



Gender Differences in the Authorship of Original Research in Pediatric Journals, 2001-2016

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Objectives To examine the gender of authors of original research in 3 high-impact pediatric journals between 2001 and 2016, given the importance of publishing on academic promotion, and to compare authorship gender with the percentage of women on editorial boards and with academic faculty composition.

Study design We assessed the prevalence of female first and senior (last-listed) authorship of original research articles published in 3 pediatric-focused journals *Pediatrics*, *JAMA Pediatrics* (entitled *Archives of Pediatric and Adolescent Medicine* until 2013), and *The Journal of Pediatrics*. We also examined the gender breakdown of the main editors and the broader editorial boards of these journals. In addition, we examined whether junior female faculty co-authored with male or female senior faculty.

Results Of 3895 original articles, 22 were excluded because the gender of either the first or senior author could not be determined from the name. An analysis of authorship by year showed increasing female representation across the selected journals in both first (39.8% in 2001, 57.7% in 2016) and senior (28.6% in 2001, 38.1% in 2016) authors, respectively. Editorial boards also showed increasing female representation (17.8% in 2001 to 39.8% in 2016). Junior female faculty were more likely to co-author with senior female women (female first and last author); the gap remained unchanged despite the increasing number of women entering pediatrics.

Conclusions Women are underrepresented as authors and editors, although the gap is closing. Junior women are less likely to co-author with senior men, which may be a disservice given current gender disparities in promotion and leadership. (*J Pediatr* 2017;191:244-9).

The number of female physicians has risen steadily over the past 50 years and now comprises 34% of all practicing physicians and 40% of all academic physicians in the US.¹⁻³ However, women continue to be underrepresented in senior faculty and academic leadership positions.^{1,4,5} As of 2014, 24% of division chiefs, 15% of department chairs, and 16% of deans were women.³

Similar patterns have been seen in pediatrics, 1 of only 2 specialties (along with obstetrics and gynecology) in which the majority of physicians are women.³ As of 2013, although 32% of practicing physicians were women (an 8% increase from 2000), women made up 58% of pediatricians (a 10% increase from 2000).² In addition, the proportion of female residents in pediatrics increased from 66% in 2000 to over 73% in 2016. Despite accounting for over 55% of all full-time pediatric faculty positions, women hold only slightly more than 40% of senior faculty positions (associate and full professorship). Although 27% of male pediatric faculty members are full professors, only 11% of female pediatric faculty members have the same rank.⁶ Of the 138 US members of the Association of Medical School Pediatric Department Chairs in 2015, 28 (20%) were women.⁷

One crucial aspect for tenure and promotion within academic medicine is grant funding and publication in high impact journals. Previous studies have shown that women are awarded fewer research dollars from the National Institutes of Health and are less likely to be refunded.^{3,8,9} They are also underrepresented in first authorship, senior authorship, and guest editorial authorship across a range of specialties including internal medicine, obstetrics and gynecology, surgery, otolaryngology, and ophthalmology.^{1,10-12} However, with the exception of the analysis of a single pediatric journal from 1970 to 2004,¹ no studies to date have specifically examined gender-related disparities in pediatric peer-reviewed research publications.

In this study, we examined the prevalence of female first and senior authorship of original research in 3 high-impact pediatric journals from 2001 until 2016. We also examined the gender breakdown of editorial boards of these journals over the same time period. Finally, we compared the gender breakdown of articles published by US authors with the gender breakdown of US pediatric faculty as

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determined by the Association of American Medical Colleges (AAMC).

Methods

We assessed the prevalence of female first authorship and senior (last-listed) authorship of original research articles published in 3 high-impact general pediatric-focused journals *Pediatrics*, *JAMA Pediatrics* (entitled *Archives of Pediatric and Adolescent Medicine* until 2013), and *The Journal of Pediatrics* as well as the gender congruence between first and senior authors. We also examined the gender breakdown of their main editors and their broader editorial board.

