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Modality Access: Strategies for Optimizing Throughput

INTRODUCTION

In our initial "Imaging Value Chain" series, we outlined the drivers, imperatives, and opportunities to reengineer the radiology workflow to one that delivers greater safety, quality, and patient satisfaction. In this follow-up series, we attempt to offer more concrete and specific recommendations to radiologists seeking to achieve that goal. In this fourth article of the present series, we strive to offer practical strategies to expand and expedite patient access to high–fixed cost imaging modalities—mainly CT, MRI, and CT/PET—in both the inpatient and outpatient settings.

This discussion assumes that the examination request is appropriate and concordant with ACR guidelines, an assumption unlikely to represent reality in day-to-day clinical practice because up to 30% of requested examinations are considered by some to be inappropriate. Advice to markedly improve appropriateness, however, was offered in the second article in this series. Assuming that appropriateness has been confirmed—indicating a real need for imaging to inform the next steps in a patient's diagnosis and/or treatment—it behooves the radiology department to perform that examination as quickly as possible. Understandably, some examination requests will still require modification or cancelation for a variety of reasons (eg, patient contraindications), but these should now be minimized through the appropriate use of order-entry decision-support tools and sophisticated protocol management and workflows.

Once an examination is legitimately deemed necessary, any delay in its performance has consequences. From the patient's and referring physician's perspectives, the need for imaging is almost always related to a clinical question, so any holdup inevitably delays a diagnosis or therapeutic decision. Given the natural anxiety most patients feel when further testing is needed, expediting imaging removes an unnecessary source of stress, which in turn enhances patient satisfaction, an increasing priority in patient-centered delivery initiatives. Furthermore, with intense institutional focus on reducing lengths of hospital stay for both cost and safety reasons, a delay in performing an inpatient MRI study, for example, could add thousands of dollars of cost to the admission (and lost revenue by preventing other patients from being admitted) as well as increasing the possibility of iatrogenic complications (eg, hospital-acquired infections). Finally, payment reform through the Patient Protection and Affordable Care Act will penalize providers financially if they fail to meet an increasing array of outcome metrics, with patient experience uppermost.

A goal, therefore, of any radiology department should be to maximize appropriate patient throughput in a safe and customer-focused environment. But this is easier said than done. Most organizations are not awash in unused expensive hardware, and most already operate close to or at full capacity. Not infrequently, therefore, managers believe that "access problems" can be solved only through the purchase of additional equipment. But modality capacity is relative depending on the workflow, resources, and culture of the organization. What one organization might consider maximal patient throughput for a given modality can be viewed by others as an inefficient use of their equipment. Opportunities for improvement almost always exist.

SIX STRATEGIES FOR SUCCESS

There are essentially six strategies for improving imaging modality efficiency, all potentially mitigating downstream costs. Some of these require additional resources (eg, IT or personnel) but in aggregate rarely lead to longer term financial disadvantages. In fact, by improving delivery-system efficiency, the contrary frequently proves true. Most optimization solutions deliver a return on their investment, even in the short term, and managers need to

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recognize that minimizing additional costs necessary to operate high—fixed cost assets more efficiently is generally shortsighted. Although short-term budgets may be adequately met, longer term opportunities for greater return on investment of those high—fixed cost assets are wasted. These strategies are outlined as follows:

