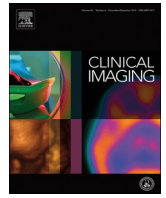




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## Correspondence

## Contemporary Interventional Radiology employment: analysis of the American College of Radiology and the Society of Interventional Radiology Occupational Portals



## Editor

The Interventional Radiology (IR) training pathways underwent a paradigm shift in 2012 when the dual Interventional Radiology/Diagnostic Radiology (IR/DR) certificate was approved by the American Board of Medical Specialties (ABMS), and subsequently, the new Integrated and Independent IR residency programs emerged [1]. Integrated IR residency includes one year of clinical internship, three years of DR, and two years of IR; Independent IR residency consists of traditional DR residency coupled with one-to-two years of dedicated IR at the same or a different institution. While the impetus for this transformation was the promotion of specialty specific expertise through early recruitment and tailored clinical and procedural training, employment opportunities for the increasing number of the new IR trainees remains unclear. The new generation of IR trainees is likely to expect practicing “high-end” IR with dedicated consultation and clinic experiences. Therefore, it is paramount to analyze the current career market for the available IR opportunities and the proportion of IR-to-DR duty expectations as this information may be useful for current trainees. The purpose of this study was to survey and report the contemporary IR employment opportunities in the United States (US) using the *American College of Radiology* (ACR) and the *Society of Interventional Radiology* (SIR) occupational portals.

*Institutional review board*-approval was not required for this study. The ACR and SIR employment portals were evaluated in April 2020. All IR-related employment opportunities were screened. Employment related to interventional neuroradiologists, technologists, nurses, physician assistants, and non-physician staff were excluded. Overlapping career opportunities between the two portals were excluded. No time-limit exclusion criteria were applied. The opportunities were stratified by the US region (Northeast, Midwest, Southeast, Southwest, or West) and practice environment (academic, private practice, or hybrid). Employment descriptions were evaluated for the percentage of dedicated IR (versus DR). Academic employments were assumed to be entirely IR unless otherwise stated in the employment opportunity description.

One hundred forty-six job postings were included in this study; 79 (54.1%) were obtained from ACR and 67 (45.9%) were acquired from SIR portals. Employment opportunities were distributed in the Northeast (n = 15; 10.3%), Midwest (n = 51; 34.9%), Southwest (n = 29; 19.9%), Southeast (n = 32, 21.9%), and West (n = 19; 13.0%) (Fig. 1). Thirty-eight (26.0%) were academic, 93 (63.7%) were private, and 15 (10.3%) were hybrid practice settings (Fig. 2A). Ninety-five (65.1%) opportunities mentioned the proportion of IR within their descriptions; 47 (49.4%) were 100%, 21 (22.1%) were 75–99%, 22

(23.2%) were 50–75%, and five (5.3%) were < 50% IR (Fig. 2B). Amongst the private practice opportunities (93), only 14 (15.1%) were 100% IR.

The results of this study indicate geographic variability in IR employment opportunities with the highest concentrations in the Midwest and Southeast. This likely correlates with regional differences in population density, number of academic medical centers, and radiology practices. Only a minority of career opportunities were academic (26.0%), indicating that these positions may be comparatively sparse or filled outside of the ACR and SIR occupation portals. Covey et al., in 2001, showed that IR employment opportunities shifted toward the private sector in the Midwest and California, a pattern which appears to have persisted [2]. Approximately half (49.4%) of the employment opportunities offered 100% IR positions, with the remaining job postings requiring varying proportions of IR and DR. This may be a result of many Radiology career opportunities remaining in the private sectors which often require a general DR skillset [3]. Conversely, a recent study of Musculoskeletal Radiology career opportunities showed that 29% opportunities tagged as “Musculoskeletal” required some IR-based skills [4]. It may be presumed that in the near future, the IR career market may undergo a paradigm shift as graduates of IR residencies enter into practice and expect greater dedication to the specific practice of IR. It remains unclear; however, the nature of interventions (e.g. aortic, venous, peripheral arterial, oncology, or non-vascular) IR trainees will be expected to perform in these jobs, since the referral patterns and practices vary widely. This information is not readily available through career opportunity postings. Furthermore, the expectations of employers may vary and there may be concerns that the new training pathways may encourage limited general diagnostic skills, thereby hindering group productivity. This remains a subject of future investigation.

