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ARTICLE *in* INTERNATIONAL JOURNAL OF RADIATION ONCOLOGY, BIOLOGY, PHYSICS · JANUARY 2014

Impact Factor: 4.26 · DOI: 10.1016/j.ijrobp.2013.09.033

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Results of the 2012-2013 Association of Residents in Radiation Oncology (ARRO) Job Search and Career Planning Survey of Graduating Residents in the United States

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Received Aug 15, 2013, and in revised form Sep 15, 2013. Accepted for publication Sep 18, 2013.

Summary

Graduating radiation oncology residents were surveyed to determine the timeline used by postgraduate year 5 radiation oncology residents during the job application process and the factors most important to them when deciding on a first job. These results provide a resource for residents to use when applying for a job, and for employers to understand what aspects

Purpose/Objective(s): To determine the timeline used by postgraduate year (PGY)-5 radiation oncology residents during the job application process and the factors most important to them when deciding on a first job.

Methods and Materials: In 2012 and 2013, the Association of Residents in Radiation Oncology conducted a nationwide electronic survey of PGY-5 radiation oncology residents in the United States during the final 2 months of their training. Descriptive statistics are reported. In addition, subgroup analysis was performed.

Results: Surveys were completed by 180 of 314 residents contacted. The median time to start networking for the purpose of employment was January PGY-4; to start contacting practices, complete and upload a curriculum vitae to a job search website, and use the American Society of Radiation Oncology Career Center was June PGY-4; to obtain letters of recommendation was July PGY-5; to start interviewing was August PGY-5; to finish interviewing was December PGY-5; and to accept a contract was January PGY-5. Those applying for a community position began interviewing at an earlier average time than did those applying for an academic position ($P = .04$). The most important factors to residents when they evaluated job offers included (in order from most to least important) a collegial environment, geographic location, emphasis on best patient care, quality of support staff and facility, and multidisciplinary approach to

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Preliminary data from 2011 were presented at the Association of Residents in Radiation Oncology Career Seminar at the 53rd Annual Meeting of the American Society for Radiation Oncology (ASTRO), Miami Beach, FL, October 3-6, 2011.

Conflict of interest: V. Gondi has received payment for the

development of educational presentations from the American Board of Medical Specialties. The authors declare no other conflicts of interest.

Acknowledgment—The authors thank Shripal Bhavsar, Andrew Trister, Mohindra Pranshu, and Richard Bakst of the Association of Residents in Radiation Oncology Education Subcommittee for their additional effort and Cristin Watson, Lisa Cheak, and Kathy Thomas of the American Society of Radiation Oncology for administrative support.

of a first job are considered most important by graduating residents.

patient care. Factors that were rated significantly different between subgroups based on the type of position applied for included adequate mentoring, dedicated research time, access to clinical trials, amount of time it takes to become a partner, geographic location, size of group, starting salary, and amount of vacation and days off.

Conclusions: The residents' perspective on the job application process over 2 years is documented to provide a resource for current and future residents and employers to use.
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Introduction

Founded in 1982, the Association of Residents in Radiation Oncology (ARRO) has represented radiation oncology residents in the United States and has conducted surveys of these residents for almost 3 decades (1-8). These surveys have provided unique insights into radiation oncology residency training. In 2011, ARRO recognized the need for residents to better understand the processes involved with finding and solidifying postresidency employment opportunities. The first phase of this project was to survey graduating residents to determine which factors were most important to them when deciding on a first job, and also what timeline was used to complete important tasks of the job application process. The results from the first 2 years of the survey distribution are reported here.

