

A Comparison of the Representation of Women in Editor Positions at Major Medical Journals in 2021 vs 2011

Christina Starchl, MD, Vianca Shah, Ines Zollner-Schwetz, MD, Jovana Knezevic, MD, Simon Geiger, and Karin Amrein, MD

Abstract

Purpose

There continues to be a disparity in the representation of women across medicine, including in editor positions at major medical journals. The authors repeated a study they had conducted in 2011 to compare the representation of women in editor-in-chief and editorial board member positions in 2011 and 2021.

Method

The authors included in their analysis the 60 journals from their original 2011 study and the top 5 ranked journals by Journal Impact Factor in each of 12 disciplines in 2021. This led to the inclusion of 86 journals. The authors collected the names and genders of the editors-in-chief and

editorial board members at these journals, using information provided by the journals and a Google search for the photos and/or pronouns of the remaining editors. They compared results across years (2021 vs 2011), editor positions, disciplines, Journal Impact Factors, and ranks.

Results

Twenty-two of the 90 editors-in-chief (24.4%) were women in 2021 compared with 10 of 63 (15.9%) in 2011, an increase of 8.5%. Of the 6,285 editorial board members, 1,756 were women (27.9%) in 2021 compared with 719 of 4,112 (17.5%) in 2011, an increase of 10.4%. Journals with women editors-in-chief gained 3.5 ranks and 9.1 points

in Journal Impact Factor on average over this 10-year period, compared with no gain in rank and an increase of 4.7 points in Journal Impact Factor for journals with men editors-in-chief; both are statistically significant differences ($P = .045$ and $P = .016$, respectively).

Conclusions

In almost all evaluated disciplines and editor positions, there was an increase in the percentage of women at top-ranked medical journals over a 10-year period. Despite this increase, improvements are still needed to accelerate the currently slow rate of change in these positions to enhance diversity, equity, and inclusion for women in medicine.

Today, in the United States, more women than men are enrolling in medical school,^{1,2} and, in many countries, more than half of PhD students are women.³ However, the gender composition of the different disciplines in medicine varies widely. For example, in Austria, women

Please see the end of this article for information about the authors.

The authors have informed the journal that they agree that both Christina Starchl and Vianca Shah completed the intellectual and other work typical of the first author.

Correspondence should be addressed to Ines Zollner-Schwetz, Department of Internal Medicine, Medical University of Graz, Auenbruggerplatz 15, A-8036 Graz, Austria; email: ines.schwetz@medunigraz.at.

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represent more than 50% of physicians working in general medicine, obstetrics and gynecology, and pediatrics, but they are a much smaller percentage in general surgery, orthopedics, plastic surgery, and trauma surgery.⁴ Similarly, in the United States, pediatrics has the largest percentage of women, followed by obstetrics and gynecology, pediatric hematology/oncology, and child/adolescent psychiatry, while a smaller percentage of women work in orthopedics, sports medicine, interventional cardiology, and thoracic surgery.⁵ Gender disparities also exist in other scientific fields. According to a recent UNESCO report, only 29% of researchers across all scientific fields are women.³

Across all medical disciplines, the percentage of women decreases as the rank of the position increases.² For example, in 2021, women accounted for 28% of full professors, 22% of department chairs, and 22% of permanent medical school deans.⁶ Overall, women are paid less,⁷ receive less funding for their research,⁸ author publications less frequently,^{9,10} and are underrepresented in higher academic ranks (e.g., as professors),¹¹ on editorial boards,^{12,13} and

as speakers at medical conferences.¹⁴ Women remain underrepresented as patients too (e.g., in randomized controlled trials),^{15–17} even though addressing gender-specific needs and exploring treatment options adjusted by gender have been attempted to improve women's health outcomes.¹⁸

