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Out of the Basement and Into the Classroom: Pathways for Expanding the Role of Radiation Oncologists in Medical Student Education

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Abstract

Purpose—To characterize radiation oncologist involvement in undergraduate medical education at US academic medical centers and to incorporate these findings into practical pathways for greater and broader integration of radiation oncology (RO) into medical curricula.

Methods—Chairpersons and residency program directors at RO departments directly affiliated with a medical school were asked to describe all the ways in which radiation oncologists in their department are involved in medical student education, excluding their elective clerkship.

Results—Of 75 eligible departments, 49 responded (response rate 65.3%). Twenty departments (40.8%) reported that at least one faculty member participates in a curricular educational session on an oncology-related topic. Twelve (24.5%) of these sessions were focused specifically on RO. Twenty-one departments (42.9%) had faculty involved with organized clinical shadowing or preceptorship programs for first- and second-year medical students. Twelve departments (24.5%) described no involvement in the formal curricula at their local or affiliated medical school. Thirteen departments (44.8%) described participation in a medical school–organized residency fair, and 12 departments (41.4%) sponsor an RO interest group. Reported novel approaches to teaching included development of multidisciplinary clerkships or educational sessions that include RO concepts, guest lectures on RO during a required clerkship, organized extracurricular experiences such as an oncology seminar series, participation in special medical student enrichment programs, and sponsorship or initiation of an RO interest group.

Conclusion—The minority of RO departments are involved in formal teaching of the medical student body at large. The approaches described herein should facilitate more robust involvement of radiation oncologists in all areas of undergraduate medical education.

Keywords

Undergraduate medical education; radiation oncology; medical student; curriculum

INTRODUCTION

Radiation therapy is an important component of multidisciplinary cancer management, yet the average US medical student learns little, if anything, about radiation oncology (RO) during medical school [1–3]. It is not surprising that a field that begins as a relative unknown to most medical students is likely to remain a mystery to most practicing physicians [4], and the downstream implications of a lack of knowledge about how radiation can benefit patients may be manifold, including inappropriate referral patterns, improper treatments, false attribution of toxicities, and poor visibility of RO in national health policy decision making [5–9]. However, integrating radiation oncologists into undergraduate medical education, even in a general context through teaching basic principles of neoplasia or general clinical oncology, is not necessarily a straightforward task. For instance, most institutions have fewer radiation oncologists than medical or surgical oncologists, who in turn may also have more “natural” access to educational opportunities through their affiliations with the required internal medicine and general surgery clerkships, respectively. Pathologists or nonclinician research scientists may also be more likely to be invited to teach pathophysiologic concepts [2]. Because RO is a smaller and highly specialized field of medicine, it is not often tested on US licensing examinations, and because it is a relative “black box” for many doctors, including those making key decisions on curricular design, it may not be regarded highly enough to be incorporated into the curriculum. Finally, unlike tumor board conferences, most medical schools lack any formal mechanism to encourage multidisciplinary involvement in education.

The goal of this study is to better characterize the ways in which radiation oncologists at academic medical centers throughout the United States are currently involved in undergraduate medical education and to summarize these findings into practical pathways to assist other radiation oncologists in achieving improved integration of RO into the medical curricula at their home institutions.

MATERIALS AND METHODS

Between October and December 2016, a personalized e-mail was sent to all department chairpersons and program directors at each of the RO residency training programs in the United States, requesting a free text response detailing all of the ways in which radiation oncologists in their departments are involved in medical student education, excluding information on elective rotations because it was presumed that all academic RO departments would offer this experience and much has been published on it previously [10–12]. Participants were asked to consider both oncology-specific and general medical education and to include any details regarding the topic, format, and context of these activities. Details of research and career mentoring were not specifically requested; however, because many participants considered these areas to comprise a major component of medical student

education and elected to provide detailed responses on these topics, the results are included herein.

