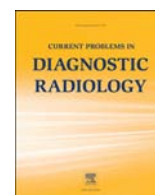




# Current Problems in Diagnostic Radiology

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## Towards Consensus: Training in Procedural Skills for Diagnostic Radiology Residents—Current Opinions of Residents and Faculty at a Large Academic Center

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**Rationale and Objectives:** The Diagnostic Radiology Milestones Project provides a framework for measuring resident competence in radiologic procedures, but there are limited data available to assist in developing these guidelines. We performed a survey of current radiology residents and faculty at our institution as a first step toward obtaining data for this purpose. The survey addressed attitudes toward procedural standardization and procedures that trainees should be competent by the end of residency.

**Materials and Methods:** Current residents and faculty members were surveyed about whether or not there should be standardization of procedural training, in which procedures residents should achieve competency, and the number of times a procedure needs to be performed to achieve competency.

**Results:** Survey data were received from 60 study participants with an overall response rate of 32%. Sixty-five percent of respondents thought that procedural training should be standardized. Standardization of procedural training would include both the list of procedures that trainees should be competent in at the end of residency and the standard minimum number of procedures to achieve competency. Procedures that both residents and faculty agreed are important in which to achieve competency included central line/port procedures; CT-guided abdominal, thoracic, and musculoskeletal procedures; minor fluoroscopic-guided procedures; general fluoroscopy; peripheral line placements; and US-guided abdominal procedures. For most of these categories, most respondents believed that these procedures needed to be performed 6–20 times to achieve competency.

**Conclusion:** Both resident and faculty respondents agreed that procedural training should be standardized during residency, and competence in specific procedures should be achieved at the completion of residency. Although this study is limited to a single institution, our data may provide assistance in developing future guidelines for standardizing image-guided procedure training. Future studies could be expanded to create a national consensus regarding the implementation of the Diagnostic Radiology Milestones Project.

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### Introduction

In February 1999, the Accreditation Council for Graduate Medical Education (ACGME), which is primarily responsible<sup>1</sup> for accrediting allopathic clinical residency and fellowship programs in the United States unveiled its Outcome Project.<sup>2</sup> This report outlined a 10-year plan that defined 6 general competencies (patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and system-based practice) thought to be common to physicians in training in all specialties.<sup>2</sup> Within this framework, some specialties such as Cardiology, General Surgery, and Internal Medicine require a standardized list of procedures for which all candidates are expected to be competent at the completion of

training.<sup>3–5</sup> Furthermore, Cardiology and General Surgery require a minimum number of each procedure for board certification.<sup>3,4</sup> Rao<sup>6</sup> published survey results of national Diagnostic Radiology program directors in 1996 which indicated that 74% of national program directors supported the concept of specifying procedures in which radiology residents should be trained.

In 2012, a joint initiative of ACGME and the American Board of Radiology published the Diagnostic Radiology Milestones Project which detailed competency-based developmental outcome expectations for graduates of Diagnostic Radiology residency programs.<sup>1</sup> Within the purview of patient care and technical skills, the Milestones Project provides a framework for monitoring and measuring resident competence in radiologic procedures.<sup>1</sup> The Milestones Project encompasses 6 domains of physician competency including patient care and technical skills, medical knowledge, system-based practice, practice-based learning and improvement, professionalism, and interpersonal and communication skills. Currently, there is no standardized list of radiologic procedures in which diagnostic radiology residents are expected to achieve competence prior to graduation.

Grants supporting this research: None.

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<https://doi.org/10.1067/j.cpradiol.2017.09.012>

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Our study attempts to capture the opinions of residents and faculty within the radiology department of a large academic center regarding resident competency in image-guided procedures and seeks to identify a consensus between residents and faculty. Our academic center training facilities encompass a 900+ bed level 1 trauma center, 500+ bed tertiary care hospital, and a 500+ bed community subspecialty hospital. For example, at our tertiary care hospital and community subspecialty hospital, over 600,000 examinations were performed in 2014. We believe that such information will be useful additions for future development and implementation of the Milestones Project<sup>1</sup> and provide insight into the experiences of residency graduates over the course of their training.

