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Utilization management in the clinical laboratory: An introduction and overview of the literature

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ABSTRACT

There is a broad literature addressing the need for improving utilization management in medical care. Numerous review articles and case studies have described approaches to utilization management challenges in the laboratory. This article will present an overview of the literature on laboratory utilization management and will compile a "toolbox" of strategies that can be used to address specific utilization management initiatives. A clear theme among successful utilization management programs is the need to recruit institutional champions both for the overall utilization management program and for ad hoc assistance with specific utilization challenges. It is important that these individuals represent a cross section of laboratory and clinical specialties and that the group be organized as a committee that has been established by the administrative and physician leadership of the organization. The changing nature of healthcare reimbursement will likely provide increased motivation to control laboratory testing and costs. Clinical pathologists are in a unique position to observe testing behavior patterns, suggest alternatives, implement order entry changes, manage testing algorithms and provide interpretive services for laboratory testing. For these reasons, clinical pathologists have a major opportunity to become institutional leaders in utilization management.

1. Introduction

The topic of utilization management in the clinical laboratory has been described in a number of review articles over the years [1–11]. This report will not attempt to present an exhaustive review of the literature as this can be assembled from the various articles cited in the references. Rather, our purpose is to highlight key concepts relating to utilization management and to describe examples of different techniques and strategies that have been reported in the literature. Some of our observations are only relevant to the current situation in the United States. In countries where the model for financing health care is significantly different, the motivation and alignment of incentives for controlling utilization may vary substantially.

Inappropriate laboratory utilization includes both over-utilization and under-utilization. Pronounced variation in test ordering patterns between physician practices, hospitals, and across different countries highlights the fact that a significant opportunity exists to reduce utilization of laboratory services [1,5]. Examples of tests that are most subject to over-utilization include routine automated tests such as complete blood counts and chemistry panels. A number of studies have reported on efforts to control the utilization of these tests [e.g. 12–15]. However, many esoteric tests such as broad panels for genetic screening (as opposed to selected testing for the most likely genetic mutations) are also over-utilized. In contrast, some tests, especially screening and monitoring exams [2] (e.g. cholesterol [16], hemoglobin A1C, and HIV testing), are clearly under-utilized. In some cases, performing these tests is increasingly required as part of physician pay-for-performance programs and physician-payer risk sharing insurance plans. Finally, there are a number of tests that fall into a more questionable category where their utility in terms of producing actionable clinical information is either poorly defined (high sensitivity C-reactive protein) or hotly debated (prostate-specific antigen testing to screening test for prostate cancer). In the case of PSA screening, there continues to be significant debate even in the face of published national guidelines.

The issue of inappropriate laboratory utilization is hardly new but has received increasing attention internationally due to pressure to reduce health care spending in many developed countries. Technological advances in recent decades have created a clinical laboratory infrastructure with significantly expanded capacity to accommodate high volume testing with a rapidly expanding test menu. Turnaround time has also been significantly reduced. Collectively, these developments have enabled a rapid expansion in laboratory test utilization. This trend has been closely paralleled by steadily increasing costs, prompting renewed pressure to control utilization [7]. Some of this pressure arises from the common perception that laboratory testing is often grossly over-utilized. For example, one early study using retrospective chart reviews reported that pathologists and clinicians deemed 26.5% and 42.8% of ordered laboratory tests unnecessary, respectively. Further, the top ten most commonly ordered tests were the most likely to be thought unnecessary [17].

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While the cost of laboratory testing is justifiably a motivating force behind efforts to control utilization, the clinical laboratory comprises only a small percentage (about 4%) of the budget of most hospitals. Therefore, reductions in individual test volumes have a relatively small impact on the overall operating budget of the hospital. However, laboratory tests are estimated to impact up to 60 to 70% of all medical decisions [18]. Consequently, the downstream costs of laboratory testing – both appropriate and inappropriate – are substantial. These downstream costs include workups for abnormal test results, a significant percentage of which are falsely abnormal. Most normal reference ranges for common laboratory tests are established as the mean of a normal population plus or minus two standard deviations. 5% of all test results will be by definition falsely abnormal. For a laboratory performing 5 million tests per year this translates into 150,000 falsely abnormal test results. The clinical work-up of the abnormal results consumes the time of physicians and may prompt further radiological studies and laboratory testing.

While it is generally accepted that between 10 and 50% of laboratory tests are unnecessary [17], clearly defining what constitutes appropriate utilization has proven to be challenging [6]. Criteria to determine what testing is appropriate and the correct frequency of testing are often subjective. In most cases, there are no evidence based standards that can be applied to a given utilization management problem. For example, what is the appropriate frequency of testing for a complete blood count in the typical hospital patient? In many cases the frequency of testing is defined in entirely arbitrary terms such as daily, weekly or, in the case of screening tests, annually. These definitions may be convenient in that they are easy to remember but are, in the end, completely lacking an evidence base. As a general guide, it is important to remember the classic teaching standard from George Lundberg who said in 1975, "laboratory tests should not be ordered without a plan for using the information gained. What will be done if the test result is abnormal? High? Low?" [1,19].

