Practical Implications for an Effective Radiology Residency Quality Improvement Program for Milestone Assessment

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Utilization of a radiology resident–specific quality improvement (QI) program and curriculum based on the Accreditation Council for Graduate Medical Education (ACGME) milestones can enable a program's assessment of the systems-based practice component and prepare residents for QI implementation post graduation. This article outlines the development process, curriculum, QI committee formation, and resident QI project requirements of one institution's designated radiology resident QI program. A method of mapping the curriculum to the ACGME milestones and assessment of resident competence by postgraduate year level is provided. Sample projects, challenges to success, and lessons learned are also described. Survey data of current trainees and alumni about the program reveal that the majority of residents and alumni responders valued the QI curriculum and felt comfortable with principles and understanding of QI. The most highly valued aspect of the program was the utilization of a resident education committee. The majority of alumni responders felt the residency quality curriculum improved understanding of QI, assisted with preparation for the American Board of Radiology examination, and prepared them for QI in their careers. In addition to the survey results, outcomes of resident project completion and resident scholarly activity in QI are evidence of the success of this program. It is hoped that this description of our experiences with a radiology resident QI program, in accordance with the ACGME milestones, may facilitate the development of successful QI programs in other diagnostic radiology residencies.

Key Words: Quality improvement; quality curriculum; milestones; residency; quality program.

INTRODUCTION

As the culture of health care shifted to one of value, quality improvement (QI) and system-based improvement initiatives have become increasingly emphasized within the medical community. This affects the specialty of radiology and specifically residency education as programs strive to educate residents and future practicing radiologists on these quality initiatives. Resident education and competence in systems-based practice with assessment by the outcome-based specialty-specific residency milestones is one of the common requirements of the Accreditation Council for Graduate Medical Education (ACGME) (1–3). To assess for proficiency in systems-based practice, residents must demonstrate awareness and responsiveness to the healthcare system, demonstrate effective use of resources to provide optimal health care, work effectively and coordinate patient care in various healthcare settings and systems, and advocate for quality patient care and patient care systems (1,4,5). The American Board of Radiology (ABR) also recognizes the importance of QI skills in practice for maintenance of certification (6).

Residency programs struggle to implement QI into their curriculum. A number of barriers to the success of resident QI initiatives have been identified: lack of education, lack of ideas, limited faculty mentorship, and lack of dedicated time and resources (7–9). A few programs have reported diverse approaches including the development of a comprehensive curriculum (5), a quality assurance elective (10), a resident QI leadership position (11), a systems-based practice project requirement (4), and a dedicated general competency curriculum (12).

This article provides a practical guide to the creation and successful implementation of a radiology resident QI program comprising a specific QI curriculum and assessment methods in accordance with the ACGME milestones.

PROGRAM DEVELOPMENT

Our institution is a major academic center with a radiology department of 34 residents (eight to nine per year), 16

fellows, and 41 clinical faculty members. To meet the expectations of the ACGME systems–based QI milestone, a dedicated resident QI program with curriculum was needed to educate residents on QI and to promote resident enthusiasm for improving healthcare quality and patient care. The initial steps in formation of the program included designating a program leader, meeting with the hospital's department of quality, training of the program leader, formation of the curriculum, and institution of a QI committee related to resident education.

The program leader is a faculty member passionate about QI and education, who is willing to develop and maintain the program, and to be a champion for resident projects. To align the radiology program with the hospital's quality initiatives and goals, the designated program leader met with the key members of the hospital's department of quality. After meeting with the Medical Director of Quality, the graduate medical education Director of Quality and Patient Safety, and the manager of the Performance Improvement Department in the medical center's Office of Quality and Patient Safety, the program leader had a greater understanding of the available hospital resources and their allocation as well as the QI methodology used by the hospital. Furthermore, the leader gained expert mentorship for the radiology residency QI program. Our institution uses a continuous improvement process based on Six Sigma and Lean manufacturing principles called IMPROVE. The acronym stands for **I**dentify the problem, **M**easure the impact, **P**roblem analysis, **R**emedy the critical issues, **O**perationalize the solutions, **V**alidate the improvement, and **E**valuate over time (13). Training of the radiology residency QI program leader consisted of a training course on the IMPROVE methodology, attendance of an American College of Radiology annual conference on Quality and Safety (14), and the online resources Radiological Society of North America Quality Certificate Program (15) and Institute for Healthcare Improvement (IHI) modules (16).

RESIDENT EDUCATION QI COMMITTEE

To promote QI project development and faculty involvement, a radiology QI committee specifically related to resident education was established. This committee is a subset within the larger radiology departmental QI committee and meets bimonthly. The resident education QI committee is made up of faculty and residents interested in quality and quality education and chaired by the residency QI program leader. Members include eight faculty members from different divisions, one physicist, and two peer-selected residents (a lower level and an upper level). The purpose of this committee is to provide guidance and advice in all aspects of QI inclusive of QI projects performed by the residents and their appropriate faculty mentor(s). In addition, this committee assists in collaboration with interdepartmental projects and serves as a liaison with radiology administration, technologists, and information technology.

CURRICULUM

On a rotating 2-year basis, the QI residency curriculum consists of a series of four didactic lectures presented by members of the hospital's quality department in addition to a journal club focused on QI topics. At the conclusion of the educational components, the residents should have a basic understanding of QI, understand the departmental aims regarding quality and its measurement, and learn QI methodology and problem-solving skills. Example topics and presenters for the didactic series are as follows: "Introduction to the Quality Movement" presented by the medical director of quality, "Introduction to IMPROVE Methodology Principles" and "Process mapping" presented by the manager of the performance improvement department, and "Understanding Quality Metrics" presented by the director of quality and safety. Residents also attend a bimonthly quality assessment (QA) conference led by the department chair or the residency program director. The goals of this conference are to improve resident interpretative quality, self-reflection and self-assessment, and knowledge of departmental quality initiatives. The QA conference addresses call discrepancies, patient safety incidents, QI project updates, and patient care issues. Resident attendance is taken to document credit for the educational component of the QI curriculum. Furthermore, it is expected that residents will understand and participate in the departmental quality initiatives such as peerVue. Finally, it is recommended but not required that the residents complete over the length of their residency eight training courses produced by the IHI (16).

PROJECT REQUIREMENTS

Each resident is expected to complete at least one supervised QI project. This can be an individual or a group project with up to four residents involved in a single project to receive credit. Each project requires a faculty mentor or a group of mentors who along with the resident(s) formulates a QI project. A project proposal is submitted to the resident quality committee for project approval. The project proposal form identifies the project title, participants in the project and their roles, background information, variables and potential barriers, improvement metrics, expected outcome, and a draft problem statement. The QI team must maintain a standardized project summary table for project organization. The summary document includes information listed by completion date on project title, problem statement, established metrics, baseline data, specific metric goal, root cause analysis statements, potential barriers and solutions, and the implementation plan. The table also is used to maintain data obtained on the project over time and lists lessons learned from the project. Standardized documentation following hospital-approved QI methodology allows the teams or individuals to conceptualize and formulate an organized approach to projects and maintain workable time lines. The residents with their faculty mentors meet with the resident QI committee to receive