The findings were predominantly qualitative, with the responses of each RO department organized into three general domains of education: clinical, research, and career mentoring [13]. Where applicable, description of the teaching context for first-through fourth-year medical students is included. Descriptive statistics were also used to summarize relevant quantitative data. Only departments that were directly affiliated with a medical school located in the same municipality were included in the analysis because only these would have a reasonable opportunity to educate medical students outside of a clinical clerkship offered in their department. This study was exempt by the West Virginia University institutional review board.

RESULTS

Of the 75 eligible academic RO departments, 49 submitted a response (response rate 65.3%, with an 8.3% margin of error at 95% confidence interval). Table 1 summarizes our findings, highlighting creative approaches to integrating RO into medical student education when barriers to more conventional approaches might exist. Notably, only 41% of departments reported any faculty participation in a curricular educational session on an oncology-related topic, and only 25% of these were focused specifically on RO. Twenty-five percent of departments described no involvement in the formal curricula at their local or affiliated medical school. Research mentorship seemed in many cases to be the departments' most significant contribution to medical student education, with the means of forming the initial mentormentee connection most commonly stemming from a summer research program coordinated and funded by the medical school for students between their first and second years of medical schooling. Career mentorship activities included working with the office of student affairs to make sure applicants are competitive, conducting mock interviews, helping with rank lists, sharing advice on transition to internship, and attending the white coat ceremony and graduation. Several departments also participate in a RO interest group (ROIG), which most commonly sponsors one to three meetings per year that might involve discussions about RO practice, career counseling, radiation biology or physics, brachytherapy, radiosurgery, or a journal club. Some ROIGs host lunch or dinner informational tours in the department, and one particular ROIG has won the American Society of Clinical Oncology Cancer Interest Group Award for the past 2 years, largely for its implementation of a 4-day oncology seminar series with multidisciplinary speakers discussing career options, patient care, and research.

DISCUSSION

RO as a specialty suffers from a crisis in identity, and at times even reputation, among those outside of our field. If that is to change, it is incumbent on radiation oncologists to take ownership over the dissemination of knowledge about our value in patient care and the oncology team. Many radiation oncologists want to teach, but the vast majority of our teaching is dominated by the medical student clerkship in RO and mentored research projects, both of which are important but neither of which reaches an appreciable percentage

of a medical school class. Many radiation oncologists may not even know where to begin to get involved in other meaningful ways. This study is, to our knowledge, the first to characterize the approaches academic radiation oncologists use to engage medical students, highlighting creative solutions to overcome natural barriers to progress and increase students' exposure to and engagement in the field.

It is important when interpreting our findings to understand that the data were collected in a flexible free-text format rather than a more structured electronic survey given the wide variability of curricular approaches to undergraduate medical education and also to be more sensitive in identifying the full breadth of educational methods employed. However, the limitation of our qualitative approach is that because participants were not prompted to respond to specific educational approaches, some degree of underreporting of content is likely, due to recall bias or lack of awareness of all of their colleagues' activities. Reporting of research and mentorship may have been particularly affected by this because these were not specifically mentioned in the recruitment e-mail. However, the percentages of those who engage in specific types of activities within these realms is likely accurate. We expect that the levels of involvement for clinical education activities are also relatively accurate because they are consistent with other reported estimates that radiation oncologists are infrequently involved in clinical teaching [1–3]. Another limitation of the study was our exclusion of RO programs that are affiliated with a medical school but lack an RO residency program. This could have the opposite effect of overstating involvement of radiation oncologists at the average medical school because RO departments with a residency program may be more likely (on average) to contain faculty members with an interest in teaching than RO departments that do not have a residency program. Furthermore, those chairpersons and program directors with greater interest in education may have been more likely to reply. The high response rate among surveyed departments is a particular strength of the study.

