

# Exposure to, Understanding of, and Interest in Interventional Radiology in American Medical Students

Lavi Nissim, MD, Elizabeth Krupinski, PhD, Timothy Hunter, MD, Mihra Taljanovic, MD

**Rationale and Objectives:** The purposes of this study were to determine the degree to which medical students are exposed to interventional radiology (IR) in medical school, to assess their knowledge of the field, and to gauge their interest in IR as a career choice.

**Materials and Methods:** An institutional review board–approved survey was generated using the website [www.surveymonkey.com](http://www.surveymonkey.com). Medical student participation nationwide was elicited by sending e-mails to administrators of medical schools and radiology residency program directors and asking them to distribute the survey link to their students.

**Results:** Seven hundred twenty-nine medical students from 21 states responded to the survey. Although 58% of students said they were interested in a hands-on career, only 5.5% of students said they had participated in an IR rotation and only 12.7% were interested in IR. Less than half of the IR domain–related questions used to assess understanding of IR were answered correctly, with greater understanding found among the students who had participated in an IR rotation.

**Conclusions:** Exposure to IR in accredited US medical education programs is inconsistent, although interest in the field is moderate among medical students compared with interest in other hands-on specialties. Understanding of IR is limited among the study population. Improved understanding of the field and recruitment could result from greater exposure.

**Key Words:** Interventional radiology; medical students; knowledge; interest.

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For the near future, there is a projected shortage in interventional radiologists in North America (1–3). Until recently, interventional radiologists were a subset of residents who entered the specialty after first completing a 4-year diagnostic radiology residency chosen during medical school or afterward. Overwhelmingly, those students who entered the traditional diagnostic radiology residency did not become interventional radiologists (4). Stemming from this, pilot programs, such as the 6-year vascular and interventional radiology DIRECT Pathway, were introduced in the United States to allow clinically oriented medical students to enter the field straight out of medical school, rather than selecting interventional radiologists solely from the pool of diagnostic radiology residents (1). There are currently 25 DIRECT Pathway–approved programs in the United States, although four of them are not currently recruiting new residents (<http://www.theabr.org/ic-vir-direct>).

With expanding “turf battles” with other specialties (5), recruitment of medical students into interventional radiology (IR) has become a significant problem being addressed by those passionate about maintaining survival of the field.

From a medical student’s perspective, there are several problems in generating interest in the field of IR. One of the problems cited anecdotally is a lack of exposure, because there is no core rotation in the field (6). Furthermore, it has been suggested that students do not have as fulfilling an experience during their IR rotation due to limited participation in procedures and clinical management compared with other “hands-on” rotations such as general surgery and emergency medicine (6). Other problems cited include lack of role models for medical students and the perception of radiologists being antisocial (7). Last, with the growing development of image-guided techniques in other specialties such as cardiology and vascular surgery, there may be confusion among medical students as to which of these fields truly presents the best opportunity for training in and practice of such procedures (8).

Supporting the notion that there is lack of exposure to the field, one study of European final-year medical students found that nearly two-thirds of students did not participate in a radiology elective and nearly half of the 234 respondents thought that interventional radiologists were surgically trained

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From the Department of Medical Imaging, University of Arizona, 1609 N Warren Ave., Tucson, AZ 85724. Received July 25, 2012; accepted September 18, 2012. Address correspondence to: E.K. e-mail: [krupinski@radiology.arizona.edu](mailto:krupinski@radiology.arizona.edu)

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(9). Understanding of the field of IR was also judged to be inadequate in this study. Although most respondents correctly identified tunneled catheters, uterine fibroid embolizations, and image-guided biopsies as IR procedures, few recognized vertebroplasty and nephrostomy as IR procedures and most thought that coronary angioplasty was performed by IR. Another survey conducted in one US medical school demonstrated that the vast majority of students did not associate radiologists with the performance of interventional procedures (10). O'Malley and Athreya (11) surveyed Canadian medical students and also found that they had poor knowledge of IR (53%) and generally were not interested in a career in IR (only 18% said they would be interested).

