

# Women in Emergency Medicine Residency Programs: An Analysis of Data From Accreditation Council for Graduate Medical Education–approved Residency Programs

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## ABSTRACT

**Objective:** Understanding the factors associated with attracting women to a residency program would help residency program leadership build programs that are appealing to women candidates. The objective of this study was to identify factors associated with the percentage of women residents in emergency medicine (EM) residency programs.

**Methods:** A list of 161 Accreditation Council for Graduate Medical Education–approved EM residencies was compiled. The public websites for each of the residencies was queried for information on the following variables: residency region (Midwest, Northeast, South, West), residency length (3 years vs. 4 years), sex of the department chair, sex of the program director (PD), percentage of women faculty, and the number of residents by graduation class and sex.

**Results:** The websites of 161 EM residencies were reviewed. Complete data were available from a total of 143 programs representing 4,547 residents from the studied classes of 2014, 2015, and 2016. Overall, 38% were women ( $n = 1,743$ ). The percentage of women residents per program varied from 0% to 68% across residency programs. There was no association between the percentage of women residents and residency region, sex of the department chair, and sex of the PD.

**Conclusions:** In this study, there was no evidence that EM residencies with a greater percentage of women faculty and women in select leadership roles had a greater percentage of women residents. There was also no evidence for regional variability in women's selection of residency programs. This study was limited to publicly available data and cannot address the many other complex factors which may play a role in women's decision making when choosing a residency.

One of the success stories involving employment for women since the late 20th century has been the increasing proportion of women in the medical profession. While strides still need to be made in wage equality between the sexes within the house of medicine, the percentage of physicians who are women has increased

from 10% of the medical student body in 1965 to 47% of medical students today.<sup>1,2</sup> The same upward trend has also occurred in the specialty of emergency medicine (EM). In 2001, women represented 28.3% of residents in EM, and by 2011 the percentage of women in EM residency programs increased to 39.8%.<sup>1</sup>

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Numerous factors influence an applicant's selection of a particular EM residency. Applicants consider the happiness of the program's current residents, faculty enthusiasm, and the program's personality.<sup>3</sup> A survey of EM training applicants identified geographic location and program characteristics including, but not limited to, influences such as reputation of the program, length of the program, interview experience, and personal experience with residents as priorities.<sup>4</sup> Levine et al.<sup>5</sup> interviewed female medical students and found that sex seems to play a role, albeit complex, in how female medical students look at a residency mentoring relationship. Respondents in this study also identified a need for access to female mentors. They had expectations that their female mentors would be more likely to develop relationships with their mentees, be supportive, and offer themselves as mentors.<sup>5</sup> Female respondents reported that they specifically sought out female mentors for their perspective when discussing career considerations.

Although these are valuable observations, little has been documented regarding the impact of having a greater percentage of women faculty or including women faculty in EM leadership roles on a woman's choice of EM residency program. To address this literature gap and to assist residency program leadership in building programs that are appealing to female candidates, the purpose of this study was to explore whether there was any evidence that EM residencies with women in select leadership roles had a greater percentage of women residents.

## METHODS

A cross-sectional review of publicly available websites of Accreditation Council for Graduate Medical Education (ACGME)-approved EM residency programs was conducted in July 2014. A list of 161 ACGME-approved EM residencies was compiled, and their public websites were queried for the following variables: residency region, which was divided into Midwest, Northeast, South, and West in accordance with U.S. Census Regions used by the Centers for Disease Control and Prevention when reporting health outcomes data;<sup>6</sup> residency length (3 years vs. 4 years); sex of the chair of the department; sex of the residency program director (PD); and the number and percentage of women residents by class (year of graduation 2014, 2015, or 2016). Region was considered because of the potential that women might perceive one region of the

country to be a more female friendly training environment than another. The chair and residency PD are the most frequently reported on residency program websites and, as such, were selected as important indicators of women's leadership roles in a given residency program for the purposes of the current study. While other leaders in academic departments including clerkship directors, medical directors, and research directors, to name a few, may be important mentors to women residents, the authors hypothesized that the senior leadership positions of chair and residency PD would have a significant impact on women's residency choices.

Descriptive analyses were conducted to describe the study sample. Separate logistic regression analyses were used to model the percentage of female residents in a given residency program by the sex of the chair of the department, the sex of the PD, geographic region, and by 3-year versus 4-year residency program status. This study was reviewed and determined not to be human subjects' research by the university's institutional review board.

## RESULTS

Data were analyzed for a total of 143 EM residency programs representing 4,547 residents from the graduating classes of 2014, 2015, and 2016. The residency programs were distributed across the United States with 28.7% in the South ( $n = 41$ ), 26.6% in the Midwest ( $n = 38$ ), 26.6% in the Northeast ( $n = 38$ ), and 18.1% in the West ( $n = 26$ ). The majority (79%,  $n = 113$ ) of EM residency programs were 3-year programs rather than 4-year programs (21%,  $n = 30$ ). EM residency programs with women as the chair of the department were few (9.3%,  $n = 13$ ) compared to those with men serving as chair (90.7%,  $n = 127$ ). A higher percentage of EM residency programs had women serving as the residency PD (25.9%,  $n = 37$ ), although men still predominated in this position (74.1%,  $n = 106$ ). The percentages of women residents by graduating class and residency region are shown in Table 1. Nationally, the percentage of women residents overall was 38.3%. Regionally, the West had the greatest percentage of female residents overall (40.4%), and the South had the fewest (36.8%).