Methods and Materials

The survey was developed by the authors of this report, primarily using as a guide the information presented at the 2010 ARRO Career Seminar. The survey was composed of 5 main questions. The first question asked when the resident initiated each of a series of tasks as he or she applied for jobs. Categories included the following: start requesting letters of recommendation, start networking with the thought of looking for a job, start contacting practices looking for a job, use the American Society for Radiation Oncology (ASTRO) Career Center (either online or at the annual meeting), complete a curriculum vitae and upload it to the ASTRO Career Center website (or other job search website), start getting interviews, finish interviewing, have a lawyer review the contract, accept a contract, and complete all of the employer's necessary paperwork. The second and third questions assessed how many applications each resident submitted and how many in-depth interviews each resident went on before accepting an offer. The fourth question asked residents to rate on a Likert scale (1-3) how knowledgeable they felt about the job application process during each year of residency. The fifth question asked residents to indicate on a Likert scale (1-5) how a variety of factors influenced their decision to accept an employment offer. These factors were randomized in a different order for every respondent to reduce bias resulting from the ordering of factors. Residents were given the opportunity to add written comments after every question. Several questions were included in the 2013 survey that were not included in the 2012 survey (age and marital status of applicant, whether the applicant had children, number of firm offers received, type of position accepted, level of satisfaction with the position accepted, and whether the accepted position was at the applicant's institution of training). The concept of a firm offer was not explicitly defined in the survey but was intended to mean an offer for employment received by the applicant used to develop

a contract that could be signed by all parties involved. All other factors were the same for both years.

The survey was disseminated by e-mail using SurveyGizmo to postgraduate year 5 (PGY-5) residents in May and June of 2012 and 2013, the final months before the completion of residency training. The first page of the survey provided information on the investigator (ARRO), length of the survey (5-10 minutes), and purpose of the study. Participation was voluntary, and no incentives were offered for completion of the survey. Residents were encouraged to complete every question, although they were allowed to skip any questions they preferred not to answer. Only completed questions and sections of the survey for each respondent were included in the analysis. The responses were anonymous, and residents were not asked to report their specific training programs. Through use of an e-mail invitation that uniquely tied the survey link to a given e-mail address, it was ensured that each respondent filled out only a single survey. Respondents were able to edit or go back to previous questions until the survey was submitted, at which point no further editing was possible. As many as 5 reminder e-mails were sent to residents who did not respond to the survey, although residents who did respond were not sent any further invitations to take the survey. To protect against unauthorized access to personal information, the SurveyGizmo account was password protected, and Secure Sockets Layer (SSL) encryption was enabled. The survey was initially sent out to graduating residents in 2011 through a weblink in a series of ARROgrams as a pilot study to assess the usability and functionality of the questionnaire, although these data are not included

Table 1 Demographics of respondents

Characteristic	No. of respondents	%
Year		
2012	86	48%
2013	94	52%
Sex		
Female	53	29%
Male	127	71%
Location of training program		
Northeast	46	26%
Atlantic coast	14	8%
South	38	21%
Midwest	46	26%
Southwest	7	4%
West coast	26	14%
Other	3	1%
Type of position applied for		
Academic only	55	31%
Community only	41	23%
Both academic and community	79	44%
Other/fellowship	5	3%

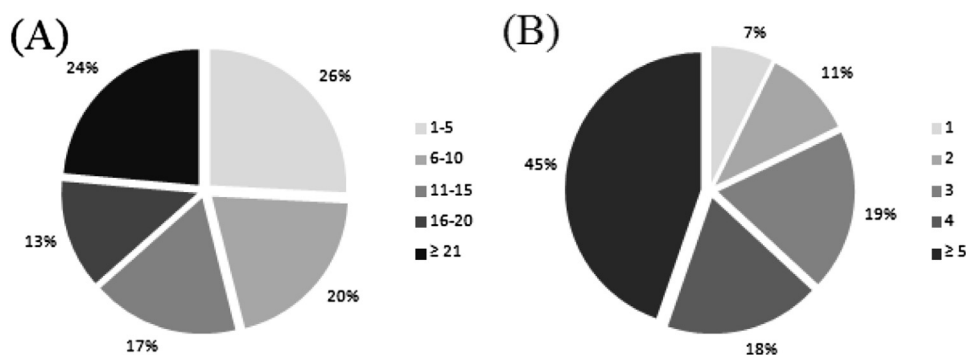


Fig. 1. Pie charts showing (A) the proportion of respondents who submitted a given number of applications and (B) the proportion of respondents who went on a given number of in-depth interviews before accepting a job offer.

in the subsequent analysis. Statistical analysis was performed with Microsoft Excel 2007 and Stata, version 12.1. The χ^2 test, Fisher exact test, 2-tailed Student *t* test, 1-way analysis of variance, pairwise correlation, and Spearman ρ correlation were used where appropriate in order to compare subgroups of respondents. A *P* value of $<.05$ was considered statistically significant. This study was approved by the local institutional review board.

