

# Maximizing Benefit and Minimizing Risk in Medical Imaging Use: An Educational Primer for Health Care Professions Students

Journal of Medical Education and Curricular Development  
Volume 5: 1–8  
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DOI: 10.1177/2382120518798812



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## ABSTRACT

“I am not young enough to know everything.”

Oscar Wilde

**BACKGROUND:** There is insufficient knowledge among providers and patients/caregivers of ionizing radiation exposure from medical imaging examinations. This study used a brief, interactive educational intervention targeting the topics of best imaging practices and radiation safety early in health professions students' training. The authors hypothesized that public health, medical, and physician assistant students who receive early education for imaging appropriateness and radiation safety will undergo a change in attitude and have increased awareness and knowledge of these topics.

**MATERIALS AND METHODS:** The authors conducted a 1.5-hour interactive educational intervention focusing on medical imaging utilization and radiation safety. Students were presented with a pre/postquestionnaire and data were analyzed using *t* tests and multivariate analysis of variance.

**RESULTS:** A total of 301 students were enrolled in the study. There was 58% ( $P < .01$ ) and 85% ( $P < .01$ ) improvement in attitude and knowledge regarding appropriateness of imaging, respectively. The authors also found an 8% increase ( $P < .01$ ) in students who thought informed consent should be obtained prior to pediatric computed tomographic imaging. Physical assistant students were more likely than medical students to prefer obtaining informed consent at baseline ( $P = .03$ ).

**CONCLUSIONS:** A brief educational session provided to health professions students early in their education showed an increased awareness and knowledge of the utility, limitations, and risks associated with medical imaging. Incorporation of a best imaging practice educational session early during medical education may promote more thoughtful imaging decisions for future medical providers.

**KEYWORDS:** Diagnostic imaging, radiation safety, medical education

**RECEIVED:** June 28, 2018. **ACCEPTED:** August 13, 2018.

**TYPE:** Original Research

**FUNDING:** The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: C.M.S. was supported by the National Center for Advancing Translational Sciences (NCATS), National Institutes of Health, through grant award number UL1TR001111. The present research represents a self-initiated, nonfunded quality improvement project. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

**DECLARATION OF CONFLICTING INTERESTS:** The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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## Introduction

Over the past 3 decades, high-tech medical imaging has influenced patient care through its transformative capabilities for rapid diagnoses, close monitoring, and management of many conditions. Lately, however, it has become equally as concerning for its overutilization.<sup>1–3</sup> Studies suggest that up to 20% to 50% of high-technology imaging such as multisection computed tomography (CT), magnetic resonance imaging, and positron emission tomography fail to provide information that improves patient care and hence may represent unnecessary

imaging services.<sup>1,4</sup> Such high-intensity practice patterns run at cross-purposes with ensuring high-quality care of patients, all the while exposing patients to unnecessary risks, most notably radiation-induced cancer.<sup>5</sup> Estimates show that approximately 29 000 future cancers could be related to CT use in the United States in 2007.<sup>6,7</sup> Children are especially vulnerable to the harmful effects of radiation.<sup>7–12</sup> Two recent epidemiologic analyses on large populations over many years have shown similar results: a 24% increase in cancer in children and adolescents exposed to ionizing radiation from CT scans.<sup>9,13,14</sup>



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An overwhelming majority of both providers and patients/caregivers believe that communicating radiation risks before CT scans are important.<sup>15–20</sup> Yet, knowledge regarding potential radiation-induced cancer risk from CT among both groups is poor.<sup>10,16,21–23</sup> Most recent statistics show that 48% of physicians and 72% of trainee physicians are uncomfortable sharing radiation risk information with patients.<sup>21</sup> Most of the providers underestimate radiation doses of common radiologic examinations.<sup>21</sup> Furthermore, many providers display misconceptions regarding different imaging procedures, with up to 28% of clinicians unable to correctly identify which modalities expose patients to ionizing radiation.<sup>23,24</sup> Most recent systematic literature reviews and historical comparisons spanning more than a decade demonstrate that this knowledge gap has not diminished significantly over time.<sup>16,21</sup> Lack of an understanding of radiation risks jeopardizes effective risk/benefit discussions and undermines the decision process for ordering the CT.<sup>19,21</sup> Studies show that sharing radiation risk information between providers and patients occurs seldomly (<25% cases).<sup>10,16,21,22,25,26</sup> Despite the fact that radiation risk communication occurs rarely, there is evidence to suggest that risk-benefit dialogue with patients could be a valuable tool for decreasing unnecessary CT use in an acute care setting.<sup>27–30</sup>

