EDITORIAL

Top Concerns of Radiation Oncology Trainees in 2019: Job Market, Board Examinations, and Residency Expansion

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Radiation oncology (RO) is a dynamic and rapidly changing field. Residents are uniquely positioned to identify issues relevant to graduate medical education and the future workforce. As the elected members of the Executive Committee for the Association of Residents in Radiation Oncology (ARRO), we communicate with the larger RO community about the issues that residents identify as being the most pressing. ARRO recently sent a brief survey to registered American Society for Radiation Oncology (ASTRO) members-in-training (N = 710) asking them to rank in order any (or all) of 14 specified issues that “concern[ed] them as radiation oncologist[s].” Responses were received from 179 individuals from April 4th through May 10th (response rate = 25.2%). The top 3 concerning issues (Fig. 1), by rank order, were the job market (91%), the American Board of Radiology (ABR) qualifying (written) examinations (85%), and residency expansion (84%). Other issues identified by trainees included oral boards, declining reimbursement, variability in training programs, and fellowship expansion. Additional free-text concerns were submitted by 90 trainees. The top 2 themes included clinical relevance of board certification examinations (n = 17) and trust in leadership (n = 11). Here, we will briefly discuss the top 3 issues.

Job Market

The principal concern identified by residents was the job market (Fig. 1). Not only did 91% of residents rank the job market as “a concerning issue,” but 72% ranked it as 1 of the...
top 3 “most concerning issues.” Consistent with this, the recently published ASTRO Workforce Study reported that a majority (52.9%) of practicing radiation oncologists are concerned about an oversupply of practitioners. Like many practicing physicians, residents are concerned about declining reimbursement, market saturation in desirable geographic regions, and appropriate utilization of midlevel providers. For many years, ARRO has been gathering data reflecting the perception of the job market among graduating residents. The ARRO chief resident survey asks senior residents to compare their job search experience with former residents in their programs. In surveys collected from 2016 to 2018 (Fig. 2), 9% (n = 12) of respondents reported that the current market was “slightly less competitive,” 39% (n = 54) reported it was “equally competitive,” 32% (n = 44) reported it was “slightly more competitive,” and 20% (n = 28) reported it was “much more competitive.” Free-text responses suggested that residents may prioritize location (ie, geographic region, city population size), type of practice, or salary over other job quality metrics. This is supported by a survey of recently graduated RO residents, which found that graduates strongly prefer jobs that are located in large cities (population >500,000) and that specific geographic regions, such as the Midwest, are considered to be less desirable. Importantly, however, 72% of trainees were offered a position consistent with the applicant’s preferred region, job type, or city population size, and 56% received a position consistent with all of their preferences. In our 2016 to 2018 chief resident survey, we also found that 88% of respondents received their “first choice type of job.” It is worth noting that this survey did not further clarify “type” of job and was sent only to chief residents in each residency class.

To evaluate the current status of the job market, we queried the number of job postings that advertised for a full-time “radiation oncologist” in the United States using the ASTRO Career Center during 2018 (nonphysician positions, part-time/locums positions, and positions without a specific geographic location were excluded). This query yielded 219 unique positions offered in 166 different locations throughout the calendar year. This number is similar to the 211 unique positions posted during the 2016 calendar year, as previously reported. Interestingly, a majority of jobs were either located in the Midwest (n = 51, 23.7%) or South (n = 60, 27.4%), reflecting a potential mismatch in positions sought (ie, West Coast) versus those that are currently offered. Figure 3 gives the geographic distribution of all posted positions by job type in 2018, including an additional 38 part-time jobs, locums, or instructor positions, for a total of 257 unique postings. Accurate information regarding the distribution of available jobs is important to graduating residents and medical students considering RO. Although the ASTRO Career Center is considered to be the most extensive list of available RO employment opportunities in the United States, results of the Practice Entry Survey (2012-2017) reported that 77% of graduates find jobs through other means.

Aside from geography, another potential factor contributing to concerns regarding the job market is the dramatic shift in the distribution of job type over the past 2 decades. In 2002, the ASTRO Workforce Study found that 76% of respondents worked in private practice with only a minority working in an academic (17%) or alternative (7%) setting. The 2017 Workforce Study found quite a different landscape with only 38% of respondents working in private practice and a large increase in the number of respondents working in an academic (41%) or nonacademic hospital (17%) setting. These shifts potentially affect job quality metrics, including autonomy, earning potential, and advancement opportunities, that may be important to current and prospective residents.

