

# Assessment of Female Medical Students' Interest in Careers in Cardiothoracic Surgery

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**OBJECTIVE:** Although over half of medical students are females, women comprise only 21% of cardiothoracic (CT) surgery residency applicants and 5% of the CT workforce. We sought to gain insight into female medical students' perceptions of CT surgery and identify targets to increase interest.

**DESIGN:** A 33-question survey queried career selection factors, perceptions of CT surgery, and ways to increase interest in the field. Responses were stratified by sex and preclinical versus clinical years.

**SETTING:** Women at 13 US medical schools were compared to men at a Midwest medical school.

**PARTICIPANTS:** Surveys were distributed to approximately 4400 women and were completed by 372 (8.5%) women. Comparison surveys were distributed to approximately 170 preclinical men and were completed by 98 (57.6%) men.

**RESULTS:** Preclinical woman had broad interests, whereas clinical women were more interested in primary care ( $p = 0.0124$ ). Intellectual interest and lifestyle were important in specialty selection for men and women (91% versus 90%; 78% versus 86%). Although preclinical men valued perceived prestige and salary significantly more than preclinical women (39% versus 20%,  $p = 0.0014$ ; 64% versus 48%,  $p = 0.0173$ ), preclinical women valued caring for specific ethnicities and addressing health disparities significantly

more than preclinical men (26% versus 15%,  $p = 0.0173$ ; 53% versus 33%,  $p = 0.0019$ ). Making family plans was cited by 83% of women as difficult if they choose to become a CT surgeon. Women thought that attaining their career interests and life goals (76%) or access to female CT surgery mentors (63%) would make the field more appealing. Over 70% of preclinical women were interested in shadowing a CT surgeon. Of these women, 12% attempted to shadow.

**CONCLUSIONS:** Although baseline interest in CT surgery is low among women, there are many targets for increasing interest especially during preclinical years. Residency programs have the opportunity to entice women to the field by addressing their priorities of lifestyle, family planning, and addressing health disparities. (J Surg Ed 1:111-111. © 2017 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

**KEY WORDS:** cardiac surgery, career choice, female, sex, medical students, thoracic surgery

**COMPETENCIES:** Professionalism, Interpersonal Skills and Communication, Patient Care

## INTRODUCTION

Despite the existence of professional organizations such as women in thoracic surgery, women constitute less than 5% of cardiothoracic (CT) surgeons.<sup>1-4</sup> At the same time, the proportion of women entering the field remains low. Although 8907 of 18,705 (48%) graduating medical students in 2015 were female, only 21% of applicants to integrated CT surgery residencies were women.<sup>5,6</sup>

Both these authors contributed equally to this article.

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The sex composition discrepancies of the CT surgical workforce and the residency application pool are particularly notable when considering that there is a predicted shortage of approximately 1500 CT surgeons by 2020.<sup>7</sup> To make up for this anticipated shortfall, appealing to and recruiting future CT surgeons of both sexes is of paramount importance to meet the increasing needs of an aging population for CT surgical care.

Therefore, gaining insight into potential female applicants' conceptions of CT surgery as a career and key factors in career decision-making is needed. Additionally, because a previous analysis showed that many active CT surgeons selected CT surgery as a career before or during medical school,<sup>1</sup> it is of particular importance to understand these attitudes in first or second-year medical students. Using a web-based survey, we sought to characterize the current interest in, perceptions of, and experiences with CT surgery, as well as motivators in career selection among female medical students across the United States.

## MATERIAL AND METHODS

### Study Design

A web-based survey containing 33 questions was created using the University of Michigan Qualtrics software suite (<https://umich.qualtrics.com/>). Institutional Review Board approval was obtained; the study was considered exempt from further review. The survey was targeted at female medical students from all 4 years of medical school as well as research years of Medical Scientist Training Program (MSTP)/MD, PhD programs to assess their personal motivations, career and lifestyle goals, attitudes toward CT surgery, and experiences with CT surgery during medical school. It was distributed via e-mail, in 2010, to the entire student bodies at 13 medical schools across the United States targeting responses from women, with information collected for 1 year. A minimum of 1 reminder e-mail was sent. A preclinical male comparison group was formed from a similar survey distributed to male medical students at the University of Michigan Medical School. The full questionnaire is provided in [Supplementary Table 1](#).

### Statistical Analysis

Categorical variables were reported as frequencies with corresponding proportions and continuous variables as a mean ( $\mu_x$ )  $\pm$  standard error. Participants were divided into 3 cohorts—preclinical women, clinical women, and preclinical men. MSTP students were included in the preclinical group. Comparisons of categorical data were made using *z*-test. Continuous data were compared using Student's *t*-test. Statistical testing was performed via Microsoft Excel (Version 12.3.6, Microsoft Corporation, Redmond, WA), 2 sample *t*-test calculator for unpaired data sets (<http://www.usablestats.com/calcs/2samplet&summary=1>), and *z*-score calculator for 2 Population Proportions (<http://www.socscistatistics.com/tests/ztest/>) with a type I error of  $\alpha = 0.05$ .

## RESULTS

### Demographics

The survey was distributed to approximately 4400 women. The response rate was approximately 8.5%, with 372 female students having completed the survey. The mean age of female respondents was  $24.2 \pm 2.0$  years. A comparison male survey was distributed to approximately 170 preclinical men with 98 preclinical male respondents and a response rate of 57.6%. The mean age of male respondents was  $23.6 \pm 2.0$  years. Among women, 61% were in preclinical years (first, second, and research years for MSTP students), and 39% were in clinical years (third and fourth years). White comprised 49%, 20% were African American, and 18% were Asian. Hispanic ethnicity comprised 12%. Demographic data are presented in [Table](#). There was a statistically significantly higher proportion of East Indian and Middle Eastern minority groups among preclinical men versus women.

### Career Interests and Goals

Preclinical women had broad interests, including primary care specialties. Internal medicine or family medicine was listed as the first choice by 18% of preclinical women, pediatrics by 16%, obstetrics and gynecology by 11%, surgery or surgical subspecialties by 21%, and medical subspecialties by 20%. However, women in the clinical years demonstrated significantly more interest in primary care specialties—internal medicine or family medicine (31%,  $p = 0.0124$  compared to preclinical women). Among preclinical men, surgery and surgical subspecialties (50%,  $p < 0.001$  compared to preclinical women) and internal medicine subspecialties (24%,  $p = 0.0111$ ) were most popular when selecting a first choice ([Fig. 1](#)).

As shown in [Fig. 2](#), when comparing factors that influence career interests among preclinical versus clinical women, 32% versus 46% valued acute care ( $p = 0.0124$ ) and 23% versus 37% valued managing chronic disease ( $p = 0.0142$ ). When comparing factors that influence career choice among preclinical men versus preclinical women, 39% versus 20% valued the field's perceived prestige ( $p = 0.0014$ ), 64% versus 48% considered salary ( $p = 0.0173$ ), and 78% versus 88% valued lifestyle ( $p = 0.034$ ). When comparing career interests and goals among preclinical men versus preclinical women, 15% versus 26% would like to care for members of a specific ethnic population ( $p = 0.0488$ ), 55% versus 32% would like to participate in acute care of patients ( $p = 0.0004$ ), 26% versus 40% wish to be involved in preventative care ( $p$

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