A recent study revealed that most of the emergency department (ED) providers thought that the CT scans they ordered may have been unnecessary 25% to 50% of the time.<sup>27</sup> However, in this same study, the subset of providers who considered patients' radiation dose history and conducted risk-benefit discussions before ordering a study were less likely to order unnecessary CT scans.<sup>27</sup> Studies stress that the provision of radiation safety information and appropriate understanding of radiation exposure will influence the number of advanced imaging studies requested by the provider.<sup>31</sup> Furthermore, parents are more willing to avoid radiation exposure from a CT scan for their child if the likelihood of a positive finding is low.<sup>32</sup>

Educating our future health care professionals and imaging prescribers regarding appropriate imaging utilization to optimize quality and safety and minimize risk is crucial. Nonetheless, public health, advanced practice provider and medical students receive little or no exposure to imaging appropriateness principles and radiation safety practices.<sup>33–35</sup> Our goal in the present project was to pilot a brief, interactive educational intervention, aimed at instilling an awareness of best imaging practices and radiation safety, early in health professions student training. We hypothesize that public health, physician assistant (PA), and medical students who receive early education on the major challenges of imaging appropriateness and radiation safety will undergo a change in attitude and will improve awareness and knowledge of these topics. In turn, these interventions may promote improved critical thinking and self-directed learning.<sup>36</sup>

## Methods

### *General study design*

Our pilot study consisted of a single 1.5-hour interactive educational intervention for health profession students that included a PowerPoint presentation and a facilitated discussion (Table 1). Our primary objective was to test the initial feasibility of the intervention. The secondary objective was to compare results of the intervention by student type, specifically medical and PA students. The interactive session comprised the issues surrounding medical imaging overutilization and CT radiation safety. To evaluate the intervention, we presented students with a questionnaire (Appendix 1) to complete prior to the educational session and again directly following it. The UNC Biomedical IRB (institutional review board) determined this study to be exempt from IRB review under 45 CFR 46.101(b). To the best of our knowledge, this is the first quality improvement educational interactive session that addresses medical imaging overutilization and CT radiation safety targeting health professions students early in their training.

### *Study participants*

The principal investigator (D.A.) presented the educational intervention to multiple cohorts of students within their health professions programs at 3 different academic institutions between 2014 and 2018. Specifically, we included public health graduate students, second year PA students, and medical students (ranging from first to fourth year) in our study, whom we selected through convenience sampling. The latter 2 groups included students who were on clinical rotations/electives. One institution invited the principal investigator (D.A.) to speak to the entire medical school class enrolled in their preclinical years (first and second) of medical school.

During their second year on clinical rotations, PA students intermittently return to campus as an entire class for scheduled didactic sessions. In contrast, medical students during their third and fourth year of required clinical rotations may select to participate in a radiology elective. For iterative cycles (annually and/or monthly) involving PA and medical student cohorts, respectively, the course directors invited the principal investigator (D.A.) for didactic lectures on the topic.

### *Educational session*

Drawing from the most recent medical literature and lay press, we presented a balanced overview of imaging overuse, often cited statistical projections and direct epidemiologic data related to radiation-induced cancer risks from CTs, concerns surrounding health care-related harms, and health care costs. Moreover, we emphasized current literature underscoring effective provider/patient/caregiver interactions. The lecturer (D.A.) functioned mainly as a facilitator because students were encouraged to interject with their own personal experiences,

