

Women Underrepresented on Editorial Boards of 60 Major Medical Journals

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ABSTRACT

Background: Although there has been a continuous increase in the number of women working in the field of medicine, women rarely reach the highest academic positions as full professors or editorial board members.

Objective: We aimed to determine the proportion of women on the editorial boards of top-ranked medical journals in different medical specialties.

Methods: We analyzed the gender of editorial board members of 60 top-ranked journals of 12 Thomson Reuters Web of Knowledge Journal Citation Reports categories. A total of 4175 editors were included in our analysis.

Results: Only 15.9% (10 of 63) editors-in-chief were female. In the 5 categories, critical care, anesthesiology, orthopedics, ophthalmology and radiology, nuclear medicine and medical imaging, currently not 1 woman holds the position of editor-in-chief. Less than one fifth (17.5%, 719 of 4112) of all editorial board members were women. There were significant differences among the evaluated categories, with the highest percentage of women in the category of medicine, general and internal and the lowest in the category critical care, followed by orthopedics. In every category, the proportion of women as editorial board members was substantially lower than that of men.

Conclusions: Women are underrepresented on the editorial boards of major medical journals, although there is a great variability among the journals and categories analyzed. If more women are nominated to serve on editorial boards, they will be a visible sign of continuing progress and serve as important role models for young women contemplating a career in academic medicine. (*Gend Med.* 2011;8:378–387)

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Key words: academic career, academic medicine, gender discrimination, gender equality, human resources, work environment.

INTRODUCTION

Over the past decades, the participation of women in medicine has increased steadily. Women now represent the majority of medical students in many countries of the world. However, only a few women are promoted to academic leadership positions, and with each step up the academic ladder, the proportion of women decreases substantially,^{1–6} a phenomenon called the “glass ceiling.”^{4,7} Female researchers receive fewer resources and funding than their male colleagues.^{4,5,8} Moreover, the percentage of female winners of scholarly awards in most societies is even much lower than the proportion of female full professors in each discipline.⁹ In a landmark study in 1997 in Sweden, female grant applicants with the same scientific productivity were given lower scores than male applicants by the reviewers.⁸ In 2008, a much-debated study claimed that the change from a single- to a double-blind review policy might be causally related to a significant increase in papers with women as first authors.¹⁰ Authorship of medical research is predominantly male across different journals and specialties, although in recent years, an increase in the contribution of women is evident.^{11–16} All these facts might add to women’s low representation in higher academic posts and lower integration in the scientific community, exemplified by the allocation of influential positions in scientific associations or on journal editorial boards. The National Academy of Sciences stated in their 2006 report¹⁷ “Beyond Bias and Barriers” that women’s slow advancement in science is due to “unintentional biases and outmoded institutional structures” and called for a “reasonable representation of women on editorial boards.” Journal editors are usually senior scientists in their field of research. They hold a powerful and highly visible position in fulfilling the important role of shaping the nature of published research. In various studies, the percentage of female editorial board members was consistently much lower than that of males.^{1–3,18–20} In the most extensive study on this topic, Jaggi et al¹⁸ found a higher percentage of women in non-US compared with US journals. In this study, we aimed to (1) give a description of the participation of women on the editorial boards of 60 international top-ranked jour-

nals in 2011 and (2) assess whether there are differences among journals depending on the journal category, country of publication, and gender of the editor-in-chief.

METHODS

We analyzed the gender of the editors-in-chief and editorial board members of 60 top-ranked medical journals listed in 12 Thomson Reuters Web of Knowledge Journal Citation Reports categories (2010), as indicated on the journals’ homepages in August 2011.²¹ The top 5 journals in the following categories were analyzed: medicine, general and internal; critical care; anesthesiology; surgery; orthopedics; ophthalmology; hematology; dermatology; clinical neurology; radiology, nuclear medicine and medical imaging; pediatrics and obstetrics and gynecology (**Table I**).

We contacted the editorial offices and/or editors-in-chief of all journals up to 4 times via e-mail and were able to obtain an answer from 52 of the 60 editorial offices and/or editors-in-chief of the analyzed journals. For the remaining 8 journals, we counted men and women from the masthead of the journals. In 122 of a total of 4188 cases (including editors-in-chief, 2.9%), an assignment of gender was not definite, so we contacted the editorial offices again, but did not receive an answer. Two authors independently tried to identify the gender of these remaining editorial board members by using the Google search engine (Google Inc., Mountain View, California), searching for a picture or a curriculum vitae with a gender-specific pronoun of the editor in question. Results were then compared. There were no mismatches. In 3 cases (1 from *Stem Cells*, 2 from *Pain Physician*), the names could not be attributed without doubt. These 3 persons were excluded from our analysis.

