

EDITORIAL

THE HOLMAN RESEARCH PATHWAY IN RADIATION ONCOLOGY

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A decade ago, the American Board of Radiology established a research pathway for residency training designed for individuals to simultaneously train in diagnostic radiology or radiation oncology and in basic science, clinical, or transitional investigation. This new pathway was called the ABR Holman Research Pathway, named for B. Leonard Holman, M.D., who first proposed this initiative to foster a cadre of research-oriented academicians. We graduated with the first two classes of Holman Research Pathway (HRP) Fellows in 2004 and 2005. Here, we review the HRP for radiation oncology trainees, and we consider the status of the program and current challenges facing physician scientists in radiation oncology.

The HRP presents an alternative residency structure for physicians seeking careers as physician scientists. The traditional residency pathway requires 48 total months in radiation oncology with a minimum of 36 months in clinical radiation oncology. In the HRP, residents can become eligible for board certification after 27 months of clinical training. The remaining 21 months of residency training must be devoted to research. The goal of the HRP is to train residents with a documented history of research, such as those with M.D./Ph.D. degrees, who demonstrate such strong clinical skills that clinical competence can be achieved in an abbreviated period of time. Therefore, HRP residents not only have the opportunity to receive clinical training in radiation oncology but also undertake a significant postdoctoral research project during their residency. This opportunity can be used not only to gain key research skills but also to develop a portable research project, which can be used to help the resident successfully transition into a career as an independent physician scientist.

The HRP has been evolving over the past decade with growing support in the field of radiation oncology (1). In

fact, an analysis of publications by radiation oncology trainees showed that residents in the HRP published twice the national average of abstracts and articles compared with other radiation oncology residents (2). Many residency programs at large academic medical centers now have at least one HRP Fellow in their resident pool. As the number of HRP Fellows continues to grow there is concern that the field of radiation oncology is not fully prepared to absorb the HRP Fellows as physician scientist faculty members when they complete their training (3).

Although there have been reports describing the HRP (1, 3), no surveys have been reported that collect data from HRP trainees themselves to define the characteristics of this group, catalogue their views of the pathway, and assess this group's ultimate career goals. To accomplish these aims, we performed a survey of the HRP Fellows in radiation oncology.

HOLMAN FELLOWS AND CLINICAL TRAINING

With the help of the American Board of Radiology (ABR), a survey was sent to HRP trainees in the field of radiation oncology. Trainees in diagnostic radiology were not included in this survey. The results described below are based on 33 responders out of a possible pool of 51 radiation oncology residents and HRP graduates in the fall of 2009. The responders were in different phases of their radiation oncology training; almost half had completed residency training. The majority (93%) of responders completed M.D./Ph.D. degrees. Only one Fellow reported not feeling well trained clinically. The ability to receive strong clinical training within the abbreviated 27 months of clinical rotations is reflected by pass rates on the ABR examinations: over 95% of HRP Fellows passed clinical

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The authors are supported by grants from the National Cancer Institute including K08 CA 114176 (D.G.K.) and K08 CA 124484 (J.B.W.).

Conflict of interest: none.

Acknowledgment—The authors thank Dr. Paul Wallner for critically reading this manuscript.

Received Nov 15, 2010, and in revised form Jan 4, 2011.
Accepted for publication Jan 10, 2011.

written and oral board examinations on their first attempt. It should be noted that most Fellows described their training programs as clinically very busy. Therefore, adequate clinical training during the 27-month clinical block may depend on exposure to a sufficient number and variety of cases.

