

Point: Losing the Zero-Sum Game: It's Time to Eliminate Required Research in Radiology Residency

Cory M. Pfeifer MD, MS

Department of Radiology, University of Texas Southwestern Medical Center, Dallas, Texas

Darel E. Heitkamp MD

Department of Radiology and Imaging Sciences, Indiana University School of Medicine, Indiana University Hospital, Indianapolis, Indiana

Rooted in a dogma prescribed by Abraham Flexner's 100-year-old mission statement [1], research publication has been referred to as "the currency of academic advancement" [2]. As the primary accrediting organization for graduate medical education (GME) in the United States, the ACGME gives high priority to trainee research, stating the word a total of seven times in the program requirements for diagnostic radiology [3]. The ACGME mandates not only resident participation in a scholarly activity but also its subsequent publication or presentation at a scientific meeting, a requirement that many residency programs look to satisfy by having their trainees complete independent research projects. Other accessory domains of knowledge important to resident education, such as informatics, health policy, and health care economics, although perhaps more relevant than research in the day-to-day practice of radiology, are less explicitly emphasized by the ACGME in its written requirements for trainees.

Resident Research: The Status Quo

Grimm et al [4] assessed factors associated with a future career in academic radiology, concluding that medical school rankings, a medical school research year, a history of publication, and an additional advanced degree showed positive correlation with academic pursuits after radiology residency training. The researchers also found that despite the strong academic reputations of the Duke and Stanford radiology programs, only 21% of applicants to these programs from 1993 to 2010 later became academic radiologists. In 2016, the annual survey of the ACR Commission on Human Resources Workforce revealed that only 23% of radiologists work in academic or university environments [5].

Dunnick [6] outlined factors related to resident research in response to Grimm et al's [4] study, noting that new changes to the structure of radiology residency and the ABR board examinations allow residents to dedicate much of their fourth year to pursuing research interests. Unfortunately, 12 months is precious little time to successfully navigate the unpredictable waters of radiology research and still have time to publish or present findings before leaving residency. Under the new residency format, the first 3 years are so tightly packed with essential rotations necessary to prepare residents for the core examination that, during this time, most programs don't allow residents the opportunity to explore important noninterpretive areas of learning such as research, health care economics, or global health.

This is the author's manuscript of the article published in final edited form as:

Pfeifer, C. M., & Heitkamp, D. E. (2018). Point: Losing the Zero-Sum Game: It's Time to Eliminate Required Research in Radiology Residency. *Journal of the American College of Radiology*, 15(4), 658–660.
<https://doi.org/10.1016/j.jacr.2017.09.039>

To complicate matters, the research missions and resources of programs are highly variable, and as such, the ability to stimulate scientific interest and foster investigative thought in trainees may be limited in programs in which the culture itself emphasizes clinical productivity over inquiry. Among the myriad struggles inherent to smaller programs [7] is a relative lack of scientific pedigree, hospital research coordinators, and statistical support staff members enjoyed by programs sponsored by research-intensive universities. Just as referencing a personal interest in research may serve to please the admissions committee of an academically focused radiology program [6], participating in research at many programs may be viewed simply as a mechanism to satisfy an ACGME requirement [3] or to earn a reimbursed trip to a conference [8].

Additionally, the idea of what constitutes an acceptable vehicle of academic publication has changed enormously over the past 20 years. Although the limited availability of paper journals once generated reverence for the Impact Factor, a quotient tied to the frequency of a given journal's citations, the ability to acquire scientific literature electronically ahead of print and the explosion of open-access publications has accelerated the accumulation of knowledge to the point at which alternative metrics are now becoming more relevant [9]. Radiology residents and junior faculty members may in fact place greater value on social media on which important findings and opinions can be instantly shared and debated among learning communities, than they do traditional journals, which may take months to publish results. Indeed, academic institutions are beginning to recognize the tremendous impact of social media on research and education by integrating social media scholarship activities in their academic promotions criteria.

The Value of Research to Radiology Residents

The truth is that precious few radiology residents participate in research after residency training. In our experience, only a subset of residents who choose careers in academic radiology will end up performing radiology research, whereas the vast majority—practically all of those entering private practice and a substantial number entering academics—will never conduct a legitimate research project in their careers. Yet most residents are still expected by their programs to spend months toiling over research projects to satisfy the ACGME requirement for scholarly activity.

It's also worth noting that although some residents perform outstanding research, the quality of resident research on the whole is inconsistent. Many programs struggle to enforce their minimum research standards, requiring at least that projects contain actual data. Apathetic residents tend to choose simple retrospective projects whose research questions are of marginal importance, or projects that lack real data altogether and function more as case studies. Months of mundane data collection and outsourced statistical analysis often culminate in an 8-min, 10-slide oral presentation at a departmental research symposium. The bottom line is that the investment of time and energy in resident research comes at a real cost, and even if done well, the outcomes are of limited utility to most residents entering practice.

Could it be that the traditional residency requirement of doing an independent research project is outdated? To many trainees, the policy represents just one of countless GME checkboxes that need to be ticked before graduation, along with other scripted requirements such as participation in a quality project and completion of minimum case logs. We find that most residents have a rather utilitarian view of research, seeking it out as a means to improve the overall strength of their fellowship applications.

