

The 21st-century radiology department: lessons from the pediatric section

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Health care policy in the USA is in a time of transition. The requisite changes will impact services and practices throughout provider systems. Radiology departments will not be spared from these changes and will be forced to meet shifting expectations. Many of the standard practices within pediatric radiology sections can be utilized in a broader context throughout radiology departments as they evolve to meet these novel challenges.

Even before the Supreme Court decision upholding the Patient Protection and Affordable Care Act (PPACA), accountable care organizations (ACOs) were being established across the USA [1]. The ACOs, or networks of hospitals, patients and caregivers, are an integral part of the developing health care system. The goal of ACOs is to provide better care for patients while simultaneously lowering overall costs. By focusing on outcomes and holding health care providers accountable, the belief is that patient care will be better coordinated and less expensive while generating improved outcomes.

Although the current U.S. health care system is focused on providing the highest level of care, for at least a portion of the population, it does so at an enormous cost. In 2010, it is estimated that health care expenditure was \$2.6 trillion, or 17.9% of the GDP [2]. One of the main drivers of health care expense is medical imaging [3]. Although there have been recent declines in medical imaging, it still represents more than 9% of overall Medicare spending [4]. For there to be meaningful reductions in the health care expenditure, there will need to be controls on the relative amounts spent on radiology and radiology services.

Although it is not clear exactly how ACOs will best address medical imaging, what is understood is that radiology will have an important role in achieving the required efficiencies and optimizing patient care. While clinicians will be incentivized through their shared savings programs to limit the overall number of examinations ordered, radiology has the potential to make diagnoses faster, allowing earlier treatment and the hope of better patient outcomes, so it will continue to have a central role in care. There should also be cost savings related to making a more timely diagnosis, including expenses related to time spent in the hospital undergoing observation as well as additional tests.

It has been noted that radiologists are more than simply skilled examination interpreters [5–7]. In a general sense, there are two categories of value that radiologists provide: interpretive and non-interpretive. Interpretive value is based on the review and reporting of medical imaging examinations. This is the value provided by “reading films.” Typical metrics of interpretive value focus on speed of interpretation (as measured by turn-around times of reports) and accuracy (as measured by various quality-assurance parameters). Non-interpretive value refers to the other duties that radiologists perform, including time spent consulting with clinicians, speaking with patients and families, attending conferences and reviewing imaging algorithms. For example, while reading an examination is part of the interpretive value, directly reimbursed through a Relative Value Unit scale, equally as important are the non-interpretive factors, such as screening the study for appropriateness, tailoring the study to the indication, supervising the study and communicating with the patient and physician. Although the non-interpretive value is more difficult to quantify and often not directly reimbursed, it represents a crucial function of the radiologist and a fundamental responsibility as a physician.

Although ACOs will continue to require highly skilled interpretive ability, there will be a new emphasis on non-

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interpretive value. With realigned incentives intended to drive down the number of unnecessary examinations ordered, clinicians are more likely to focus on optimizing the impact of the imaging examinations they do request and tailor imaging examinations to best address their clinical concern. This could result in a paradigm shift for practicing radiologists as groups are forced to seek additional ways to provide value that might not be directly reimbursed.

Uniquely, pediatric radiology has always embraced its non-interpretive roles. Historically, this has been done to limit the number of imaging examinations performed on children, particularly with respect to limiting radiation exposure. It is the cross-application of these practices throughout the radiology department that might help groups adjust to the changes that ACOs and PPACA policies bring.

There are at least three main categories of pediatric radiology practices that have department-wide implications. These include a consultative role, a focus on minimizing the number and the scope of examinations performed, and a general attitude about non-interpretive value.

With respect to the consultative role, pediatric radiologists have historically had a close relationship to their associated clinicians. In some hospitals, the neonatal and pediatric intensive care unit teams still make daily rounds in radiology departments to review examinations and meet with the pediatric radiologists. Unfortunately, even this is becoming less common. An informal poll taken at a recent SCORCH (Society of Chairs of Radiology in Children's Hospitals) meeting noted that less than 50% of pediatric radiology sections have regular rounds with the intensive care unit teams in the radiology department (personal communication with Dr. Thomas Slovis, 5 November 2012). Personal interaction allows the clinicians the chance to hear exactly what the radiologists think, especially when provided the full clinical picture, which is never included on a limited requisition. It also allows the radiologist to make a more focused report when given proper clinical context. Finally, there is the educational benefit for the radiology and pediatrics trainees, as well as the more senior staff.