The primary goal of this study was to stimulate radiation oncologists to take action at their home institution, and the specific approaches described herein should facilitate that process. However, we also hope to galvanize the American Society for Radiation Oncology and other radiation societies to take more interest in this topic because RO organizations, to our knowledge, are currently minimally involved with outreach to spread knowledge about radiation therapy to medical students entering other fields, something that is likely to be a more productive investment of resources than efforts to assuage and combat indoctrinated biases and misperceptions about our specialty that may be acquired later during training. The ACR has recently started including RO in the AMA clinical skills workshop for medical students. We encourage other societies to create a forum for radiation oncologists with specific interest in this topic to facilitate sharing of ideas, with the goal to develop formal recommendations for how RO as a field should be interfacing with the broader medical education curriculum. Ultimately, though, those concrete recommendations may not be feasible in every curriculum or find an amenable audience in every course or clerkship director, whereas the more flexible approach of offering a set of possibilities that can be tailored to one's circumstances may be most successful in the long run.

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TAKE-HOME POINTS

- Radiation oncologists are active contributors to medical student research and career mentoring, but few departments are involved in more formal teaching of the student body on either general oncology or RO topics.
- Novel approaches to teaching included development of multidisciplinary clerkships or educational sessions that include RO concepts, guest lectures on RO during a required clerkship, organized extracurricular experiences such as an oncology seminar series, participation in special medical student enrichment programs, and sponsorship or initiation of an ROIG.
- The approaches described herein should facilitate more robust involvement of radiation oncologists in all areas of undergraduate medical education.

Table 1

Summary of approaches to clinical, research, and career education for medical students

Category	Passive or Conventional Approaches	Active or Creative Solutions
Clinical	<ul style="list-style-type: none"> • Offer the standard radiation oncology elective clerkship to MS4 students. • Rely on students to seek you out for shadowing opportunities independent of any formal program. • Speak as an invited lecturer on radiation oncology for MS1-2 students (25%). • Serve as a small-group mentor in established nononcology course (12%; eg, PBL, doctoring course, health care ethics). 	<ul style="list-style-type: none"> • Work with curriculum committee to allow a 1- to 2-week “selective” for MS3 (or MS2) students to give early exposure to interested students (16%). • Develop a multidisciplinary oncology clerkship (<5%). • Offer shadowing opportunities to MS1-2 students through curricular preceptorship (43%). • Create novel shadowing experience at multidisciplinary tumor board (<5%) [14]. • Explore opportunities for exposing students to radiation oncology through other preclinical topics (16%; eg, anatomy, pathophysiology) [15,16]. • Create novel student experiences that incorporate radiation oncology (<5%; eg, oncology PBL case or mock tumor board). • Offer a guest lecture on radiation oncology topic during a required clinical clerkship (<5%). • Organize extracurricular experience for interested students (<5%; eg, a summer seminar series). • Participate in high school, college, or masters courses (<5%; eg, research methodology, nuclear engineering, or radiographic anatomy).
Research	<ul style="list-style-type: none"> • Wait for students to find you as a research mentor without any advertising or promotion. • Rely on university or dean’s office to provide all student funding for research. • Involve students in clinical research only. 	<ul style="list-style-type: none"> • Advertise available research projects to students, especially in contexts where they can get funding from the university or dean’s office (eg, summer between MS1-2, or undergraduate opportunities). • Provide departmental funding incentives for students with significant involvement in research or presentation of abstract at national meeting (11%). • Match funding from dean’s office or outside grants (7%; eg, RSNA medical student grant). • Seek involvement in medical or doctoral student thesis committee (11%).
Career	<ul style="list-style-type: none"> • Advise MS3-4 students planning to apply for radiation oncology residency. • Speak at oncology interest group (31%). • Speak at medical school’s residency fair (45%). 	<ul style="list-style-type: none"> • Advise students at all levels of medical school with any level of interest in radiation oncology. • Develop a radiation oncology interest group (41%). • Organize a stand-alone event for students interested in learning more about radiation oncology (10%). • Develop special enrichment programs geared toward leadership, humanism, or research (7%).

The numbers in parentheses (where applicable) represent the percentage of departments in this study that described at least one faculty member being engaged in the given type of experience. MS = years of medical school; PBL = problem-based learning.