The Representation of Women on the Editorial Boards of Major Medical Journals: A 35-Year Perspective

In their recent landmark report on gender bias in science and engineering, the National Academy of Sciences and Institute of Medicine called for "reasonable representation of women on editorial boards and in other significant leadership positions." Indeed, membership on the editorial board of a major medical journal is a highly visible, prestigious appointment and affords one the opportunity to have a substantial impact on the nature of the published scholarly discourse of academic medicine. Despite the increased entry of women into the medical profession over the past several decades, with women constituting half of the current medical school class, some have suggested that women may remain substantially underrepresented in senior leadership positions, including editorial positions at biomedical journals.

For editorial comment see page 449

This study examines the gender distribution of editors-in-chief and members of the editorial boards of 16 major medical journals over time to determine the extent to which women have achieved these influential positions within the academic medical community.

Methods. We focused on 16 prominent biomedical journals that publish original research, selected after consideration of published journal impact factors, citation half-life, and comments solicited from medical school faculty members regarding the long-term prestige and importance of the various journals in their fields. We included 5 major, English-language, general medical journals published in the United States, United Kingdom, and Canada—The Journal of the American Medical Association (JAMA), The New England Journal of Medicine (NEJM), The Lancet (Lancet), British Medical Journal (BMJ), and Canadian Medical Association Journal (CMAJ)—that publish clinically oriented research of interest to practitioners of all medical specialties. We also selected 6 journals specific to 4 major clinical specialty fields: internal medicine (Annals of Internal Medicine [Ann Intern Med] and Archives of Internal Medicine [Arch Intern Med]), surgery (Annals of Surgery [Ann Surg]), obstetrics and gynecology (Obstetrics and Gynecology [Obstet Gynecol]), and pediatrics (The Journal of Pediatrics [J Pediatr] and Pediatrics). In addition, we examined 5 journals that report research in the experimental biomedical sciences: Cell, Nature Medicine (Nature Med), Science, The Journal of Experimental Medicine (J Exp Med), and The Journal of Clinical Investigation (J Clin Invest).

The lists of editorial board members and names of editors-in-chief published in the first issues of the years 1970, 1975, 1980, 1985, 1990, 1995, 2000, and 2005 were examined for each journal to determine number and gender. Gender was determined by initial inspection of first name; for cases in which gender was not certain, attempts were made to discern gender through Internet searches using the Google (Google Inc, Mountain View, California) search engine or by communication with the journal’s editorial offices.

Other editors (such as senior editors, deputy editors, and assistant editors) and editorial staff members (such as editorial assistants, copy editors, and statistical consultants) were not included in the analyses that are presented here. Gender information was collected for the senior editorial staff of each journal in each of the years studied, and these data are available to interested readers on request to the corresponding author. Given the heterogeneity in titles, qualifications, and duties for editorial staff positions across the different journals, it was not possible to summarize these data with an acceptable degree of clarity or consistency in this report.

For certain journals, the group of biomedically trained professionals appearing to serve the role of editorial board was not called “editorial board” but rather held a different title (eg, International Advisory Board and Advisory Editors). In these cases, the specific title of the individuals analyzed is listed in Table 1. Individuals who served as editors-in-chief or editorial board members in multiple years were counted in each year in which their names were listed.

The tabulated data were stored in an Excel database (Microsoft Corporation, Redmond, Washington) and analyzed using SAS version 9.1 statistical software (SAS Institute Inc, Cary, North Carolina) to determine the gender distribution of members of the editorial board for each journal. Percentages were calculated from only those names with gender determined; names for which gender could not be identified were excluded from all analyses. Because the size of the editorial boards varied considerably from journal to journal, an analysis in which the percentage of women was averaged from each journal (to weight equally each journal) was also performed. Reported P values pertain to the significance of trends over time in these data.

Results. Gender was determined for 3218 of the 3237 names (99.4%) of editorial board members listed in the selected journals in the years studied. Gender was determined for 115 of 118 editors-in-chief (97.5%) listed.

Table 1 presents the detailed gender distribution of editorial board members and editors-in-chief. Overall, 371 (11.5%) of the editorial board members were female. This figure rose from 1.4% in 1970 to 16.0% in 2005. Significant trends of increased female representation were evident for a number of the analyzed journals that had editorial boards over the 35-year period (Table 1). However,
women remained in the minority on all editorial boards studied, and markedly so for some. Fewer than 15% of the editorial board members of the NEJM and Cell in each year studied, and fewer than 10% of the members of the editorial board of Ann Surg in each year were women.

