The Role of Gender in Publication in *The Journal of Pediatrics* 2015-2016: Equal Reviews, Unequal Opportunities

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Objectives To examine whether the gender of corresponding authors, reviewers, and editors led to differential publication recommendations and outcomes for original research articles and invited editorials submitted to *The Journal of Pediatrics* in 2015 and 2016.

Study design Names of corresponding authors, reviewers, editors, and editorial writers in *The Journal of Pediatrics* databases for 2015-2016 were analyzed to determine gender using computer algorithms and Internet searches. Reviewer recommendations and final editor dispositions were stratified by their gender and the gender of the corresponding authors.

Results Of 3729 original manuscripts, 54.3% had female corresponding authors. Women were the associate editor (40.2% of submissions), guest editor (34.8%), or primary reviewer (37.4%), with no gender difference in editor or reviewer assignments for submissions by female vs male corresponding authors. There were no outcome differences by author gender for manuscripts overseen by female ($P = .71$) or male ($P = .62$) editors nor recommendation differences by female ($P = .18$) or male ($P = .71$) reviewers. Female editors had a lower acceptance rate overall than male editors (20.1% vs 25.6%; $P < .001$). Women were statistically less likely to accept and complete the invitation to peer review original articles (34.0%; 2295 of 6743) compared with men (40.0%; 3930 of 9823; $P < .001$). Women wrote 33 of 107 editorials (30.8%).

Conclusions There were no differences in reviewer recommendations or editor decisions for original research articles based on corresponding author gender. However, women had fewer opportunities to serve as peer reviewers and editorial writers than would be expected given their representation as academic pediatric faculty. *(J Pediatr 2018;■■:■■-■■).*

The number of women in medicine in the US has increased steadily over the past 40 years, and in 2015-2016 women represented 46.8% of medical students, 45.8% of trainees, and 39.8% of allopathic faculty.[1,2] Numerous journal articles have documented the increasing number of women as first and senior authors in peer-reviewed publications in various fields of medicine, although women remain underrepresented in comparison with their professional representation.[3-12] The data also show women are underrepresented as reviewers and members of journal editorial boards.[13-16] Even in pediatrics, where in 2015-2016 women represented a majority of hospital trainees (71.1%) and allopathic faculty (55.3%),[1,2] women were underrepresented as reviewers and journal editors.[3,16] In fact, none of the 3 major American pediatric journals (*Pediatrics, JAMA Pediatrics, The Journal of Pediatrics*) has ever had a female editor-in-chief.

After attending *The Journal of Pediatrics* board meeting in which a presentation on implicit bias was given, 2 of the authors requested access to *The Journal's* databases to determine if implicit bias were present in the peer review process. Implicit or unconscious bias refers to:

> [T]he attitudes or stereotypes that affect our understanding, actions, and decisions in an unconscious manner. These biases, which encompass both favorable and unfavorable assessments, are activated involuntarily and without an individual's awareness or intentional control (references omitted).[17p16]

Implicit bias has been shown to be pervasive in many areas of life.[18] The goal of this study was to examine whether the gender of corresponding authors, reviewers, and editors led to differential publication invitations, recommendations, and outcomes for original research articles and invited editorials submitted to *The Journal of Pediatrics.*

AAMC Association of American Medical Colleges

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Methods

We sought to analyze the role of gender in the review and publishing processes for original research articles and editorials submitted to *The Journal of Pediatrics* during 2015 and 2016. We were provided unrestricted access to *The Journal of Pediatrics* data spreadsheets of editors (editor name, manuscript number, article title, corresponding author name, and final disposition) and reviewers (date reviewer invited, reviewer name, whether reviewer did or did not complete the review, reviewer recommendation, article title, corresponding author, and corresponding author country). We requested and received additional data regarding editor dispositions from late 2014 and early 2017 to include all original research manuscripts that had their primary peer review or editor desk rejection during 2015 and 2016. We merged all the information associated with each manuscript into a single database, which allowed us to determine the timeline of article review for each article submitted. We separately analyzed all invited editorials accepted in 2015 and 2016.

