

## ORIGINAL RESEARCH

## Gender Disparities in Leadership and Scholarly Productivity of Academic Hospitalists

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**BACKGROUND:** Gender disparities still exist for women in academic medicine but may be less evident in younger cohorts. Hospital medicine is a new field, and the majority of hospitalists are <41 years of age.

**OBJECTIVE:** To determine whether gender disparities exist in leadership and scholarly productivity for academic hospitalists and to compare the findings to academic general internists.

**DESIGN:** Prospective and retrospective observational study.

**SETTING:** University programs in the United States.

**MEASUREMENTS:** Gender distribution of (1) academic hospitalists and general internists, (2) division or section heads for both specialties, (3) speakers at the 2 major national meetings of the 2 specialties, and (4) first and last authors of articles from the specialties' 2 major journals

**RESULTS:** We found equal gender representation of hospitalists and general internists who worked in university hospitals. Divisions or sections of hospital medicine and general internal medicine were led by women at 11/69 (16%) and 28/80 (35%) of university hospitals, respectively ( $P = 0.008$ ). Women hospitalists and general internists were listed as speakers on 146/557 (26%) and 291/580 (50%) of the presentations at national meetings, respectively ( $P < 0.0001$ ), first authors on 153/464 (33%) and 423/895 (47%) publications, respectively ( $P < 0.0001$ ), and senior authors on 63/305 (21%) and 265/769 (34%) articles, respectively ( $P < 0.0001$ ).

**CONCLUSIONS:** Despite hospital medicine being a newer field, gender disparities exist in leadership and scholarly productivity. *Journal of Hospital Medicine* 2015;10:481–485. © 2015 Society of Hospital Medicine

Gender disparities still exist for women in academic medicine.<sup>1–9</sup> The most recent data from the Association of American Medical Colleges (AAMC) show that although gender disparities are decreasing, women are still under-represented in the assistant, associate, and full-professor ranks as well as in leadership positions.<sup>1</sup>

Some studies indicate that gender differences are less evident when examining younger cohorts.<sup>1,10–13</sup> Hospital medicine emerged around 1996, when the term “hospitalist” was first coined.<sup>14</sup> The gender distribution of academic hospitalists is likely nearly equal,<sup>15,16</sup> and they are generally younger physicians.<sup>15,17–20</sup> Accordingly, we questioned whether gender disparities existed in academic hospital medicine (HM) and, if so, whether these disparities were greater than those that might exist in academic general internal medicine (GIM).

## METHODS

This study consisted of both prospective and retrospective observation of data collected for academic adult hospitalists and general internists who practice in the United States. It was approved by the Colorado Multiple Institutional Review Board.

Gender distribution was assessed with respect to: (1) academic HM and GIM faculty, (2) leadership (ie, division or section heads), and (3) scholarly work (ie, speaking opportunities and publications). Data were collected between October 1, 2012 and August 31, 2014.

## Gender Distribution of Faculty and Division/Section Heads

All US internal medicine residency programs were identified from the list of members or affiliates of the AAMC that were fully accredited by the Liaison Committee on Medical Education<sup>21</sup> using the Graduate Medical Education Directory.<sup>22</sup> We then determined the primary training hospital(s) affiliated with each program and selected those that were considered to be university hospitals and eliminated those that did not have divisions or sections of HM or GIM. We determined the gender of the respective division/section heads on the basis of the faculty member's first name (and often from accompanying photos) as well as from information obtained via Internet searches

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and, if necessary, contacted the individual institutions via email or phone call(s). We also determined the number and gender of all of the HM and GIM faculty members in a random sample of 25% of these hospitals from information on their respective websites.

### Gender Distribution for Scholarly Productivity

We determined the gender and specialty of all speakers at the Society of Hospital Medicine and the Society of General Internal Medicine national conferences from 2006 to 2012. A list of speakers at each conference was obtained from conference pamphlets or agendas that were available via Internet searches or obtained directly from the organization. We also determined whether each presenter was a featured speaker (defined as one whose talk was unopposed by other sessions), plenary speaker (defined as such in the conference pamphlets), or if they spoke in a group format (also as indicated in the conference pamphlets). Because of the low number of featured and plenary speakers, these data were combined. Faculty labeled as “additional faculty” when presenting in a group format were excluded as were speakers at pre-courses, those presenting abstracts, and those participating in interest group sessions.