Pinho-Gomes and colleagues recently investigated the representation of women amongst editors-in-chief of leading medical journals, showing an underrepresentation of women overall (21%, 94/447).¹⁹ In dentistry, oral surgery, and medicine; psychiatry; allergy; anesthesiology; and ophthalmology, none of the editors-in-chief of the leading journals were women. Similarly, in disciplines like radiology and dermatology, other studies have shown that there are still large disparities between the share of women who work in the discipline and those who have reached the top leadership positions at journals.^{12,13,20,21} Yet, several studies have documented increases over the last decade in the representation of women in disciplines such as psychiatry²² and general and plastic surgery.^{5,23}

In 2011, we studied the representation of women in editor positions at 60 top ranked medical journals in 12 disciplines.²⁴ We found that less than 20% of all editors were women. A comprehensive evaluation of the current representation of women in editor positions at journals across a wide range of medical disciplines is not available. Therefore, we repeated our 2011 study, evaluating the editor positions at 86 journals in 12 disciplines in medicine and drawing comparisons with our previous findings to evaluate the progress that has been made over the course of the past decade.

Method

We started by identifying the 60 journals that we had analyzed in our previous study and found substantial fluctuations in their rankings between 2021 and 2011 according to the Thomson Reuters Web of Knowledge Journal Citation Reports of 2020. Of the original journals, 27 were no longer in the top 5 ranked journals in their discipline. We decided to use the 60 original journals from our 2011 study, and we added the top 5 ranked journals in 2021 in the same 12 disciplines: 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. This led to a total of 86 journals included in our analysis. See Supplemental Digital Appendix 1 at <http://links.lww.com/ACADMED/B336> for a list of these journals.

First, we contacted the editorial offices and/or editors-in-chief of the included journals up to 2 times via email to obtain the gender of the editor-in-chief and editorial board members. We were able to obtain all the information requested from 23 journals (26.7%). For the remaining journals, we counted the number of men and women using any names and images listed on the journal website. If an assignment of gender was not definite using this method, 2 authors (C.S. and V.S.) independently tried to identify the gender of the remaining editors-in-chief and editorial board members using a Google search (Google, Inc., Mountain View, California) for a picture or curriculum vitae with a gender-specific pronoun. We stopped collecting data on March 1, 2022. We then compared results across years (2021 vs 2011),

positions, disciplines, Journal Impact Factors, and ranks.

We excluded the *European Journal of Nuclear Medicine and Molecular Imaging* from the analysis because the first names of the editorial board members were abbreviated, only city names, not full affiliations, were given on the journal website, and the full first names could not be provided by the journal. Therefore, identification of editorial board members' gender was not possible. In addition, for 8 journals, a total of 12 names were excluded because we could not identify without doubt the gender of these individuals (0.12%).

Due to the heterogeneity in titles and qualifications across 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 and assistant and associate editors but not editorial staff members (such as editorial assistants, copyeditors, technical editors, and statistical consultants). We also excluded former editors-in-chief and founding editors as well as emeriti and social media editors, including podcast and video editors. We did not include elite reviewers, trainee fellows, and early-career researchers.

Each of the journals was weighted equally regardless of the absolute number of editorial board members. Statistical analysis was performed using SPSS 27 (SPSS Statistics, IBM, Armonk, New York). Significant differences were analyzed using the *t* test for normally distributed and the Mann-Whitney *U* test for not normally distributed data. Correlations were evaluated using Pearson or Spearman correlations according to the distribution of data. $P < .05$ was considered statistically significant.

Results

A total of 86 journals were evaluated in this study, which included 90 editors-in-chief and 6,285 editorial board members.

Editors-in-chief

Twenty-two of the 90 editors-in-chief (24.4%) were women in 2021 compared with 10 of 63 (15.9%) in 2011, an increase of 8.5%. Considering only the journals ranked in the top 5 in their discipline in 2021, we identified

15 women editors-in-chief of 63 total editors-in-chief (23.8%). The disciplines of orthopedics, ophthalmology, and anesthesiology had no women editors-in-chief in their top 5 ranked journals. Hematology was the discipline with the largest percentage of women editors-in-chief (3/6; 50.0%). Four journals had 2 editors-in-chief; for 2 of those journals, both were men, and for the other 2 journals, one was a man and one was a woman.