There are limitations to this study. First, this study did not include IR career opportunities which were not advertised, but rather disseminated through personal contact. This “word of mouth” hiring strategy may have geographic variability depending upon physician networks and cannot be readily evaluated. Second, a single temporal capture of current state, in the absence of recent comparison, limits description of trends and therefore forecasting. Future studies, over a defined period, may need to be performed to capture job opportunities more accurately. Third, the accuracy of the information was not verified by contacting individual career posters, and consequently, some discrepancies may exist. Fourth, the nature of interventions could not be analyzed due to lack of information in job postings. Finally, the study month of April 2020 encompasses the coronavirus disease-19 pandemic, which may have impacted the career opportunities due to hiring freezes.

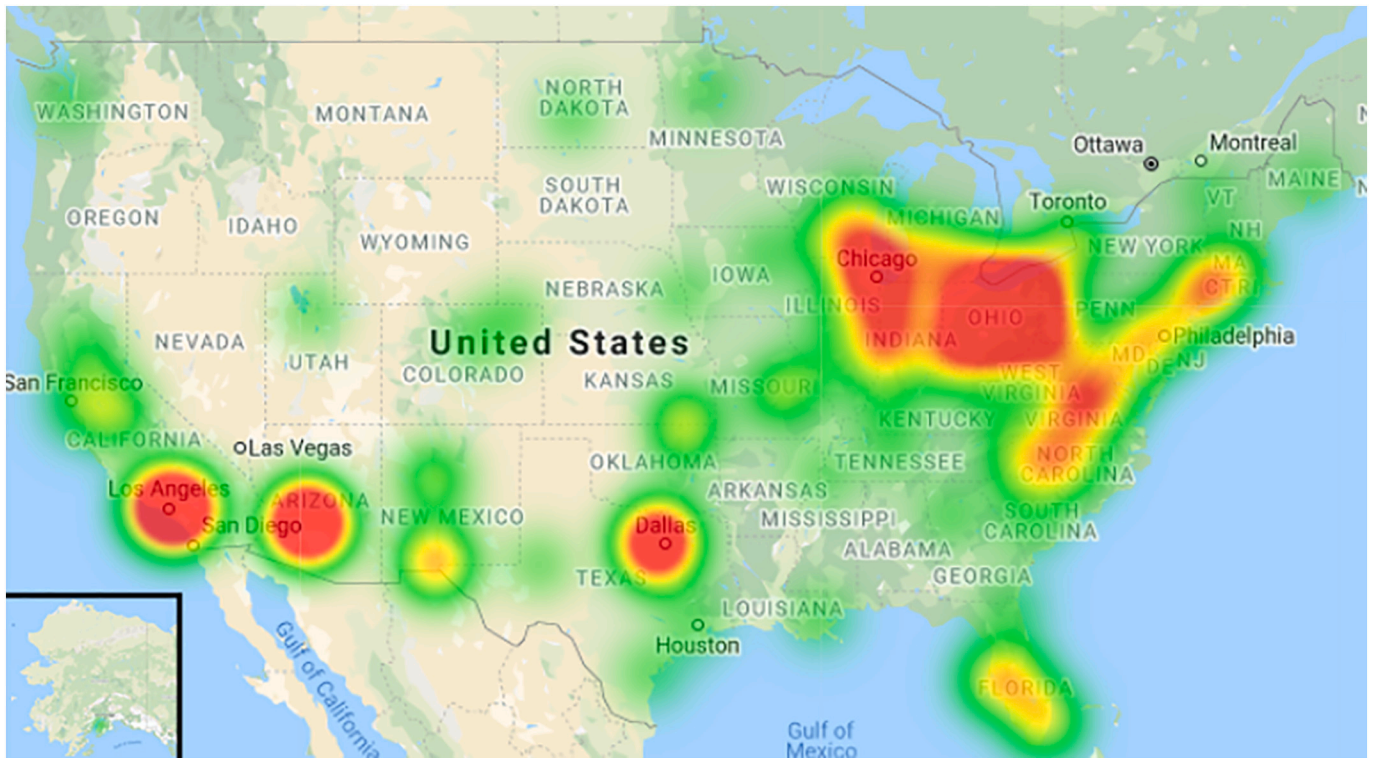


Fig. 1. Geographic heat map of Interventional Radiology (IR) job postings in the American College of Radiology (ACR) and Society of Interventional Radiology (SIR) occupational portals.

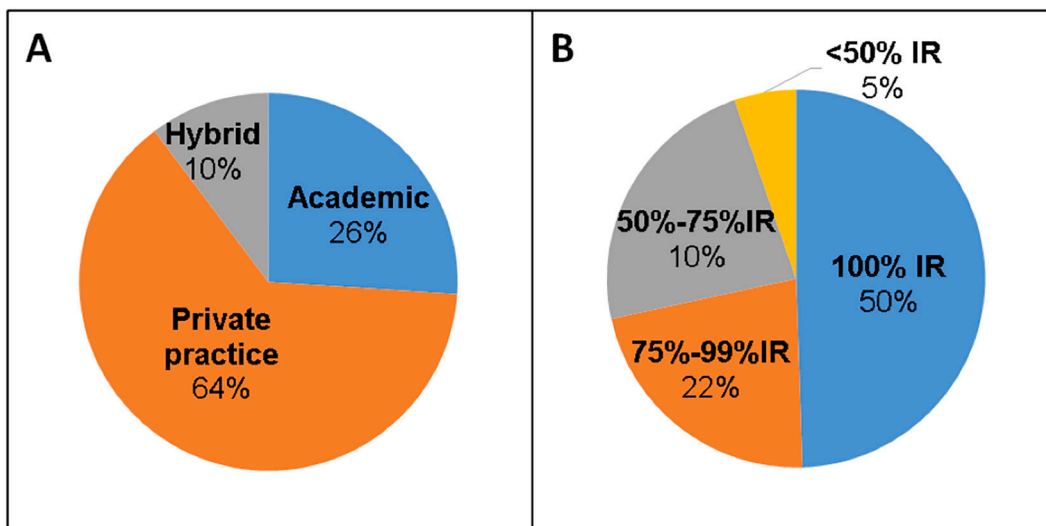


Fig. 2. Proportion of jobs by practice type (A) and percentage of IR (B) in the American College of Radiology (ACR) and Society of Interventional Radiology (SIR) occupational portals.

To conclude, the current IR career market in the United States is heterogeneous, with almost half of the opportunities offering complete IR-only practice and majority of jobs concentrated in the Midwest and Southeastern regions. Future large-scale trends should be evaluated as more graduates of the new IR/DR residencies enter the workforce and bring their unique skill set to the market.

**Declaration of competing interest**

All authors have no relevant conflicts of interest to declare.

**References**

- [1] Di Marco L, Anderson MB. The new Interventional Radiology/Diagnostic Radiology dual certificate: “higher standards, better education”. *Insights Imaging* Feb 2016;7(1):163–5.
- [2] Covey AM, Sunshine J, Forman HP. Changes in the job market for interventional radiology as detected through a help-wanted index of job advertisements. *Acad Radiol* Feb 2001;8(2):175–81.
- [3] Misono AS, Saini S, Prabhakar AM. Radiology jobs: uncovering hidden and not-so-hidden opportunities from the ACR jobs board. *J Am Coll Radiol JACR* Apr 2016;13(4):471–6.
- [4] Nellamattathil M, Flug J, Hoffmann JC, Weiss S, Amber I. Characteristics of musculoskeletal radiology job postings to guide radiology trainees. *Clin Imaging* May 2020;61:54–7.

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