## Materials and Methods

This HIPAA-compliant study was approved for exempt status by the Institutional Review Board of BLINDED. Survey data were collected anonymously.

An electronic survey regarding procedural competency (Appendix A) was sent to all residents and faculty of the BLINDED. The survey was sent via an e-mail listserv to all residents, fellows, and clinical faculty at our institution. Respondents were given 2 weeks to respond. For the purposes of this study, only clinical faculty in diagnostic radiology or nuclear medicine were considered. The authors did not participate. In accordance with our Institutional Review Board, an information page was provided so that participants could make an informed decision prior to beginning the survey. The survey consisted of 4 parts. The first part collected basic demographic information including level of training (faculty or resident), subspecialty practice, and years in practice postresidency or fellowship. The second part asked respondents to provide their definition of "procedural competence"; whether direct observation or number of procedures performed was more important in the evaluation of procedural competence; and whether or not there should be standardization of procedure training for diagnostic radiology residents. The third part included a list of 65 procedures obtained from the department's online resident procedure log tool. Here the respondents were asked if they felt it was important for radiology residents to

achieve competency in each procedure on this list. Responses were gathered using a 5-item Likert scale. They were provided with choices of "strongly disagree," "disagree," "neither agree nor disagree," "agree," "strongly agree," and "not applicable." The fourth part of the survey used the same procedure list but asked the respondents to indicate how many times each procedure needed to be performed to achieve competency. They were provided with choices of "1-5," "6-10," "11-20," "21-40," "> 40," or "not applicable."

Counts and frequencies for each radiology procedure were calculated and assessed. Blank or "not applicable" responses were excluded. Responses that indicated "agree" or "strongly agree" that competency in a procedure was necessary were combined and those respondents are considered supporters of the procedure; participants who reported "neither agree nor disagree," "disagree," or "strongly disagree" were not considered supporters of the procedure being required. Approval by 70% of each group was selected as representing consensus for the survey. Differences in responses by faculty and resident subgroups were tested for statistical significance using the Fisher exact test. *P* values less than 0.10 were considered statistically significant. A *P* value of less than 0.10 was chosen, rather than the traditional 0.05, because of the small sample size and nonparametric analysis. The range of number of times needed to perform a procedure to gain competency was assessed for each consensus procedure. The overall modes among residents, faculty, and 2 respondents that did not specify whether they were a faculty or resident were reported along with the frequency of that range in the data.

## Results

The survey was sent to 61 residents and 124 faculty members. There were 60 total respondents: 17 residents, 41 faculty, and 2 that did not specify resident or faculty status. This corresponds to overall response rates of 32%; 33% among identified faculty and 28% among identified residents. Faculty subspecialties and years of practice after residency are shown in Table 1, organized into 2 groups based on greater than 10 years of experience. A roughly

**TABLE 1**

List of faculty by subspecialties and years of practice post residency/fellowship training, grouped by less than 10 years of experience

10 years of experience or less		Greater than 10 years of experience	
Specialty	Years posttraining	Specialty	Years posttraining
Abdominal imaging	1	Abdominal imaging	13
Abdominal imaging	3	Abdominal imaging	20
Abdominal imaging	1	Abdominal imaging	16
Abdominal imaging/interventional radiology/musculoskeletal radiology/neuroradiology	0	Abdominal imaging	15
Breast imaging	1	Breast imaging	42
Breast imaging	2	Breast imaging	12
Breast imaging	1	Breast imaging	22
Breast imaging	1	Breast imaging	42
Cardiothoracic imaging	5	Breast imaging	30
Cardiothoracic imaging	2	Interventional neuroradiology	27
General radiology/neuroradiology	1	Interventional radiology	40
Interventional radiology	4	Interventional radiology	11
Interventional radiology	2	Interventional radiology	23
Neuroradiology	1	Neuroradiology	15
Neuroradiology	0	Neuroradiology	15
Neuroradiology	0	Neuroradiology	12
Neuroradiology/nuclear medicine	0	Nuclear medicine	31
Nuclear medicine	8	Nuclear medicine	20
Nuclear medicine	4	Pediatric imaging	20
Pediatric imaging	5	This cell intentionally left blank	
Pediatric imaging	4		

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