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Showcasing Our Profession to the Future Physician Workforce: Medical Student Radiology Expo

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Rationale and Objectives: There has been waxing and waning of popularity of radiology as a career choice over the last few years. These fluctuations may in part be due to misconceptions such as the perceived lack of patient contact, as well as the perception of decreasing numbers of entry-level jobs. To address such misconceptions, it is important to reach medical students early in their training, both to give them a comprehensive and balanced understanding of radiology practice, and to appropriately frame radiologists as clinicians. Realizing the benefits of direct student outreach, a number of medical specialties are moving toward more direct recruitment efforts often through student interest groups and career fairs. The Medical Student Radiology Expo (MSRE) was proposed and executed by the Alliance of Medical Students Educators in Radiology, which was supported by the Association of University Radiologists (AUR) and the American College of Radiology. The MSRE was held immediately after the 2016 AUR annual meeting and hosted at the Moores Cancer Center at the University of California, San Diego. The goals of the MSRE were threefold: (1) to showcase radiology as a distinct and exciting specialty to all medical students, (2) to foster an interest in pursuing a career in radiology among medical students, and (3) to create a distributable and customizable combined symposium and workshop that could be easily replicated elsewhere.

Methods: The activities of this 1-day expo started with a morning of didactic elements, including a session identifying inaccurate myths surrounding radiology, specific details of interest pertaining to diagnostic radiology and interventional radiology residency programs, followed by interactive imaging diagnosis games, and question and answer sessions. A casual lunch with faculty members and attendees provided for more sustained direct and informal interactions between the students and the faculty. During the afternoon sessions, students participated in hands-on workshops, including ultrasound, imaging-guided biopsies, catheter manipulation, and post-processing image analysis, as well as roundtable discussions about radiology with the faculty.

Results: The results from the post-program survey of the medical students were overall positive.

Conclusions: The MSRE, with the combined efforts of multiple organizations, was successful. A customizable, modular toolkit has been posted on the AUR website. Using this toolkit as a template, this recruitment and informational activity can be replicated at individual institutions, local radiology chapters, multidisciplinary meetings, and radiology meetings.

Key Words: Radiology; residency; education; medical student; recruitment; interest group; curriculum.

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INTRODUCTION

There has been waxing and waning interest in radiology as a career choice among US medical students in a cyclical manner. There was a sharp decline in interest from 2009 to 2013 (1), with an uptick in the last 2 years (2–4). These fluctuations may be driven in part by misperceptions regarding a long-term slowdown in the job market (5–8). With the notion that many radiologists have little patient contact and the less visible role of radiologists on the patient care team, there may also be a misperception that radiologists are not valued or seen as integral members of the patient care teams. According to a recent survey of fourth-year medical students, one of the top reasons

students gave for choosing a career other than radiology was the perceived lack of patient interaction (9).

Reaching medical students early in their training is essential to reinforce the fact that radiologists have direct patient contact and play critical roles in patient care teams (10). To convey the message to the entire future physician workforce, effective outreach efforts addressing the misperception of radiology and radiologists should broadly target all medical students rather than just those who express an early interest in radiology. It is also essential to capitalize on methods and approaches outside of the existing standard medical school curriculum, such as mentoring by radiologists, participation of medical students in radiology research, radiology student interest group activities, and institutional student fairs (9). Realizing the benefits of active outreach, a number of other medical specialties have already moved toward more direct recruitment efforts, often through student interest groups and career fairs (11–15).

The Medical Student Radiology Expo (MSRE) was proposed and executed by the Alliance of Medical Students Educators in Radiology (AMSER), and was financially and organizationally supported by the Association of University Radiologists (AUR) and the American College of Radiology (ACR). The expo was held in conjunction with the 2016 AUR annual meeting hosted by the Department of Radiology at the University of California, San Diego (UCSD).

The goals of the MSRE were threefold: (1) to showcase radiology as a distinct and exciting specialty among all medical students, (2) to foster an interest in pursuing a career in radiology among medical students, and (3) to create a distributable and customizable combined symposium and workshop that could be easily replicated elsewhere.

The purpose of this report is both to describe the structure and the process of the MSRE—planning, logistics, execution, and post-event evaluation—and to provide a brief summary of “lessons learned” from the MSRE.

METHODS

AMSER is the primary advocacy group for radiologists dedicated to educating and advising medical students. Inspired by the example set by the Society of Interventional Radiology educational efforts directed at medical students, the members of AMSER sought to create a shareable template for medical student outreach (13,14). AMSER, with the Alliance of Clinical Educators in Radiology, applied for and received the inaugural Venture Capital Fund Grant from the AUR. Additional support was given by the ACR, as the products of this activity would benefit the entire radiology community by increasing interest in radiology.

