

Precision Radiology Residency Training: Special Distinction Tracks for Noninterpretative Professional Development

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Rationale and Objectives: The role of a radiologist has expanded beyond the tripartite mission of patient care, education, and research to include cross-specialty consultation for patient management, innovative solutions to improve health-care quality and safety, device design, and policy advocacy. As such, radiology residency programs should incorporate formalized training to prepare residents for these various professional roles.

Materials and Methods: Since the 2015–2016 academic year, five training tracks focused on noninterpretative skills have been integrated into our residency training program: Clinician Educator, Quality Improvement, Entrepreneurship/Innovation, Health Policy Advocacy, and High-Value Care. Each track is longitudinal, with a set of requirements throughout the residents' training necessary to achieve certification at graduation.

Results: To date nine residents have participated in the programs, including two who received distinction in two separate tracks. Residents in each of the tracks have implemented successful initiatives related to the focus area. As such, these tracks enrich training by ensuring that residents make meaningful contributions to the department and institution during their training and disseminate successful initiatives through presentation at national meetings and publications.

Conclusion: The duration of a radiology residency and resources available in an academic center provide opportunities for residency program directors to advance residents' skills in important noninterpretative components of radiology practice. Regardless of whether residents pursue academic medicine or private practice, these skills are necessary for graduates to become valuable members of a radiology practice and serve as national leaders in the field of radiology.

Key Words: Residency education; entrepreneurship; quality improvement; high-value care.

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INTRODUCTION

The role of a radiologist involves more than the interpretation of images; radiologists also act as educators, policy advisors, consultants, inventors, and quality improvement leaders. To prepare for these various roles radiologists will likely undertake in their professional careers, it is valuable for diagnostic radiology residency programs to offer learning opportunities in these areas during training. Indeed, one of the overarching goals of Accreditation Council for Gradu-

ate Medical Education (ACGME) training is to create a foundation for professional growth. The ACGME also cites several specific noninterpretative skills in its "Core Competencies" of diagnostic radiology residency, including quality improvement, participation in education, acting as a consultant, and supporting improved patient care (ACGME) (1).

Our residency has a long-standing research track, with the opportunity to complete a full year of funded research through a departmental T32 grant. Other institutions have reported on novel programs to encourage career development in important noninterpretative areas of professional development including teaching (to prepare residents for academic careers); entrepreneurship (to train and encourage residents to create new devices and technologies); health-care policy (to educate residents on issues related to the health-care system and develop leadership skills in this area); and quality improvement (2–5).

Many of our trainees were participating in projects related to these different areas of practice, but we only provided a formalized program and recognition at graduation for quality

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improvement and informatics fellowships offered during the fourth year. As such, we recognized the need to advance professional development in their respective areas of interest by creating structured, longitudinal, noninterpretative skills pathways to serve as the foundation for leadership in practice.

METHODS AND RESULTS

Beginning in the 2015–2016 academic year, four professional development residency tracks were created (Clinician Educator, Quality Improvement, Innovator/Entrepreneur, Health Policy) and have evolved each year. In 2016, an additional track was created for residents who aim to champion high value care. As health care continues to become more focused on value-based care and payment models, radiologists must play an important role in ensuring that all imaging adds value to patient care, and this begins with exam selection. In this new environment, radiologists need to be engaged in the decision-making regarding whether imaging is necessary and in the selection of the most appropriate modality and protocol. It is crucial, therefore, for radiology residents to develop skills related to multidisciplinary collaboration and education.

The tracks and their respective requirements are presented to first year residents during orientation. Residents are self-selected in their first or second year of residency, and although participation is not required, multiple residents in each class have elected to complete at least one pathway. Each of the tracks is longitudinal, with a set of requirements throughout the residents' training necessary for special distinction certification, and the requirements have evolved as new programs and resources are discovered to enhance the pathway. The details of each track are provided below. For residency programs that do not have local resources, the American College of Radiology offers a range of 1–2 week fellowships for residents, which fit well with many of the pathways (6). As such, applying for these fellowships was recently added as a requirement for each of our tracks, as detailed below.

Clinician Educator Track

Residents play an active role in peer and medical student education in our training program. This track is designed for those residents interested in pursuing a career as a clinician educator. Requirements include the following:

- direct the radiology-pathology or journal club lecture series during second year of training;
- attend a 2-day teaching workshop sponsored by our institution in the fourth year;
- design and implement a new didactic curriculum or online education resource during the fourth year; and
- apply to participate in the ACR Valerie P. Jackson Education Fellowship during the fourth year.

Quality Improvement Track

Residents in the quality improvement track hone skills necessary to design and implement quality improvement initiatives. Residents and faculty in our department work closely with the Technology Innovation Center, which is a team of software engineers developing solutions to improve patient care quality and safety. Requirements include three of the following metrics:

- successfully implement at least two quality improvement projects;
- represent the department on the House Staff Patient Quality and Safety Committee;
- complete the Quality or Informatics Leadership program at our institution in the fourth year;
- direct the monthly Q/I case conference for fellow residents in the fourth year;
- apply to participate in the ACR E. Stephen Amis Jr., MD, Fellowship in Quality and Safety during the fourth year.

Residents in the Q/I track are also encouraged to pursue board certification from the American Board of Medical Quality or the American Board of Imaging Informatics, for which the department will cover the cost.

Entrepreneur/Innovator Track

As radiologists are in a prime position to create new medical devices and technologies, and may desire a career path in business, the entrepreneur/innovator track was created. Residents pursuing this track must do the following:

- work with a translational research resource in the institution to participate in the development of a new device or technology; at our institution, these include the Carnegie Center for Surgical Innovation, the Center for Bioengineering and Design, or the Technology Innovation Center;
- generate a publication, presentation at a national conference, an invention disclosure, or a patent license application; and
- attend Technology Bootcamp course during the fourth year, which is a 3-day course at our institution run by business school professors and successful entrepreneurs designed to teach skills needed to transition an idea into a viable business proposal.

Health-care Policy Track

Not only must radiologists be advocates for quality patient care, they may also play a pivotal role in directing the future of the health-care system, including payment systems. Therefore, a health-care policy track was created. Requirements include the following:

- serve on a committee of the ACR or the Maryland Radiological Society, the Maryland branch of the ACR;
- participate in at least one lobby activity, either on the state or national level;

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