Editorial board members

Of 6,285 editorial board members, 1,756 were women (27.9%) in 2021 compared with 719 of 4,112 (17.5%) in 2011, an increase of 10.4%. The maximum percentage of women on any evaluated editorial board was 80.0% and the minimum was 1.7%.

Considering only the journals ranked in the top 5 in their discipline in 2021, we counted 3,861 editorial board members in total, of which 1,118 were women (29.0%). The median percentage of women on any editorial board in the top 5 ranked journals was 29.0%, with a maximum of 80.0% and a minimum of 4.3%. There was no statistically significant difference in the percentage of women editorial board members between the top 5 ranked journals and the lower ranked journals ($P = .179$). There was also no statistically significant difference ($P = .470$) between the percentage of women editorial board members of journals with men editors-in-chief (28.8% women) and journals with women editors-in-chief (29.7% women).

The journals with the largest percentage of women editorial board members were *The Lancet* and *Nature Reviews Disease Primers* (each 80.0%). The journals with the smallest percentage of women were *Arthroscopy* with 1.7% and *The Spine Journal* with 4.3%. The disciplines with the largest percentage of women editorial board members were medicine, general and internal, and pediatrics with 48.9% and 48.5% women editors, respectively. Some disciplines showed a $\geq 15\%$ increase in women editorial board members from 2011 to 2021, including critical care medicine, clinical neurology, orthopedics, and pediatrics (see Table 1). The discipline with the smallest percentage of women editorial board members was anesthesiology with 21.7%. Critical care medicine had the largest increase from 7.3% in 2011 to 30.5% in 2021 (+23.2%).

Table 1

Percentage of Women in Editor Positions at Journals Ranked in the Top 5 in Their Discipline in 2011 vs 2021^a

Discipline	% Women editors-in-chief, 2011	% Women editors-in-chief, 2021	% Women editorial board members, 2011	% Women editorial board members, 2021	% Increase in women editorial board members, 2011–2021
Anesthesiology	0	0	15.2	21.7	6.5
Clinical neurology	20.0	40.0	14.6	30.1	15.3
Critical care medicine	0	40.0	7.3	30.5	23.2
Dermatology	40.0	40.0	22.7	35.5	12.8
Hematology	40.0	50.0	19.3	28.3	9.0
Medicine, general and internal	40.0	20.0	37.6	48.9	11.3
Obstetrics and gynecology	20.0	16.6	26.9	37.4	10.5
Ophthalmology	0	0	21.1	33.2	12.1
Orthopedics	0	0	9.3	28.3	19.0
Pediatrics	20.0	40.0	30.8	48.5	17.7
Radiology, nuclear medicine, and medical imaging	0	25.0	14.1	22.7	8.6
Surgery	20.0	20.0	16.1	27.5	13.7

^aValues are given as mean percentages per discipline.

Association of journal metrics and editor-in-chief gender

Considering the evaluated journals overall, neither a change in Journal Impact Factor nor a change in rank correlated significantly with the percentage of women editorial board members. For the journals ranked in the top 5 in their discipline in 2021 with women editors-in-chief, the improvement in rank ($P = .045$) and the increase in Journal Impact Factor ($P = .016$) over the 10-year period was higher compared with those journals with men editors-in-chief. Journals with women editors-in-chief gained 3.5 ranks and 9.1 points in Journal Impact Factor on average, compared with no gain in rank and an increase of 4.7 points in Journal Impact Factor for journals with men editors-in-chief.

Discussion

To date, women are still underrepresented in editor positions at leading medical journals, and change is slow. Although we did see an increase in the percentage of women editorial board members in 2021 compared with 2011, it was a small change (27.9% vs 17.5% or 1.0% increase per year). There was an even smaller increase in the percentage of women editors-in-chief (24.4% vs 15.9% or 0.9% increase per year). At this rate, it would

take decades to reach gender parity (about 1 generation, 22 years, until 2043 for editorial board members and almost 2 generations, about 28 years, until 2050 for editors-in-chief).

