

# The Effect of Gender on Resident Autonomy in the Operating room

Shari L. Meyerson, MD,\* Joel M. Sternbach, MD,\* Joseph B. Zwischenberger, MD,<sup>†</sup> and Edward M. Bender, MD<sup>‡</sup>

\*Department of Surgery, Northwestern University, Feinberg School of Medicine, Chicago, Illinois;

<sup>†</sup>Department of Surgery, University of Kentucky, Lexington, Kentucky; and <sup>‡</sup>Department of Cardiothoracic Surgery, Stanford University, Palo Alto, California

**OBJECTIVE:** Discrimination against women training in medicine and surgery has been subjectively described for decades. This study objectively documents gender differences in the degree of autonomy given to thoracic surgery trainees in the operating room.

**DESIGN:** Thoracic surgery residents and faculty underwent frame of reference training on the use of the 4-point Zwisch scale to measure operative autonomy. Residents and faculty then submitted evaluations of their perception of autonomy granted for individual operations as well as operative difficulty on a real-time basis using the “Zwisch Me!” mobile application. Differences in autonomy given to male and female residents were elucidated using chi-square analysis and ordered logistic regression.

**SETTING:** Seven academic medical centers with thoracic surgery training programs.

**PARTICIPANTS:** Volunteer thoracic surgery residents in both integrated and traditional training pathways and their affiliated cardiothoracic faculty.

**RESULTS:** Residents ( $n = 33$ , female 18%) submitted a total of 596 evaluations to faculty ( $n = 48$ , female 12%). Faculty gave less autonomy to female residents with only 56 of 184 evaluations (30.3%) showing meaningful autonomy (passive help or supervision only) compared to 107 of 292 evaluations (36.7%) at those levels for male residents ( $p = 0.02$ ). Resident perceptions of autonomy showed even more pronounced differences with female residents receiving only 38 of 197 evaluations (19.3%) with meaningful autonomy compared to 133 of 399 evaluations (33.3%) for male residents ( $p < 0.001$ ). Potential influencing factors

explored included attending gender and specialty, case type and difficulty, and resident level of training. In multivariate analysis, only case difficulty, resident gender, and level of training were significantly related to autonomy granted to residents.

**CONCLUSIONS:** Evaluations of operative autonomy reveal a significant bias against female residents. Faculty education is needed to encourage allowing female residents more operative autonomy. (J Surg Ed ■■■■■. © 2017 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

**KEY WORDS:** gender disparity, surgical education, autonomy, bias

**COMPETENCIES:** patient care

## INTRODUCTION

In 1961, the first women cardiothoracic surgeons were certified by the American Board of Thoracic Surgery. Over the next 20 years, the number of women certified rose to only 10. Since then, advances have been made in recruiting, training, and promoting women in thoracic surgery. In 2010, the 50th anniversary of the first female thoracic surgeon, the 200th woman received board certification.<sup>1</sup> There are now more accessible female role models for trainees, a strong professional society (Women in Thoracic Surgery), and a social media movement to support women surgeons in training and practice (ILookLikeASurgeon).<sup>2</sup>

Women, however, face unique and ongoing challenges. In 1996, Dresler et al.<sup>3</sup> surveyed male and female practicing cardiothoracic surgeons about their experience of harassment and discrimination. Approximately 42% women reported frequent or somewhat frequent harassment from male faculty during cardiothoracic surgery training, 44% reported verbal innuendo, and a full 10% reported physical

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*Correspondence:* Inquiries to Shari L. Meyerson, MD, Department of Surgery, Division of Thoracic Surgery, Northwestern University, Feinberg School of Medicine, 676N. Saint Clair St. Suite 650, Chicago, IL 60611; fax: (312)-695-3644; e-mail: smeyerso@nm.org

advances. Currently, the profession still is not free of important gender-directed inappropriate behavior. In 2015, evidence of sexual harassment and bullying was brought to light in Australia.<sup>4</sup> Further investigation by the Royal Australasian College of Surgeons showed that more than 50% of surgeons (male and female) responding to a survey reported that they had been subjected to discrimination, bullying, sexual harassment, or harassment in the workplace, and cardiothoracic surgery lead the specialties at 63%.<sup>5</sup> In addition to these explicit instances of discrimination and maltreatment, there are also unconscious biases directed toward women.