Labor markets are highly complicated and elastic; ARRO does not purport to have the single or best solution, yet we believe all stakeholders can agree that continuing to attract exceptional medical students to our field is important. The results of the 2019 Match may forebode a change in both the number and quality of applicants moving forward. Although numerous factors may influence an individual’s choice of specialty, it is not unreasonable that employment projections and assumptions regarding geographic flexibility may be important to many medical students. For those competitive applicants who are weighing the pros and cons of 2 specialties, it is conceivable these concerns may tip the scale. As a result, clarification of this issue and action toward its resolution should be made a priority.

**Board Examinations**

The 2018 ABR qualifying examination pass rates for radiation and cancer biology and radiation physics were 74% and 71%, respectively. These rates represent statistically significant decreases from the mean pass rates of 92.9% (P < .001) and 89.7% (P = .002), respectively, reported from 2005 through 2017 (Table 1). More than one-third of the 2019 graduating class, therefore, will retake 1 or both examinations 1 day before the clinical RO written examination. This represents a significant burden both in time and emotional energy at the cost of time spent mastering clinical RO during the final postgraduate training year. A number of individual residents have shared with ARRO their feelings of hopelessness, anxiety, and shame related to the 2018 examination results. Although a rigorous board certification process purports to ensure a minimum standard of competency and encourages public trust in practicing radiation oncologists, many residents are now questioning the process of examination development and validation, as well as the clinical relevance of these examinations.
Based on this feedback, ARRO submitted several letters directly to the ABR discussing these concerns, which are available on our website. We acknowledge the collaborative efforts by ASTRO and the ABR to provide a list of topics in preparation for the 2019 examinations. Unfortunately, the results of this survey, as well as recent communication with our constituents, indicate that concerns persist nearly a year later. As recently noted by Lee and Amdur, a greater number of hours in the board certification examinations for RO are devoted to the testing of the basic sciences than to clinical RO. This is not to deny the critical relevance of these subjects to our specialty, nor the need for residents to demonstrate mastery of this material. This emphasis, however, necessarily comes at the expense of other subjects that are relevant to the practice of RO. Although the ASTRO Physics Core Curriculum...
Subcommittee publishes an updated curriculum every several years, there is no corresponding subcommittee for radiation and cancer biology or for clinical radiation oncology in general.

**Residency Expansion**

A 2010 publication forecasted a shortage of radiation oncologists owing to a projected increase in radiation utilization by 2020.\(^8\) Since this publication, American College of Graduate Medical Education (ACGME) accreditation has been granted to 14 new residency programs, comprising an additional 178 trainee positions. According to the National Resident Matching Program (NRMP), the number of positions offered annually in the Match has increased by 227% since 2001 (93 versus 211; \Figure\ 4).\(^9\) Although there are significant limitations to any future projections of supply and demand, this rapid increase in resident complement seems to exceed any projected increase in demand for radiation therapy.\(^10\) Although numerous publications have discussed this trend over the past 7 years, residents continue to express significant concern regarding the persistence of program expansion and a perceived disconnect by leadership regarding this subject. Feedback from members-in-training reflects the opinion that some training programs may not provide sufficiently rigorous training for independent practice or may not prioritize education over administrative tasks. With continued residency expansion and/or accreditation of new training programs, residents are at risk of inferior training secondary to insufficient number or variety of clinical cases, as well as inconsistent prioritization of resident education. The ARRO Executive Committee strongly believes that ACGME accreditation should not be an easily achievable designation. Accredited RO programs should demonstrate a high level of clinical expertise and academic productivity and a persistent prioritization of resident education. Although we were extremely heartened by the ACGME residency review committee’s efforts to propose changes to criteria for training program accreditation, RO residents have expressed hesitancy regarding several of the changes as written. A consensus response based on feedback from our constituents was submitted to the ACGME and has been made publicly available on the ASTRO/ARRO website. Overall, our comments focus on 2 primary themes: first, that any change(s) to the ACGME program requirements be considered in the context of relevant data (ie, ACGME case logs, association with relevant outcomes); and second, that any proposed change to the program requirements prioritize resident education and transition to independence (ie, RO milestones; practice performance measurements of competence).

More specifically, we propose several suggestions, including (1) specification of a maximum number of participating sites in addition to a program’s primary clinical site (ie, 3); (2) increasing the minimum percentage of time required to be spent at a program’s primary clinical site for core rotations (ie, from 50% to 60%-75%); and (3) specification of minimum numbers of site-specific (and total) definitive external beam simulations that must be performed before graduation. We appreciate the residency review committee’s efforts regarding this critical topic and look forward to subsequent proposals based on feedback from stakeholder organizations, medical educators, and the public.

