

# Scholarly Productivity in Clinical Pharmacology Amid Pandemic-Related Workforce Disruptions: Are Men and Women Affected Equally?

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From unequal access to fundamental services, such as health care and broadband internet to the disproportionate burden for child-rearing, the recent severe acute respiratory syndrome-coronavirus 2 (SARS-CoV-2) pandemic has brought much needed attention to the disparities faced by individuals from various sociodemographic groups.<sup>1-3</sup> Encouragingly, the spotlight on disparities driven by coronavirus disease 2019 (COVID-19), and amplified through social justice protests across much of the world, has moved organizations and companies to voice their support of diversity, equity, and inclusion (DEI). The American Society for Clinical Pharmacology and Therapeutics (ASCPT) has long recognized the wide array of disparities facing our members and has reaffirmed its commitment to ensuring equitable opportunities for involvement and engagement irrespective of gender, race, nationality, age, and career stage.<sup>4,5</sup>

Early in the pandemic, widespread shutdowns forced many researchers to temporarily vacate their offices, laboratories, and clinical research units to work from home while simultaneously attending to domestic responsibilities, including childcare and schooling. The family centered aspect of these disruptions prompted a number of commentaries theorizing that

a disproportionate burden would be felt by women in the workforce, exacerbating the problems noted above.<sup>2,3</sup> We feared that many hard-earned gains in this area could be set back by years as younger women navigated the balance of professional responsibilities with increasing household and childcare commitments.

At the outset of the pandemic (March and early April), journal staff noticed an uptick in requests for extensions to *Clinical Pharmacology and Therapeutics* (CPT) manuscript submission and review deadlines coming primarily from female authors and reviewers. Because CPT represents ASCPT's flagship journal, and a premiere journal in the field of Clinical Pharmacology, we set out to systematically understand the impact of the SARS-CoV-2 pandemic on the magnitude and timeliness of scientific submissions by female authors in the field. Data for all submissions to CPT between January 1 and December 31 were extracted for 2020 and the preceding 2 years (2018 and 2019) from the database supporting the online submission and review platform. Variables of interest included: type of submission, date of submission, corresponding author, corresponding institution, editorial decision, editorial decision date, and revision submission date(s). Acknowledging the inherent limitations of

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Received May 11, 2021; accepted July 1, 2021. doi:10.1002/cpt.2358

externally assigned binary gender classification, author gender/sex was determined via an exhaustive internet search, including institutional affiliations, professional organizations, publication databases, social media sites, and online biographical references. Two authors independently researched gender and missing or incongruent findings were recorded as indeterminate. Standard descriptive statistics were used to characterize the population. Comparisons of proportions between variables of interest (i.e., sex, geography, and sector) in any given timeframe was accomplished using a  $\chi^2$  test or z-test. Generalized linear models were used to explore the magnitude of differences in submission patterns. Linear and nonlinear regression was used to examine trends in submission patterns over time. Analysis of variance was used to characterize differences in revision times. All statistical analyses were performed in SPSS version 23 (IBM SPSS, Armonk, NY).

During the review period, there were 3,431 submissions, 2,214 original submissions, and 1,217 revisions. Gender could be determined for 3,340 corresponding authors (97.3%) with a distribution of 2,137 males (62.3%), 1,203 females (35.1%), and 91 indeterminate authors (2.7%). The majority of submissions were received from North America (1,556), followed by Europe (1,144), and the Asia-Pacific (648). The temporal distribution of submissions over the last 3 years is detailed in **Figure 1**. A significant spike in submissions was observed in April of 2020, which retained statistical significance through June ( $P < 0.05$ ). Although present for women, the spike in submission was delayed by 1 month as compared to men, with May representing the first month where a significant increase in submissions was observed.