The menu of available tests in most hospital laboratories is quite large. For example, the test menu in our hospital includes over 1600 tests. Developing evidence-based criteria for the appropriate ordering for each test across a diverse spectrum of clinical disorders would be an impossible burden; though, when it does exist, it should be followed. Some criteria have been found to be generalizable across patient groups and test types: timing and frequency of testing, choice of tests with common indications, clinical indications for testing, and determination of the probability of an out-of-range result [6].

Excessive utilization of laboratory testing not only increases health care costs but also leads to an increased need for phlebotomy. Excessive blood draws in hospitalized patients may result in the development of moderate to severe hospital acquired anemia (HAA: hemoglobin < 11 g/dl) [20]. Hospital acquired anemia has been associated with worse short and long term patient outcomes, including increased morbidity and higher mortality rates [21]. Laboratories have tried to mitigate the incidence of HAA by resorting to the use of smaller blood tubes and by consolidating more tests onto a single specimen type. In spite of these efforts, HAA remains a significant problem.

Calculating the cost of a laboratory test or test panel can be challenging. Consequently, determining the savings if the test is not ordered is equally problematic. Costs (to produce laboratory tests) must be differentiated from charges to patients or third party payers. A number of studies reporting on the savings from utilization management initiatives have wrongfully used charges to assess savings to the hospital. When assessing the financial impact of reducing test utilization, it is important to view the problem from five different perspectives:

1. The cost to the laboratory or hospital
2. Potential revenues to the laboratory
3. The charge to the payer
4. The cost (if any) to and impact on the clinician
5. The downstream costs of clinical care.

Third party payers are concerned only with what they are charged. It is of no consequence to them how much the test costs to produce. In most situations, laboratory testing for inpatients is not directly reimbursed but rather is folded into a single fixed global payment for an episode of care under a diagnostic related group (DRG; e.g. admission for heart failure). The payer is not concerned with how many tests are performed on a given patient admission because they only reimburse a fixed global payment. For this reason, many hospitals emphasize utilization reduction of testing on inpatients; performing fewer tests generates a greater revenue margin from the global payment. In contrast, outpatient testing is usually reimbursed directly (in the United States) and can be quite profitable for the laboratory. The hospital has little incentive to reduce utilization of outpatient testing in this case. However, the payer has a significant interest to reduce excessive testing on outpatients as they get billed directly for each test that is performed. The perspective of physicians is nuanced and can be quite complex based on the situation. Physicians in the United Sates are frequently paid for services under Medicare part B. While most physicians genuinely want to do the right thing, there is often no financial incentive to reduce utilization of diagnostic tests. In cases where physicians have on-site physician office laboratories, significant revenue can be brought into the practice by billing for outpatient testing. Many physicians have recently joined large group practices or are direct employees of health care systems. These "staff physicians" have a vested interest in the financial success of their employer and are generally more motivated to promote rational utilization of ancillary testing. The reimbursement system in the United States is moving toward a model of global payments for services (as opposed to fee for service). The incentive structure for physicians will change dramatically under this new model. Many physicians are now participating in "at risk" insurance contracts where quality and cost performance targets are linked to insurance payment withholdings. Failure to meet the predetermined benchmarks may result in forfeiture of the withheld payment. The federal government has recently begun pilot projects for global bundled payments which include both hospital charges under Medicare part A and physician charges under Medicare part B. Under this arrangement the physician and the hospital will share a single global payment. If this approach becomes the norm, physicians will suddenly have a strong incentive to reduce utilization.

The total cost of a test includes pre-analytical costs (e.g. phlebotomy, transport and specimen processing), analytical costs (fixed, variable, direct and indirect laboratory expenses), and post-analytical costs (result reporting, specimen storage and the downstream clinical impact of the test). The cost per test does not include the time and cost to the patient to get to a phlebotomy site. For automated testing the analytical costs typically represent only small portion of the total cost of a test. Likewise, when these tests are eliminated from a pre-existing operation, only the variable cost of the test is actually saved. Thus removing a single test from a multi-test chemistry panel achieves little in true cost savings. To the extent that most clinical laboratories have high fixed costs, the savings resulting from a reduction in automated testing are often disappointing. Winkelman estimated that a 10% reduction in automated testing results in only a 1.32% reduction in cost because only the marginal (variable) cost of the tests is actually saved [22]. For high volume automated testing it is usually best to target elimination of entire test panels (or tubes of blood) as this reduces pre-analytical, analytical and post-analytical costs. Unlike eliminating one test from a panel, the savings can be significant when entire panels are eliminated. Conversely, for tests that utilize expensive reagents such as molecular diagnostics, their variable cost is substantial and significant money can be saved by reducing the volume of these tests. When calculating cost savings, it is important to understand the entire process involved in laboratory testing. Failure to appreciate this concept can result in savings that are greatly over or underestimated. Significant errors in cost savings have been published in the literature. Common errors include using charges (instead of