# Women in Radiology: Exploring the Gender Disparity

EC: Editor's Choice

*Rebecca Zener, MD[a], Stefanie Y. Lee, MD[a,b], Kari L. Visscher, MD[a], Michelle Ricketts, MD[a,c], Stacey Speer, MD[a], Daniele Wiseman, MD[a,b]*

## Abstract

**Purpose:** In 2015, only 1.5% of female Canadian medical students pursued radiology as a specialty, versus 5.6% of men. The aim of this study was to determine what factors attract and deter Canadian medical students from pursuing a career in radiology, and why fewer women than men pursue radiology as a specialty.

**Methods:** An anonymous online survey was e-mailed to English-speaking Canadian medical schools, and 12 of 14 schools participated. Subgroup analyses for gender and radiology interest were performed using the Fisher exact test ($P < .05$).

**Results:** In total, 917 students (514 women; 403 men) responded. Direct patient contact was valued by significantly more women who were not considering specialization in radiology (87%), compared with women who were (70%; $P < .0001$). Physics deterred more women (47%) than it did men (21%), despite similar educational backgrounds for the two gender groups in physical sciences ($P < .0001$). More women who were considering radiology as a specialty rated intellectual stimulation as being important to their career choice (93%), compared with women who were not (80%; $P = .002$). Fewer women who were not interested in radiology had done preclinical observerships in radiology (20%), compared with men who were not interested in radiology (28%; $P = .04$).

**Conclusions:** A perceived lack of direct patient contact dissuades medical students from pursuing radiology as a career. Women have less preclinical radiology exposure than do men. Programs that increase preclinical exposure to radiology subspecialties that have greater patient contact should be initiated, and an effort to actively recruit women to such programs should be made.

**Key Words:** Radiology residency, women in radiology, gender, radiology exposure, specialty selection

*J Am Coll Radiol 2016;13:344-350. Copyright © 2016 American College of Radiology*

## INTRODUCTION

Women constituted more than half (53%) of Canadian medical graduates applying to Canadian residency programs in 2015, yet diagnostic radiology was the first-choice discipline for only 1.5% of women, compared with 5.6% of men [1]. Despite equal success rates among men and women in obtaining radiology residency positions in Canada, this gender difference has remained relatively constant during the past decade [1,2].

In the 2015 Canadian residency match, 25% of medical students matching into diagnostic radiology were women [1]. In contrast, women constituted 40% of all medical students who matched into a surgical specialty [1]. Similarly, in the United States, radiology ranks 17th of 20 among the largest training specialties for its proportion of women, and it is the lowest ranked of the nonsurgical specialties [3,4].

Underrepresentation of women in radiology has been the topic of several papers, including a review by Potterton et al [5], which discussed how positive exposure to a specialty during medical school may influence specialty choice [5]. Other studies [6,7] have found that direct patient contact is a factor influencing specialty choice. Although a survey by Fielding et al [7] found that a lack of direct patient contact was the factor that most strongly dissuaded American clerkship students from pursuing radiology as a specialty [6], no significant gender-specific differences in factors dissuading men and women were elicited [6].

[a]Department of Medical Imaging, Schulich School of Medicine & Dentistry, Western University, London, Ontario, Canada.

[b]Department of Diagnostic Radiology, London Health Sciences Centre, London, Ontario, Canada.

[c]Department of Diagnostic Radiology, St Joseph's Health Care, London, Ontario, Canada.

Corresponding author and reprints: Rebecca Zener, MD, Department of Medical Imaging, London Health Sciences Centre, Victoria Hospital, 800 Commissioners Rd. E., London, Ontario, Canada, N6A 5W9; e-mail: rebeccazener@gmail.com.

The authors have no conflicts of interest related to the material discussed in this article. The authors have no financial, nor industry-related disclosures that are relevant to this article.





1546-1440/15/$36.00 ■ http://dx.doi.org/10.1016/j.jacr.2015.10.019

These studies point to a need for further research, as the factors that account for the significantly lower proportion of women who choose radiology, compared with that of men, are still not well understood [5-7]. Historically, in the United States, the relative attractiveness of diagnostic radiology as a specialty has been related to its economic vitality (ie, job market and salary) [8]. Overall, medical students' knowledge of the interplay between economic factors and radiology has been suggested as a relevant factor in their selection of a specialty, but the role of gender in this context has not been examined.

The reasons underlying gender disparity in radiology training programs remain unknown. Are women who consider radiology attracted to different qualities in a specialty, compared with women who do not? Are men and women deterred from pursuing radiology as a specialty for different reasons? The purpose of this study was to investigate what factors attract Canadian medical students to and deter them from radiology, and to determine if these factors differ between women and men.

## METHODS

This study was fully approved by the Western University Research Ethics Board. Institutional research ethics board approval for the study was obtained from our home university, as well as from the other schools that subsequently agreed to participate in the study. Factors included in the questionnaire were identified based on the published literature, as well as discussion among study team members. The study was pilot tested, with multiple medical students rotating through our radiology department, and revised for clarity and ease of use, through multiple iterations, to minimize potential ambiguity in the questions. The main survey questions were peer reviewed by three radiologists, two radiology residents, and four medical students (Online Appendix 1).

Survey participants provided demographic data, including age, gender, medical school attended, level of training (years 1 and 2: preclerkship; years 3 and 4: clerkship), and field of study before medical school. Students who were potentially interested in considering a career in radiology were asked to identify factors that attracted them to the field. Students who were definitely not considering a career in radiology were asked to identify factors that were dissuading them from pursuing a career in radiology. Students were asked to indicate their prior radiology exposure, any previous mentoring they had received in radiology, and factors influencing their specialty choice in general.

All 14 English-language Canadian medical schools were invited to participate in the anonymous online survey hosted on SurveyMonkey.com in the 2012-2013 academic year. Eleven of the medical schools directly distributed the invitation to participate in the survey to their students, via e-mail, which contained a link to the online survey. One school posted the invitation on a notice board in their medical school. Two schools declined to distribute the survey to their students, citing frequent survey requests as the reason for not participating. Based on data from the Canadian Resident Matching Service [1], approximately 6,770 students had the opportunity to participate in the survey.

All statistical analyses were performed using commercially available software (GraphPad Prism, version 6.00, GraphPad Software, La Jolla, California). Categoric data, including the number of male and female medical students classifying a factor as important, and the corresponding proportions, with their numerators and denominators expressed as percentages, were calculated. Regarding overall specialty choice and radiology exposure, for each factor, comparisons were made between: (1) women and men; and (2) students who were considering radiology and students who were not. Subgroup analyses for each factor were performed for both men and women, based on whether they were considering radiology. Two-by-two tables were formed, using the numerators and denominators for the number of individuals who did and did not select a particular factor. Statistical analyses were performed using the Fisher exact test, with a significance level of $P < .05$.

## RESULTS

In total, 917 participated in the survey, for a response rate of approximately 14%. Of these, 514 were women (56%), and 403 were men (44%). Level of training was reported by 896 students: 560 students were in preclerkship (63%); 336 were in clerkship (38%). No significant difference was found in level of training by gender. Students who were potentially interested in considering radiology numbered 291 (32%), whereas 626 students (68%) were definitely not considering radiology as a specialty. Among the former group, 109 were women (37%), and 182 were men (63%).

### Radiology Exposure

Among students considering radiology as a specialty, more men did radiology-related research compared with women, whereas among students who were not considering a radiology specialty no gender-specific differences