Special Report

Radiology Research in Quality and Safety: Current Trends and Future Needs

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Promoting quality and safety research is now essential for radiology as reimbursement is increasingly tied to measures of quality, patient safety, efficiency, and appropriateness of imaging. This article provides an overview of key features necessary to promote successful quality improvement efforts in radiology. Emphasis is given to current trends and future opportunities for directing research. Establishing and maintaining a culture of safety is paramount to organizations wishing to improve patient care. The correct culture must be in place to support quality initiatives and create accountability for patient care. Focused educational curricula are necessary to teach quality and safety-related skills and behaviors to trainees, staff members, and physicians. The increasingly complex healthcare landscape requires that organizations build effective data infrastructures to support quality and safety research. Incident reporting systems designed specifically for medical imaging will benefit quality improvement initiatives by identifying and learning from system errors, enhancing knowledge about safety, and creating safer systems through the implementation of standardized practices and standards. Finally, validated performance measures must be developed to accurately reflect the value of the care we provide for our patients and referring providers. Common metrics used in radiology are reviewed with focus on current and future opportunities for investigation.

Key Words: Quality and Safety Research; Culture of Safety; Performance Metrics.

INTRODUCTION

The Institute of Medicine (IOM) brought much attention to medical errors and the quality of health care in the United States through their pivotal report "To Err is Human" in 1999. Two years later, in "Crossing the Quality Chasm," the IOM recommended a strategy for improving quality by promoting patient-centered aims, aligning payment policies with quality improvement, practicing evidence-based medicine, and developing an information technology infrastructure (1). Despite national efforts to drive these changes through meaningful use, national quality goals, and payment incentives such as the Practice Quality Reporting System, the effects on care quality and delivery have been limited in the face of rising costs.

As proposed by the IOM, recent legislation has sought to align quality improvement with new payment policies. Scheduled to begin as early as 2019, the Medicare Access and CHIP Reauthorization Act will increasingly tie quality to reimbursement through the Merit Based Incentive Payment (MIPS) program and Advanced Alternative Payment Models. Of the two, most physicians are expected to be reimbursed through MIPS, in which quality (50%) and clinical practice improvement activities (15%) comprise the majority of the reimbursement criteria (2). Although these measures have yet to be finalized, robust quality and safety programs will be necessary to improve patient care and will determine physician reimbursement going forward.

Given the need for change through quality improvement activities, the AUR Radiology Research Alliance convened a task force to explore this topic, with the results presented in this review. This article examines five key dimensions of a quality and safety program including an organization's safety culture, incident reporting, education requirements, information

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technology infrastructure, and common performance measures in radiology. Opportunities for current and future research in each category are discussed in the following sections.

CULTURE OF SAFETY

Health organizations that establish a culture of safety operate with fewer adverse safety events (3–5). A positive safety culture recognizes that medical errors are often caused by underlying systems-level issues, and that human error is inevitable within a highly complex and dynamic healthcare environment (6,7). Rather than blaming and punishing individuals for errors, individuals are encouraged to speak up and disclose both errors and near-misses, so as to uncover latent issues, learn from mistakes, and facilitate crafting solutions that will mitigate future events (5,7). A culture of safety embraces the role of all workers in reducing patient harm, decreases authority gradients, and empowers frontline staff to make changes toward improvements (7,8). Providing a work environment where staff feel comfortable and safe in disclosing errors, without fear of retribution, facilitates such a system (7).

The related concept of "just culture" balances the focus on systems-level issues with individual accountability (7). A just culture considers an individual's intent, adherence to safety procedures, and history of unsafe acts in determining the level of responsibility and associated consequences (9). This model recognizes that safety problems are exacerbated and errors underreported if individuals with good intention are punished for errors that occur while following standard procedures (9). Individuals are thus disciplined only in the setting of unjustified reckless behavior.

Measuring Institutional Culture

Reliably measuring the culture of safety within an organization can be challenging (6). Although outcome measures related to patient safety events are important to track, culture itself is best evaluated through structural assessments pertaining to staff perceptions and beliefs. Such self-reported information most closely reflects the prevailing organizational culture (5,10). To be useful, surveys must have psychometric validity, reliably reflect feelings regarding culture, and also be sensitive to changes over time (5,10). Such measures provide a mechanism not only for identifying particular areas for improvement, but also for evaluating the effectiveness of subsequent interventions (11). The Joint Commission requires hospitals to measure their culture of safety using validated assessments (12).

One widely applied safety culture survey is the Agency for Healthcare Research and Quality (AHRQ) Hospital Survey on Patient Safety (HSPS) (13). Donnelly et al. applied the AHRQ HSPS survey before and after a comprehensive safety culture program in a pediatric radiology department, observing improvement in all of the survey's safety dimensions. In addition, radiology scored higher than hospital averages in most categories (14). Legg et al. successfully used the AHRQ HSPS survey to identify areas of positive and neutral perception among vascular interventional technologists across the United States (15). The Patient Safety Climate in Healthcare Organizations survey is another extensively used survey, with similar structure and content (16). Such surveys have been reported for a broad range of hospital settings and departments, revealing differences in perceptions among practitioners of varying disciplines, roles, and levels of authority (10,17). Although these studies are encouraging, further investigations of the culture of safety within radiology departments remain warranted, for instance identifying the primary gaps in safety within the imaging pathway from initial examination ordering to final interpretation and communication of results; exploring variation in perceptions among radiologists, trainees, technologists, nurses, receptionists, and administrators; and comparing radiology's safety culture to that of other medical subspecialties. Development of a radiology-specific patient safety culture survey is an additional opportunity for future work.

Creating a Culture of Safety

Creating a culture of safety requires establishing an organizational priority and identifying areas at risk for errors and harm. Every individual involved in patient care is held accountable for patient safety, and is expected to report potential problems (18). Open communication is vital to allow discussions about safety and quality to occur in a blame-free and transparent fashion with an emphasis on improvement. Cultural change can be achieved through training. Some institutions have employed a Safety Coach Program whereby a dedicated individual reinforces expected safety behaviors and techniques by being a role model and conducting safety observations in which they give feedback (18). "Lessons Learned" and "Communication Programs" are used to facilitate learning by sharing safety narratives (18). Leaders are also encouraged to undergo safety training sessions so that they can then be held accountable for patient safety through rewards and recognition programs, yearly reviews, and performance-based privileging (3). Error prevention training focuses on a personal commitment to safety, clear communication, and attention to detail (14). Simulation training improves communication and allows teams to practice safety behaviors in a low-risk environment (19,20).

Future research should focus on how innovative programs and initiatives can be broadly implemented in radiology departments to improve culture and patient outcomes. Effective programs designed to improve culture in other settings and specialties can be assessed for adaptability in radiology practices. Residents and fellows provide a substantial amount of care in the academic setting and unique interventions may exist for trainees and graduate medical education programs that can be evaluated using modified culture surveys (21). Further investigation into the factors that influence a culture of safety may yield significant improvements in patient care.

QUALITY AND SAFETY (QS) EDUCATION

The Accreditation Council for Graduate Medical Education requires that residents and fellows in US teaching hospitals