**Table 1.** Topics covered during the educational session.

Available evidence	<ul style="list-style-type: none"> <li>• Definitions of terms, including <i>imaging overutilization</i>, <i>As Low As Reasonably Achievable (ALARA)</i>, radiology computerized order entry (COE), and decision support (DS)</li> <li>• Differentiation between radiation-based (CT) and nonradiation based (MRI, US) imaging modalities</li> <li>• Selected medical literature (with citations) covering topics of overutilization medical imaging and health risks (pros and cons) of ionizing radiation from CT scans</li> <li>• Examples of articles from the public domain on imaging use and radiation exposure (eg, <i>The New York Times</i>, <i>Newsweek</i>)</li> <li>• Graphs depicting 600% increase in US annual per capita radiation dose from medical sources spanning 1980-2006</li> </ul>
Our current work	<ul style="list-style-type: none"> <li>• Graphic depiction of widespread variation in pediatric head CT radiation dose from regional community hospitals from research team's (D.A., T.S.H., C.M.S., K.S.) own recently funded and published research</li> <li>• Examples of 2 juxtaposed abdominal pediatric CT scans, each performed for evaluation of acute appendicitis; one scan using unnecessarily high radiation dose, the other scan using optimized low radiation dose <i>As Low As Reasonably Achievable (ALARA)</i></li> </ul>
Future patient care	<ul style="list-style-type: none"> <li>• Illustrations of Imaging Appropriateness Criteria, American College of Radiology <i>Image Wisely</i><sup>37</sup> and American Board of Internal Medicine <i>Choosing Wisely</i><sup>38</sup></li> <li>• Specific campaigns, including Web site links, to decrease unnecessary utilization of medical imaging</li> <li>• Two interactive student-based case presentations</li> <li>• Web site links and resources covering the topics of medical imaging and radiation risk sharing to help students formulate their future conversations with caregivers and patients (eg, <i>Image Gently</i><sup>15</sup> and the World Health Organization<sup>19</sup>)</li> </ul>

interpretations, and lines of questioning. The educational session included 2 interactive student-based case presentations: (1) the Ottawa Ankle Rules<sup>39</sup>: teenage baseball player with minor ankle injury and (2) validated clinical prediction rules for children at very low risk of clinically important traumatic brain injury (ciTBI)<sup>40</sup>: toddler with minor head injury.

### Survey instrument

The questionnaire (Appendix 1) consisted of a total of 7 questions grouped into 3 categories—attitude, knowledge, and opinions toward informed consent. We also collected written comments during the posttest about the presentation from students that wished to provide them. Following data collection from each session, we coded survey data and compiled them into an Excel spreadsheet for analyses. The data analyst (T.H.) rereviewed data at a later date to ensure accuracy of coding. We scored attitude questions (questions 1 and 2) on a scale from 0 to 4, where 0 represented “not at all important” and 4 represented “very important.” To rate knowledge questions (questions 3, 4, 6, and 7), we used a score of 0 or 1 for incorrect and correct answers, respectively. For students who failed to answer a knowledge question, we used a score of 0. For question 5, which asked students whether informed consent should be obtained prior to a pediatric CT examination, we used a score of 0 and 1 for “no” and “yes,” respectively. At the conclusion of all survey collection, we compiled selected student comments and grouped them into 3 categories—previous experiences, current reactions, and future practice changes.

### Evaluation

We defined feasibility as successfully conducting the intervention involving each student type and an overall increase in

knowledge after the intervention. Our statistical analyses of survey results used SAS 9.4 (SAS Institute Inc., Cary, NC, USA). First, we assessed all data for normality using a Shapiro-Wilk test. Once data were confirmed to be normally distributed, we compared variables using *t* tests and included all students in the overall analysis and the analysis by sex. However, to compare the results of medical students and PA students, we excluded public health graduate students because PA and medical students will eventually be involved in the decision-making process and prescribing imaging studies, whereas public health graduate students per se will not generally be involved in direct patient care. Finally, we employed a  $\chi^2$  test and a multivariate analysis of variance (MANOVA) to test for an association and any interactions between sex and student type. Statistical significance was defined as  $P < .05$ .

## Results

### Cohort characteristics

Our sample included 301 students. An additional 5 students and 1 nonstudent physician also completed the pretest but did not complete the posttest. These individuals were excluded from all analyses and not included in the total. Of these, 204 (67.8%) were women and 96 (31.9%) were men. One student did not report sex. A total of 11 (3.6%) were public health graduate students, 142 (47.2%) were PA students, and 148 (49.2%) were medical students. Medical students were pursuing postgraduate residency training in Emergency Medicine, Family Medicine, Internal Medicine, Pediatrics, Surgery, Radiology, Radiation Oncology, Anesthesiology, Neurology, Obstetrics and Gynecology, Ophthalmology, and Geriatrics. The PA students were pursuing practice opportunities in Family Medicine, Surgery, Emergency Medicine, Gastroenterology, Internal Medicine, Orthopedics, Cardiology, Behavioral Medicine, Pediatrics, and Critical Care.

