Clinical Chemistry Trainee Council
Pearls of Laboratory Medicine
www.traineecouncil.org

TITLE: Quality I: Laboratory Test Utilization

PRESENTER: Geoffrey S Baird, MD, PhD

Slide 1: Title Slide

Slide 2:
In this presentation, I will review four salient topics in utilization, namely the reasons for test utilization, the scope of the overutilization problem, the negative consequences of overutilization, and several interventions that work to reduce wasteful laboratory test overutilization.

Slide 3:
Laboratory Test Utilization has been studied essentially as long as laboratory testing has been offered. More than 30 years ago, Lundberg published a study that investigated the reasons why physicians order tests. In this study based on chart review, he found that most tests were ordered for diagnosis, screening or monitoring, while fewer tests were ordered for medicolegal reasons, education in teaching hospitals, or to follow-up other abnormal results. While some may consider testing purely for education to be wasteful, I believe that this understanding of how to order and interpret laboratory tests is an essential part of a medical education, and I do not consider such testing wasteful. Of interest, though, was the fact that for nearly one third of the tests performed, the ordering physicians stated on review that the test did not contribute to a change in diagnosis, therapy, prognosis, or understanding of disease.

Slide 4:
It is important to consider other motivations in ordering tests. In studies of trainees, it has been found that some physicians tend to order more (and some order less) of every type of study, be it laboratory tests or radiologic studies, and their behavior does not seem to change much over time. Reasons for this could be the "little ticket" hypothesis, meaning that some people consider laboratory tests to be a small or trivial expense, that some physicians are less comfortable with not knowing as much about patients as possible, or that some physicians have financial incentives that reward them for excessive testing. One must also consider the fact that patients are becoming increasingly educated about health matters and testing on the Internet. The list shown on the right of this slide comes up when clicking on the first Google hit for "joint pain." Think about what type of testing a worried well person might want to ask their doctor for after reading this list.

Slide 5:
Utilization is an important issue in both inpatient and outpatient settings. Many of us know about the so-called "executive physical." where adults go to their physician and get a panel of laboratory tests to assess their health. As you can see in this table of recommendations by the United States Preventative Services Task Force, very few tests are recommended for screening in healthy adults. The recommendation against using PSA for screening for prostate cancer is controversial, to say the least, and several other bodies do recommend screening. However, for many of the tests that are performed on well adult outpatients (CBC, Metabolic Panel, TSH), there is no evidence to support the practice of routine screening in healthy populations.

Slide 6:
The scope of overutilization has been assessed on very large scales. In a review of health care expenditures in Canada in 2003, for example, more than 30% of all testing done on outpatients in the province repeated identical previous testing within one month, even though some of these repeat tests did not appear to be medically justified. In addition, a 2011 study in the US found a high rate of within-year repeat lipid testing (for which multiple tests within a year are likely not needed), and found that repeat testing was highly correlated with having multiple providers.

Numerous studies have been performed looking at the scope of overutilization in inpatient settings, many of which base their conclusions on the fraction of test volumes that can be reduced after an intervention. Even trivial procedural interventions, like requiring an extra click on a computerized order form, lead to significant drops in utilization, with the literature converging on somewhere between one quarter and one third of testing likely being "unnecessary." Not all of these studies have had outcomes assessments, though, so the safety of such measures should be considered when implementing similar strategies in your own institution.

Slide 7:
Overutilization would not be a problem were it not for the negative consequences. The obvious consequence is wasting resources, meaning money. While laboratory testing is often cheap relative to other health care costs, it accounts for a large sum of money when considered cumulatively. Money considerations aside, though, it should be obvious that wasteful testing is just that, waste, and should be avoided for that reason alone. Testing in the setting of a low pre-test probability is unlikely to yield informative answers, due to Bayes' Theorem, and also likely to lead to confusing or potentially dangerous follow-up. In a study focused on reducing ionized calcium testing, for example, an intervention that reduced ionized calcium testing by about 70% (upper right graph; two hospitals plotted) also reduced IV calcium therapy by a comparable fraction (lower right graph; two hospitals plotted). Thus, prior to the intervention, ~2/3 of the ionized calcium testing was leading to a significant amount of IV calcium therapy. Outcomes were assessed in this study, and no adverse outcomes were identified. Of interest, diagnoses of hypocalcemia in the hospital plummeted despite the fact that IV calcium utilization dropped, most likely because most of the hypocalcemia diagnosed in the hospital was "laboratory" hypocalcemia that did not require therapy.

Slide 8:

So, what can be done about laboratory test overutilization? First, one should be aware of things that do not work. In study after study, and in my personal experience, education alone, in the form of lectures, reminders, or grand rounds and staff meetings, do nothing to curb test utilization problems, even when the audience is receptive. The culture of medicine that dictates ordering practices is strong, and people lose motivation to change their behaviors when they exit the classroom door. For educational interventions to be successful, they must be paired with a structural change in the way the testing is ordered. It should also be clear that lab-only approaches to curbing overutilization are doomed to fail. Without buy-in from the clinical services that order our tests, the laboratory cannot hope to facilitate a long-term change in hospital practices.

Slide 9:

The main interventions that work are listed here. Education PAIRED with a structural change in test ordering does lower utilization, as in the ionized calcium strategy mentioned earlier. In that case, ionized calcium testing was offered as a reflexive test after a cheaper and automated total calcium test, which the clinicians in the hospital found to be helpful. Computerized reminders during ordering are also helpful, although flooding clinicians with popup menus during test ordering is a recipe for disaster. Utilization report cards are a very helpful mechanism for allowing clinicians to see their own utilization (and perhaps that of their peers or subordinates, as well), and these have been proven to reduce outpatient test overutilization. More stringent limitations can also lead to lower utilization; if expensive sendout testing is being overordered by clinicians, requiring pathologist (or resident) approval is a good method to curb the practice. Finally, the most draconian method to reduce test utilization is simply to stop offering the test. There are a number of tests that are still currently available but have been replaced by better tests, as well as a wide variety of tests that are either of questionable clinical value or outright fraud, and it makes sense to disallow these tests entirely.

Slide 10:

As a summary, it is instructive to see the types of interventions that have been instituted over time by a single institution, in this case Massachusetts General Hospital (MGH). Over time, by reviewing ordering practices, by employing computerized physician order entry guidance, by discouraging long-term daily testing, and several other interventions, the Clinical Pathology faculty at MGH has seen sustained decreases in wasteful testing. The point of this slide, in conclusion, is to demonstrate that a successful approach to ensuring appropriate laboratory test utilization is multifaceted, and that the best approaches are ones that pair education with structural changes to testing to ensure long-term success.