The project consisted of designing a replicable and customizable modular toolkit that would be used to construct a 1-day interactive symposium directed to medical students that would capture key concepts explaining and contextualizing a career in radiology. The components of the project include a manual, approximate costs, templates

for invitation letters, programs, flyers and posters, and resource cards, along with a proposed program layout. The costs can be minimal with volunteer faculty and residents and the use of university space. The module segments include videos, shareable lectures, and an outline for the workshops. These materials were designed to help guide not only those interested in holding expos at future regional or national meetings, but also those interested in hosting similar events at individual institutions.

Medical Student Radiology Expo (MSRE)

The MSRE was held 1 day after the annual AUR meeting in San Diego in 2016. The date was selected to be convenient to the radiology educators and leaders who attended the AUR meeting; the weekend date was also chosen to attract the greatest number of regional medical students. The Department of Radiology at the UCSD graciously hosted the event at the UCSD campus. The physical setting included an auditorium; a lobby for registration, breakfast and refreshments, and an open patio for lunch; and a cluster of several small rooms within the radiology department, in close proximity for the hands-on interactive workshops on ultrasound (US), biopsies, catheters, and picture archiving and communication systems (PACS).

Advertisement, Preparation, and Registration

The targeted group was students from the regional medical schools in and around southern California, although the event was open to all interested medical students. Advertising and notification to medical schools in southern California and its vicinity took place through radiology student interest groups, and national outreach was performed through AUR e-mails to members. Although all students were welcome, first- through third-year medical students were targeted. Matched students were also recruited to serve as mentors for the more junior students. Registration and reminders were sent out through SurveyMonkey, which helped inform the students that space was limited. Knowing student information and interests, especially approximate numbers of attendees in advance, assisted with the planning. Most of the students hailed from six institutions in the southern California region, with a few from other institutions outside the immediate region. Student travel expenses were either provided by the students or their affiliated institutions.

Faculty volunteers were recruited through e-mails distributed to AUR members and to UCSD faculty and residents. The volunteers were diverse, including young and enthusiastic faculty members and a number of women, an important feature, as women may choose a career where they see women mentors (9). These volunteers were organized into small task force workgroups. Workgroup tasks included selecting promotional videos; organizing lectures, game shows, and workshops; creating e-brochures, surveys, and giveaways;

recruiting students and volunteers; and fundraising from individual radiology departments.

Staff from both the AUR and UCSD helped in advance and during the expo day with logistics, including registration, making badges, and sending out reminders, as well as with organizing the venue and catering.

Content of the Expo

The program included interactive activities that highlighted key concepts about radiology, emphasizing aspects generally not well conveyed through a traditional curriculum (see Appendix 1 for the outline of the program).

The morning session included a variety of formats, including short informative talks, and professionally prerecorded video clips, as well as games and a panel for active audience participation. The variation maintained audience engagement and was intended to cater to differing student learning styles. A “myth-busters” session of talks addressed several hot topics, including job market cycles, the radiologist’s role in patient care and patient contact, and international and philanthropic radiology. A segment regarding diagnostic radiology and interventional radiology residency updates was also included. Videos were interspersed between the talks that discussed “a day in the life of” a radiologist, the breadth of imaging, and the diagnostic and interventional roles provided by radiology in patient care. Interventional radiology was discussed, along with state-of-the-art technical innovations and what they may provide to the future of health care. A Jeopardy game, giving clues of diseases suffered by celebrities, with short descriptions of radiographic manifestations of the diseases, engaged the participants and was intended to connect the students with the faculty.

During one segment, program directors of radiology residencies and medical student educators conducted a panel discussion and a question and answer session regarding important factors related to the application process. This open-floor question and answer session led to a wide range of topics, ranging from discussions concerning fellowships in radiology, to the cultural diversity seen among radiologists (14).

A casual lunch provided an additional opportunity for students and faculty to network. During the afternoon sessions, the students were divided into two groups to participate in workshops or roundtable discussions. The group was divided into two groups for more personal attention in each activity. The groups switched activities after 1 hour. Half of the students took part in a series of workshops that offered hands-on experience in various aspects of radiology. Workshop stations included US-guided biopsy, rotator cuff US imaging, catheter manipulation with and without angiography phantoms (Fig 1), and a “how-to” three-dimensional tutorial performed on diagnostic PACS workstations. The other half of the students met with radiology program directors and mentors, allowing the students to ask questions regarding radiology generally, as well as specific questions regarding the application process.



Figure 1. Medical students are shown learning catheter manipulation on a phantom during a hands-on workshop.