Results

A total of 180 survey responses (86 in 2012 and 94 in 2013) were received, representing response rates of 54% and 61%, respectively. The demographics of the survey respondents are shown in Table 1. More than two-thirds of respondents were male. The majority were from training programs in the Northeast, South, or Midwest (in approximately equal proportions). Based on the demographic information collected in 2013 (but not 2012), the median age of respondents was 33 (range, 28-42). A total of 76% of respondents were either married or in a domestic partnership; 53% had children, and 47% did not. Figure 1A shows a relatively even distribution of residents who submitted 1 to 5, 6 to 10, 11 to

15, 16 to 20, or 21 or more applications. Figure 1B shows that 82% of applicants went on at least 3 interviews, 63% went on at least 4 interviews, and 45% went on at least 5 interviews before accepting a job offer. The 2013 data showed that 56% of applicants received at least 3 firm job offers, 29% received at least 4 firm job offers, and 15% received at least 5 firm job offers. Of those who applied for both types of positions, 44% ultimately chose an academic positions (or an academically affiliated hospital), and 56% ultimately chose a community practice position. A total of 23% of respondents accepted a position at their institution of training (59% of these were at the primary campus, and 41% were at a satellite campus). Fifty-two percent were extremely satisfied with their job selection, 40% were very satisfied, 8% were moderately satisfied, and none reported being either slightly satisfied or not at all satisfied.

The timing of when respondents completed a series of tasks relevant to applying for a job is expressed in a box-and-whisker plot (Fig. 2). Although all respondents answered this series of questions, not every task was relevant to every resident. For instance, an answer of “Not Applicable” was written most often for the categories of “have a lawyer review your contract” (80 residents, 44%) and “start requesting letters of

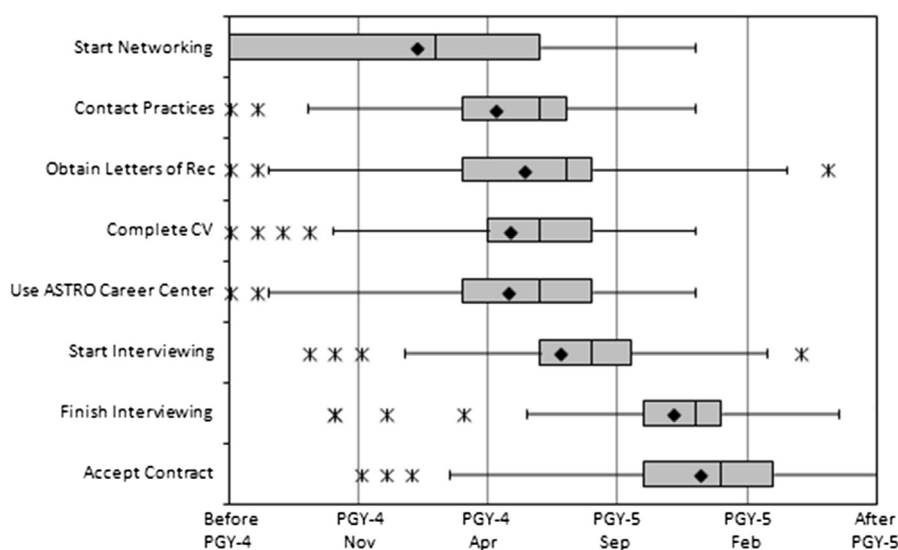


Fig. 2. Box-and-whisker plot showing the timeline for initiating key components of the job application process. The ends of each box represent lower and upper quartiles, the middle band represents the median, and whiskers represent the furthest datum within 1.5 interquartile range of the nearest quartile. \times = outliers; \blacklozenge = mean; CV = curriculum vitae, Rec = recommendation, PGY = postgraduate year.