The purposes of the present study were to test the hypothesis that medical students in the United States have limited exposure to IR and to assess their understanding of and desire to enter the field. These results may help substantiate anecdotal evidence about lack of exposure as well as studies demonstrating a lack of understanding of the field. Ultimately, such information would help support the cause for a structured IR experience during medical education, the same way that many medical schools in the nation have mandated short clerkships in surgical subspecialties such as ear-nose-and-throat, orthopedics, and ophthalmology.

## MATERIALS AND METHODS

An online survey was created using the anonymous and secure website [www.surveymonkey.com](http://www.surveymonkey.com). The survey was structured into two halves. The first half included questions designed to identify student exposure to IR during their medical education and their interest in the field. The second half consisted of 10 didactic questions designed to assess student's knowledge of IR procedures (Appendix 1). Respondents were asked to include their year in medical school as well as indicate the state in which they were located. To protect anonymity, they were not asked to identify their specific medical school.

To control for such factors as differences in medical school curricula and possible geographic variability in education philosophies, as many schools as possible were targeted. This was done by performing an online search to identify contact e-mails for administrators of medical schools around the nation and then e-mailing the program directors to solicit participation by their students in the survey. Approximately 40 different schools were contacted in this method. Additionally, a list of contact information for ~180 radiology residency program directors was obtained. These directors were contacted and asked to forward the survey to medical students in their affiliated medical school. Results were collected anonymously, with IP addresses used to confirm that multiple responses were not obtained from the same address.

## RESULTS

Seven hundred twenty-nine responses were obtained during the 6-month period of March 2009 through August 2009.

Respondents were from 21 states (Table 1). The distribution of respondents was equal across medical school years (Table 2). Exposure to IR among the sample population was very limited. An overwhelming minority (.4%) of medical students reported that their medical school has a mandatory IR rotation (Table 3), with 70.8% saying their school did not and 28.8% being unsure. Only 1.7% said their school had a mandatory diagnostic radiology (DR) rotation (67.6% said their school did not and 30.7% were unsure). Responses to the didactic questions (summarized in Appendix 1) reflect a limited understanding of what procedures are typically performed by interventional radiologists.

Of those with a mandatory IR rotation, only 20.8% had completed or were participating in it. Of those without a mandatory IR rotation, only 5.5% of students said they have participated in an elective IR rotation and only an additional 10.5% said they planned on participating in an elective IR rotation (Table 4), with 52.3% not planning to participate and 31.8% unsure. Only 12.7% of students said they were interested in IR, while an additional 18.6% said they were interested in both IR and DR (Table 5), with 4.4% being interested in DR only and 64.2% interested in neither. Of those with a mandatory DR rotation, only 18% have completed or are participating in it. Of those without a mandatory DR rotation, 44.6% have or plan to participate in a DR rotation with 28.5% saying they will not and 26.9% being unsure. A majority (57.9%) of students said they were interested in a "hands-on" specialty (Table 6), with 23.1% not interested and 19% unsure. Of these students, there was a slightly greater increase in interest in IR (18%) or IR and DR (21%).

Overall, only 53.9% of the respondents answered at least half of the questions correctly (Table 7), with only 1.4% answering all 10 correctly and 1.8% answering all of them incorrectly. The highest number answered correctly was 4 by 17.2% of the respondents, followed by 6 or 5 (both 15.9%) and 3 (13.5%). When stratified according to medical school class, there was a significant linear increase ( $r = 0.99$ ) in the average number of correct responses with each year (Table 8). Those students who said they had participated in an IR rotation demonstrated an improvement in performance on the didactic questions (averaging 7.3 correct), although the difference did not reach statistical significance.

## DISCUSSION

To the best of the authors' knowledge, to date there are no large studies of US medical students to determine their affinity for IR. The data acquired from the anonymous survey of >700 respondents from 21 states suggest that IR has a small role in medical school education around the nation and that understanding of this field is limited among both those interested in the field and those interested in other medical specialties. The data suggest, however, that interest in hands-on specialties is strong among US medical students, and interest in IR is moderate.

Finally, one limitation of the study is that it does not make a direct connection between medical education and

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