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Reference laboratory utilization management

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ABSTRACT

This chapter describes the unique challenges of managing reference laboratory utilization. The nature of reference laboratory testing and how it differs from routine hospital clinical laboratory testing is discussed. The vast majority of reference laboratory testing is high complexity, low volume testing to support specialized care. In contrast the hospital clinical laboratory is most effective at performing rapid turn-around, routine, high volume testing. The implication of these differences with respect to identifying utilization issues and interventions to manage utilization is presented along with examples.

1. Introduction

The need for utilization management is driven by unsustainable rates of cost growth in providing patient care services, including diagnostic testing in the clinical pathology laboratory. The President's Council of Economic Advisers estimated based on cost growth rates in 2009 that the cost of healthcare in the United States would represent 34% of gross domestic product (GDP) by 2040 [1]. This report noted that addressing systemic inefficiencies (e.g., high cost-low value services) and preventable errors could significantly reduce healthcare costs. The focus of this chapter is to outline the management of reference laboratory testing to improve the cost effectiveness of clinical pathology services. Particular attention is given to reducing systemic inefficiencies by monitoring and managing physician orders for reference laboratory tests and determining when to use reference laboratory services as opposed to performing tests "in-house." Utilization tools for measuring performance, assessing value and reviewing ordering patterns are described. Examples are presented to illustrate the application of these management tools and recommended interventions.

The Centers for Medicare and Medicaid Services defines a reference laboratory as "A Medicare-enrolled laboratory that receives a specimen from another, referring laboratory for testing and that actually performs the test."[2]. Reference laboratories are typically for-profit facilities that can provide 1) lower costs than can be achieved by individual hospital laboratories by leveraging high test volumes (e.g., economy of scale) or 2) specialized, high complexity testing (particularly molecular tests) that is too costly for hospital based laboratories to support. Clearly these two drivers are closely related. Thus, the mix of tests sent to reference laboratories by hospital-based clinical laboratories varies considerably. In general the number of tests sent to reference laboratories is small compared to total volume of tests performed in hospital clinical laboratories, yet reference laboratory testing represents a large portion of the test menu and a significant percentage of the total cost of testing [3]. Furthermore as test volumes, new tests, and ordering patterns change, this mix of internal versus send-out testing must be constantly managed to achieve an optimal advantage in utilizing reference laboratory services.

Utilization management of reference laboratory testing requires integration of the same three components needed for management of testing in any area of the clinical laboratory [4–10]:

- personnel (ordering physicians, oversight committees, administrators, laboratorians)
- workflow (all processes from specimen acquisition to receipt of results and action by the ordering physician)
- informatics (systems to acquire, process and monitor workflow, costs and impacts)

A recent review of a decade of experience at an academic medical center [11] identified the following critical elements of successful management of laboratory utilization:

- a utilization management structure recognized and supported institutionally
- leadership by clinical pathologists
- real-time access to utilization data
- identification of implementation tools most appropriate to the unique circumstances of each utilization management initiative

Reference laboratories present unique challenges with respect to each of these elements. When making internal versus send-out testing decisions, hospital clinical laboratories must consider the overall cost of patient care services as well as the economics associated with the testing per se. As illustrated in Fig. 1, the relationship between the hospital and reference laboratory with respect to costs versus revenues

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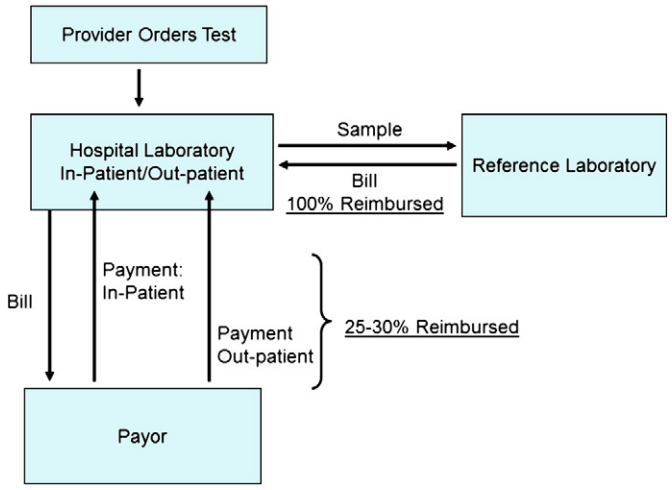

Fig. 1. Relationship between reference laboratories and hospital-based clinical laboratories.

is quite complex. It is relatively easy to do accurate cost accounting because the reference laboratory bills the hospital for every test at a specimen level. However, loss of hospital revenue is much harder to calculate depending on whether the testing is performed on in-patients versus out-patients and the third party payer mix. Given current billing practices reducing out patient, as opposed to in patient, testing volume can have a serious negative impact on institutional revenues.