Table 2 Mean (standard deviation) rating of various factors that may have affected a resident's employment decision, listed for all respondents and subgroups of respondents according to type of position applied for

Factor	All respondents	Academic only	Community only	Both types of positions	P value*
Collegial environment	1.42 (0.60)	1.59 (0.72)	1.27 (0.45)	1.40 (0.57)	.02
Geographic location (eg, housing costs, family preference)	1.53 (0.87)	1.79 (1.00)	1.32 (0.61)	1.41 (0.78)	.01
Emphasis on best patient care (vs financially driven care)	1.63 (0.82)	1.92 (0.92)	1.59 (0.77)	1.50 (0.75)	.01
Quality of support staff and facility	1.86 (0.82)	1.98 (0.96)	1.76 (0.73)	1.87 (0.76)	.42
Multidisciplinary approach to patient care	1.89 (0.94)	1.89 (0.89)	1.98 (0.99)	1.87 (0.96)	.84
Quality of equipment/physics/dosimetry/quality assurance	1.98 (0.87)	2.11 (0.95)	1.83 (0.83)	2.01 (0.81)	.29
Reputation of practice/department	2.07 (0.95)	2.02 (0.82)	2.12 (1.00)	2.09 (1.02)	.86
Adequate mentoring	2.13 (1.06)	1.74 (0.88)	2.54 (1.12)	2.24 (1.05)	<.01
Quality of referring physicians	2.31 (1.01)	2.19 (0.92)	2.27 (1.05)	2.42 (1.01)	.40
Autonomy	2.35 (0.95)	2.33 (0.94)	2.12 (0.87)	2.47 (0.98)	.16
Financial state of office/department	2.38 (1.06)	2.68 (1.09)	2.15 (0.88)	2.29 (1.06)	.03
Number of treatment locations where you will be working	2.45 (1.07)	2.53 (1.15)	2.39 (1.05)	2.47 (1.03)	.83
Size of group	2.67 (1.03)	3.00 (1.04)	2.39 (0.95)	2.58 (1.03)	.01
Quality of medical records (eg, pathology and radiology reports)	2.73 (1.08)	2.74 (1.02)	3.00 (1.04)	2.66 (1.10)	.26
Number/type of anatomic sites you will be treating	2.74 (1.07)	2.55 (1.02)	2.85 (1.01)	2.79 (1.13)	.39
Variety, or lack thereof, of patients	2.77 (1.23)	2.85 (1.29)	2.49 (1.10)	2.87 (1.23)	.23
Direct access to your boss	2.80 (1.16)	2.55 (1.03)	2.98 (1.35)	2.95 (1.09)	.10
Starting salary	2.82 (1.09)	3.11 (0.97)	2.58 (0.98)	2.73 (1.15)	.02
Access to clinical trials	2.86 (1.26)	2.25 (1.10)	3.59 (1.20)	2.95 (1.17)	<.01
Plan for salary increases with time (ie, what the "target salary" is, and how long it takes to reach that point)	2.89 (1.21)	3.11 (1.31)	2.56 (1.23)	2.91 (1.08)	.09
Staff co-coverage during vacations (vs self-arranged locums)	2.93 (1.17)	3.25 (1.09)	2.78 (1.24)	2.86 (1.15)	.09
Fringe benefits (eg, malpractice, disability, life insurance, pension, 401k, education/meeting allowance)	3.01 (1.10)	3.13 (1.18)	2.80 (0.98)	3.00 (1.07)	.35
Methods of care (eg, weekly on-treatment check, frequency of portal imaging, follow-ups)	3.05 (1.11)	3.32 (1.00)	3.08 (1.14)	2.90 (1.15)	.10
Amount of vacation/days off	3.07 (1.10)	3.32 (1.11)	2.73 (1.05)	3.10 (1.06)	.03
Amount of time it takes to become a partner	3.35 (1.45)	4.31 (1.15)	2.34 (1.04)	3.23 (1.41)	<.01
Equipment repair budget/breakdown backup options	3.38 (1.28)	3.62 (1.24)	3.24 (1.18)	3.33 (1.30)	.29
Call schedule	3.42 (1.06)	3.43 (1.01)	3.41 (1.09)	3.49 (1.05)	.93
Dedicated research time	3.48 (1.54)	2.09 (1.22)	4.85 (0.48)	3.81 (1.32)	<.01
Job start date	3.54 (1.19)	3.48 (1.29)	3.71 (1.19)	3.54 (1.10)	.58
Way in which weekend emergencies are handled	3.65 (1.06)	3.55 (1.05)	3.88 (0.94)	3.64 (1.12)	.32
Bonus	3.76 (1.10)	3.79 (1.15)	3.76 (1.07)	3.79 (1.04)	.98
Access to basic science research	3.89 (1.46)	2.81 (1.51)	4.85 (0.57)	4.18 (1.30)	<.01
Payer mix (ie, type of insurance most of your patients will have)	3.95 (1.10)	4.15 (0.99)	3.59 (1.22)	4.00 (1.07)	.04
Transcription options	4.03 (1.04)	3.91 (1.20)	4.07 (0.93)	4.05 (1.00)	.67