Milkman et al.<sup>6</sup> sent potential research mentors standardized e-mails from students seeking to discuss research opportunities. Student names were clearly selected to indicate gender of the student, but the messages were otherwise the same. Male names were significantly more likely to receive a response suggesting a preference for mentoring male students. These biases are so prevalent that many women consider such discrimination normal and expected. Seeman et al.<sup>7</sup> published a study investigating women surgeons' perception of the effect of their gender on their careers. More than 50% of the subjects felt that gender had played a role in their career challenges. One subject stated, "Discrimination is not the term I'd use, but perhaps it is correct. I feel I am looked over for leadership positions because I am a woman."

Talented women tend to underestimate their skills, whereas equally talented men are more likely to either overestimate or inflate their skills. This unsupported overconfidence can lead to bias favoring men.<sup>8</sup> In a study of resident confidence with laparoscopy, residents were asked to predict their score on the Fundamentals of Laparoscopic Surgery examination. Female residents predicted scores less than half that of male residents despite the fact that their actual scores were equivalent.<sup>9</sup> The combination of unconscious bias against female trainees and female residents' tendency to underestimate their abilities has the potential to negatively affect their training. Progressive autonomy in the operating room is dependent on resident skill, projection of confidence or readiness, and the relationship between the faculty and the resident, and represents a key developmental step for surgical trainees. In this context, differences in autonomy allowed can be used as a proxy for gender bias. This study investigates the effect of gender on the amount of autonomy received in the operating room by thoracic surgery trainees.

## METHODS

After approval by the Institutional Review Board at each site, thoracic surgery residents and faculty underwent frame of reference training on the use of the previously validated, 4-point Zwisch scale to measure operative autonomy

(show-and-tell → active help → passive help → supervision only).<sup>10,11</sup> After training, residents were given free access to the Zwisch Me!! mobile application, and demographic data were recorded including resident gender, year of training at the time of study entry, and type of training program (integrated, traditional, or advanced non-Accreditation Council for Graduate Medical Education [ACGME] approved). For data analysis, residents were allocated to 1 of 3 levels of training groups. Integrated residents in their first 3 years were considered junior residents. First-year traditional fellows and fourth-year integrated residents were considered intermediate residents, as this group is in their first year of truly dedicated cardiothoracic training. Second- and third (for 3-year programs)-year traditional fellows, fifth and sixth year integrated residents, and advanced fellows made up the senior residents group, as all of these residents should be approaching independent practice. As the study duration included more than 1 academic year, some residents transitioned from 1 group to another during the study. For each case, their level of training was calculated based on the level at the time of the case.

Faculty data collected included gender and surgical specialty (cardiac or thoracic) that were defined as the case type which composes most of their practice. At the completion of an operative case, residents submitted an evaluation of their perception of autonomy granted for that individual operation as well as operative difficulty compared to other cases of the same type through the app. Faculty members were contacted using an automated text message generated by the app and, without seeing the resident's evaluation, asked for their own perception of autonomy and difficulty as well as brief feedback for the resident. Similar to logging a case in the ACGME system, residents could evaluate only 1 operation per evaluation. For example, if a resident performed an aortic valve replacement and coronary artery bypass grafting on the same patient, the each evaluation can only address 1 component. If they want feedback on each part, they are encouraged to submit 2 evaluations for the same case to get specific comments for both portions. The level of autonomy granted to a resident is expected to vary over the course of a case. It is not uncommon, for example, for a resident to open and close independently (supervision only), but for the faculty surgeon to dissect out and divide the vascular structures of the lung, especially when the resident is on the earlier parts of the learning curve. During frame of reference training, the participants were instructed to describe the level of autonomy granted for the "key portions of the procedure" which is a familiar term used by faculty to document their presence in the operating room for legal and billing purposes. Meaningful autonomy was defined as the resident operating with either passive help or supervision only for the key portions of the case as those are the stages where the resident directs the flow of the operation. Case type was

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