Table 2 presents the mean percentage of women among editorial board members, with each journal weighted equally. Overall, this percentage rose from 1% in 1970 to 21% in 2005. Table 2 also details the mean percentage of women by journal type. In 2005, the mean percentage of women was 22% in the general medical journals, 25% in the clinical specialty medical journals, and 15% in the biomedical science journals. These differences were not statistically significant (P = .89 for the comparison of the percentage female in the general medical journals vs the basic science journals and P = .27 for the percentage female in the specialty medical vs basic science journals).

In the year 2000, all 5 general medical journals listed editorial boards; these were compared by the journal’s national origin. The representation of women on the editorial boards of the 3 general medical journals published in the United Kingdom and Canada differed significantly from the proportion of women on the editorial boards of the 2 general medical journals published in the United States in that year. Of the 50 editorial board members for the 2 American general journals (JAMA and NEJM), 6 (12.0%) were female, and 29 (27.1%) of the 107 editorial board members of the Canadian (CMAJ) and British (The Lancet and BMJ) journals were female. This difference was statistically significant (P = .04).

Overall, 8 (7.0%) of the editors-in-chief listed were female (7 individuals, with 1 individual serving during 2 of the years studied). The journals ever having female editors-in-chief in the studied years were JAMA, NEJM, Cell, J Exp Med, and Nature Med. Journals having female editors-in-chief were not significantly more likely to have female editorial board members during those years than journals with male editors-in-chief (P = .45).

Comment. This study demonstrates a substantial increase in women’s representation on the editorial boards of a number of major medical journals over the past 3 decades and the appointment of women to the position of

(continued)
### Table 1. Gender Distribution of Editors and Editorial Board Members of 16 Prominent Biomedical Journals (cont)

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<td>Total &quot;editorial and advisory board&quot; members, No.</td>
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<td>27</td>
<td>25</td>
<td>24</td>
<td>37</td>
<td>46</td>
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<td>4 (7)</td>
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<tr>
<td>Gender of editor-in-chief</td>
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<td><strong>Obstet Gynecol</strong></td>
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<td>Total editorial board members, No.</td>
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<td>8</td>
<td>9</td>
<td>12</td>
<td>13</td>
<td>13</td>
<td>15</td>
<td>16</td>
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<tr>
<td>Female, No. (%)&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>2 (25)</td>
<td>0</td>
<td>1 (8)</td>
<td>2 (15)</td>
<td>3 (23)</td>
<td>4 (27)</td>
<td>5 (31)</td>
<td>.03</td>
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<tr>
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<td>28</td>
<td>46</td>
<td>61</td>
<td>61</td>
<td>69</td>
<td>64</td>
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<tr>
<td>Female, No. (%)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2 (8)</td>
<td>0</td>
<td>3 (7)</td>
<td>3 (5)</td>
<td>5 (8)</td>
<td>5 (7)</td>
<td>7 (11)</td>
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<td>.17</td>
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<td>Journal not started</td>
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<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>F</td>
<td>F</td>
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<td><strong>Science</strong></td>
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<tr>
<td>Total editorial board members, No.&lt;sup&gt;c&lt;/sup&gt;</td>
<td>14</td>
<td>14</td>
<td>9</td>
<td>14</td>
<td>None listed</td>
<td>19</td>
<td>80</td>
<td>117</td>
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<tr>
<td>Female, No. (%)&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>2 (22)</td>
<td>2 (14)</td>
<td>None listed</td>
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<td>11 (14)</td>
<td>22 (19)</td>
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<td>Journal not started</td>
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<td>M</td>
<td>M</td>
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<td>35</td>
<td>34</td>
<td>31</td>
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<td>180</td>
<td>217</td>
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<tr>
<td>Female, No. (%)&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>2 (7)</td>
<td>0</td>
<td>1 (3)</td>
<td>0</td>
<td>22 (16)</td>
<td>11 (6)</td>
<td>22 (10)</td>
<td>.10</td>
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<tr>
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<td>M</td>
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<td><strong>J Exp Med</strong></td>
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<td>Total &quot;advisory editors,&quot; No.</td>
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<td>17</td>
<td>29</td>
<td>38</td>
<td>40</td>
<td>98</td>
<td>99</td>
<td>101</td>
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<tr>
<td>Female, No. (%)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0</td>
<td>2 (7)</td>
<td>2 (5)</td>
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<td>12 (12)</td>
<td>14 (14)</td>
<td>18 (18)</td>
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<tr>
<td>Gender of editor-in-chief&lt;sup&gt;e&lt;/sup&gt;</td>
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<td>M</td>
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<td>M</td>
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<td><strong>Nature and Nature Med</strong>&lt;sup&gt;f&lt;/sup&gt;</td>
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<td>Gender of editor-in-chief</td>
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<td>None listed</td>
<td>M</td>
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<sup>a</sup>Number is reported as number female/total number with gender determined.