Increase in women's representation as editorial board members

In 1999, 11.5% of editorial board members at 12 major journals were women.²⁵ In 2005, Jagsi and colleagues reported that 17% of editorial board members at 16 major medical journals were women, compared with 27.9% in our current study in 2021.²⁶ Overall, we see a steady increase in the percentage of women, but this increase was not equally visible in all disciplines. For example, critical care medicine, which a decade ago had the smallest percentage of women editorial board members at 7.3%, now has 30.5% women, which constitutes an increase of 23.2%. In critical care medicine, specific initiatives have promoted the academic success of women.^{2,27} In contrast, the percentage of women editorial board members in anesthesiology only increased from 15.2% in 2011 to 21.7% in 2021, a 6.5% change.

Reasons for persisting gender inequality in medicine

Gender bias is complex. There is no single cause for the underrepresentation of

women in medicine. Instead, the causes are a collection of different, often subtle factors that add up over the years in the careers of individuals. Similar issues also exist for women in other fields outside medicine.²⁸ Many of these factors and suggested improvements are discussed in detail in a recent international, interdisciplinary paper by Llorens and colleagues.²⁹ Important factors that perpetuate gender inequality in academia include: family responsibilities (e.g., women are typically the primary caregivers for children and aging parents),⁷ lack of female role models,³⁰ gender differences in competitiveness,³¹ financial reasons (e.g., women receive less funding for their research),^{8,32} and barriers to the visibility of women's scientific work.

Suggested actions

Without active intervention from journals and/or their corresponding publishers or societies, it will still take a (too) long time to substantially improve the representation of women in editor positions at major medical journals. We therefore suggest the following actions. First, journals should introduce affirmative action in the form of a quota for the percentage of women editors. This quota should reflect the percentage of women working in each specific discipline.

Affirmative action has been shown to bring the strongest individuals to the table.^{33,34} Next, journals should include demographic information on their editors (possibly also on their reviewers and authors) on their publicly available websites and in official citation reports. Some publishers such as Elsevier and Wolters Kluwer have already started this process. Third, journals should make the editor selection process more transparent as well as clarify the responsibilities and benefits of the position. Many women may not actively seek such a position when the conditions are not clear, especially when invitations from predatory journals are omnipresent. Finally, journals should anonymize manuscript submission and implement a double-masked peer review process to prevent bias,³⁴ as women's manuscripts³⁵ and abstracts³⁶ are more often accepted when reviewers are unaware of the authors' identities. Women who have a successful publication track record more likely will be considered for editor positions at relevant journals.

Limitations and strengths

Our study did not allow for a more detailed analysis of the different positions on editorial boards, due to the inconsistency of titles and descriptions among different journals. We could therefore not assess in detail the gender composition of editors with decision-making responsibilities compared with the composition of editorial board members with advisory responsibilities only. Furthermore, we only included highly ranked journals in our analysis from the disciplines in our 2011 study, which may have affected our results. Additionally, we assigned a gender to each of the listed names on the journals' websites using a Google search in most cases, which could have led to false results. We also were not able to take nonbinary or other gender identities into account, due to absent data. A strength of our study is the direct comparison of data from the same medical journals after a decade, covering many important disciplines. However, limiting the areas of medicine we included to the 12 disciplines we reviewed in 2011 can also be viewed as a limitation of our study.

Conclusions

Our comparative analysis using data from 2011 and 2021 shows an increase in the percentage of women in almost all editor positions at top-ranked medical journals in the evaluated disciplines. Although the percentage of women editors-in-chief changed slowly, the journals with women in this position showed a greater increase in rank and Journal Impact Factor over the last 10 years. Despite the observed increases in the representation of women in editor positions, improvements are still needed to accelerate the currently slow rate of change to enhance diversity, equity, and inclusion for women in medicine.

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C. Starchl is a medical doctor, Medical University of Graz, Graz, Austria.