**Table 2.** Paired *t* test by question to compare pre/posteducational session responses (N=301).

QUESTION	PRE-SESSION MEAN (SD)	POST-SESSION MEAN (SD)	P VALUE
1	3.3 (0.7)	3.8 (0.5)	<.001
2	3.3 (0.8)	3.8 (0.5)	<.001
3	0.3 (0.4)	0.5 (0.5)	<.001
4	0.6 (0.5)	1.0 (0.3)	<.001
5	0.8 (0.4)	0.9 (0.3)	<.001
6	0.3 (0.4)	0.8 (0.4)	<.001
7	0.2 (0.4)	0.9 (0.3)	<.001
Attitude group	6.6 (1.3)	7.5 (0.9)	<.001
Knowledge group	1.3 (1.0)	3.1 (0.9)	<.001

### Study feasibility

We successfully completed 15 invited sessions. Of these sessions, we conducted 1, 10, and 4 with public health, medical, and PA students, respectively. Lively in-session questions, responses, and discussions served to promote students' critical thinking and to motivate self-directed learning (Tables 1 and 4). Course directors were grateful for the new experience, pleased with the success of the session, and requested the session be repeated over a 4-year period.

### Survey results

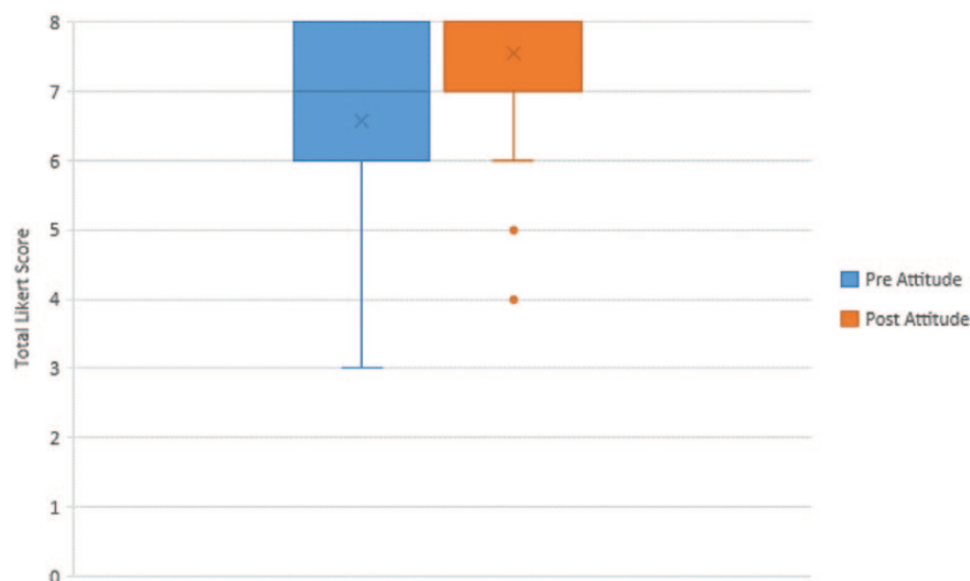
Our study showed that the pilot intervention was readily feasible with all 3 student types. Based on the pre/postevaluation,

we found a statistically significant difference in all survey questions before and after the session. Results are summarized in Table 2 and Figures 1 and 2. One student failed to answer an attitudinal question and was not given a score for this specific question. All students answered question 5.