From our perspective as educators, required research during residency does little to encourage a career in academics or teach residents practical skills they'll need when in practice.

We feel that the time has come for radiology programs to modify their scholarly activity requirements, replacing mandatory resident research with robust interactive curricula in evidence-based radiology. This would allow trainees to learn practical skills they need to know when they leave residency, such as how to critically assess the radiology literature and use that information to improve their everyday radiology practices. Existing journal club programs, although effective at providing a means to review articles, tend to lack such comprehensive learning curricula. The creation of a national curriculum in evidence-based radiology would be an excellent opportunity for an organization such as the Radiology Research Alliance to greatly assist program directors and have a tremendous impact on trainee education. Under such a model, programs could still encourage interested residents and fellows to participate in departmental research, but strictly on a voluntary basis.

Accessory Learning Domains in Radiology: A Zero-Sum Game

Just as research has changed, so has the practice of radiology. The rise of commoditization [10] and the shifting supply and demand for radiologists [11] have resulted in greater consolidation of radiology practices [12] while accelerating resident interest in the business of medicine as a by-product. Despite a robust thirst for knowledge regarding how to negotiate favorable employment agreements, improve measurable value to radiology practices, and avoid predation by notorious threats to the health of diagnostic radiology as a specialty, academic radiology remains slow to adapt to these demands. Indeed, learning domains such as health care economics have evolved to become more relevant than research in the daily practice of most radiologists, yet without direction from the ACGME, the average program still provides research with a much larger footprint in its educational curriculum.

To protect our specialty and its future, more should be taught with respect to the skills needed to succeed in independent practice, not just in academic radiology. Most programs still address the newer learning domains with relatively minimal effort, directing learners to external Internet resources or inviting practice representatives to share their anecdotal wisdom with residents during noon conferences. Under the current paradigm of radiology GME, programs fritter away trainees' valuable time on mandatory research projects, then send them out into the real world as sheep among wolves, underprepared for the harsh reality of clinical practice. Thankfully, radiology leaders and national organizations have begun to acknowledge the critical need for modern practice skills and have collaborated to produce national curricula for trainees in areas such as health care economics and informatics 13, 14.

Program directors have known for more than a decade that space in the resident education curriculum has become something of a zero-sum game, largely because of the exponential rise in mandatory ACGME requirements. With so many new critical domains of information needing to be integrated into today's radiology GME, such as physician well-being, patient-centered care, artificial intelligence, and cultural competency, how do we begin to make room? We suggest a starting point that calls for eliminating the time-consuming scholarly activity requirement and replacing it with a more efficient curriculum in evidence-based radiology.

References

1. Ludmerer KM. Commentary: understanding the Flexner report. *Acad Med* 2010;85: 193-6.
2. Relyea-Chew A. Research and responsibility: best practices in resident education. *Acad Radiol* 2016;23:841-3.
3. Accreditation Council for Graduate Medical Education. ACGME program requirements for graduate medical education in diagnostic radiology. Available at: [http://www.acgme.org/Portals/0/PFAssets/Program Requirements/420_diagnostic_radiology_2017-07-01.pdf](http://www.acgme.org/Portals/0/PFAssets/Program%20Requirements/420_diagnostic_radiology_2017-07-01.pdf). Accessed September 1, 2017
4. Grimm LJ, Shapiro LM, Singhapricha T. Predictors of an academic career on radiology residency applications. *Acad Radiol* 2014;21:685-90.
5. Bluth EI, Bansal S. The 2016 ACR Commission on Human Resources work-force survey. *J Am Coll Radiol* 2016;13: 1227-32.
6. Dunnick NR. Preserving the seed corn. *Acad Radiol* 2014;21:563-4.
7. Heitkamp DE, Ruchman RB, Rozenshtein A. Lessons from Flexner: the struggle of small radiology residency programs in the United States. *J Am Coll Radiol* 2017;14:675-7.
8. Pfeifer CM. Presentation to publication: institutional and individual factors. *Pediatr Radiol* 2017;47:245-6.
9. Rosenkrantz AB, Ayoola A, Singh K, et al. Alternative metrics (“altmetrics”) for assessing article impact in popular general radiology journals. *Acad Radiol* 2017;24:891-7.
10. Durand DJ, Narayan AK, Rybicki FJ. The health care value transparency movement and its implications for radiology. *J Am Coll Radiol* 2015;12:51-8.
11. Sharafinski ME Jr, Nussbaum D, Jha S. Supply/demand in radiology: a historical perspective and comparison to other labor markets. *Acad Radiol* 2016;23:245-51.
12. Proval C. The radiology 100: grows upward. *Radiology Business Journal*. October 2015. Available at: <http://www.radiologybusiness.com/magazine/2015/october-november-2015>. Accessed September 1, 2017.
13. Prober AS, Mehan WA, Bedi HS. Teaching the healthcare economics milestones to radiology residents: our pilot curriculum experience. *Acad Radiol* 2016;23:885-8.
14. SIIMCast Episode 2—Tessa Cook interview: national informatics curriculum and course. Society for Imaging Informatics in Medicine. Available at: <https://soundcloud.com/siimcast/episode-2-tessa-cook-interview>. Accessed September 1, 2017.