At the end of the program, the students responded to a brief survey (Appendix 2).

An institutional review board waiver was obtained.

RESULTS

Fifty-two students signed up and 45 participated: 21 first-year students, 11 second-year students, 10 third-year students, and 3 fourth-year students. About half were women and half were men. Thirty-nine of 44 participating students (89%) completed the post-exposition survey, with each student posting responses to most of the questions.

Although it is likely that all MSRE attendees had at least some baseline interest in radiology, the survey results are likely skewed toward those with the greatest interest in radiology, as they are highly likely to constitute the 89% who actually completed the survey. It is possible that none of the other 11% had a serious interest in radiology, and that among this group few of these students had a changed impression following the MSRE.

The survey showed some general patterns. The results of the post-program survey of the medical students were overall positive. The survey showed that 100% of the participants who responded changed their impression of radiologists, with 87% showing moderate to significant change (Fig 2). Following the expo, all the student participants who answered responded that they were more likely to consider radiology as a career choice—97% moderately to significantly more, although the students may have self-selected and many of the attendees may have been already thinking of radiology as a career option (Fig 3).

Questions clarifying the perceived value of each component of the program also showed patterns. The lectures were considered more engaging and more informative than the videos, but some students liked the videos more than the lectures. The panel and question and answer sessions were considered more informative than the workshops and the games. The workshops, and especially games, were considered more

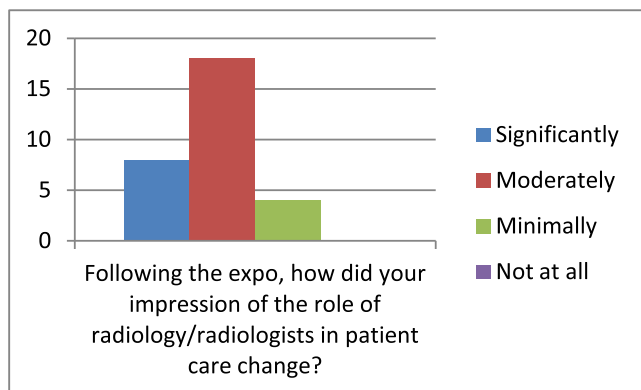


Figure 2. 100% of the participants changed their impression of radiology, and 87% showed moderate to significant change.

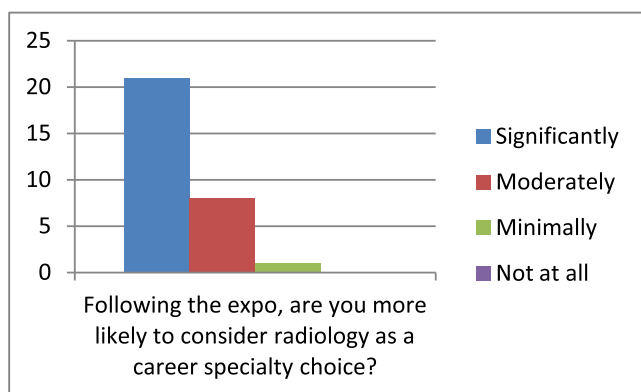


Figure 3. 100% of the participants responded that they were more likely to consider radiology after the Medical Student Radiology Expo, with 97% more likely by a moderate to significant amount.

engaging. The mixer activities allowed informal access to residents and faculty.

The following are examples of unedited narrative comments:

- I was most impressed by the attending to student ratio.
- I was grateful for the opportunity to speak to leaders in the field, especially to many program directors and department chairs.
- It was an amazing experience being able to hear panel discussions from all of the experts in radiology, who were all personable, kind, engaging, funny, and informative.
- The presence of residents was helpful because they can relate to the medical student experience.
- It was interesting to hear about the fellowships. For instance, this was the first time I had ever heard of an Emergency Radiology Fellowship.
- All of the questions that I had about radiology were addressed and I understand more about what radiologists actually do.
- I went from having some interest in the field, to seriously considering it now.

- As a third-year medical student, this expo clarified any questions I had about the field of radiology and the application process.

DISCUSSION

Medical student outreach efforts should be a vital mission for radiology communities. Recruitment of talented individuals into radiology is critical to ensuring the future success of the field. Arguably, an even more important mission is to teach all medical students about radiology regardless of what specialty they eventually select (10), to ensure that radiology is properly understood and utilized. To succeed at these two tasks of both improving recruitment and better informing all physicians about radiology, radiologists must broaden their interactions with students and connect not only with those expressing an early interest in radiology but also with all medical students in their early preclinical training period. Students are sometimes not aware of radiology as a distinct field of medicine until late in training—possibly too late to consider this as their career choice. This lack of exposure is especially true for underrepresented minorities and students who come from nonmedical backgrounds. As such, reaching out broadly to engage women and underrepresented minorities may help increase diversity and decrease the marked gender gap in radiology (16,17). Additionally, as the majority of current medical students are millennials (18), unique challenges of teaching and recruitment arise (19). The format of the MSRE can be utilized to address the multiple factors affecting teaching and recruitment, including generational differences.