In logistic regression analyses, the percentage of women residents was not significantly predicted by any of the following: sex of chair of department

**Table 1**  
Women Residents by Graduating Class and Region

Year	South		Midwest		Northeast		West		Nationally	
	Total	Women	Total	Women	Total	Women	Total	Women	Total	Women
2014	384	139 (36.2)	400	141 (35.3)	368	144 (39.1)	264	105 (39.8)	1,416	529 (37.3)
2015	437	159 (36.4)	436	167 (38.3)	392	151 (38.5)	295	110 (37.3)	1,560	587 (37.6)
2016	436	165 (37.8)	426	163 (38.3)	419	171 (40.8)	290	128 (44.1)	1,571	627 (39.9)
Total	1,257	463 (36.8)	1,262	471 (37.3)	1,179	466 (39.5)	849	343 (40.4)	4,547	1,743 (38.3)

Data are reported as number (%).

( $\chi^2 = 0.003$ ,  $p = 0.96$ ), sex of residency PD ( $\chi^2 = 0.859$ ,  $p = 0.35$ ), or geographic region of residency ( $\chi^2 = 3.98$ ,  $p = 0.26$ ). The percentage of women was significantly predicted by the length of the residency program ( $\chi^2 = 18.45$ ,  $p < 0.001$ ). The odds of being female in a 4-year residency program were 1.4 times higher than those in a 3-year program (odds ratio = 1.4, 95% confidence interval = 1.22–1.62).

## DISCUSSION

Approximately 40% of EM residents are women. The percentage of women in individual EM residencies varies considerably across the country. The factors that contribute to female residents choosing a specific residency are surely complex, as is the actual match process itself. Nevertheless, identifying potential contributing factors to this decision process would be helpful for residencies interested in creating a program with sex balance. Identifying these factors could assist in recruitment efforts and resource allocation.

Cheng et al.<sup>7</sup> found an association between the presence of a female department chairperson and a higher proportion of female faculty in EM. It seemed like a logical extension of this finding that there may be an association between the number of female faculty in a given residency and the number of female residents in that residency. The results of this study did not support this. There was no association found between the number of female chairpersons and PDs and the proportion of female residents. The number of female residents in a given program was not predicted by the sex of the department chair nor the PD. One assumption may have been that female candidates find a residency training environment to be more appealing with more women in mentorship roles. This may be true but the data from this study do not provide supporting evidence. One reason may be that there are factors that female candidates

consider more important than the number of female faculty when choosing a residency, such as location, friendliness, training environment, or academics.<sup>8</sup> Furthermore, the relatively small percentage of women in the chair (9.3%) and PD positions (25.9%) in the residency programs studied may have forced this factor to be prioritized less than it may have been otherwise been, especially given the overall competitiveness of EM, so that a female candidate could secure an opportunity to train in her desired specialty.

There was no significant association between geographic region and the percentage of female EM residents. There was an association between the type of residency program and sex in that residents of 4-year programs were slightly more likely to be female. The reasons for this are unclear.

## LIMITATIONS

Because this study used only publicly available data from residency program websites, the type of data available for analysis was limited. The analysis may have included data that were out of date or incomplete. In particular, we were unable to use the overall number and percentage of female faculty in our analysis because these data were available for only 12% of the EM residency programs on their publicly available websites, and thus the data were too incomplete from which to draw meaningful conclusions. Our analyses were thus limited to two key leadership roles of women in the residency programs: department chair and PD. The women candidates could have gained insight into a particular residency program through other means, such as an audition rotation where they may have learned about the percentage of female faculty, and could have used this information in their decision. It is also possible that a single faculty member served as a mentor to a particular candidate and as such created more of a qualitative influence than a

quantitative one. It is also not possible to assume that mentorship occurs from the chair or PD position, further limiting use of females in these positions as a proxy for positive influence on women candidates and their choice of residency.

We did not address the possibility that the current residency makeup, i.e., number of current female residents in a given residency, may influence female candidates' choice of residency. In addition, this study only addressed the factors identified and could not address the many other potential factors that may have influenced this complex decision process, such as institutional excellence in a research subject of interest. Finally, the match process is complex, and EM is competitive. Many men and women alike do not get their first choice of residency. Being a resident in a particular program may or may not be representative of one's actual preference.

## CONCLUSIONS

While the factors that influence the choice of an emergency medicine residency program for female candidates are many, the sex makeup of a residency's faculty leadership as represented by the chair and residency program director was not associated with residency program choice in this study. Residency program leadership must continue to look for and focus on those factors that are important to female

residents and resident candidates to focus resources and recruitment efforts accordingly.

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