Practice Quality Improvement During Residency:

Where Do We Stand and Where Can We Improve?

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Rationale and Objectives: Completing a systems-based practice project, equivalent to a practice quality improvement project (PQI), is a residency requirement by the Accreditation Council for Graduate Medical Education and an American Board of Radiology milestone. The aim of this study was to assess the residents' perspectives on quality improvement projects in radiology.

Materials and Methods: Survey data were collected from 154 trainee members of the Association of University Radiologists to evaluate the residents' views on PQI.

Results: Most residents were aware of the requirement of completing a PQI project and had faculty mentors for their projects. Residents who thought it was difficult to find a mentor were more likely to start their project later in residency ($P < .0001$). Publication rates were low overall, and lack of time was considered the greatest obstacle. Having dedicated time for a PQI project was associated with increased likelihood of publishing or presenting the data ($P = .0091$). Residents who rated the five surveyed PQI steps (coming up with an idea, finding a mentor, designing a project, finding resources, and finding time) as difficult steps were more likely to not have initiated a PQI project ($P < .0001$ for the first four and $P = .0046$ for time).

Conclusion: We present five practical areas of improvement to make PQI a valuable learning experience: 1) Increasing awareness of PQI and providing ideas for projects, 2) encouraging faculty mentorship and publication, 3) educating residents about project design and implementation, 4) providing resources such as books and funds, and 5) allowing dedicated time.

Key Words: Practice quality improvement; systems-based practice; core competency; maintenance of certification; milestones.

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The world of health care is rapidly changing, and a significant component of that change is the emphasis on accountability to the public for the quality of medical practice. Quality improvement (QI) in medicine has become vital to the daily practice of physicians and the training of future physicians. QI in radiology encompasses improving the effectiveness of diagnostic and therapeutic procedures, selecting the appropriate imaging services, ensuring safety and quality of services delivered, and overseeing the efficiency and management of all imaging services (1). To highlight the importance of QI, the American Board of Radiology made Practice Quality Improvement (PQI) one of the four core components for Maintenance of Certification (MOC). At least 23 other medical specialty boards besides the American Board of Radiology (ABR) have a requirement for some form of practice improvement under the MOC plan developed by the American Board of Medical Specialties in 2000 (2). When MOC was officially introduced in 2007 by the ABR, radiologists were only required to perform one PQI project every 10 years (3). The requirements were then adjusted to three PQI projects every 10 years (4). Recently, with the introduction of "continuous certification," the expected change in requirement to one project every 3 years occurred (3). All the current residents in radiology programs nationally will be certified under this new ABR requirement, and preparing residents for the future has become a vital component of training across the country.

Additionally, one of the six core competencies of the Accreditation Council for Graduate Medical Education (ACGME) during residency is systems-based practice (SBP) (5). Systems-based practice is defined by the ACGME as "awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value" (5). Since 2008, the ACGME has required participation of radiology residents in at least one systems-based practice project with documentation of participation in such an activity (6). The ABR has formally incorporated this requirement as one of the 12 required milestones to be achieved by radiology residents during their training (7). SBP is a challenging

TABLE 1. American Board of Radiology Practice Quality Improvement Categories of Resident-Led Projects by PGY

	Patient Safety	Accuracy of Interpretation	Report Timeliness	Practice Guidelines and Technical Standards	Referring Physician Surveys
PGY-2	25*	37.5	0	37.5	0
PGY-3	24.53	16.98	13.21	39.62	5.66
PGY-4	20	16.67	0	56.67	6.67
PGY-5	21.43	21.43	28.57	21.43	7.14

PGY, postgraduate year.
  *% of survey respondents in the respective PGY.

competency to define, teach, and evaluate (8) and was reported to be the most difficult competency to implement in radiology residency programs in the 2005 annual survey of the Association of Program Directors in Radiology (9).

A systems-based practice project performed during residency is essentially equivalent to a PQI project performed after board certification. This study examined radiology residents' perspectives on QI and explored the obstacles faced by them during the process of performing QI or systems-based practice projects. The aim of this study was to determine the awareness of residents of the PQI requirement, hindrances faced by residents in the process of project development and completion, and the percentage of projects published in the scientific literature or presented at meetings. A secondary goal was to provide an insight into steps that may be taken within academic radiology departments to facilitate the process of completing PQI projects in a way that would make PQI a valuable learning experience for residents.

MATERIALS AND METHODS

An eight-question electronic survey using SurveyMonkey (www.surveymonkey.com) was sent out to 51 residents at our institution and 2039 registered trainee members of the Association of University Radiologists with responses collected for approximately 8 weeks (see Appendix). This survey was distributed in May 2013, near the end of the academic year, to avoid bias related to having initiated a new residency program or year.

The survey initially queried the participants about their postgraduate year (PGY) level and their awareness of the requirement of doing a SBP or QI project during residency. Next, a series of questions was asked to learn about the PQI policy at the residents' institutions including availability of dedicated time and a formal process to assist in development and completion of QI projects. The subsequent sequence of questions was targeted toward gauging the time frame of initiation and completion of QI projects during residency.

The participants were additionally asked to state which of the five ABR PQI categories (patient safety, accuracy of interpretation, report timeliness, practice guidelines and technical standards, and referring physician surveys) best described their QI projects. They were also questioned regarding faculty mentorship and publication and presentation of their projects.

Last, they were asked to rate the hardship they faced on a scale of 5 ranging from very easy to very difficult in completing these five PQI steps: coming up with an idea, finding a mentor, designing and implementing the project, finding resources such as books and funds, and finding time. Participants were also provided an opportunity to leave comments about the QI process at the end.

The data were collected anonymously and analyzed using descriptive statistics and chi-square and Fisher exact tests with statistical significance defined as $P < .05$. This survey was institutional review board exempt.

RESULTS

Overview of Participants, Awareness of QI Projects, and Topics Covered

A total of 154 residents nationally responded to the survey, of which approximately 11% were PGY-2, 54% were PGY-3, 25% were PGY-4, and 10% were PGY-5 residents. Ninety-one percent of the residents were aware of the requirement to complete a systems-based practice project or a QI project during residency, whereas 9% were not aware of this requirement. All PGY-5 respondents knew about the PQI requirement for graduation, but 12% of PGY-2, 11% of PGY-3, and 8% of PGY-4 participants were not aware of this requirement.

The ABR classifies QI projects into five categories: patient safety, accuracy of interpretation, report timeliness, practice guidelines, and technical standards. The category of practice guidelines and technical standards accounted for the highest number of projects at 42%. Twenty-three percent of projects fit the category of patient safety, whereas 19% were related to accuracy of interpretation. The categories of report timeliness and referring physician surveys defined the remaining 16% of the projects. The distribution of these five QI project categories by PGY is illustrated in Table 1.

Timeframe of QI Projects

The majority of the survey participants had begun their PQI project in their first 2 years of residency, with 52% initiating them during PGY-2 and 40% during PGY-3 (Fig 1). Of the remaining 8% that had started their projects during their last