V. Shah is a medical student, Robinson College, University of Cambridge, Cambridge, United Kingdom.

I. Zollner-Schwetz is associate professor, Division of Infectious Diseases, Department of Internal Medicine, Medical University of Graz, Graz, Austria.

J. Knezevic is a medical doctor, Medical University of Graz, Graz, Austria.

S. Geiger is a medical student, Medical University of Graz, Graz, Austria.

K. Amrein is consultant, Division of Endocrinology and Diabetology, Department of Internal Medicine, Medical University of Graz, Graz, Austria.

References

- Association of American Medical Colleges. 2020 Fall Applicant, Matriculant, and Enrollment Data Tables. <https://www.aamc.org/media/49911/download>. Published December 2020. Accessed August 8, 2022.
- Lautenberger DM, Dandar VM. The State of Women in Academic Medicine: 2018–2019. Washington, DC: Association of American Medical Colleges; 2020.
- UNESCO. Women in Science. Fact Sheet No. 55. June 2019. <https://uis.unesco.org/sites/default/files/documents/fs55-women-in-science-2019-en.pdf>. Accessed August 8, 2022.
- Austrian Medical Association. Medical Statistics of Austria. https://www.aerztekkammer.at/documents/261766/986618/ÖAK_Ärzttestatistik_2020.pdf/8d3a4002-2ba2-4e44-6550-6cf190e0fb6b. Published March 2020. Accessed August 8, 2022.
- Association of American Medical Colleges. 2020 Physician Specialty Data Report. Washington, DC: Association of American Medical Colleges; 2021. <https://www.aamc.org/data-reports/workforce/report/physician-specialty-data-report>. Accessed August 8, 2022.
- Association of American Medical Colleges. Faculty Roster: U.S. Medical School Faculty. Washington, DC: Association of American Medical Colleges; 2021.
- Butkus R, Serchen J, Moyer DV, et al. Achieving gender equity in physician compensation and career advancement: A position paper of the American College of Physicians. *Ann Intern Med*. 2018;168:721–723.
- Bates C, Gordon L, Travis E, et al. Striving for gender equity in academic medicine careers. *Acad Med*. 2016;91:1050–1052.
- Viglione G. Are women publishing less during the pandemic? Here's what the data say. *Nature*. <https://www.nature.com/articles/d41586-020-01294-9>. Published May 20, 2020. Accessed August 8, 2022.
- Chary S, Amrein K, Soeteman DI, Mehta S, Christopher KB. Gender disparity in critical care publications: A novel female first author index. *Ann Intensive Care*. 2021;11:103.
- Raj A, Carr PL, Kaplan SE, Terrin N, Breeze JL, Freund KM. Longitudinal analysis of gender differences in academic productivity among medical faculty across 24 medical schools in the United States. *Acad Med*. 2016;91:1074–1079.
- Grinnell M, Higgins S, Yost K, et al. The proportion of male and female editors in women's health journals: A critical analysis and review of the sex gap. *Int J Womens Dermatol*. 2020;6:7–12.
- Lobl M, Grinnell M, Higgins S, Yost K, Grimes P, Wysong A. Representation of women as editors in dermatology journals: A comprehensive review. *Int J Womens Dermatol*. 2020;6:20–24.
- Modra LJ, Austin DE, Yong SA, Chambers EJ, Jones D. Female representation at Australasian specialty conferences. *Med J Aust*. 2016;204:385.
- Geller SE, Koch AR, Roesch P, Filut A, Hallgren E, Carnes M. The more things change, the more they stay the same. *Acad Med*. 2018;93:630–635.
- Carcel C, Harris K, Peters SAE, et al. Representation of women in stroke clinical trials: A review of 281 trials involving more than 500,000 participants. *Neurology*. 2021;97:e1768–e1774.
- Gaudino M, Di Mauro M, Fremes SE, Di Franco A. Representation of women in randomized trials in cardiac surgery: A meta-analysis. *J Am Heart Assoc*. 2021;10:e020513.
- Machluf Y, Chaiter Y, Tal O. Gender medicine: Lessons from COVID-19 and other medical conditions for designing health policy. *World J Clin Cases*. 2020;8:3645–3668.
- Pinho-Gomes A-C, Vassallo A, Thompson K, Womersley K, Norton R, Woodward M. Representation of women among editors in chief of leading medical journals. *JAMA Netw Open*. 2021;4:e2123026.
- Gollins CE, Shipman AR, Murrell DF. A study of the number of female editors-in-chief of dermatology journals. *Int J Womens Dermatol*. 2017;3:185–188.
- Jalilianhasanpour R, Charkhchi P, Mirbolouk M, Yousem DM. Underrepresentation of women on radiology editorial boards. *J Am Coll Radiol*. 2019;16:115–120.