Likert scale: 1 = extremely important; 5 = not at all important.

* Analysis of variance.

recommendation" (44 residents, 24%). Although the vast majority accepted a contract during PGY-5, 9 residents (5%) had not yet done so when this survey was completed, and 97 residents (54%) were still completing the employer's necessary

paperwork when the survey was completed. The average rating of 32 factors that may have an impact on a resident's employment decision are given in Table 2, ordered from most to least important.

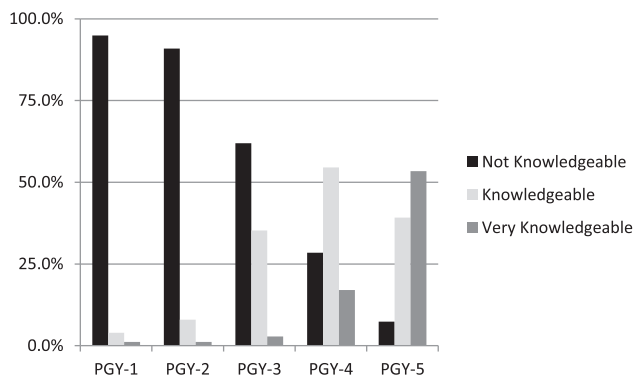


Fig. 3. Respondents' self-assessed level of knowledge about the job application process during each year of residency.

Residents' knowledge about the job application process increased throughout residency (Fig. 3). For each year of residency, there was a statistically significant correlation between a higher knowledge level and earlier networking/applying, with the strongest correlation in the PGY-4 year (Spearman $\rho=0.35$ for networking and 0.45 for applying, $P<.01$). Earlier networking and applying also correlated with earlier interviewing and accepting an offer. Those who started contacting practices before June of PGY-4 had an earlier mean start of interviewing (April PGY-4 vs September PGY-5, $P<.001$) and acceptance of a job offer (November PGY-5 vs February PGY-5, $P<.001$). Those who started networking before January of PGY-4 also had an earlier mean start of interviewing (May PGY-4 vs August PGY-5, $P<.001$), but there was no difference in the timing of accepting a job offer. These findings were confirmed by pairwise correlations.

A subgroup analysis was performed to determine whether there was a significant difference in responses according to the type of position applied for. Those applying for only an academic position or only a community position were more likely to submit 1 to 5 applications than were those applying for both types of positions (33% vs 17%, $P=.02$), whereas the group applying for both types of positions trended toward being more likely to submit more than 15 applications (43% vs 30%, $P=.07$). Those applying for an academic position went on a single interview before accepting an offer more frequently than did those applying for a community position or both types (19% vs 2% vs 1%, $P<.01$), whereas those applying for a community position or both types trended toward being likely to go on 5 or more interviews than were those applying in academia (49% vs 51% vs 35%, $P=.07$).