Articulating our profession's commitment to the future physician workforce will lead to greater appreciation of and respect for radiologists as key players in the healthcare system, and such directed efforts should appropriately reinforce the perception of radiologists as clinicians and integral members of the care team. Such efforts should ultimately result in more effective communication and collaboration between radiologists and our other clinical colleagues.

Incorporating mandatory radiology rotations into the required medical school curriculum is becoming more common (10). Instructional approaches should address both interpretive and noninterpretive skills to give students a more accurate understanding of imaging and to also reinforce the critical role of radiologists in direct and team-based patient care (20). Radiology departments should promote faculty and resident engagement in the interactive teaching of medical students not only during formal radiology rotations, but also as medical students rotate on consulting clinical teams. Another method of involving students in radiology is to mentor them in research (21), although this is more time-consuming and involves a much greater longitudinal time commitment by the radiology faculty member. Although there is little substitute for direct mentoring by radiologists (22,23), other mechanisms to increase exposure to radiology may also be effective. These could include web-based vehicles like the Association of American Medical Colleges Careers in Medicine website (24,25), social media, radiology interest groups, and radiology expositions.

Some limitations to the programs included the small number of participants, self-selected students, the regional nature of the event, and lack of easy public transport to the site. Future projects could include following participating students to see what their field of choice ultimately was—and how they perceived radiology if their field was something other than radiology. Also, pending use of the toolkit by others, there could be follow-up demonstrating impact on those students.

CONCLUSION

An MSRE may reach only 50–100 medical students at a time, but this may provide a high degree of personalized attention to each student (26). Efforts would be maximized if this model was replicated at academic medical centers and at local radiology chapters across the nation. The customizable toolkit has been posted on the AUR/AMSER website (<http://www.aur.org/medical-student-expo-tool-kit/>) (27), and can be used by anyone interested in conducting similar radiology exhibitions. The materials can be downloaded from the referenced website and used either as is, or modified to best fit the circumstances. The contents include the following: a checklist, a program, letters, e-brochures, games, PowerPoint presentations, videos, and a survey. Portions of this toolkit could also be used by individual students as a mini-online expo to provide an introduction to interested students.

The ACR and AUR leadership intends to promote this concept of medical student outreach in September every year as Radiology Expo Month (26). It is our hope that the success of MSRE in San Diego in April 2016 will inspire many radiology programs across the country to conduct similar events, so medical students all over the country can benefit from first-hand exposure to the opportunities that radiology has to offer. As a result, we anticipate that a sustained effort cannot help but result in positive and durable effects on medical student recruitment to radiology.

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APPENDIX 1

RADIOLOGY MEDICAL STUDENT EXPO OUTLINE

Registration/Breakfast

Welcome and Introduction to Radiology

1. Welcome Remarks
2. Myth-busters #1: Misconceptions
3. Video—What We Do—*Radiology Cares (Testimonials w/ clinicians/patients)*
4. Myth-busters #2: Job Market
5. Video—*Without a Scalpel*
6. DR/IR Residency Updates
7. Video—State-of-the-Art/The Future—Molecular Imaging, fMRI
8. Myth-busters #3: International Radiology
9. Question and answer

Break

Radiology Games/Panel of Program Directors

1. Jeopardy/Crossword (*color coded to separate groups*)
2. Panel of Program Directors (PD)—what we look for and question and answer

Mixer/Lunch

Workshop Stations:

1. IR: Catheters—2 groups
2. US: Breast Biopsy Demos
3. US: DIY Stations—Rotator Cuff
4. CT: 2 groups
 - a. 3D Reconstruction Processing Lab
 - b. Dictating Stations

Panel for informal questions

Program Director/Medical Student Advisors/Resident/
Matched Medical Students

Closing Remarks/Online Survey time

APPENDIX 2

POST-EXPO SURVEY

1. Were the activities of the program engaging to you?

	Not engaging	Neutral	Engaging	Very engaging
Videos				
Talks				
Games				
Panel				
Mixer				
Workshops				

2. Were the activities of the program informative to you?

	Not informative	Neutral	Informative	Very informative
Videos				
Talks				
Games				
Panel				
Mixer				
Workshops				

3. Is there an additional topic you expected at this event?

Free answer

4. Additional comments:

Free answer