we plan to investigate further.

Bob Barrett: Well, finally doctor, did compliance with your alert differ by the ordering provider's role?

Dr. Jackups: Yes, it did. And by a considerable amount, in fact. We were surprised to learn that registered nurses directly order a significant volume of lab tests at our institution and they had the lowest compliance with our alert. They triggered about 22% of the alerts that we studied, and had 23% compliance. This is in contrast to physicians and nurse practitioners who had a compliance of close to more than 60%.

Since registered nurses are only allowed to order tests under the direction of a physician, we felt what was likely happening was that the nurses felt compelled to ignore the alert and continue ordering the test even if it could have been inappropriate, rather than question the physician's decision. This highlights an important principle of CDS, which is to ensure that your intervention targets the providers who are truly responsible for the decision in order to maximize effectiveness.

This means we need to go back and find a way to provide feedback to a patient's attending physician when nurses and

residents bypass the alert on their patients, or alternatively to empower nurses to check with the physician before bypassing an alert. Again, this is an example where monitoring the success rate of a CDS intervention can inform future improvements in our design.

Bob Barrett: That was Dr. Ronald Jackups, from the Department of Pathology and Immunology at Washington University School of Medicine in St. Louis. He's been our guest in this podcast about repeat laboratory testing. That article appears in the September 2019 issue of *Clinical Chemistry*. I'm Bob Barrett. Thanks for listening.