Because of the heterogeneity in titles and qualifications across different journals, we summarized all positions with decisive functions regarding manuscript acceptance, except the editor-in-chief, as editorial board members. We included advisory board members but not editorial staff members (such as editorial assistants, copy editors, technical editors, and statistical consultants) unless we received different information from the journal. For every category, each of the 5 journals was

Table 1. Percentage of women as editorial board members and gender of editors-in-chief of the 60 journals analyzed, including category, ranking, and country of publication as indicated by the Thomson Reuters (ISI) Web of Knowledge Journal Citation Report (2010).²¹

Journal	Category (ISI 2010)	Ranking	Country	Percentage of Female Board Members	Editor-in-Chief: Man (M) or Woman (W)
<i>Anesthesiology</i>	Anesthesiology	1	United States	11.6	M
<i>Pain</i>	Anesthesiology	2	The Netherlands	23.9	M
<i>British Journal of Anaesthesia</i>	Anesthesiology	3	England	9.4	M
<i>European Journal of Pain</i>	Anesthesiology	4	England	24.2	M
<i>Anesthesia and Analgesia</i>	Anesthesiology	5	United States	6.9	M
<i>American Journal of Respiratory and Critical Care Medicine</i>	Critical care medicine	1	United States	13.0	M
<i>Critical Care Medicine</i>	Critical care medicine	2	United States	9.1	M
<i>Intensive Care Medicine</i>	Critical care medicine	3	United States	1.4	M
<i>Critical Care Resuscitation</i>	Critical care medicine	4	England	4.3	M
<i>New England Journal of Medicine</i>	Critical care medicine	5	Ireland	8.8	M
<i>Lancet</i>	Medicine, general and internal	1	United States	25.6	M
<i>Journal of the American Medical Association</i>	Medicine, general and internal	2	England	71.4	M
<i>Annals of Internal Medicine</i>	Medicine, general and internal	3	United States	37.5	M
<i>PLoS Medicine</i>	Medicine, general and internal	4	United States	31.4	W
<i>The Journal of Nuclear Medicine</i>	Medicine, general and internal	5	United States	22.0	W
<i>Radiology</i>	Radiology, nuclear medicine and medical imaging	1	United States	9.9	M
<i>NeuroImage</i>	Radiology, nuclear medicine and medical imaging	2	United States	12.2	M
<i>Journal of the American College of Cardiology Cardiovascular Imaging</i>	Radiology, nuclear medicine and medical imaging	3	United States	25.0	M
<i>Human Brain Mapping</i>	Radiology, nuclear medicine and medical imaging	4	United States	9.4	M
<i>Annals of Surgery</i>	Radiology, nuclear medicine and medical imaging	5	United States	14.0	M (2x)
<i>Endoscopy</i>	Surgery	1	United States	11.4	M
<i>American Journal of Transplantation</i>	Surgery	2	Germany	1.2	M
<i>Journal of Neurology, Neurosurgery and Psychiatry</i>	Surgery	3	Denmark	10.3	M
<i>Archives of Surgery</i>	Surgery	4	England	21.7	M
<i>Circulation</i>	Surgery	5	United States	24.2	W
<i>Blood</i>	Hematology	1	United States	19.4	M
<i>Circulation Research</i>	Hematology	2	United States	29.3	W
<i>Leukemia</i>	Hematology	3	United States	20.0	M
<i>Stem Cells*</i>	Hematology	4	England	8.8	W
<i>Lancet Neurology</i>	Hematology	5	United States	18.8	M
<i>Annals of Neurology</i>	Clinical neurology	1	England	15.8	W
<i>Brain</i>	Clinical neurology	2	United States	21.4	M
<i>Neurology</i>	Clinical neurology	3	England	12.9	M
<i>Pain Physician**</i>	Clinical neurology	4	United States	16.3	M
	Clinical neurology	5	United States	6.4	M

(continued)

Table I. (continued).