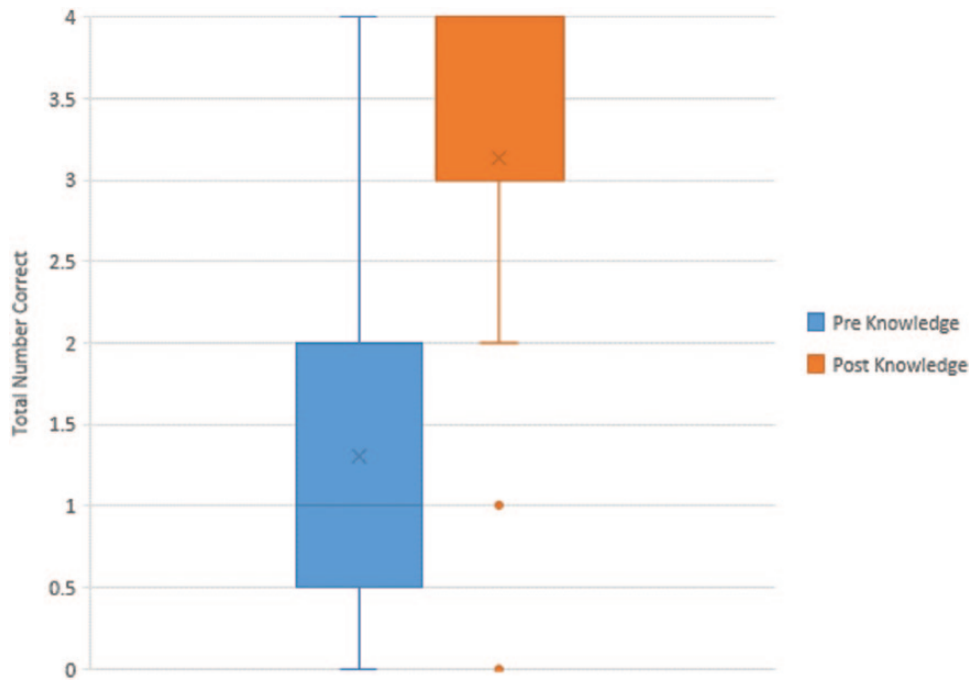
We found an increase in attitude score favoring the importance of a risk discussion associated with obtaining a CT in 174 (58%) students with a mean increase of 1 (1) point on a 5-point Likert scale ( $P < .001$ ). In addition, we found an increase in knowledge in 256 (85%) students who, on average, answered approximately 2 (1) more questions correctly on the posttest ( $P < .001$ ). When asked whether pediatric CT examinations should require written informed consent, 249 (83%) students felt that they should prior to the session. After the session, this increased to 273 (91%) students, representing an 8% increase ( $P < .001$ ).

The PA students were more likely than medical students to prefer obtaining informed consent prior to the session ( $P = .03$ ). The PA students also reported increased attitude scores toward the importance of radiation risk considerations, such as the patient's radiation dose history and engaging in radiation risk discussion with patients both before and after the intervention. Results are summarized in Table 3.

In general, the data appear to suggest differences between male and female students in attitude scores toward the importance of radiation risk considerations and favor for obtaining informed consent prior to a pediatric CT study. However, in comparing sex and student type using a  $\chi^2$  test, we found that there is a significant association between sex and student type ( $P < .01$ ). Given this association, the differences between medical students and PA students may be related to either sex or student type differences. For example, the medical students included 64 (43.5%) men and 83 (56.5%) women, whereas more PA students were women (113 [79.6%]) compared with



**Figure 1.** Graphical summary of attitude scores (total Likert) by pre/posteducational session questionnaire.



**Figure 2.** Graphical summary of knowledge scores (total number correct) by pre/posteducational session questionnaire.

**Table 3.** Comparison of educational session responses for medical and PA students by student type (n=290).

	QUESTION	MEDICAL (N=33)	PHYSICIAN ASSISTANT (N=142)	P VALUE
Pre-educational session	1	3.2	3.4	.09
	2	3.2	3.4	.04
	3	0.3	0.2	.26
	4	0.5	0.7	<.01
	5	0.8	0.9	.03
	6	0.3	0.2	.33
	7	0.2	0.2	.86
Post-educational session	1	3.7	3.9	<.01
	2	3.7	3.9	<.01
	3	0.4	0.6	<.01
	4	0.9	1.0	.43
	5	0.9	1.0	.18
	6	0.8	0.9	<.01
	7	0.8	1.0	<.01

men (29 [20.4%]). Our MANOVA revealed that the differences in pre/postvalues are likely explained by the student type ( $P < .01$ ). When controlling for students type, we found that sex no longer had a significant effect ( $P = .09$ ).

In addition to our quantitative analyses, we obtained several comments from students, which we summarized in Table 4.