The box-and-whisker timeline plots for each of the above subgroups are shown in Figure 4. Those applying for a community position started interviewing at an earlier average time than did other applicants ($P=.04$), but the timing of other tasks was no different between the groups. Those applying for an academic position were also significantly less likely to have a lawyer review their contracts than were other applicants (20% vs 72%, $P=.01$). The top 10 most important factors when evaluating a job were relatively similar for every subgroup. Notable exceptions include "adequate mentoring" and "dedicated research time," which were relatively more important to those applying for an academic position (ranked 2 and 8) than to those applying for a community position (ranked 15 and 33). The "amount of time it takes to become a partner" was more important to those applying for a community position (ranked 11) than to those applying for an academic position

(ranked 34). The relative ranking of each factor for those applying for both types of positions was generally more similar to those applying for only community practice positions than for those applying for only academic positions (average difference in ranking, 2.47 vs 3.88), although this difference was not statistically significant ($P=.17$). Factors with a mean rating that was significantly different between subgroups based on the analysis of variance (Table 2) included "collegial environment," "geographic location," "emphasis on best patient care," "adequate mentoring," "state of the finances of the office/department," "size of the group," "starting salary," "access to clinical trials," "amount of vacation/days off," "amount of time it takes to become a partner," "dedicated research time," "access to basic science research," and "payer mix." Several other factors also trended toward a significant difference.

Sex did not significantly impact the number of applications submitted, interviews attended, or timeline for completing the aforementioned tasks. Women were more likely to apply to both types of positions (56% vs 39%, $P=.04$) than to either academics alone or community practice alone. The only differences between the sexes in the rating of the important factors were "methods of care" (ranked 17 for women and 24 for men), "starting salary" (ranked 15 for women and 21 for men), and "amount of time it takes to become a partner" (ranked 30 for women and 25 for men). Men rated as more important "amount of time it takes to become a partner" (3.18 vs 3.71, $P=.03$) and "equipment repair budget/breakdown backup options" (3.23 vs 3.65, $P=.04$), whereas women rated as more important "number of treatment locations where you will be working" (2.21 vs 2.54, $P=.05$).

Discussion

The data presented herein come from a survey distributed to graduating radiation oncology residents in the United States during their final months of training in 2012 and 2013, with particular focus on the job application process. This report represents the first publication of this type in the field of radiation oncology, although similar data have been reported in other areas of medicine (9, 10). Research of this type is warranted based on the fact that only approximately 25% of residents feel "knowledgeable" about the job application process during their PGY-4 year (when the process typically begins), and only approximately 50% of residents feel "very knowledgeable" during their PGY-5 year even while going through the process. This sentiment was echoed in some of the respondents' comments; they endorsed a lack of information sharing between junior and senior residents and an inability to fully rely on their seniors' and faculty members' advice because they often have different priorities. The goal of this publication is to alleviate some of these concerns and to help residents feel more comfortable with career planning throughout their residencies.

The initial stage of the job application process, in which residents begin networking with the thought of future employment, is the most variable aspect of the timeline, starting for some before the beginning of PGY-4 and for others not until PGY-5. It is not particularly surprising that many residents in a specialty such as radiation oncology, which is among the most competitive specialties in the National Resident Matching Program, would attempt to maximize their employment opportunities at an early stage of residency. Some residents commented that they started networking earlier because of a strong geographic preference, especially if that preference was for a relatively coveted location. However, waiting