The Journal of Pediatrics review process begins with assignment of a manuscript to an editor. The editor can either desk reject or select and invite multiple reviewers. After reviewers submit their recommendations, the editor decides whether to make a final decision to accept, reject, or return the manuscript to the authors for revisions. Manuscripts sent for revision are usually sent back to some or all of the same reviewers until the editor makes a final decision. Manuscripts with favorable decisions are discussed at an editorial meeting, at which the decision to accept for publication is affirmed and a decision is made whether to invite an editorial. Editorials can serve to highlight an article and/or to provide additional context. Editorials may focus on more than 1 related manuscript published in the same issue of *The Journal*.

An outline of the internal review, peer review process, and editorial invitation process is detailed in **Figure 1**.

Peer Reviewers

Reviewer selection is a complex process. Authors can recommend reviewers, some of whom may be invited. Editors select reviewers from the author's suggestions and based on their own familiarity with the field. When additional reviewers are needed, reviewers may be identified in *The Journal*'s database and invited by *The Journal* staff such that editors do not have full control of reviewer selection. We received 2 separate reviewer datasheets. The first was an undated list of all invited reviewers associated with a manuscript title. The second list included the names of those reviewers who accepted the invitation and completed the review with the manuscript title, date of the invitation, and their recommendation. Reviewer recommendations were categorized as accept as is, accept with revisions, and reject—no potential for acceptance. We identified all unique primary reviewers, defined as individual reviewers who were invited and accepted the invitation within 2 weeks of editor assignment. Primary reviewer decisions of accept as is and accept with revisions were combined owing to the scarcity of an accept as is from a primary review, resulting in a binary outcome of either accept or reject. We elected to analyze only the primary round of reviews to eliminate the bias caused by multiple reviews of the same manuscript by the same reviewers; virtually all accepted manuscripts undergo more than 1 round of reviews and most rejected manuscripts undergo only 1 round of review. A recommendation to accept by primary reviewers does not indicate the ultimate outcome of the manuscript, but merely that individual reviewer's recommendation. Reviewers are also asked to rank priority of manuscript for publication, but this was neither included in the datasheets nor analyzed.

Editors

We made note if the editor assignment was to the editor-in-chief and/or associate editors, whom we refer to as journal editors, or members of the editorial board, whom we refer to as guest editors (and who were responsible for fewer manuscripts). Two journal editors served as both associate and guest editors during the time period. We elected to classify all of their assigned manuscripts as having been reviewed by a journal editor. If an editor rejected a manuscript without sending it out for review, we labeled this as an editor desk reject. All other manuscripts are sent out for peer review.

Gender

We rigorously determined the gender of the corresponding authors, reviewers, and editors through inspection of name by human or computer algorithm, with additional confirmation by searching academic profiles and online accounts (such as Research Gate, Doximity, and institutional websites), if necessary. We created a conservative gender-identifying program with MATLAB (R2017a, MathWorks Inc, Natick, Massachusetts) for large-scale sorting and collating that completed the first screen of the names. The goal of the program was to identify the names most commonly associated with a gender. We elected to create our own program rather than to use commercially available products so that we could have more precise control over the specificity of the labeling. Using US census data, we incorporated the top 200 names for each gender from 1940 to 2000. The program labeled any name that appeared on both female and male lists as unisex. We followed a similar process using available data from countries in Europe, Australia, the Middle East, and Central and South America. In addition, we used common web curations of unisex names to minimize type I errors. The program had 4 options and would label each name as male, female, unisex, or unknown. We verified the accuracy of the program by running several thousand author names already identified by an author and found an error rate of less than 1%. The gender of those with unisex and unknown names were determined by human inspection using the Internet. We searched for biographies and pictures on the web as well as descriptions of the individuals and pronouns used to describe them.

One shortcoming of the MATLAB program was that we could not find reliable census data for many Asian countries. As such, all gender determinations were done by human inspection using the Internet. For Asian names that were not

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