Journal	Category (ISI 2010)	Ranking	Country	Percentage of Female Board Members	Editor-in-Chief: Man (M) or Woman (W)
<i>Progress in Retinal and Eye Research</i>	Ophthalmology	1	England	9.1	M
<i>Ophthalmology</i>	Ophthalmology	2	United States	15.6	M
<i>American Journal of Ophthalmology</i>	Ophthalmology	3	United States	16.0	M
<i>Archives of Ophthalmology</i>	Ophthalmology	4	United States	34.3	M
<i>Investigative Ophthalmology & Visual Science</i>	Ophthalmology	5	England	30.4	M
<i>Journal of Investigative Dermatology</i>	Dermatology	1	United States	20.7	M
<i>Pigment Cell and Melanoma Research</i>	Dermatology	2	England	18.6	M
<i>British Journal of Dermatology</i>	Dermatology	3	England	23.1	W
<i>Journal of the American Academy of Dermatology</i>	Dermatology	4	United States	25.5	M
<i>Archives of Dermatology</i>	Dermatology	5	United States	25.5	W
<i>Osteoarthritis and Cartilage</i>	Orthopedics	1	England	15.9	M
<i>American Journal of Sports Medicine</i>	Orthopedics	2	United States	5.9	M
<i>Arthroscopy</i>	Orthopedics	3	United States	1.6	M
<i>The Spine Journal</i>	Orthopedics	4	United States	0	M
<i>Journal of Orthopedic Research</i>	Orthopedics	5	England	23.5	M (2x)
<i>Human Reproduction Update</i>	Obstetrics and gynecology	1	England	26.3	M
<i>Obstetrics and Gynecology</i>	Obstetrics and gynecology	2	United States	27.3	M
<i>Human Reproduction</i>	Obstetrics and gynecology	3	England	33.8	M
<i>Gynecologic Oncology</i>	Obstetrics and gynecology	4	United States	30.6	W
<i>Seminars in Reproductive Medicine</i>	Obstetrics and gynecology	5	United States	16.7	M
<i>Pediatrics</i>	Pediatrics	1	United States	39.4	M
<i>Journal of the American Academy of Child & Adolescent Psychiatry</i>	Pediatrics	2	Netherlands	33.3	M
<i>Journal of Pediatrics</i>	Pediatrics	3	United States	30.3	M
<i>Archives of Pediatrics & Adolescent Medicine</i>	Pediatrics	4	United States	33.3	M
<i>Developmental Disabilities Research Reviews</i>	Pediatrics	5	United States	17.9	1 M 1 W

*The gender of 1 of 161 editorial board members could not be assigned.

*The gender of 2 of 80 editorial board members could not be assigned.

weighted equally regardless of the absolute number of editorial board members.

The country of publication of each journal was also noted as listed in Thomson Reuters Web of Knowledge Journal Citation Reports (2010). Statistical analysis was performed using the GraphPad Prism 3.0. ANOVA and a post hoc test or a Student *t* test were used for the analyses where appropriate.

A *P* value <0.05 was considered to indicate statistical significance.

RESULTS

Ten of 63 editors-in-chief (15.9%) were female. One journal (*Developmental Disabilities Research Reviews*) is chaired by a female and a male editor-in-chief. Two journals (*Journal of Orthopaedic Research*