LABORATORY TRAINING

Approximately half of the responders had applied to the HRP during their internship year. Most of the remaining responders applied during their first year of radiation oncology training (PGY-2), which is consistent with the current recommendation of the ABR. Half of the HRP Fellows chose a laboratory outside of radiation oncology, but all were given options to train in laboratories outside of their home departments. The majority (90%) started the research arm of the program during their second year of residency (PGY-3). All agreed that ideally the research should begin no sooner than the start of the second year of radiation oncology residency. During their research time, 87% performed clinical duties fewer than 10 hours a week, which is consistent with the ABR guidelines. All Fellows reported feeling scientifically well trained. However, many felt that 21 months was not sufficient time to complete a postdoctoral program and develop a project on which to start their own laboratory. Therefore, some HRP Fellows continued working in the same laboratory during their first faculty position, so that their research projects could mature. Other Fellows extended their postdoctoral training by continuing their research when they returned to clinical training, most commonly for the final 12 to 15 months of residency. In general, most Fellows continued their research project during this time by relying on a research technician, who was supplied by the research mentor or supported by grant funding obtained by the Fellow. The Fellows were quite active and successful in obtaining grant funding; 89% received internal and/or external funding before completing residency.

CAREER PLANS

The great majority of HRP Fellows surveyed (97%) indicated that they wanted to pursue a career in academic medicine; one responder planned to go into industry. 97% of the Fellows planned to stay involved in research; 93% wanted to establish their own independent laboratories. All these Fellows desired to be involved with patient care, but they universally indicated that a time commitment of less than 50% for patient care would be most desirable to maximize the likelihood of success in research.

For the 16 responders who had graduated from the program at the time of this survey, 57% were offered positions as assistant professors and 43% as instructors in academic medicine. Only 1 of these 16 graduates accepted a position in private practice, and the other 15 accepted positions in academic medicine. The Fellows who moved to a new institution were offered their own laboratory space and startup

package (*i.e.*, funds for supplies, technicians, salary support). The 13% of Fellows who continued their postdoctoral programs by remaining in the same laboratory after completing residency did not receive a full startup package, but they did have the opportunity to care for patients as an attending physician. For the Fellows hired as physician scientists, the amount of clinical commitment for the position varied significantly: 50% of the Fellows had less than 25% clinical time with at least 75% effort devoted to research, 42% of the Fellows had between 25% and 50% clinical time, and 8% had clinical responsibilities that were more than 50% of their work week.

CHALLENGES FACING PHYSICIAN SCIENTISTS IN RADIATION ONCOLOGY

In its first decade, the HRP has proved to be an effective method of training radiation oncology residents to be independent physician scientists. The initial cohort of graduates are now part of the junior faculty at several academic medical centers, where they not only care for patients but also successfully compete for extramural funding to support their laboratories. Of course, the HRP is not the only way for radiation oncology residents to become successful independent physician scientists. Several of our colleagues completed the traditional residency program with a 12-month block for research and have successfully established their own laboratories, which now have extramural funding. There is no one path that will be right for every trainee who aspires to a career as a physician scientist in radiation oncology. To be successful, however, each resident must develop an independent research project on which to build a laboratory and compete for grant funding. Although this has successfully been accomplished in as little as 12 months within the context of a traditional radiation oncology residency, Fellows in other oncology subspecialties typically spend several years obtaining postdoctoral research training before starting their own independent laboratories. Therefore, residents in radiation oncology may also need more than 12 months of research to develop a project with which to launch their own laboratory. The HRP is one mechanism to give radiation oncology residents additional research time to achieve this goal. Even with the 21 months of research time within the HRP, some Fellows may need additional time for their research project to mature. In these cases, academic departments and HRP Fellows should work to create positions that include patient care and an opportunity to continue their research project within a mentored environment. Although this path will delay the time when the Fellow establishes an independent laboratory, in the long term the extra time in a mentored position may increase the probability that the Fellow will build a laboratory that is sustained with external funding.

Once the Fellow has developed a system in which to build an independent laboratory, he or she will need to obtain a faculty position with protected time for research, laboratory space, and a startup package. As the field of radiation

oncology attracts and develops a growing number of physician scientists it will be important for departments to create

these kinds of positions to retain physician scientists to help generate new knowledge upon which our field can grow.

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