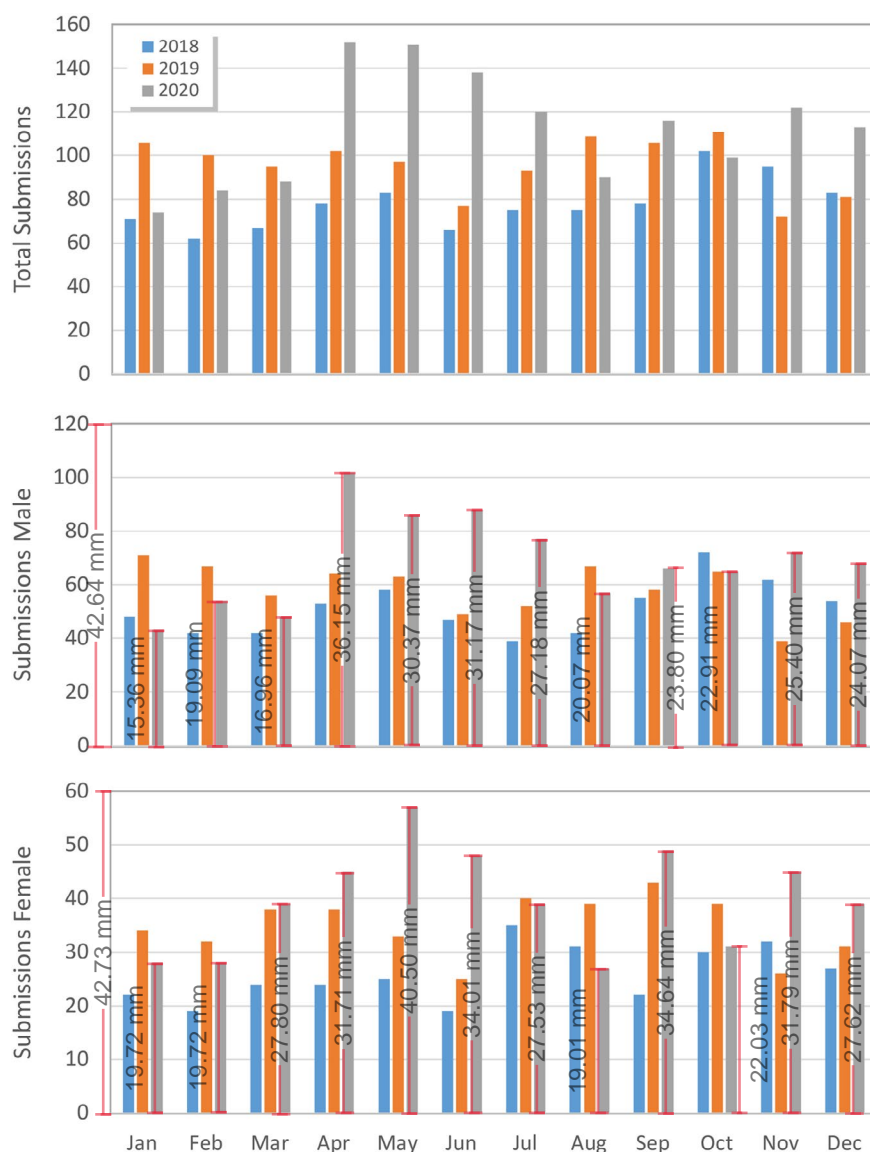
Longitudinal trends in the ratio of male-to-female authors, along with the quarterly rolling average is depicted in **Figure 2**. During the first 2 years of the evaluation timeframe, female authors appeared to be closing the gender disparity gap with a significant decline in the male:female ratio from  $> 2$  to 1.5 (slope [95% CI]:  $-0.029 [-0.051, -0.008]$ ). During the pandemic, this gap was observed to widen again with a steady increase in the ratio of male:female submissions. However, the inflection point appeared to occur in the fourth quarter of 2019, effectively predating the pandemic, a trend that would not have been detected if we had restricted our evaluation to 2020. Had we not tracked submissions continuously over the past 3 years, we could have

erroneously concluded that female submissions were dropping during the pandemic when, in fact, this trend began at the end of 2019.