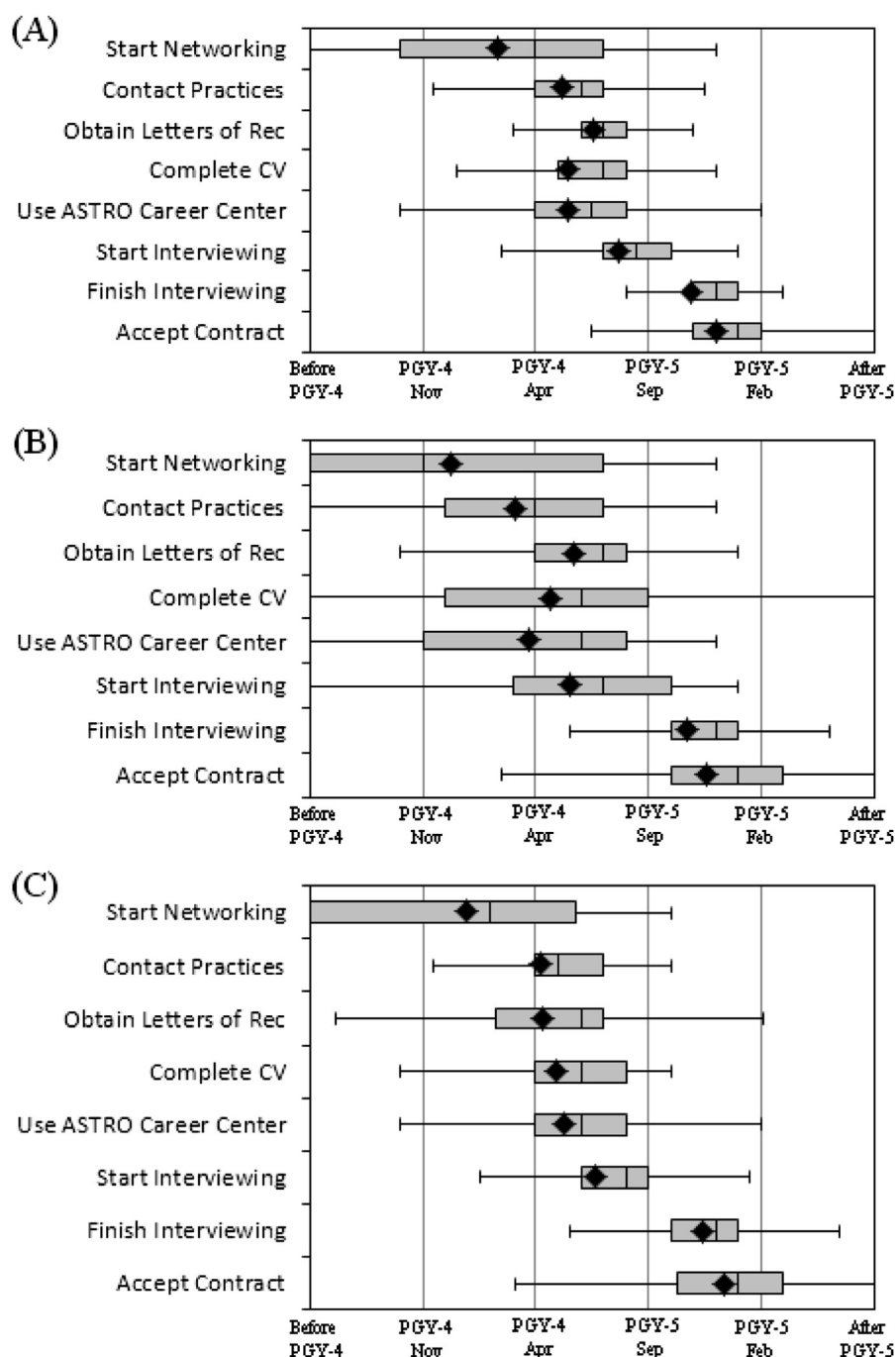


Fig. 4. Box-and-whisker plot showing the timeline for the job application process for (A) respondents who applied for academic positions only, (B) respondents who applied for community positions only, and (C) respondents who applied for both academic and community positions. ♦ = mean; CV = curriculum vitae, Rec = recommendation, PGY = postgraduate year.

until approximately midway through PGY-4 to start thinking about employment is most common, with those applying for community positions initiating the process on the earlier end of the spectrum. It is interesting that although 26% of respondents began networking before the PGY-4 year, the majority did not believe themselves to be particularly knowledgeable about the job application process in those early years of residency. Furthermore, respondents commented that they felt that most job openings did not actually become available until summer of their PGY-5 year for community

positions, and autumn of their PGY-5 year for academic positions. Thus, the question arises as to the relative utility of networking early. According to our data, knowledge level correlated with the timing of networking/applying, which subsequently correlated with earlier interviewing and acceptance of a contract. Thus, a select group of more knowledgeable residents may be gaining access to some employment opportunities at an earlier time than their colleagues, although whether these opportunities are inherently different or better than others is unclear.