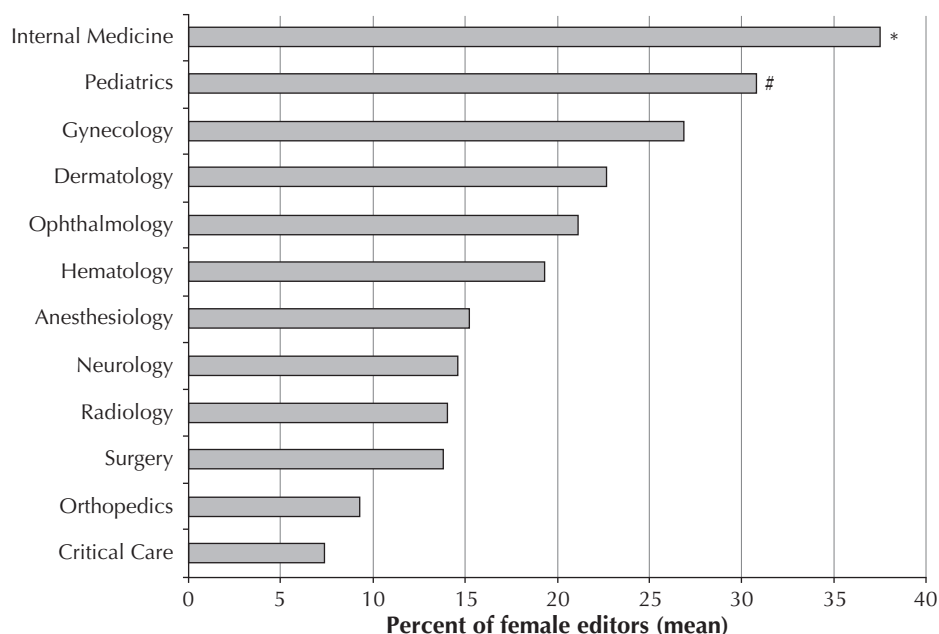


Figure. Percentages of women as editorial board members in the top 5 journals of 12 medical specialties. Within each category, each of the 5 journals was weighted equally regardless of the absolute number of editorial board members. * $P < 0.05$ compared with critical care, orthopedics, radiology, surgery, anesthesiology, and neurology. # $P < 0.05$ compared with critical care and orthopedics.

and *Human Brain Mapping*) are chaired by 2 male editors-in-chief. In the top 5 journals in the categories critical care, anesthesiology, orthopedics, ophthalmology and radiology, nuclear medicine and medical imaging, currently not 1 woman holds the position of editor-in-chief. There are 2 female editors-in-chief in the categories hematology, dermatology, and medicine, general and internal and 1 female editor-in-chief in the categories clinical neurology, pediatrics, obstetrics and gynecology, and surgery respectively (**Table I**).

Of 4112 members of editorial boards, 719 (17.5%) were female. The lowest percentage of women on editorial boards was evident in the category critical care (7.3%), followed by orthopedics (9.3%) (**Figure** and **Table II**). Among journals, this proportion varied between 0 and 71.4% (**Table I**) and showed a significantly higher proportion in medicine, general and internal compared with critical care, orthopedics, radiology, surgery, anesthesiology, and clinical neurology. A significantly higher proportion of female editors was also found in pediatrics compared with critical care and orthopedics (**Figure**).

There was no difference in the percentage of female editorial board members among journals with female editors-in-chief ($n = 10$; 22.8%) compared with journals with male editors-in-chief ($n = 50$; 18.6%). Neither the country of publication nor whether a journal was associated with a society significantly contributed to the proportion of women.

Data comparing the percentage of women on editorial boards with the representation of women in the United States and United Kingdom as faculty or consultants are shown in **Table II**. The percentage of women on editorial boards was substantially lower than the corresponding number of women working as full-time faculty (all ranks, United States) in all categories studied with the exception of the category medicine, general and internal.

In a longitudinal analysis of the 11 journals that were also evaluated by Kennedy et al³ Jaggi et al¹⁸ in the past decade, at least some progress in the representation of women on editorial boards was evident in 7 journals, whereas no change or even a decrease was seen in the remaining 4 (**Table III**).

Table II. Percentages of women in different medical specialties

Category	Women on Editorial Boards (Mean)	United States* Women Faculty, All Ranks	United States† Women Physicians	United Kingdom‡ Women Consultants
Anesthesiology	15.2	32	22	31
Clinical neurology	14.8	33	24	24
Critical care	7.3	–	–	23
Dermatology	22.7	46	37	49
Hematology	19.3	–	–	41
Medicine, general and internal	37.6	34	31	19
Obstetrics and gynecology	26.9	52	41	42
Ophthalmology	21.1	32	17	25
Orthopaedics	9.3	15	4	5
Pediatrics	30.8	49	52	49
Radiology, nuclear medicine and medical imaging	14.1	27	22	32
Surgery	13.8	19	14	10

References used and specialty category headings when different from ISI (Thomson Reuters) Web of Science specialty category headings are as follows.

*Women in U.S. Academic Medicine and Science: Statistics and Benchmarking Report 2009–2010²⁴: neurology, internal medicine, orthopedic surgery.

†Physician characteristics and distribution in the United States, 2006 edition²³: general internal medicine/general and family practice, diagnostic radiology, general surgery.

‡General Medical Council, September 2011 (Registered and Licensed Doctors with a specialty by Primary Specialty)²²: anesthetics, neurology, intensive care and intensive care medicine, general (internal) medicine, trauma and orthopedic surgery, clinical radiology, general surgery.

