



Ⓜ Slow Progress toward Gender Equality in Critical Care Medicine

In this issue of the *Journal* (pp. 840–847), Vranas and colleagues examine gender differences in authorship of critical care literature (1). They describe several findings of gender disparity in authorship, including low rates of first and senior authorship, a tendency toward publication in lower-impact journals than those in which male authors are published, and slow growth in female authorship over the last decade (1). These findings add to a growing list of examples of the persistence of gender disparity not only in critical care medicine but also in academic medicine as a whole (2, 3). The authors acknowledge several limitations, including potential confounding by journal and search term selection, gender misclassification, author bias, and lack of a denominator of female academic intensivists worldwide. Although recognizing these limitations, Vranas and colleagues report findings that echo trends reported across a multitude of medical specialties (4–9).

The underrepresentation of female authors in academic medicine is of significant concern, given the importance of publication in both the growth of academic careers and furthering the science of medicine. This phenomenon has been described as “both a reflection and a cause of women’s under-representation and disadvantage in other areas of the scientific enterprise” (10), leading to a “vicious circle” of reduced research funding and publication rates (3). It is important to continue to investigate this trend, not only to avoid losing sight of this issue but also to help us get to the root cause and ultimately develop strategies to improve the presence of women in academic publishing. Vranas and colleagues keep this issue at the forefront with their present study while also being the first, to our knowledge, to describe this phenomenon in our own discipline.

The authorship gender disparity in critical care literature may in part be explained by the continued male predominance of the specialty. Although the gender gap in medical school admissions and matriculations closed in the last two decades, many specialties remain predominantly male (11). A 2018 study found that only 37% of members of critical care professional societies were women. In addition, despite comprising about one-third of the critical care workforce internationally, women remain underrepresented in leadership positions, including society presidents, board and council members, and symposia chairs (12). Other reports have noted that although in some regions women may actually represent closer to 50% of practicing intensivists, they continue to be less likely to chair committees, serve on editorial and guideline boards, or hold academic leadership positions (13, 14). Authorship disparity not only correlates with but also may partially explain the paucity of women among academic leaders. Individuals in leadership positions often have strong research funding histories (4–7, 9). Fewer publications

among women may in turn lead to lower rates of promotion and less likelihood of successfully securing funding, thus reducing advancement into leadership roles and again highlighting the vicious cycle associated with reduced publication and academic productivity (3).

Although not specifically addressed in the report by Vranas and colleagues, studies of gender authorship disparity in other medical specialties have noted additional concerning trends. For example, orthopedic surgery literature has reported that although female authorship has increased substantially over the last several decades, women still publish fewer papers per author than their male counterparts do (15), and female authors were less likely than male authors to continue to publish 5 years after their original publication (15). These findings raise concern for reduced academic productivity and lower rates of retention in academic medicine among female researchers. It is yet to be seen whether this trend exists in academic intensive care medicine.

Although the gender authorship disparity may be improving, Vranas and colleagues found slow rates of increase in overall, first, and senior female authorship (1) from 2008 to 2018. This finding has been echoed in other medical and surgical specialties and correlates with slow rates of growth of women in academic leadership positions (2, 4, 6, 10, 16). Given the close relationship between publication and academic advancement, these trends are likely to remain closely linked. To advance women in leadership roles and academia in general, it is crucial to increase female contributions to the body of scientific literature.

The findings of this and other studies of female authorship disparity should not be viewed solely in a negative light. Although the rates of growth are slow in our specialty and many others, female authorship is growing, and the gender gap is narrowing. Recognizing a disparity is the first step toward devising strategies to improve it. Many studies, including the one presented by Vranas and colleagues, have delved further into the data to identify trends that may help craft a solution to increase female representation in academic authorship and leadership. This study and several others observed higher rates of female first authorship when a senior author is also female (5). These findings highlight the importance of strong female mentorship in the recruitment, promotion, and retention of young women in academic medicine (2, 10). Further studies are needed to determine the best strategies to promote successful female mentor–mentee relationships.

In addition to identifying the need for strong mentorship, studies of gender publication trends have observed that male authors tend to use positive language more frequently than female authors in publications describing their research (17). This difference in rates of positive language use were greatest in higher-impact journals, and positive language correlated with increased citation of publications (17). These findings suggest that training female academicians to present their research using more affirmative language could result in higher rates of publication in increasingly prestigious journals and greater acknowledgment of their work via citations in other publications. Ongoing studies such as the one presented in this

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issue of the *Journal* are crucial to provide data to guide individuals, leaders, and professional society working groups when they face the seemingly daunting task of determining how to increase female mentorship, leadership, and success in the world of academic medicine. ■

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Identifying the Patient at Risk for Acute Kidney Injury: Pediatric Sepsis Biomarker Risk Model Study

Acute kidney injury (AKI) contributes to adverse outcomes in hospitalized patients across the lifespan, including increased morbidity and mortality, prolonged hospital stays, and higher risk of developing chronic kidney disease (1–4). Identification of patients at risk for the development of AKI would enable closer evaluation of kidney function and implementation of strategies to ideally prevent the development of AKI before onset or lessen its duration and severity. There have been several prior attempts to develop reliable strategies for AKI prediction, including the use of known kidney injury biomarkers (5, 6), attempts at novel candidate

biomarker discovery (7), and the renal angina index (RAI) (8, 9). In published reports, the 3-day time point for the development of AKI is chosen because of the poor patient outcomes associated with severe AKI occurring 48 hours after ICU admission and as a point to signify clinically significant AKI. Identification of patients at risk for AKI on Day 0 of illness allows implementation of standardized care bundles promoting renal protection in high-risk patients, which has been shown to reduce AKI severity and associated morbidity (10, 11).

Risk factors for the development of AKI differ depending on patient age, making risk stratification difficult. In neonates, risk factors for developing AKI vary on the basis of gestational age at birth: medication exposures in infants at <28 weeks of gestation and outborn delivery and need for resuscitation in infants from 28 weeks to term gestation (12). Currently, there are no predictive tools for risk stratification of neonates with a high probability

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