- 22 Medical Womens Federation. Facts & Figures. 2018. <https://www.medicalwomensfederation.org.uk/our-work/facts-figures>. Accessed August 8, 2022.
- 23 Stephens EH, Heisler CA, Temkin SM, Miller P. The current status of women in surgery: How to affect the future. *JAMA Surg*. 2020;155:876–885.
- 24 Amrein K, Langmann A, Fahrleitner-Pammer A, Pieber TR, Zollner-Schwetz I. Women underrepresented on editorial boards of 60 major medical journals. *Gend Med*. 2011;8:378–387.
- 25 Kennedy BL, Lin Y, Dickstein LJ. Women on the editorial boards of major journals. *Acad Med*. 2001;76:849–851.
- 26 Jagsi R, Tarbell NJ, Henault LE, Chang Y, Hylek EM. The representation of women on the editorial boards of major medical journals: A 35-year perspective. *Arch Intern Med*. 2008;168:544–548.
- 27 Faculty of Intensive Care Medicine. Women in Intensive Care Medicine. <https://ficm.ac.uk/careersworkforceworkforce/women-in-intensive-care-medicine>. Accessed August 8, 2022.
- 28 Thomas R, Cooper M, Urban KM, et al. Women in the Workplace. McKinsey & Company. https://wiw-report.s3.amazonaws.com/Women_in_the_Workplace_2021.pdf. Published 2021. Accessed August 8, 2022.
- 29 Llorens A, Tzovara A, Bellier L, et al. Gender bias in academia: A lifetime problem that needs solutions. *Neuron*. 2021;109:2047–2074.
- 30 Horsburgh J, Ippolito K. A skill to be worked at: Using social learning theory to explore the process of learning from role models in clinical settings. *BMC Med Educ*. 2018;18:156.
- 31 Buser T, Niederle M, Oosterbeek H. Gender, competitiveness, and career choices. *Q J Econ*. 2014;129:1409–1447.
- 32 Burns KEA, Straus SE, Liu K, Rizvi L, Guyatt G. Gender differences in grant and personnel award funding rates at the Canadian Institutes of Health Research based on research content area: A retrospective analysis. *PLoS Med*. 2019;16:e1002935.
- 33 Niederle M, Segal C, Vesterlund L. How costly is diversity? Affirmative action in light of gender differences in competitiveness. *Manage Sci*. 2013;59:1–16.
- 34 De Kleijn M, Jayabalasingham B, Falk-Krzesinski HJ, et al. The Researcher Journey Through a Gender Lens: An Examination of Research Participation, Career Progression and Perceptions Across the Globe. Elsevier. https://www.elsevier.com/_data/assets/pdf_file/0011/1083971/Elsevier-gender-report-2020.pdf. Published 2020. Accessed August 8, 2022.
- 35 Budden AE, Tregenza T, Aarssen LW, Koricheva J, Leimu R, Lortie CJ. Double-blind review favours increased representation of female authors. *Trends Ecol Evol*. 2008;23:4–6.
- 36 Roberts SG, Verhoef T. Double-blind reviewing at EvoLang 11 reveals gender bias. *J Lang Evol*. 2016;1:163–167.