DISCUSSION

Discussion of Our Findings and Comparison With Representation of Women in the Corresponding Clinical Specialty

Our data demonstrate that in 2011, women are still a minority on editorial boards, accounting for 16% of editors-in-chief and 18% of editorial board members in our sample of 60 leading medical journals. In 5 of the 12 studied categories (critical care, anesthesiology, orthopedics, ophthalmology and radiology, nuclear medicine and medical imaging), currently not 1 woman holds the position of editor-in-chief. Among the journals, this proportion varied between 0 and 71% and showed a significantly higher proportion in the categories of medicine, general and internal and pediatrics.

Possibly the greatest challenge in the interpretation of our data is what proportion of women on editorial boards should be expected. The percentage of women in different medical specialties varies greatly from country to country, making an estimate of the expected percentage of female editors difficult because of the international composition of editorial

boards. In Great Britain in 2011, for example, the specialties with the lowest proportion of women registered and licensed as consultants include orthopedics (4%) and surgery (10%), whereas those with the highest proportion are dermatology and pediatrics (49%).²² Data from the United States on women physicians are similar.^{23,24} We assumed that the percentage of women on editorial boards would be higher in specialties with a higher percentage of women, and more so in those in which the proportion has been reported to be high for decades, for example, in anesthesiology.^{24–27} We were surprised by the low percentage found in this category (15.2%) that was even lower than the number of women working as full professors (18%) and barely higher than in surgery (13.8%), which is still a male-dominated medical specialty.^{15,23,28,29}

Although the absolute percentages found in categories such as dermatology, pediatrics, and obstetrics and gynecology were relatively high, they were still astoundingly low when the traditionally high representation of women working in these specialties is taken into account.^{22–24,26,27,30}

Table III. Percentage and total number of women on editorial boards: comparing 2011 data with 1999/2000 and 2005 data^{3,18}

Category	1999/2000	2005	2011
<i>Journal of the American Medical Association</i> *	11.5% (3/26)	16.0% (4/25)	37.5% (18/48)
<i>Lancet</i> *	12.5% (3/24)	41.7% (10/24)	71.4% (15/21)
<i>New England Journal of Medicine</i> *	12.5% (3/24)	10.5% (2/19)	25.6% (10/39)
<i>Journal of Pediatrics</i> *	13.0% (3/23)	15.8% (3/19)	30.3% (9/30)
<i>Pediatrics</i> *	22.2% (6/27)	21.7% (5/23)	39.4% (13/33)
<i>Neurology</i> †	12.8% (6/47)	–	16.3% (15/92)
<i>Annals of Surgery</i> *	6.5% (3/46)	6.9% (4/58)	11.4% (10/88)
<i>Ophthalmology</i> †	15.4% (4/26)	–	15.6% (5/32)
<i>Obstetrics and Gynecology</i> *	26.7% (4/15)	31.3% (5/16)	27.3% (6/22)
<i>Journal of the American Academy of Dermatology</i> †	33.3% (28/84)	–	25.5% (28/110)
<i>Annals of Internal Medicine</i> *	38.9% (7/18)	31.3% (5/16)	31.4% (16/51)

*Adapted with permission.¹⁸†Adapted with permission.³

The situation for the category medicine, general and internal is special. The prestigious top 5 journals in this category (*New England Journal of Medicine*, *Lancet*, *Journal of the American Medical Association*, *Annals of Internal Medicine*, and *Public Library of Science Medicine*) attract highly selected editorial board members of all specialties including basic and translational fields. Therefore, a comparison with the specialties of internal medicine or family practice does not seem reasonable.

Comparison With Earlier Time Points

When comparing the 11 journals that were evaluated by Kennedy et al³ and Jagsi et al¹⁸ in 1999/2000 and 2005, respectively, we found a clear increase in the number of women in two thirds of the journals. One third has similar or even lower percentages of women on their editorial boards in 2011.

Limitations and Strengths

Our study has several limitations. We assigned gender in 52 of 60 journals by direct information from the editorial offices; in the remaining 8 journals, we had to assign gender by inspection of the first name or by an Internet search. A more detailed analysis of different functions within editorial boards was not possible because of the diversity of positions and the inconsistency of their distributions among journals. Because of the high status of each of the analyzed journals in their field, we would expect more women in these journals

than in journals with lower impact factors; however, it was beyond the scope of this investigation to assess this hypothesis. Nevertheless, with data on 60 top-ranked medical journals, this is the most extensive cross-sectional investigation on women as editorial board members published to date.