### Discussion

For all health care providers, the practice of imaging appropriateness demands a strong skill set, including the “interpretation of the clinical presentation, due regard for available evidence and best practice, cost-effectiveness, limitations, and risk-benefit analysis.”<sup>34</sup> Despite strong advocacy on the part of the radiology community for a compulsory medical school curriculum in radiation safety and appropriate imaging use through initiatives including the Alliance of Medical Student Education in Radiology, Liaison Committee on Medical Education, the Association of American Medical Colleges, and the American Medical Association, important contextual principles of the practice of medicine, including imaging appropriateness, radiation safety, imaging modality differences, and provider-patient risk/benefit communication, are taught rarely.<sup>5,23,34,35,41</sup> Importantly, such lack of exposure to the challenges of appropriate imaging and the presence and effects of radiation in diagnostic imaging leaves students feeling unprepared and unsure about their future radiology ordering practices.<sup>29,34,42</sup>

Our study demonstrates feasibility and a statistically significant impact of a single, brief interactive session on increased awareness and knowledge of the utility, limitations, and risks associated with medical imaging. One recurring theme from our study is the shift in attitude on the part of young students toward the importance of checking the patient’s radiation dose history and discussing risks and benefits of the examination with the patient/caregiver so they can make an informed

**Table 4.** Selected student comments on the educational session for all student types.

PREVIOUS EXPERIENCES
<p>"I've had long conversations with parents about how you can't see a concussion on CT. And many times parents are adamant that they want one-'just to be sure.' This information will help me talk with them and convince them it's not only not necessary, but it's harmful."</p> <p>"I came across a lot of unnecessary ordering of CT scans in the ER at [Hospital]. Certain providers would educate about radiation, but most would not."</p> <p>"From my experience, half of the scans we did were because the patient requested it. Patient education could make a huge difference."</p>
CURRENT REACTIONS
<p>"How can we as clinicians find out the exact cost of these imaging procedures?"</p> <p>"Very eye-opening to a nearly graduated student. I may be too inexperienced to not order CT scans to confirm/rule out my diagnosis."</p> <p>"Extremely informative and it was crazy learning about the increased risk with pediatric patients especially."</p> <p>"It is helpful to have guides/algorithms to assist in the appropriateness of imaging."</p> <p>"Made me think that having an informed consent process for CT makes a ton of sense."</p> <p>"Can we call ahead to the imaging center on a child's CT scan and ask them to turn the [radiation] knob down?"</p> <p>"Overutilization is a huge problem, not only in the exposure to the patient, but to the contribution to health care waste (i.e. having a patient sit in the ED for &gt; 3hrs. waiting for imaging results). Would love more information on "defensive" medicine and imaging [because] I think that's the majority of reasoning."</p> <p>"Great information. Thanks for sharing. How do we raise physician confidence of their [diagnosis] without using radiographic imaging?"</p> <p>"This was a very interesting presentation, as CT scans are generally considered innocuous. My only concern is the suggestion that 20% to 50% of CTs are unnecessary. How could you definitively say that they are unneeded if you wouldn't be able to rule out a diagnosis otherwise?"</p> <p>"What can be done to teach more doctors to read CTs with the least amount of radiation possible? If more doctors were mandated to be trained, I think a lot of the issues could begin to be addressed."</p> <p>"I came in prior to the presentation knowing that our medical system tends to overuse things like imaging and prescribing. I admire your work on trying to educate improve and change the way we practice medicine."</p>
FUTURE PRACTICE CHANGES
<p>"I think that this was very good information on radiation exposure. From a trauma standpoint, though, certain injuries/conditions will harm someone before radiation. I think this should be taken into account and explained to the patients as well."</p> <p>"This is helpful for guiding information to give patients."</p> <p>"This was a really engaging and informative presentation and will keep this in mind when making imaging decisions and describing risks to patients."</p> <p>"I plan to review this literature and utilize it in my practice."</p> <p>"I really enjoyed the lecture. This is something I had not thought of and will carry with me into practice."</p> <p>"Very eye-opening. Thank you for coming and teaching about this topic. It has changed the way I think about CTs and the long term impact on patients."</p> <p>"Excellent discussion and very informative. I see things that I can change but other things that will take epic shifts of the legal system before providers stop practicing 'cover your [censored] medicine.'"</p>

decision. Students were also more likely to believe that patients/caregivers should provide informed consent before a pediatric CT is ordered. Here, it is important to note that the responses and choices of young students may mirror those of practicing clinicians. According to a recent report, following an educational session, emergency medicine physicians were more likely to believe that patients should give informed consent before a CT scan and predicted that they would be more likely to discuss the risks and benefits of CT with their patients.<sup>30</sup> Despite the uncertainties, ambiguities, goal conflicts, and time pressures affecting both provider and patient/caregiver, imaging decisions and risk/benefit discussions can be open, respectful, and shared. In this study, guidelines for engendering trust within various contextual clinical frameworks, as exemplified in the Image Gently<sup>15</sup> and WHO (World Health Organization) guidelines,<sup>19</sup> were avidly sought and greatly appreciated by our students. The capacity of the provider/patient encounter for processing doubt is part of what makes this unique exchange beneficial.