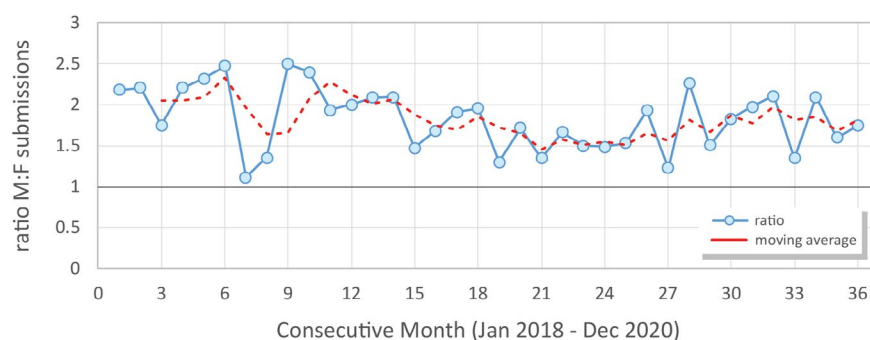
Examining the time required to prepare and submit a revision revealed no differences across the evaluation period between men and women ( $P = 0.440$ ) and only intermittent differences by quarter, none of which took place in 2020. Similar findings were observed when the time required to prepare and submit a revision were evaluated by major geographic region ( $P = 0.266$ ) and workforce sector ( $P = 0.458$ ). However, it did take significantly longer, on average, to prepare and submit revisions in the first quarter of 2020 than it did in any other quarter (31.8 vs. 18.3 days,  $P < 0.001$ ).

The global roll out of restrictions and lockdowns was accompanied by daycare and school closures, forcing families to identify alternative childcare options and develop new routines that included supporting the educational needs of school-age children transitioning to virtual learning. With the observation that the spike in CPT submissions was observed earlier for men than for women, it is possible that within the author base, this responsibility fell primarily to women. It is also possible that women assumed greater responsibility in caring for family members who became ill. Alternatively, this may reflect a difference in the balance of professional workplace responsibilities held between men and women in the field of clinical pharmacology.

Slightly more concerning was the reversal in course of the male-to-female authorship ratio beginning at the outset of 2020. Additional post hoc analyses revealed that female authors were less likely to receive a determination of accept, or accept with minor revisions in 2020 as compared with the prior 2 years ( $P = 0.059$ ). We do not, as of yet, have an explanation for either of these findings but believe that ASCPT should systematically analyze demographic metrics across all of the Society's journals to preemptively mitigate editorial decision bias. This will require implementation of a demographic data collection strategy to limit the cumbersome manual approaches used in our analysis. That said, we recognize a reluctance among certain subgroups to share these data, predisposing the risk of skewed assessments as to where the journals actually stand. We also acknowledge that data collection, in isolation, is not the only (or even best) way to ensure that ASCPT is upholding its commitment to DEI. However, it offers one strategy by which to evaluate, and take accountability for, our performance.



**Figure 1** Total manuscript submission by month received in 2018, 2019, and 2020 across all authors (upper) men (middle, and women (lower).



**Figure 2** The ratio of male to female (M:F) corresponding authors over the 3-year evaluation period along with the quarterly rolling average.

DEI efforts within the Society's family of journals extends beyond gender in our author base. Editorial teams, guest editors, review

boards, and ad hoc reviewers should reflect the full spectrum of diversity in race, sexual orientation, gender identity, disability status, age, and

religion. The science presented in the journals should also reflect research in diverse patient populations and call attention to issues of systemic racism that may impact the findings and style guides should reflect current best practices for the presentation of racial, ethnic, and gender/sex-based terms. These same principles should and will guide ASCPT in other aspects of the society: scientific sessions and speakers, panelists and topics discussed, leadership and member volunteers. Over the coming years, we plan to turn statements of commitment into action and welcome the membership's support, criticisms, and guidance.

#### FUNDING

Funded, in part, by the Marion Merrell Dow/Missouri Chair in Pediatric Clinical Pharmacology held by Dr. Abdel-Rahman.

#### CONFLICT OF INTEREST

A.B.G. and S.J.S. are employees of ASCPT, the organization that owns *Clinical Pharmacology and Therapeutics*. S.M.A.R. is a member of ASCPT

and was president of the Society at the time of writing.

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