Association of preresidency peer-reviewed publications with radiation oncology resident choice of academic versus private practice career


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Abstract

Introduction: The decision of radiation oncology residents to pursue academic versus private practice careers plays a central role in shaping the present and future of the field, but factors that are potentially predictive of this decision are lacking. This study was performed to examine the role of several factors publicly available before residency on postresidency career choice, including preresidency peer-reviewed publications (PRPs), which have been associated with resident career choice in comparably competitive subspecialties such as neurosurgery.

Methods and materials: Using a combination of Internet searches, telephone interviews, and the 2015 Association of Residents in Radiation Oncology directory, a list of 2016 radiation oncology resident graduates was compiled, along with their postresidency career choice. PRP was defined as the number of PubMed publications encompassing the end of the calendar year (2010) in which residency applications were due; this number was then correlated with career choice.

Results: A total of 163 residents from 76 Accreditation Council for Graduate Medical Education–certified programs were examined: 78% were male, 22% were MDs/PhDs, and 79 graduates (48%) chose academic careers. Fifty-two percent of graduates had at least 1 PRP at the time of application to radiation oncology residency; 35% had more than 1 PRP. Regarding career choice, the difference between 0 and 1+ PRP was statistically significant (odds ratio, 3.3; P < .01), but not between 1 and >1 PRP. Sex, PhD, or non-PhD dual degree status were not associated with career choice.

Conflicts of interest: None.

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Conclusions: Radiation oncology residency graduates with 1 or more PRPs at the time of residency application were roughly 2 times more likely to choose an academic career as their initial career choice than graduates with no preresidency PRPs. This information may prove useful to medical students, medical school advisors, and residency program directors and deserves further prospective investigation.

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Introduction

A significant factor in shaping both the present and future of radiation oncology is the decision of radiation oncology residents to pursue academic versus private practice careers. Despite the importance of these decisions, there is a paucity of factors potentially predictive of resident graduate career choice decision making in the peer-reviewed literature. Ideally, such factors should be both prevalent before residency (to most reliably replicate the period during which decisions are made regarding applicant acceptance into radiation oncology residency) and easily accessible. This study was performed to examine the role of several factors publicly available before residency on postresidency career choice, including preresidency peer-reviewed publications (PRPs), which have been associated with resident career choice in comparably competitive subspecialties such as neurosurgery.

Methods and materials

Identification of participants

This analysis focused on 2016 graduates from radiation oncology programs certified by the Accreditation Council for Graduate Medical Education (ACGME) Residency Review Committee. Name, sex, graduate degree, and career choice (academic vs private practice) were identified predominantly through Internet searches, telephone inquiries, and the 2015 Association of Residents in Radiation Oncology (ARRO) directory.

Definition of academic and private practice radiation oncology career choices

This study defined an academic radiation oncology choice as an attending staff position or postresidency fellowship directly affiliated with an ACGME-certified radiation oncology residency program. All other career choices were considered private practice, including positions with peripheral but not direct affiliation with ACGME-certified radiation oncology residency programs.

Determination of PRP was made using the PubMed database (http://www.ncbi.nlm.nih.gov/pubmed) and was defined as the number of publications up to the end of the calendar year in which residency applications were due. For example, because residents graduating in 2016 applied in 2010 to begin their postgraduate year 2 in 2012, PRP was defined as the number of publications through the end of 2010. PubMed reviews were augmented by Internet searches for resumes and colleges of graduation in order to optimize the identity of the resident. Each graduate was defined as having no PRP, 1 PRP, or >1 PRP.

The data were then coalesced for statistical analysis; the $\chi^2$ test for nominal data was performed to evaluate the relationships between each of the variables and career choice, with statistical significance assigned at $P < .05$ (GraphPad Software, San Diego, CA). For variables reaching statistical significance, odds ratios were calculated with an accompanying 95% confidence interval (MedCalc Software, Belgium).

Results

Demographic details of the 163 graduates (from 76 ACGME-certified residency programs) analyzed in this study are provided in Table 1; of note, 78% of graduates were men and 22% were MD/PhD. Details of graduate career choice stratified by PRP number are provided in Table 2; 48.5% of graduates chose academic careers.

Radiation oncology resident graduates with at least 1 PRP were more likely to choose an academic over a private practice career ($P < .01$); however, there was no difference in career choice between graduates with 1 PRP versus those with more than one. Similarly, there was no statistically significant difference in career choice between graduates with dual degree versus MD, MD/PhD vs MD, non-PhD dual degree vs MD/PhD, or male versus female gender.
sex (Table 3). The odds ratio between graduates with or without a PRP regarding choice of academic career was 3.3 (95% confidence interval, 1.8-6.4).