1. Recognize that inpatient and outpatient operations are essentially different businesses. The demands, needs, and workflows of catering to both types of patients—and their referring physicians—are very different. Operations should be designed accordingly [1]. Creating entirely separate workflow pathways may not be possible for small organizations, but larger organizations should reorganize and dedicate scanners, as part of separate operating units, to these very different patient cohorts. Given provider consolidation spurred by the Affordable Care Act, even smaller organizations may now have increased opportunities to do so. Not only can workflows be reengineered to provide greater efficiency, but patients prefer it, indicating that operations and satisfaction can indeed be aligned.
2. Prevent unnecessary examinations from being performed in the first place. The resources and tools necessary to achieve this have previously been discussed in this series. Preventing unnecessary examinations not only frees up more modality capacity but reduces costs and potentially prevents complications from imaging (eg, contrast reactions) and additional follow-up testing. Of note, third-party payers will increasingly deny payment for unwarranted examinations. As such, utilization management at the practice level will be progressively beneficial under emerging value-based payment models.
3. Minimize protocol length and reduce variance. Shortened examination slot times—to the degree that they do not compromise the image quality necessary for interpretation—increases modality capacity. Radiologists should avoid the temptation to devise unnecessarily cumbersome protocols in the hope of creating images of exquisite, but clinically unnecessary, quality. Besides, the longer a patient is within the MRI bore, the more uncomfortable that patient may become, and more likely patient motion may thus degrade image quality. Minimizing protocols to image only what is necessary rather than what is aesthetically appealing alone could add several patients to a typical MRI unit's throughput each day. For instance, by reducing the average protocol length from 45 to 30 min for an MRI scanner that operates for 16 hours a day (eg, 7 AM to 11 PM), an additional 11 patients each day could be scanned, translating to an extra 77 patients per 7-day week, or about 4,000 patients a year. Such small time savings in totality represent a major opportunity to increase modality capacity and patient access and could alone mitigate the need to purchase an additional machine if modality capacity appears exhausted. Some academic facilities imaging particularly complex patients may find this approach challenging, and so creating even half the examination slots at 30 min would still add a meaningful increase in annual throughput volume.
4. Expand hours of operation. Many inpatient scanners now operate 24 hours a day, accommodating most inpatient requests. Additionally, some emergency departments now harbor dedicated MRI machines, which can also be used to scan inpatients should a "window of opportunity" arise. If inpatient MRI operations finish in the early or late evening, organizations may be missing an opportunity to reduce their inpatient backlogs. The costs of additional technologists and support staff members necessary to operate the extended hours are small compared with the cost savings of reducing lengths of hospital stay—or purchasing new equipment. Similarly, assuming demand exists, outpatient scanners should be operated as late as possible into the evening as patient schedules permit. Adding even three hours a day of scanning time (eg, 7-10 PM) could enable nine additional 30-min slots, translating to nearly 3,300 additional examinations per year. Despite these obvious gains in productivity, many organizations choose to not operate into the late evening or for a full weekend because of the fear of burdensome resource costs (particularly technologist labor). As previously noted, however, these costs are small compared with the overall financial benefits to the organization and other benefits to both the organization and its patients [2].
5. Adequately resource modality operations with sufficient technologists, nurses, and support staff members. An additional CT technologist permits patients to be scanned in less than 15 min, potentially doubling CT capacity; adding yet another technologist

can enable patient scanning in less than 10 min [2]. Adequate technologist (or other) staffing permits the preparation of a patient for scanning (placing the patient "on deck," so to speak) while another is being scanned and yet another is receiving discharge instructions, all at the same time. This multitask redistributed workflow readily yields increased capacity, with the potential for thousands more patients to be scanned on an annual basis [2]. Additionally, a preferable complement of personnel creates a safer scanning environment in the event of an adverse occurrence (eg, a major contrast reaction).

6. Use IT tools in a sophisticated and wise manner. Appropriately leveraged IT improves scheduling design, operational planning and workflow, monitoring, and ongoing evaluation of a department's operations. Without modern business intelligence tools, radiologists and managers simply cannot obtain and process all of the information necessary to manage a busy department and appropriately plan for new opportunities.

CONCLUSIONS

Once an imaging examination is deemed medically appropriate, the patient should be imaged as soon as possible. In most practices, many opportunities exist to dramatically improve patient access using a variety of strategies aimed at optimizing appropriateness, protocol length, hours of operation, and staffing. All supportable by IT tools, many of these are commonly overlooked but can collectively enhance efficiency. Such strategies improve patient (and referring physician) satisfaction, appropriateness, safety, quality, and operational efficiency, the five key pillars of Imaging 3.0™.

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