2 Diagnostic Radiology Research Program Development

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2.1 Introduction

Providing recommendations regarding developing and maintaining radiology research and research training facilities is a difficult task because no two departments have the same goals, resources, commitment, faculty composition, or philosophy. There is no ideal model and every department must address issues specific to their own particular goals and needs. However, concern has been generated in the radiology community regarding the role, development, and expansion of research programs and many of the issues that need to be considered are germane to all departments. The primary purpose of this chapter is to provide information which may be of value to the reader charged with the responsibility of addressing research-related issues in a clinical radiology department.

The decision to develop or expand the research program in any clinical department must be made with a firm understanding of the degree of commitment that is necessary. This commitment must permeate throughout the entire department and be part of a larger commitment to total academic excellence stressing superior patient care, teaching, and research. The success of a program will eventually be judged on the quality and not the quantity of work. The research program must be an integral part of departmental activities and form a symbiotic relationship with clinical and teaching components. Although high-quality, clinically relevant research does not necessarily require major resources, it does require a strong departmental commitment to ensure its excellence and to maintain its proper perspective in the department and the institution.

During the past 15 years, the manner in which radiology departments view the development or expansion of research facilities has changed. This change has largely been related to the significant rapid advances in medical imaging technology and the manner in which these advances have altered the role of the radiologist in patient care and the training and composition of departmental faculty. When visiting radiology departments 15 years ago, it was not uncommon to be guided through one or two small, cramped rooms that constituted the "dog lab" or "physics lab." These facilities were usually used by one or two faculty members. In most cases, the laboratory did not constitute an integral part of an established, goal-oriented departmental research
program. These laboratories were usually equipped with secondhand or discarded clinical equipment and staffed by technicians who had additional responsibilities as X-ray technologists in the clinical department. Funding almost always came from clinical revenue or industry and very few received support from extramural peer-reviewed sources such as governmental agencies, foundations, or large private funding sources. However, the radiology researchers were usually very dedicated and much of their work laid the foundation for modern-day applications such as in interventional radiology. At that time, most radiological imaging involved film-screen technique, research was not a major focus in most departments, and university and hospital administrators did not look upon most radiology departments as research-oriented resources.

Although such facilities still exist today, the trend is changing towards many radiology departments being concerned with developing more active, comprehensive, and formal research and research training programs. This involves major financial investments for renovation, equipment, personnel, and space. However, if some individuals are discouraged from developing or supporting a major research program because of the potentially prohibitive cost, the following factors should be considered:

1. People and not equipment or facilities are responsible for successful research programs.
2. Well designed clinical and basic research projects in medical imaging have a much greater chance of receiving extramural funding than was the case 10-15 years ago.
3. Most successful radiology research programs focus attention in only one or two specific areas of work.
4. Government research funding agencies will usually reimburse equipment use and maintenance fees for expensive imaging equipment used for research.
5. Multidepartmental generated funds can be a major source of income to purchase equipment and finance technical support salary.
6. Industry often provides reduced purchase prices or even free equipment for research laboratories.
7. The university and other departments benefit both academically and financially from image research laboratories and should help provide funding.
8. Highly successful, productive, clinically applicable research can still be done in relatively simple facilities. For example, good basic research in interventional radiology can be performed with X-ray equipment including little more than a fluoroscope, an overhead tube, and a film changer.
9. Strong academic programs with well equipped research facilities will attract academically strong clinicians and basic scientists who can support their own research projects through extramural sources. Strong academic programs attract strong academic people.

Because of the diversity of departmental goals, capital, and research interests, it is impossible to make specific recommendations regarding space, equipment, and personnel needed to develop or expand existing facilities. However, careful consideration must be given to space and equipment requirements not only for the immediate needs but also for those of the future. One of the most important factors to consider in planning radiology research facilities is maintaining flexibility and balance to meet changing needs relative to technology development, faculty research interests, and funding sources. Although some departments have invested heavily in personnel and resources directed towards a single specific area such as digital angiography, magnetic resonance imaging (MRI), and interventional radiology, it is those programs that maintain flexibility and balance that will continue to be productive over an extended period of time. If properly planned, this can be done without diluting areas of research that may experience temporary but clinically important periods of intense investigation. Investing heavily in research and development during this initial technology and application research phase can be highly productive and rewarding. However, if such investment totally jeopardizes other more conventional areas of work, the long-term results may not be in the overall best interests of the department or faculty.

If major investments in manpower, equipment, and facilities are heavily directed towards a very specific area of work, the results should be designed to benefit other clinical and basic research areas in the department. For example, computerized image acquisition, presentation, transfer, and analysis will form an important contribution in radiology departments of the future. This applies not only to larger academic institutions but also to the smaller community hospitals. Radiology departments cannot ignore the importance of this developmental trend. Research and development investments in image analysis will have widespread application in all clinical and research areas of the department. If academic institutions invest in cen-