<sup>b</sup>In 1995, *BMJ* listed a group of "editorial advisors" only, and this is the group analyzed in the Table. In 2000, it listed an "editorial board" (33 members, of whom 10 were female) and "editorial advisors" (30 individuals, of whom 9 were female and 1 unknown); these groups were combined for this.

<sup>c</sup>In 2000 and 2005, *Science* did not list an editorial board, but it did list a "board of reviewing editors." Therefore, for 1970 to 1995, we considered the "editorial board" lists, and in 2000 and 2005, the list of the "board of reviewing editors."

<sup>d</sup>From 1975 to 1990, *J Clin Invest* listed an "editorial committee." In 1995, it listed both an "editorial committee" of 36 individuals, of whom 12 were female, as well as a list of 104 "consulting editors," of whom 10 were female and 3 were unknown. In 2000 and 2005, it listed only "consulting editors." In these analyses, in 1975-1990, the editorial committee was analyzed; in 1995, both groups were combined; and in 2000 to 2005, consulting editors were analyzed.

<sup>e</sup>*J Exp Med* did not list a specific individual as editor-in-chief in the years 1970, 1975, 1980, 1985, 1990, or 1995. The journal did, however, list a small group of "editors" (4 in 1970, 5 in 1975, 4 in 1980, 3 in 1985, 5 in 1990, and 6 in 1995). These individuals were all male; therefore, the gender of the editor-in-chief has been reported and analyzed as "male" for each of these years. In 2000 and 2005, an "executive editor" was listed separately, and this individual was analyzed as the editor-in-chief.


### Table 2. Mean Percentage of Female Editorial Board Members by Journal Type and Year

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editor-in-chief of several prominent journals. Nevertheless, the majority of editors-in-chief of the journals studied herein continue to be men, and women's representation on the editorial boards of certain journals remains low.

Previous studies have also explored the gender distribution of journal editors in years past. Wilkes and Kravitz conducted a survey study a decade ago, finding that 96% of 221 responding editors-in-chief of US and Canadian medical journals were men. Furthermore, they found that 96% of respondents reported having "a great deal of control over" original scientific articles, commentaries, and editorials, leading them to speculate that "homogeneity and concentration of power may have contributed to certain unintended biases in publication." However, a detailed study of the gender of editors, reviewers, and corresponding authors of manuscripts submitted to JAMA in 1991 revealed no apparent effect of gender differences on the final outcome of the review process or acceptance for publication.

In any case, it is clear that the positions of editor-in-chief and editorial board member are prestigious appointments that afford the opportunity to guide the underlying direction of a journal, with the potential for consequent impact on the nature of the research emphasized in the medical academic community. These individuals make critical decisions and policies that govern the dissemination of scientific information, such as rules protecting the public from information that has not yet been reviewed by the academic community, policies regarding conflicts of interest on the part of researchers, and policies regarding advertisements. Therefore, it is important to consider the evolving composition of these appointments and the underlying forces shaping that distribution over time.

Our results show that in 2005, 16% of the editorial board members of the journals studied were women. The mean percentage of women for that year (with each journal weighted equally) was 21%. The greatest challenge in interpreting these findings lies in determining what the level of women's participation ought to have been. If the proportion of medical students who are women has only recently reached parity, one cannot expect the senior ranks (from which editorial board members are drawn) to approach an equal gender distribution until substantial time has passed. This has been dubbed the "pipeline phenomenon." Unfortunately, several well-designed studies have suggested that the low representation of women observed in senior positions in academic medicine is due to more than a simple pipeline effect alone. For example, a detailed cohort study by Nonnemaker has suggested that women are not achieving senior status as quickly as would be expected. Tesch and colleagues have also found that promotions in rank appear to be achieved more slowly by women faculty members. A number of explanations for these findings have been proposed, and future research should seek to understand more fully the barriers faced by women in their ascent to the upper echelons of academic medicine.