Discussion

The goal of this study was to examine easily reproducible objective measures (preresidency PRPs, gender, dual degree status, MD/PhD) using a widely accessible medium (PubMed) and an objective outcome (initial career choice) as potential predictors of career choice for a radiation oncology residency applicant. The most recent ACGME public report states there are 92 ACGME-approved radiation oncology residency programs comprising 757 on-duty residents (roughly 190 residents per year); our study population included 76/92 programs (82.6%) and roughly 163/190 graduates (85.8%). Our findings indicate that residency graduates with at least 1 PRP were roughly 2 times more likely to choose academic over private practice careers, whereas neither sex nor degree status was predictive of subsequent career choice. The easily verifiable aspect of PRP via PubMed search allows it to protect radiation oncology residency program directors from being deceived by potential applicant misrepresentation of peer-reviewed research, as has been the case in specialties such as radiology, orthopaedic surgery, emergency medicine, and pediatrics. Our findings indicate that PRP may be at least as important as, if not more important than, dual degree status or gender for program directors to consider when attempting to predict whether radiation oncology applicants will ultimately choose academic versus private practice careers. These results also highlight the need for training programs to assess their goals for residents: for programs desiring to train future academic radiation oncologists, it is likely that they should look for residency applicants with at least 1 PRP at the time rank lists are being made.

Limitations

This study has several limitations, the first of which is its retrospective nature, which limits the conclusions that can be drawn from the relationship between PRP and radiation oncology residency graduate career choice. Second, the data did not include every graduating resident from the class of 2016 because the information regarding career choice was obtained predominantly through Internet searches and the 2015 ARRO directory; this may have falsely skewed the data toward an academic career choice because academic radiation oncology tends to have a more visible Internet presence (and be more likely composed of residents registered as members of ARRO) than does private practice. Supporting this criticism, nearly 49% of the graduates in this study chose academic careers, which is more than 20% higher than the rate quoted in a survey-based study of radiation oncology chief residents over a recent 2-year period; however, a survey of 2014 graduates revealed a 41% rate of academic career choice, which is more consistent with our findings. Another limitation is the reliance of this study on PubMed to accurately reflect PRP for each graduate; hence, graduates who change their surname (more common with some female trainees) may underestimate academic output. Also, the increasing number of open-access journals over the past decade (many of which are not yet listed in PubMed) makes it possible that applicants who had published in any of these journals would not have been counted and thereby falsely recorded as having no PRP. Furthermore, this study focused only on US programs; therefore, these results may not be as applicable in other countries with differing financial and political climates regarding academic versus private practice radiation oncology. Graduates who leave an academic job for private practice and vice versa are another potential confounder. Finally, our analysis is unable to account for the fact that there may not be enough academic positions for individuals who wish to pursue that career path, because most full-time positions are not in academia. Future studies will be necessary to determine whether

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**Table 2** Distribution of radiation oncology graduate career choices based on number of preresidency PRPs

<table>
<thead>
<tr>
<th>PRP number</th>
<th>Radiation oncology graduates</th>
<th>Academic career choice</th>
<th>Private practice career choice</th>
<th>Proportion choosing academic careers (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>76</td>
<td>25</td>
<td>51</td>
<td>32.9</td>
</tr>
<tr>
<td>1</td>
<td>29</td>
<td>17</td>
<td>12</td>
<td>58.6</td>
</tr>
<tr>
<td>2+</td>
<td>58</td>
<td>37</td>
<td>21</td>
<td>63.8</td>
</tr>
<tr>
<td>1+</td>
<td>87</td>
<td>54</td>
<td>33</td>
<td>62.1</td>
</tr>
<tr>
<td>Total</td>
<td>163</td>
<td>79</td>
<td>84</td>
<td>48.5</td>
</tr>
</tbody>
</table>

PRP, peer-reviewed publication.

**Table 3** $\chi^2$ analysis of factors analyzed with respect to radiation oncology resident choice of academic versus private practice career

<table>
<thead>
<tr>
<th>Demographic analyzed</th>
<th>p value</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male vs female</td>
<td>.4</td>
<td>0.7 (0.3-1.5)</td>
</tr>
<tr>
<td>MD vs dual degree</td>
<td>.9</td>
<td>0.9 (0.5-1.8)</td>
</tr>
<tr>
<td>MD vs MD/PhD</td>
<td>.7</td>
<td>0.8 (0.4-1.7)</td>
</tr>
<tr>
<td>MD/PhD vs non-PhD dual degree</td>
<td>.7</td>
<td>1.7 (0.4-7.0)</td>
</tr>
<tr>
<td>PRP vs no PRP</td>
<td>&lt;.01</td>
<td>3.3 (1.8-6.4)</td>
</tr>
<tr>
<td>One PRP vs more than 1 PRP</td>
<td>.7</td>
<td>1.2 (0.5-3.1)</td>
</tr>
</tbody>
</table>

PRP, peer-reviewed publication.
initial career choice correlates with the graduate’s long-term career choice of academic versus private practice radiation oncology.

**Conclusion**

Radiation oncology residency graduates with 1 or more PRPs at the time of residency application were roughly 2 times more likely to choose an academic career as their initial career choice than graduates with no prereisidency PRPs. However, graduates with >1 PRP were no more likely than those with 1 PRP to choose an academic career. Applicant sex, dual degree status, and MD/PhD status were all unassociated with postresidency career choice. This information may prove useful to medical students, medical school advisors, and residency program directors in predicting the career choices of radiation oncology resident applicants, and deserves further prospective investigation.

**References**