For authorship, a PubMed search was used to identify all articles published in the *Journal of Hospital Medicine* (JHM) and the *Journal of General Internal Medicine* (JGIM) from January 1, 2006 through December 31, 2012, and the gender and specialty of all the first and last authors were determined as described above. Specialty was determined from the division, section or department affiliation indicated for each author and by Internet searches. In some instances, it was necessary to contact the authors or their departments directly to verify their specialty. When articles had only 1 author, the author was considered a first author.

Duplicate records (eg, same author, same journal) and articles without an author were excluded, as were authors who did not have an MD, DO, or MBBS degree and those who were not affiliated with an institution in the United States. All manuscripts, with the exception of errata, were analyzed together as well as in 3 subgroups: original research, editorials, and others.

A second investigator corroborated data regarding gender and specialty for all speakers and authors to strengthen data integrity. On the rare occasion when discrepancies were found, a third investigator adjudicated the results.

### Definitions

Physicians were defined as being hospitalists if they were listed as a member of a division or section of HM on their publications or if Internet searches indicated that they were a hospitalist or primarily worked on inpatient medical services. Physicians were considered to be general internists if they were listed as such

on their publications and their specialty could be verified in Web-based searches. If physicians appeared to have changing roles over time, we attempted to assign their specialty based upon their role at the time the article was published or the presentation was delivered. If necessary, phone calls and/or emails were also done to determine the physician’s specialty.

### Analysis

REDCap, a secure, Web-based application for building and managing online surveys and databases, was used to collect and manage all study data.<sup>23</sup> All analyses were performed using SAS Enterprise Guide 4.3 (SAS Institute, Inc., Cary, NC). A  $\chi^2$  test was used to compare proportions of male versus female physicians, and data from hospitalists versus general internists. Because we performed multiple comparisons when analyzing presentations and publications, a Bonferroni adjustment was made such that a  $P < 0.0125$  for presentations and  $P < 0.006$  (within specialty) or  $P < 0.0125$  (between specialty) for the publication analyses were considered significant.  $P < 0.05$  was considered significant for all other comparisons.

## RESULTS

### Gender Distribution of Faculty

Eighteen HM and 20 GIM programs from university hospitals were randomly selected for review (see Supporting Figure 1 in the online version of this article). Seven of the HM programs and 1 of the GIM programs did not have a website, did not differentiate hospitalists from other faculty, or did not list their faculty on the website and were excluded from the analysis. In the remaining 11 HM programs and 19 GIM programs, women made up 277/568 (49%) and 555/1099 (51%) of the faculty, respectively ( $P = 0.50$ ).

### Gender Distribution of Division/Section Heads

Eighty-six of the programs were classified as university hospitals (see Supporting Figure 1 in the online version of this article), and in these, women led 11/69 (16%) of the HM divisions or sections and 28/80 (35%) of the GIM divisions ( $P = 0.008$ ).

### Gender Distribution for Scholarly Productivity

#### Speaking Opportunities

A total of 1227 presentations were given at the 2 conferences from 2006 to 2012, with 1343 of the speakers meeting inclusion criteria (see Supporting Figure 2 in the online version of this article). Hospitalists accounted for 557 of the speakers, of which 146 (26%) were women. General internists accounted for 580 of the speakers, of which 291 (50%) were women ( $P < 0.0001$ ) (Table 1).

Of the 117 featured or plenary speakers, 54 were hospitalists and 5 (9%) of these were women. Of the 49 who were general internists, 22 (45%) were women ( $P < 0.0001$ ).