**Fig. 2.** Perceived competitiveness of the job market by chief residents per the Association of Residents in Radiation Oncology Annual Chief Resident Survey, 2016 to 2018.
Moving Forward

The results of the 2019 NRMP revealed that 30 RO positions in 22 training programs went unfilled—nearly twice the highest unmatched rate seen over the last 15 years.11 Similarly, the number of US applicants (N = 163) decreased 16% from the median number that applied between 2014 and 2018 (N = 195). These numbers send a

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**Table 1**  Reported American Board of Radiology annual percentage pass rates for first-time resident examinees of the Radiation and Cancer Biology, Medical Physics for Radiation Oncology, and Clinical Radiation Oncology (written) qualifying examinations from 2005 to 2018

<table>
<thead>
<tr>
<th>Year</th>
<th>Radiation and cancer biology</th>
<th>Medical physics</th>
<th>Clinical radiation oncology</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>92%</td>
<td>84%</td>
<td>89%</td>
</tr>
<tr>
<td>2006</td>
<td>98%</td>
<td>92%</td>
<td>95%</td>
</tr>
<tr>
<td>2007</td>
<td>95%</td>
<td>85%</td>
<td>95%</td>
</tr>
<tr>
<td>2008</td>
<td>96%</td>
<td>95%</td>
<td>98%</td>
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<tr>
<td>2009</td>
<td>96%</td>
<td>89%</td>
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<tr>
<td>2010</td>
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<td>90%</td>
<td>96%</td>
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<tr>
<td>2011</td>
<td>97%</td>
<td>96%</td>
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<td>81%</td>
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<tr>
<td>2016</td>
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<td>95%</td>
</tr>
<tr>
<td>2017</td>
<td>89%</td>
<td>88%</td>
<td>84%</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>92.9% (3.8)</td>
<td>89.7% (5.9)</td>
<td>93.9% (3.9)</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td>94.0% (89.0-96.0)</td>
<td>90.0% (85.0-95.0)</td>
<td>95.0% (93.0-96.0)</td>
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<tr>
<td>2018</td>
<td>74%</td>
<td>71%</td>
<td>98%</td>
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<tr>
<td>Z-score (2018 vs 2005-2017)</td>
<td>5.3</td>
<td>3.1</td>
<td>−1.1</td>
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<tr>
<td>Two-sided P value</td>
<td>&lt;.001</td>
<td>.002</td>
<td>.29</td>
</tr>
</tbody>
</table>

*Abbreviations:* IQR = interquartile range; SD = standard deviation. Distribution of normality confirmed by the Shapiro test.
concerning message from medical students that the aforementioned issues are overshadowing the numerous aspects that make our specialty so rewarding.

The ARRO Executive Committee drafted a list of potential recommendations for each of these top 3 concerns. After group discussion, committee members were asked to vote on each recommendation to determine consensus. A member could choose to abstain from voting. A prespecified threshold of >80% positive votes (>7 of 9 members) was considered a high consensus, and a minimum of 50% positive votes (>4 of 9 members) was required to include a recommendation. In order of highest priority, these recommendations are as follows.

**Job market**

1) A commitment from the RO community to discourage predatory employment practices, including “instructor” positions and fellowships that duplicate what should generally be mastered during residency.

   **Priority:** High  
   **Consensus:** 88.9%

2) Continued advocacy for regulatory and payment policies that protect physician autonomy and the practice of RO.

3) Implementation of a prospectively maintained employment database of both active and closed job opportunities with data regarding location, practice type, benefits, and other pertinent details.

   **Priority:** Low  
   **Consensus:** 55.6%

**Board examinations and graduate medical education**

1) Re-evaluation among stakeholders of the structure and content of current board examinations, including consideration of combining the written qualifying examinations into 1 examination.

   **Priority:** High  
   **Consensus:** 100%

2) Institution of an ASTRO subcommittee of graduate medical education charged to develop and maintain a comprehensive RO curriculum.

   **Priority:** Medium  
   **Consensus:** 77.8%
Residency expansion

1) Revision of the ACGME common program requirements, based on evaluable and meaningful outcomes, with more rigorous standards for accreditation of a residency training program, as well as the prioritization of resident education and transition to independence.

Priority: **High**
Consensus: **88.9%**

2) Commitment from each program to maintain high standards in resident selection for positions filled both inside or outside of the Match (ie, demonstrated commitment to RO).

Priority: **High**
Consensus: **88.9%**

3) Self-imposed temporary hold on RO residency program expansion.

Priority: **Medium**
Consensus: **77.8%**

4) Commitment from each program to strongly consider contracting the number of resident positions.

Priority: **Medium**
Consensus: **75%**

We are mindful of the enormous effort required for implementation of these recommendations. This is not the first time that our specialty has called for a hold on residency program expansion, or for individual programs to contract the number of positions offered in the NRMP Match (Fig. 4; see Hussey et al12).13 Indeed, we are not even the first to make many of these recommendations.14 To date, there has been significant discussion regarding these concerns, but little consensus reached to drive change. This is our effort, on behalf of residents nationwide, to create momentum for positive change.

References