Reasons for Gender Inequality in Academic Medicine

In academic medicine, gender disparity is present in many facets: fewer women are promoted to higher academic ranks, their salaries are lower, and they receive fewer honors than men.^{4–6,17,31–33} The reasons for continuing gender inequality are complex and not specific to editorial board positions. We are unable to extrapolate them from our data, but the available and constantly expanding literature discusses various aspects including traditional gender roles, implicit and explicit biases, scarce mentorship, lack of female role models, and, finally, the current academic organizational structures and subjective evaluation criteria that put women at a disadvantage in many aspects of science.^{5,17,18,34–37}

The “pipeline phenomenon,” which states that a proportion of women is lost at each educational transition, is certainly relevant because editorial board positions are among the most senior positions that a scientist may achieve in her or his career. Another important reason for the underrepresentation of women in leadership positions is

family life. The rigid classic timeline of careers in medical science directly interferes with women's window for having children.^{38,39} Recently, a large survey including 3455 scientists across all academic ranks revealed that women faculty have fewer children than their male colleagues and that younger scientists who have fewer children than they want consider abandoning an academic career early, proposing a hypothesis for the pipeline phenomenon.⁴⁰ On the other hand, the situation in Scandinavian countries with a comparably favorable situation regarding child care is not as different as would be expected, pointing to other, more relevant obstacles that impede women's advancement in academic medicine.⁴¹

Solutions and Strategies for the Advancement of Women in Academic Medicine in General and on Editorial Boards in Particular

Possibly the most important step before discussing solutions to the problem is gender sensitivity—the objective acknowledgment by men and women that despite substantial progress in the past decades, significant gender disparity still exists at many levels of academic medicine.^{17,29,34} Furthermore, regular monitoring of women's academic progress by professional institutions will be critical to recognizing ongoing disparities. Our study aimed to contribute a status report on one of these dimensions. As stated previously, because the reasons for the underrepresentation of women in medical leadership positions are complex and multifaceted, there are no quick solutions. Unless sustained and fundamental efforts at the highest levels are undertaken, the progress of women to senior academic positions including their nominations to editorial boards or editors-in-chief will most likely be slow. The National Academy of Sciences has made extensive recommendations that include large-scale and specific measures that institutions such as universities, higher education societies, and journals should undertake.¹⁷ Others have suggested specific measures such as more accessible mentoring via specific programs, monitoring for gender diversity in journals and their constituent societies, and finally the establishment of

women networks, more flexible working schemes, and inexpensive, readily available child care.^{41–45}

With regard to editorial board positions, in particular, we suggest that editorial offices review their process of appointing positions. More women should be invited to prove themselves as journal reviewers, and, if they perform successfully, they should be considered for editorial board membership.⁴² On the other hand, women scientists could proactively ask for opportunities to contribute to the reviewing process.

Although a quota system is certainly not a solution, it might be worthwhile if each journal established a range of what the expected number of women on their editorial boards should be when their specific composition regarding age, experience, country of origin, and medical specialty is taken into account. If a significant gap is found, they might evaluate whether implicit bias could disadvantage women.

Why Does It Matter?

Greater participation by women on editorial boards may improve the quality and diversity of the review process because a recent study on editorial board reviewer behavior found significant differences in some aspects between men and women.⁴⁶

When striving for an academic career, it is important to serve on committees of professional societies. Serving on an editorial board is an important experience for any scientist. Moreover, it is an influential and highly visible appointment possibly translating to a more favorable position when applying for intra- and extrainstitutional research resources such as funding and laboratory space.

CONCLUSIONS

By presenting our data, we aim to stimulate a discussion on the current situation of women in academic medicine and, in particular, on editorial boards of top-ranked medical journals. Not unexpectedly, women are underrepresented on the editorial boards of major medical journals, as in many other key leadership positions in academic medicine, although there is great variability among the journals and specialties analyzed. Further research should investigate the underlying causes contribut-

ing to this specific aspect of gender disparity and assess possible strategies to encourage the appointment of suitable women to editorial boards. More women on editorial boards will be a visible sign of continuing progress, and they will serve as important role models for young women contemplating a career in academic medicine.

CONFLICTS OF INTEREST

The authors have indicated that they have no conflicts of interest regarding the content of this article.

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