As a result of these relationships, pediatric clinicians often use the pediatric radiologists as expert consultants, not simply skilled image interpreters. "If our clinical suspicion is X, what examination should we order?" Much of this give-and-take between clinicians and radiologists might be lost in other sections, and clinicians simply order studies on their patients. In that system, radiologists focus on interpretive value; that is dictating the examinations in an accurate and timely manner, but cede control over ordering examinations to the clinical staff. Clinicians take on the role as experts in determining what imaging study best suits their needs, regardless of their training or actual expertise in this area.

In a cost-sensitive system in which radiology utilization is managed, there will be a need for expertise in imaging

algorithms. This transition to a utilization management system has already begun at several institutions [8]. Certainly much of this might come from proprietary computer systems that guide clinicians, but radiology practices that make themselves available to their clinicians with the goal of best serving their patients' needs will find themselves in a much better position than groups that stand on the sideline as outsiders direct their clinicians' imaging choices.

Related to the consultative role of pediatric radiology, there is a goal in children's imaging to limit the number and scope of imaging examinations. In pediatrics, much of this is done to limit the deleterious effects of radiation, in accordance with the ALARA (as low as reasonably achievable) principle and the Image Gently campaign (a joint effort of multiple societies, including the Society for Pediatric Radiology, the American College of Radiology and the American Academy of Pediatrics), though even non-ionizing radiation examinations are limited in number and scope. Beyond radiation, there is also the issue of sedation. Although sedation in children's hospitals is both common and safe, it should not be performed without a strong indication. It is therefore imperative that unnecessary imaging examinations, particularly those involving ionizing radiation or requiring sedation, be avoided.

Research has indicated that a significant number of imaging examinations are not ordered appropriately [9]. When considering imaging options in children, we always ask ourselves whether the examination is actually necessary, and if it is we then ask whether there is an option that involves less radiation. For this reason, many potential CT examinations are redirected to US. In addition to a lack of ionizing radiation, US is less expensive, something ACO-linked practices should take note of. When CT is the best imaging modality, we attempt to focus the study. For example, at our hospital all pediatric CT studies are single-phase unless otherwise discussed with an attending pediatric radiologist. Occasionally an outside physician will order a "with and without contrast" CT study in a child; however our technologists have been trained to flag these studies and alert a pediatric radiologist for clarification prior to imaging. In most cases we are able to alter the order to limit the scope of the examination. Cross-applied throughout the department, this emphasis on limiting the number and scope of examinations would result in significant cost savings.

Finally, for radiology departments to transition to a better care model, whether an ACO model or not, there has to be a shift in attitudes regarding the value they provide. Specifically, non-interpretive value has to be understood as a core component of the department. An ACR White Paper from 2011 states that "this will most likely entail changing ... focus from interpretative productivity, in the traditional sense of number of examinations interpreted, to becoming recognized as

experts in non-interpretative areas that add additional value to the ACO" [10].

The non-interpretive portion has always been a critical component of the overall value proposition that a pediatric radiology section provides. In addition to the consultative and advisory roles discussed above, pediatric radiologists have historically been centered very much on the patient and family. As an example, in most departments, adult US examinations are performed by sonographers and then later dictated by the radiologists. At some institutions, the images are reviewed prior to the patient leaving the department. In most pediatric radiology practices, not only are the images reviewed prior to the patient leaving but radiologists speak with the family if not doing the scanning themselves. The same is true in fluoroscopy, where pediatric radiologists often review the results with the family upon examination completion. Of course, pediatric radiology is not the only subspecialty with this attention to the patient (breast imaging and interventional radiology also share this philosophy), but it tends not to be the predominant practice in most general departments.

The shift toward enhanced non-interpretive value will be advantageous in an ACO setting as patient satisfaction becomes even more highly valued. If hospital-based physicians are unable to satisfy their patients, and thus by extension the referring clinician base, the hospital system itself will suffer as patients migrate elsewhere for care. Even more vulnerable are non-hospital-based radiology practices, as clinicians often have many options in where they direct their patients. As has been written, referring physicians are the lifeblood of radiology departments [11].

In conclusion, because of fundamentally rooted efforts to image children by the most effective and efficient method, pediatric radiologists have developed a valuable non-interpretive skill set that can be translated into broader departmental practices in the evolving

post-ACO environment. The time has come for these practices to become the standard.

Conflicts of interest None

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