Our study has several strengths. First, our study had a large sample size and our educational workshops incorporated a

diversity of young graduate students, including trainees in the latter 2 groups. Second, our research team members, trained in radiology, public health, health services research, and emergency medicine worked collaboratively to develop and interpret our survey questions and results. Third, our study introduced a straightforward, first-step exposure to a challenge facing the wider community of postgraduate trainees and practicing clinicians. Importantly, young learners' responses provided a glimpse into their early development and thinking patterns and showed how they anticipate such information informing their future ordering practices and interactions with patients.

One limitation of this study was the short-term evaluation of the outcome measures. Future studies may consider repeated measures of knowledge and attitudes to assess whether the intervention effect is sustained. Another potential limitation was our nonprobability sampling method, which was chosen due to the pilot nature of the study and to curriculum differences between graduate programs. When compared with the general population of medical students, some of the medical students who were enrolled in a radiology elective course may

have a stronger interest in issues pertaining to medical imaging utilization and radiation safety. Future studies could use random samples of students to mitigate potential selection bias. Importantly, recent literature suggests that short radiology educational interventions with medical students during initial stages of their preclinical years can exert significant impact, promote critical thinking, inspire self-directed learning, and increase awareness.<sup>33,34,43</sup>

## Conclusions

An educational session for medical and PA students early in their education showed an improved awareness and knowledge of the utility, limitations, and risks associated with medical imaging. Incorporation of a best imaging practice educational session early during medical education may promote more thoughtful imaging decisions for future medical providers.

## Author Contributions

DA and TSH contributed equally to the development of this manuscript.

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## Appendix 1

### Survey instrument

Please complete the following test so that we may better understand the effects of this educational lecture. You will complete this test once before and again after the presentation.

Participation is voluntary and you do not have to complete this survey unless you want to do so. Not completing this survey will not affect you in any way. Your responses will be completely confidential and no identifying information about you will be collected.

**Q1** How important is it to you to discuss the risks and benefits of a CT scan with your patients before ordering the study?

- Very Important [4]
- Important [3]
- Somewhat Important [2]
- Not important [1]
- Not at all important [0]

**Q2** How important is it to take a patient's radiation dose history into consideration, or check to see how many prior CTs a patient has had before ordering a CT study?

- Very Important [4]
- Important [3]
- Somewhat Important [2]
- Not important [1]
- Not at all important [0]

**Q3** In your judgment, by how much is the lifetime risk of developing a cancer increased as a result of a CT scan of the abdomen and pelvis?

- 100% [0]
- 10% [0]
- 1% [0]
- 0.1% [1]
- 0.01% [0]
- 0% [0]
- Do not know [0]

**Q4** Assuming the same radiation dose from a CT scan, do younger patients less than 30 years of age have a higher risk of developing a cancer than those over the age of 50 years?

- Yes [1]
- No [0]
- Do not know [0]

**Q5** Do you think pediatric CT exams should require a written informed consent process to disclose risks of radiation exposure?

- Yes [1]
- No [0]
- Do not know [0]

**Q6** In your judgment, how many cancers would probably be induced in your patients as a result of a CT scan of the abdomen and pelvis performed on 50 year old patients?

- 1 cancer per 100 CT scans [0]
- 1 cancer per 1,000 CT scans [1]
- 1 cancer per 10,000 CT scans [0]
- 1 cancer per 100,000 CT scans [0]
- None [0]
- Do not know [0]

**Q7** In your judgment, how many cancers would probably be induced in your patients as a result of a CT scan of the abdomen and pelvis performed on children regardless of age at exposure?

- 1 cancer per 50 CT scans [0]
- 1 cancer per 500 CT scans [1]
- 1 cancer per 5,000 CT scans [0]
- 1 cancer per 50,000 CT scans [0]
- None [0]
- Do not know [0]

**Q8** What is your gender?

- Male
- Female

*Scoring criteria has been added to each question in brackets for reference. Participants were not shown the scoring criteria. The postsession questionnaire also included a comment section.*