All original articles published in the years 2001, 2006, 2011, and 2016 were included in the data set. For each article, the time of publication (year and month) and the gender of the first and senior author (female, male, unknown) were collected. Articles by a study group only with no listed authors were not recorded. We used the methods described in previous studies examining this question in other specialties and/or other time periods.^{1,10,11} The gender of both the first and senior author was determined by inspection of their first name. If the name was indeterminate, further attempts were made to determine the gender by visiting institutional websites, social media accounts (such as LinkedIn), and internet search engines (such as Google). Any author's gender not clearly identifiable was labeled as "unknown," and the article was excluded from further analysis. Articles were double coded by 2 of us to further assure accuracy of this assignment. Manuscripts with only 1 author were listed as a first authored article only.

The composition of each of the journal's editorial boards (in January for each of the listed years) was also reviewed using the same methods. Main editors included editor and associate editors, as well as statistical editor and section editors for *JAMA Pediatrics*; deputy editor, consulting editors, assistant editors, and editorial associates for *Pediatrics*; and editor and associate editors for *The Journal of Pediatrics*.

We also collected data about the geographic location of the authors' institution. Manuscripts in which both first and last author were at US institutions were classified as US. Manuscripts in which at least 1 of the 2 authors were at non-US institutions were classified as non-US and were excluded from the analysis in which we compared author gender with faculty rank at US medical school. We classified junior faculty as those who were identified as instructors and assistant professors and senior faculty as associate professors and full professors. Normative academic behavior presupposes that a last author holds a more senior academic rank compared with the first author. As such, we compared first author gender against junior faculty rank status and last author gender against senior faculty rank status. Data for academic rank of female pediatricians from the years 2001, 2006, 2011, and 2016 were obtained from the AAMC database books.

Statistical Analyses

The data were coded and stored in a Microsoft Excel database and analyzed using SPSS (v 24.0; IBM Corp, Armonk, New York) to determine the distributions of the gender of first and senior authors in the selected journals. Comparisons between journals, in addition to the effect of senior author gender on first author gender, were examined with χ^2 tests. The Cochran-Armitage trend test was used to evaluate for trend over time. A *P* value of .05 was taken as significant.

The University of Chicago Institutional Review Board exempted this research and waived the need for informed consent as it used only publically available databases.

Results

Data on a total of 3895 original articles were collected. Of these articles, 22 (0.6%) were excluded because of an inability to determine the gender of the first or senior author. There were 173 (4.5%) articles with a single author, coded as first author. The **Table** shows the percentages of female first and senior

Table. Representation of women among first authors, senior authors, and on editorial boards across 3 pediatric journals

Variables	2001	2006	2011	2016	<i>P</i> value*
Number/total number (percent)					
Overall					
First author	396/996 (39.8)	529/1063 (49.8)	473/883 (53.6)	537/931 (57.7)	<.001
Senior author	266/930 (28.6)	347/1029 (33.7)	329/858 (38.3)	336/883 (38.1)	<.001
Editorial board	16/90 (17.8)	28/93 (30.1)	36/105 (34.3)	41/103 (39.8)	<.001
J Pediatr					
First author	136/372 (36.6)	103/221 (46.6)	161/304 (53.0)	267/468 (57.1)	<.001
Senior author	84/328 (22.6)	59/197 (29.9)	92/282 (32.6)	149/421 (35.4)	.003
Editorial board	5/32 (15.6)	12/31 (38.7)	11/36 (30.6)	14/35 (40.0)	.07
JAMA Peds					
First author	65/133 (48.9)	58/97 (59.8)	65/120 (54.2)	65/111 (58.6)	.21
Senior author	47/126 (37.3)	39/97 (40.2)	48/118 (40.7)	46/111 (41.4)	.51
Editorial board	6/25 (24.0)	6/23 (26.1)	9/27 (33.3)	9/23 (39.1)	.21
Pediatrics					
First author	195/491 (39.7)	368/745 (49.4)	247/459 (53.8)	205/352 (58.3)	<.001
Senior author	135/476 (28.4)	249/735 (33.9)	189/458 (41.3)	141/351 (40.2)	<.001
Editorial board	5/33 (15.2)	10/39 (25.6)	16/42 (38.1)	18/45 (40.0)	.01

**P* value represents significance of trend.

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