Special Report

Radiology Research Funding: Current State and Future Opportunities

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Funding for research has become increasingly difficult to obtain in an environment of decreasing clinical revenue, increasing research costs, and growing competition for federal and nonfederal funding sources. This paper identifies critical requirements to build and sustain a successful radiology research program (eg, key personnel and leadership, research training and mentorship, infrastructure, institutional and departmental funding or support), reviews the current state of available funding for radiology (including federal, nonfederal, philanthropy, crowdfunding, and industry), and describes promising opportunities for future funding (eg, health services, comparative effectiveness, and patient-centered outcomes research). The funding climate, especially at the federal level, changes periodically, so it is important to have radiology-specific organizations such as the American College of Radiology and the Academy of Radiology Research serving as our key advocates. Key to obtaining any funding, no matter what the source, is a well-formulated grant proposal, so a review of opportunities specifically available to radiologists to develop and hone their grant-writing skills is provided. Effective and sustained funding for radiology research has the potential to cultivate young researchers, bolster quality research, and enhance health care. Those interested in pursuing research need to be aware of the ever-changing funding landscape, research priority areas, and the resources available to them to succeed. To succeed, radiology researchers need to think about diversification and flexibility in their interests, developing multidisciplinary and multi-institutional projects, and engaging a broader base of stakeholders that includes patients.

Key Words: Radiology research; funding; federal funding; non-federal funding; grant writing.

INTRODUCTION

Obtaining research funding in radiology has become increasingly difficult in an environment of decreasing clinical revenue, increasing research costs, and growing competition for federal and nonfederal funding sources. In addition to increasing competition, the availability of funding for research, particularly from federal sources such as the National Institutes of Health (NIH), has been negatively impacted by a variety of economic factors in the past 10–15 years. The decreased funding of these programs, in turn, affects the ability of radiology departments and the academic medical centers in which they operate to continue providing important internal resources for their researchers, limiting opportunities for successful research. Therefore, in difficult economic times, even the most promising and potentially significant research may go unfunded. However, there are many areas in which radiologists can prove their contribution to patient-centered care, a well-supported concept in health-care research funding, and there are other sources of funding, such as crowdfunding, that radiology researchers can reach out to for assistance in the meantime.

To address the current challenges in radiology research funding, the Radiology Research Alliance formed a task force to examine the current state of radiology research funding. The following task force report enumerates the components needed to build and sustain a successful radiology research program, reviews the current state of available funding for radiology, and provides analysis of diverse federal, private, commercial, and nontraditional sources that can provide future funding opportunities.

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ELEMENTS REQUIRED FOR SUCCESSFUL RESEARCH

The challenges researchers face, both in obtaining initial funding and in maximizing the impact of funding, depend largely on the available resources and academic climate in which they practice. In larger institutions, particularly those with greater NIH funding, many resources necessary to conduct successful research are in place. However, researchers in smaller or more clinically oriented academic radiology departments may encounter significant challenges to developing research programs. Recognizing this difference, Decker et al. discussed the challenges and opportunities faced by researchers in "clinically oriented academic radiology departments," defined as departments with residency programs that receive less than $1 million in annual funding from the NIH (1). A survey of these faculty identified a number of barriers preventing them from achieving research success, including: (1) lack of training in research skills including hypothesis development, experimental design, and scientific writing; (2) lack of institutional resources including funding for pilot projects, grant-writing assistance, and biostatistics and manuscript preparation support; and (3) limited research time because of overwhelming clinical and administrative demands (1). These challenges often result in poor funding and limited research output, in turn limiting opportunities for future grants and precluding engagement in larger collaborative projects (1).

Critical elements needed for success in building radiology research infrastructure include key personnel and leadership, research training and mentorship, infrastructure, and departmental research funding.

KEY PERSONNEL AND LEADERSHIP

Designating a departmental leader for radiology research and providing dedicated research time to key personnel are requisites to establish a successful research program. The leader should have institutional support for building experience in strong research practices, for mentoring and collaborating with other faculty, and for directing resources toward departmental research efforts. An effective radiology research leader aligns radiology research with the clinical strengths of the institution and promotes rewarding collaborations between departments and researchers. Collaboration is essential to gain necessary expertise outside of the radiology department. Most successful departments have both physician and scientist investigators who devote the majority of their time to research (2). Aside from radiologists or scientists directly conducting research, numerous other personnel are required to optimize the chance for successful research including, but not limited to, technologists, grant writers, project managers, and biostatisticians with expertise in informatics and outcomes methodologies (3).

RESEARCH TRAINING AND MENTORSHIP

Many academic institutions have junior faculty development programs ranging from informal lectures to structured programs with coursework and mentoring (4–6). The optimal program is one in which junior faculty benefit from coursework, gain insight from mentors' experiences, and build a network of faculty at various career stages and with a variety of professional interests. The presence of a strong faculty development program signifies an institution's investment in its junior faculty by fostering a supportive and collaborative environment. Encouraging involvement of experienced mentors in faculty development programs further increases mentorship efficacy. Workshops and courses for junior faculty are also available on a national level. Examples include the General Electric (GE) Radiology Research Academic Fellowship award for junior faculty offered by the Association for University Radiologists (7), the week-long intensive workshops provided by the Radiological Society of North America (RSNA) such as the Clinical Trials Methodology Workshop (8), and grant-writing workshops (9). In addition to providing formal training, these workshops also allow faculty to identify mentors outside their own institutions.

Although research training and mentorship for junior faculty is essential, this process should begin early during radiology residency training. In an effort to increase NIH-funded research, several efforts were undertaken in the late 1990s and early 2000s to promote research training earlier in radiologists' careers (10). Examples of these efforts include the Accreditation Council for Graduate Medical Education-accredited residency program requirement of resident participation in a scholarly activity such as a research project, as well as the establishment of the Holman Research Pathway by the American Board of Radiology in 1999 to enable diagnostic radiology or radiation oncology residents to obtain up to 18 months of training in basic science, translational, clinical, or population research; however, only 23 diagnostic radiology residents have completed this pathway since its inception (11). Workshops and programs for residents intended to promote careers in academic radiology through mentorship and exposure to research opportunities during training are also available, such as the Introduction to Academic Radiology program co-sponsored by the RSNA, the Association for University Radiologists, and the American Roentgen Ray Society (12).

INFRASTRUCTURE

Important infrastructure elements for effective research include appropriately equipped facilities, mechanisms for clinical scanner utilization for research, and provision of ancillary support personnel. As radiology research equipment is expensive, many departments often focus initially on establishing mechanisms for using clinical equipment for research purposes rather than allocating dedicated research equipment and facilities. Most institutions provide substantial discounts for research imaging studies, and some centers offer imaging studies at no-cost to investigators to allow for preliminary data acquisition for grant applications.