The number of practices contacted and applications submitted also covered a wide range. We did not specify exactly what constituted an application in the survey but rather left this to the resident to interpret. Therefore, some residents may have under-reported or overreported the number of applications depending on how an “application” was interpreted (eg, e-mail, phone call, mass-mailing, formal application). Those applying for both academic and community positions were more likely to send out larger numbers of applications than were those applying only for 1 or the other. The beginning of the PGY-5 year was the peak time for this task and all of the preparatory work surrounding it. Of note, a significant percentage of residents did not require any letters of recommendation as part of their applications because phone references were often sufficient (especially for community practices). In other cases, residents commented that the letter of recommendation was only asked for as a formality (ie, for licensing or credentialing) after acceptance of a job.

The interview season typically stretched from July to January of PGY-5. Most residents went on at least 3 in-depth interviews before accepting an offer, with many of the interviews taking place at the ASTRO Annual Meeting. Those applying for academic positions required fewer interviews than did those applying to community positions or both types, perhaps reflecting the more competitive nature of some community positions or that some individuals accepted a position at their institutions of training.

When evaluating a job offer, only 55% of respondents had a lawyer review their contract before signing it. Of those respondents who did seek legal guidance, it was most common for them to ask a mentor in their department or a family member or friend with some background in contractual law. Using a lawyer was much more common for those applying for community positions, perhaps reflecting the more standardized or straightforward paperwork at academic centers. Some residents also commented that some academic centers did not even have a contract so much as a “job description” to sign. After acceptance of a contract, the credentialing and licensing and paperwork can take months to complete. Some residents commented that it was useful to apply for the state license as soon as possible because that is often the rate-limiting step in the process.

The portion of the survey addressing which factors are most important to residents as they evaluate a practice should give future applicants and employers insight into the career preferences of the average senior resident. However, because these data were obtained from residents, they reflect job expectations rather than actual experience. Inasmuch as priorities and career preferences may change with time, our results for this portion of the survey may not extrapolate to the radiation oncology workforce at large.

It is not surprising that a collegial workplace environment and an emphasis on best patient care, rather than financially driven care, were in the top 3 factors considered by residents when evaluating a potential job. Geography is also a very important factor to most residents. At the completion of residency, many applicants have a spouse or significant other whose career and happiness are of equal importance in the decision. However, as 1 resident commented, “Do not discount a place based on geography. I never thought I would wind up where I am going to practice, but when I visited, I was blown away by the people in the department. It became my first choice.” Monetary factors like starting salary, bonus, and payer mix were rated less important as a whole. There may be multiple reasons for this, including relative uniformity in starting salaries for most positions or

the relatively high compensation of most radiation oncologists. It is also noteworthy that research-oriented factors were not rated highly even though residents in radiation oncology have a higher average number of research experiences as medical students and are more likely to have a PhD than are residents in any other field in medicine (11). This finding may reflect a changing of priorities with age, or possibly a selection bias in the survey. It is also possible that those residents looking for a job in which they can do research are applying only to research-oriented positions. Thus, their ability to do research may not be a deciding factor in their decision making if this is relatively uniform among their job prospects.

The main limitation of these data is the suboptimal response rate, although our response rate of approximately 57% does capture the majority of graduating residents and is considered relatively high compared with most electronic surveys (12). With this response rate, there is some concern that the population who chose to respond may not be representative of the overall population. It is reassuring that the responses came from a variety of geographic regions, and the male-to-female ratio was consistent with the 66% of radiation oncology residents who are male nationwide. Also, although our list of factors that may affect employment decisions was relatively comprehensive, it is likely that other factors that we did not ask about directly may have been important to some residents, for instance if they have a spouse who is also a physician, or were seeking only part-time employment. Residents were encouraged to write in these additional factors in their response to the survey so that we may incorporate them in future years. ARRO plans to continue distributing this survey in future years to increase the power of the study and to assess for any trends that may occur over time. ARRO has also surveyed practicing radiation oncologists in academic and community settings to provide further details on the job application process from the perspective of those involved in hiring. The specific factors used to evaluate applicants and the timeline for interviewing will be assessed to examine similarities and differences between the resident and attending perspectives.

Conclusion

The goal of this publication is not so much to serve as a universal guide as it is to provide a resource for residents to use when applying for a job, so that they are as confident as possible as they plan and work through the process and prepare for their future.

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