### Authorship

The PubMed search identified a total of 3285 articles published in the JHM and the JGIM from 2006 to 2012, and 2172 first authors and 1869 last authors met inclusion criteria (see Supporting Figure 3 in the online version of this article). Hospitalists were listed as first or last authors on 464 and 305 articles, respectively, and of these, women were first authors on 153 (33%) and last authors on 63 (21%). General internists were listed as first or last authors on 895 and 769 articles, respectively, with women as first authors on 423 (47%) and last authors on 265 (34%). Compared with general internists, fewer women hospitalists were listed as either first or last authors (both  $P < 0.0001$ ) (Table 2).

Fewer women hospitalists were listed as first or last authors on all article types. For original research articles written by general internists, there was a trend for more women to be listed as first authors than men (261/479, 54%), but this difference was not statistically significant.

### DISCUSSION

The important findings of this study are that, despite an equal gender distribution of academic HM and GIM faculty, fewer women were HM division/section

chiefs, fewer women were speakers at the 2 selected national meetings, and fewer women were first or last authors of publications in 2 selected journals in comparison with general internists.

Previous studies have found that women lag behind their male counterparts with respect to academic productivity, leadership, and promotion.<sup>1,5,7</sup> Some studies suggest, however, that gender differences are reduced when younger cohorts are examined.<sup>1,10-13</sup> Surveys indicate that the mean age of hospitalists is younger than most other specialties.<sup>15,19,20,24</sup> The mean age of academic GIM physicians is unknown, but surveys of GIM (not differentiating academic from nonacademic) suggest that it is an older cohort than that of HM.<sup>24</sup> Despite hospitalists being a younger cohort, we found gender disparities in all areas investigated.

Our findings with respect to gender disparities in HM division or section leadership are consistent with the annual AAMC Women in US Academic Medicine and Science Benchmarking Report that found only 22% of all permanent division or section heads were women.<sup>1</sup>

Gender disparities with respect to authorship of medical publications have been previously noted,<sup>3,6,15,25</sup> but to our knowledge, this is the first study to investigate the gender of authors who were hospitalists. Although we found a higher proportion of women hospitalists who were first or last authors than was observed by Jaggi and colleagues,<sup>3</sup> women hospitalists were still under-represented with respect to this measure of academic productivity. Erren et al. reviewed 6 major journals from 2010 and 2011, and found that first authorship of original research by women ranged from 23.7% to 46.7%, and for last authorship from 18.3% to 28.8%.<sup>25</sup> Interestingly, we found no significant gender difference for first authors who were general internists, and there was a trend toward more women general internists being first authors than men for original research, reviews, and brief reports (data not shown).

**TABLE 1.** Gender Distribution for Presenters of Hospitalist and General Internists at National Conferences, 2006 to 2012

	Male, N (%)	Female, N (%)
Hospitalists		
All presentations	411 (74)	146 (26)*†
Featured or plenary presentations	49 (91)	5 (9)*†
General internists		
All presentations	289 (50)	291 (50)
Featured or plenary presentations	27 (55)	22 (45)

NOTE: \*In-specialty comparison,  $P \leq 0.0001$ . †Between-specialty comparison for conference data,  $P < 0.0001$ .

**TABLE 2.** Hospitalist and General Internal Medicine Authorship, 2006 to 2012

	First Author		Last Author	
	Male, N (%)	Female, N (%)	Male, N (%)	Female, N (%)
Hospitalists				
All publications	311 (67)	153 (33)*†	242 (79)	63 (21)*†
Original investigations/brief reports	124 (61)	79 (39)*†	96 (76)	30 (24)*
Editorials	34 (77)	10 (23)*	18 (86)	3 (14)*
Other	153 (71)	64 (29)*†	128 (81)	30 (19)*†
General internists				
All publications	472 (53)	423 (47)	504 (66)	265 (34)*
Original investigations/brief reports	218 (46)	261 (54)	310 (65)	170 (35)*
Editorial	98 (68)	46 (32)*	43 (73)	16 (27)*
Other	156 (57)	116 (43)	151 (66)	79 (34)*

NOTE: \*In-specialty comparison,  $P < 0.006$ . †Between-specialty comparison,  $P < 0.0125$ .

Our study did not attempt to answer the question of why gender disparities persist, but many previous studies have explored this issue.<sup>4,8,12,26–42</sup> Issues raised by others include the quantity of academic work (ie, publications and grants obtained), differences in hours worked and allocation of time, lack of mentorship, family responsibilities, discrimination, differences in career motivation, and levels of institutional support, to name a few.

