

Structured Radiation Oncology Clerkship Curricula: Evaluating the Effect on Residency Applicant Knowledge of Radiation Oncology

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PROBLEM

National surveys conducted in 2012 and 2013 of students applying to radiation oncology residency revealed a high degree of variability in radiation oncology clerkship educational experiences [1,2]. The majority of clerkships had no structured didactic curricula, but students who completed clerkships that included structured didactics reported greater self-perceived preparedness for radiation oncology residency. In response, a structured didactic curriculum was developed and piloted at two institutions [3]. With the formation of the Radiation Oncology Education Collaborative Study Group, the curriculum was expanded to 22 institutions by 2016. Subjective feedback from participating students was positive, and students who completed at least one clerkship at a Radiation Oncology Education Collaborative Study Group institution reported greater postclerkship radiation oncology knowledge and preparedness for residency [4]. However, this evidence was subjective. Additionally, with the majority of medical students completing their radiation oncology clerkships at the start of their

fourth year, several months pass before residency, which may degrade any impact provided by a structured curriculum. Do radiation oncology clerkships with structured didactics provide an objective improvement to student knowledge that is retained beyond the clerkship experience?

WHAT WE DID

An anonymous, Internet-based survey and knowledge assessment was developed with input from radiation oncology faculty members and senior radiation oncology residents. Study data were collected and managed using Research Electronic Data Capture. These electronic data capture tools are hosted at the University of Chicago [5]. The survey was divided into two sections (see [Supplementary Material](#), available online). The first section collected baseline demographic information and contained questions to characterize respondents' radiation oncology experiences before beginning radiation oncology clerkships. The second section collected details regarding the curricula of each clerkship completed and asked whether respondents completed a clerkship with a formalized lecture

curriculum designed for medical students. To maintain anonymity, respondents were not asked to identify institutions by name. Branching logic was used in the survey to elaborate on specific responses. Therefore, the total number of survey questions varied depending on individual responses.

The knowledge assessment consisted of multiple-choice questions (MCQs) covering general radiation oncology knowledge, radiation biology and physics, simulations and emergencies, and treatment planning. An initial pool of 66 MCQs was developed with input from multiple stakeholders: a radiation oncology program director, a radiation oncology medical student clerkship director, a radiation oncology resident, and a medical student. The 66 MCQs were piloted with nine postgraduate year 2 to 5 radiation oncology residents. Questions with a resident proportion correct of 0.9 to 1.0 were deemed to be basic enough for a knowledge assessment at the medical student level. Feedback and performance data were used to identify 26 MCQs for inclusion in the assessment. Calculation of individual item statistics, option statistics, point biserial correlation, and test reliability

(determined by Kuder-Richardson coefficient) was used to determine the final set of MCQs to include in performance analysis (see [Supplementary Material](#), available online).

The survey and knowledge assessment were estimated to take 30 minutes to complete. Respondents were permitted to save their responses and to return at a later date. Only fully completed surveys and knowledge assessments were used in data analysis. Survey invitations were e-mailed after the 2016 US National

Resident Matching Program (NRMP) rank-list deadline (February 26, 2016) to all applicants to a single radiation oncology residency program. Participants had 16 days to complete the survey. Three automated reminder e-mails were sent to invited participants who had not completed the survey. The survey was closed March 13, 2016, before the NRMP match day, to avoid any impact of match results on survey responses.

Statistical analysis was performed using Stata version 14 (StataCorp,

College Station, Texas). Descriptive statistics were used to report general clerkship experiences. Using unpaired single-tailed *t* tests, the knowledge assessment performance of students who completed radiation oncology clerkships that incorporated formalized medical student lecture curricula (“curriculum students”) was compared with that of noncurriculum students. Effect size was calculated using standardized mean difference: [(mean performance of curriculum students) – (mean performance of

Table 1. Demographics and respondent characteristics

Variable	All Students	Curriculum Students	Noncurriculum Students	<i>P</i>
Total	78 (100)	35 (100)	43 (100)	
Medical school education track				
MD	61 (78.2)	28 (80.0)	33 (76.7)	.485
DO	1 (1.3)	1 (2.9)	0 (0.0)	
MD/PhD	16 (20.5)	6 (17.1)	10 (23.3)	
Medical school location				
United States	78 (100)	35 (100)	43 (100)	
Gender				
Female	19 (24.4)	7 (20.0)	12 (27.9)	.459
Male	58 (74.4)	27 (77.1)	31 (72.1)	
Does your medical school hospital or a hospital directly affiliated with your medical school have a radiation oncology residency program?				
Yes	55 (70.5)	24 (68.6)	31 (72.1)	.734
Prior radiation oncology experience				
Worked in a radiation oncology department conducting research	48 (61.5)	23 (65.7)	25 (58.1)	.494
Spent time in a radiation oncology department shadowing physicians	55 (70.5)	23 (65.7)	32 (74.4)	.402
Had a lecture on radiation oncology during preclinical years	29 (37.2)	14 (40.0)	15 (34.9)	.642
Other radiation oncology experience	14 (17.9)	4 (11.4)	10 (23.3)	.176
Prior to your first rotation, you had no radiation oncology clinical or research experience	12 (15.4)	6 (17.1)	6 (14.0)	.698
Radiation oncology clerkships (including home institution)				
1	9 (11.5)	3 (8.6)	6 (14.0)	.898
2	17 (21.8)	7 (20.0)	10 (23.3)	
3	39 (50.0)	19 (54.3)	20 (46.5)	
4	10 (12.8)	5 (14.3)	5 (11.6)	
≥5	3 (3.8)	1 (2.9)	2 (4.7)	
Prior to beginning your first radiation oncology rotation, were you definitely going to apply for a radiation oncology residency position?				
Yes	41 (52.6)	18 (51.4)	23 (53.5)	.856

Note: Data are expressed as number (percentage).

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