Also worthy of further exploration is the possibility that women's participation may actually improve the ability of senior professional bodies such as editorial boards to serve society. As one editor-in-chief noted in his discussion of the creation of an editorial board for his journal, "The main purpose for developing a board is to help us to prepare the journal for the next century. The members will ensure a steady flow of new ideas from a wide range of specialties, countries, and disciplines." Just as diversity in specialty, country, and discipline may be important to the ability of an editorial board to serve its mission, so may be gender diversity. If women have different perspectives and different life experiences than their male colleagues, new ideas and approaches might emerge from their participation in these groups, and the critical decisions they make might be improved. Moreover, women's participation in these visible, influential editorial positions may encourage the continued, vital participation of women in medicine more generally by providing visible role models for younger women. We believe these are important subjects for further investigation.

The primary limitation of this study lies in the small numbers that compose the denominator for many of the individual journal-years. Therefore, it is important to consider these data primarily in the aggregate, so that small, chance fluctuations (such as the hypothetical stepping down of several female editors just prior to a year considered in the study) would have only minimal effects on the percentage of women observed. We also wish to emphasize that the comparison between US and British/Canadian journals reported in the "Results" section was restricted to the one year in which the 3 general medical journals all reported editorial boards, and therefore we view this as an exploratory rather than definitive analysis, worthy of further investigation if possible in future years.

As Kuhn notes, "Scientific knowledge, like language, is intrinsically the common property of a group or else nothing at all. To understand it we shall need to know the special characteristics of the groups that create and use it." While this study documents heartening trends of increased female representation on the editorial boards of a number of the prominent journals that shape our scientific knowledge, it also suggests a need for a greater understanding of barriers that may have impeded (and may continue to impede) even greater participation by women in these critical leadership positions.

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Author Contributions: Drs Jagsi and Hylek had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. Study concept and design: Jagsi and Hylek. Acquisition of data: Jagsi, Tarbell, Henault, and Hylek. Analysis and interpretation of data: Jagsi, Tarbell, Chang, and Hylek. Drafting of the manuscript: Jagsi and Hylek. Critical revision of the manuscript for important intellectual content: Jagsi, Tarbell, Henault, Chang, and Hylek. Statistical analysis: Jagsi, Tarbell, Henault, and Hylek. Other: Jagsi and Hylek.
cal analysis: Renault and Chang. Obtained funding: Jagsi, Tarbell, and Hylek. Administrative, technical, and material support: Tarbell, Henault, and Hylek. Study supervision: Tarbell and Hylek.

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Additional Contributions: Rebecca Starr and Brenda Vega contributed in data collection.


COMMENTS AND OPINIONS

Low-Dose Rosiglitazone in Patients With Type 2 Diabetes Mellitus Requiring Insulin Therapy

W e would like to raise the following issues regarding the interesting article by Hollander et al.1 The high dropout rates (176 of the 630 randomized subjects) reported in the study may have reduced power and comparability and thus limit the validity of the results.2 Furthermore, including sample size estimation in the manuscript would facilitate assessment of the impact of follow-up losses on the study results.

The investigators must describe cardiovascular adverse events in detail, in view of recent reports showing that rosiglitazone is associated with higher risk of myocardial infarction.3 In addition, confounder analysis should be performed to evaluate if the increase in cardiovascular events reported in the study could be attributed to the high prevalence of risk factors in the subjects as reported by the authors.

Although diet and exercise are significant confounders of diabetes control,4 these variables were neither measured nor their effects on outcomes analyzed. Insulin dose was left to discretion of the investigators, which could confound diabetes control and further limit validity.

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Neither Freedom nor Autonomy Without Beneficence

W arma and Wendler’s1 recently focused on the medical ethical challenge represented by the treatment for people lacking advanced directives or designated surrogates. They argue that it is fundamental to give them the same level of respect afforded those with surrogates. The clear identification of instruments to help physicians make treatment decisions consistent with the patient’s preferences is mandatory. They propose a “population-based treatment instrument,” a computer-based tool that should be able to unravel a patient’s choice