The under-representation of women hospitalists in leadership, authorship, and speaking opportunities may be consistent with gender-related differences in research productivity. Fewer publications could lead to fewer national presentations, which could lead to fewer leadership opportunities. Our findings with respect to general internists are not consistent with this idea, however, as whereas women were under-represented in GIM leadership positions, we found no disparities with respect to the gender of first authors or speakers at national meetings for general internists. The finding that hospitalists had gender disparities with respect to first authors and national speakers but general internists did not, argues against several hypotheses (ie, that women lack mentorship, have less career motivation, fewer career building opportunities).

One notable hypothesis, and perhaps one that is often discussed in the literature, is that women shoulder the majority of family responsibilities, and this may result in women having less time for their careers. Jolly and colleagues studied physician-researchers and noted that women were more likely than men to have spouses or domestic partners who were fully employed, spent 8.5 more hours per week on domestic activities, and were more likely to take time off during disruptions of usual child care.<sup>33</sup> Carr and colleagues found that women with children (compared to men with children) had fewer publications, slower self-perceived career progress, and lower career satisfaction, but having children had little effect on faculty aspirations and goals.<sup>2</sup> Kaplan et al., however, found that family responsibilities do not appear to account for sex differences in academic advancement.<sup>4</sup> Interestingly, in a study comparing physicians from Generation X to those of the Baby Boomer age, Generation X women reported working more than their male Generation X counterparts, and both had more of a focus on work–life balance than the older generation.<sup>12</sup>

The nature of the 2 specialties' work environment and job requirements could have also resulted in some of the differences seen. Primary care clinical work is typically conducted Monday through Friday, and hospitalist work frequently includes some weekend, evening, night, and holiday coverage. Although these are known differences, both specialties have also been noted to offer many advantages to women and men alike, including collaborative working environments and flexible work hours.<sup>16</sup>

Finally, finding disparity in leadership positions in both specialties supports the possibility that those responsible for hiring could have implicit gender biases. Under-representation in entry-level positions is also not a likely explanation for the differences we observed, because nearly an equal number of men and women graduate from medical school, pursue residency training in internal medicine, and become either academic hospitalists or general internists at university settings.<sup>1,15,24</sup> This hypothesis could, however, explain why disparities exist with respect to senior authorship and leadership positions, as typically, these individuals have been in practice longer and the current trends of improved gender equality have not always been the case.

Our study has a number of limitations. First, we only examined publications in 2 journals and presentations at 2 national conferences, although the journals and conferences selected are considered to be the major ones in the 2 specialties. Second, using Internet searches may have resulted in inaccurate gender and specialty assignment, but previous studies have used similar methodology.<sup>3,43</sup> Additionally, we also attempted to contact individuals for direct confirmation when the information we obtained was not clear and had a second investigator independently verify the gender and specialty data. Third, we utilized division/department websites when available to determine the gender of HM divisions/sections. If not recently updated, these websites may not have reflected the most current leader of the unit, but this concern would seemingly pertain to both hospitalists and general internists. Fourth, we opted to only study faculty and division/section heads at university hospitals, as typically these institutions had GIM and hospitalist groups and also typically had websites. Because we only studied faculty and leadership at university hospitals, our data are not generalizable to all hospitalist and GIM groups. Finally, we excluded pediatric hospitalists, and thus, this study is representative of adult hospitalists only. Including pediatric hospitalists was out of the scope of this project.

Our study also had a number of strengths. To our knowledge, this is the first study to provide an estimate of the gender distribution in academic HM, of hospitalists as speakers at national meetings, as first and last authors, and of HM division or section heads, and is the first to compare these results with those observed for general internists. In addition, we examined 7 years of data from 2 of the major journals and national conferences for these specialties.

In summary, despite HM being a newer field with a younger cohort of physicians, we found that gender disparities exist for women with respect to authorship, national speaking opportunities, and division or section leadership. Identifying why these gender differences exist presents an important next step.



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