Other complexities to consider include "down-stream" cost impacts. For example if the on-site clinical laboratory can get test results to the ordering physician faster and that in turn reduces in-patient admissions or length of stay, it can be overall more cost-effective to in-source the test even though a reference laboratory could perform the test more cheaply. Another example is the cost analysis of molecular tests, most of which are sent-out by all hospital laboratories currently [7]. In-sourcing requires consideration of the costs associated with genetic counselors and interpretative support as well as the laboratory costs of performing the test.

Considering all the complexities, the components of a comprehensive reference laboratory utilization management plan are:

1. A full analysis of reference laboratory utilization including:
   - test ordering
   - specimen receipt and processing
   - test reporting
   - interpretative support
2. Assessment of risks associated with reference laboratory testing, including:
   - misuse for research
   - lack of interpretative expertise
3. Assessment of the value of reference laboratory testing, including:
   - What is the value to the ordering physician?
   - What is the value to the central laboratory?
   - What is the value to the hospital?
   - What is the value to the patient?

This broad view of utilization management is a key component of the ever increasing role of clinical pathology in providing "accountable care." As expressed by Miles and Weiss [12], "Pathology and laboratory medicine play pivotal roles in the creation and use of meaningful clinical information, impacting the diagnosis and treatment of patients as well as test utilization and cost of care. The practice of medicine is not easy. The correct diagnosis and course of treatment is not always clear. Therefore, with every episode of care the resources expended ensuring a timely and accurate diagnosis may be the most important because they influence all other decisions thereafter in the delivery of care. The effective use of resources to perform the right test at the right time and as close to the patient as possible is essential to the achievement of quality patient outcomes." This principle underlies the tools and their application as presented in the remainder of this chapter.

2. Parameters to monitor

Managing reference laboratory utilization requires monitoring ordering patterns, economic factors associated with sending tests to reference laboratories and the clinical value of the tests being sent out. The key elements to measure are listed in Table 1.

2.1. Ordering patterns

Monitoring changes in the volume of test orders is a common element of test utilization management that has been employed in virtually all areas of laboratory medicine. This together with the revenues generated and cost of performing the test is a straightforward and efficient way to assess value. Historically this analysis has been the primary basis for in-sourcing decisions within the central laboratory. As illustrated in Fig. 2, this simple approach easily identifies when changes associated with economy of scale or technology that enables testing on large multi-analyte platforms will result in cost savings. However, this approach to reference laboratory utilization is limited due to the rapid growth of highly complex molecular genetic or microbiology tests that require expert interpretative support or involve proprietary tests. As illustrated in Fig. 3, the costs associated with this growth are very large; management by simply performing the testing "in-house" is generally insufficient.

Sophisticated management tools are currently available. These involve additional information (see section Tools for utilization management) and ultimately management of ordering patterns (see section Implementation of management decisions below). Monitoring new test orders, repeat test orders, ordering errors and relevant clinical information associated with orders (e.g., ordering physician, ICD9 codes, etc.) are all parameters that can be obtained with a modern Laboratory Information System (LIS), especially if supported by an electronic physician order entry system (POE). High resolution data on test ordering can be a powerful utilization tool to identify costs that can be eliminated. The identifying hallmark is variability among providers. As illustrated in Figs. 4 and 5, this can lead to dramatic savings in reference laboratory costs with no impact the on quality of care. Fig. 4 shows the results of orders for genetic tests by physician. Twenty five providers accounted for 27% of all annual reference laboratory costs. Furthermore, six of these providers [Pediatric Genetics] accounted for 15 to 20% of total annual reference laboratory expenditures. Fig. 5 shows the impact of simply sharing this information the with Chief of Service and subsequently the entire practice staff. The

Table 1
Parameters for monitoring reference laboratory utilization.

Parameter	Element	Reference
Ordering patterns	Test volume	[3,10]
	New test orders	[7]
	Repeat test orders	[13]
	Ordering errors	[14,15]
	Relevant clinical information associated with orders	[16]
	Demographics of patients being tested	[8,17]
Cost of testing	Revenues	[3,10,11]
	Direct expenses (reference laboratory payments)	[3,10,11]
	Technical workforce costs	[18,19]
	Costs associated with errors	[20]
Test performance	Turn-around time	[21]
	Panels versus subset of tests needed	[22]
	Clinical utility	[7,10,23]