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**Editorial**

# How many manuscripts should I peer review per year?

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Pharmacy Practice 2018 peer reviewers.
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**Abstract:**
Peer review provides the foundation for the scholarly publishing system. The conventional peer review system consists of using authors of articles as reviewers for other colleagues' manuscripts in a collaborative-basis system. However, authors complain about a theoretical overwhelming number of invitations to peer review. It seems that authors feel that they are invited to review many more manuscripts than they should when taking into account their participation in the scholarly publishing system. The high number of scientific journals and the existence of predatory journals were reported as potential causes of this excessive number of reviews required. In this editorial, we demonstrate that the number of reviewers required to publish a given number of articles depends exclusively on the journals' rejection rate and the number of reviewers intended per manuscript. Several initiatives to overcome the peer review crises are suggested.

**Keywords:**
Peer Review, Research; Open Access Publishing; Periodicals as Topic



Peer review provides the foundation for the scholarly publishing system. Despite the pessimistic conclusion in Jefferson *et al*.'s abstract – "At present, little empirical evidence is available to support the use of editorial peer review as a mechanism to ensure quality of biomedical research" –, the two studies included in their systematic review, which aimed to assess "the effects of peer review on study report quality," clearly demonstrate the positive effects of peer review on the methodological quality and the value of the articles reviewed.[1-3]

Alternative methods for peer review have been studied, even utilizing randomized controlled trial designs, but testing their impact on the quality of the articles in a real-life environment "would be costly, time-consuming and sometimes not feasible".[4] At the end of the day, the conventional peer review system was reported to be one of the most efficient systems in Kovanis et al.'s analysis.[4] In fact, an experience of post-publication review already exists and has exposed the risks associated with the system: Social media is a perfect example of a non-reviewed publishing system, which incontrovertibly has led to a high prevalence of fake news. Facebook's adoption of fact-checking programs – nothing more than a post-publication review system – demonstrated the limitations of any post-publication peer review.[5] This is a lesson we should learn before introducing post-publication review as a common practice in scientific publishing in substitution of traditional pre-publication peer review.[6,7]

So, if peer review seems to be a good system to improve article quality, why is the system permanently under criticism? Let's be honest: We are in a rush to publish our papers. Sometimes because they are part of a master's or doctoral dissertation, other times because we need to add a line to our CVs. Scientific articles live forever and should not follow the popular saying concerning newspapers: "Today's News, Tomorrow's Fish Wrap".

When authors complain about publication delay and the tardiness of the peer review process, we would rather provide figures, as we usually do in science. Many studies evaluated the publication process times in different biomedical areas and geographic regions, reporting acceptance lag (i.e., time from submission date to acceptance date) of usually over 100 days.[8-14] Pharmacy Practice reported a first response time after peer review comments of 92 days (SE=5.7) in 2018.[15] We are happy to announce that Pharmacy Practice first response time for original research articles accepted decreased to 80 days (SE=3.8) in 2019, with an acceptance lag of 124 days (SE=5.0).

As editors of a scientific journal, we have to ask authors who complain about the long publication process times: Do you think we intentionally extend the article's processing time? Don't you think that we would prefer to quickly make a decision as to whether to accept or reject the hundreds/thousands of articles we receive? To accept an article, the editor of a peer reviewed journal needs a number of peer reviewer comments supporting the quality of the manuscript. However, to reject a paper, two options exist: 'desk rejection' or rejection supported by peer reviewers' comments. A desk rejection is the negative decision made exclusively by the editor or the editorial board prior to any external peer review process. Considering the principles of a peer reviewed journal, desk rejection should only apply when the manuscript received is outside of the scope of the journal or the study suffers from methodological flaws beyond any possible repair. Although commonly used, desk rejection subverts the concept of a peer review system.[16]

Interestingly, authors also complain about the excessive number of manuscripts they are invited to review. Some of

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them write ironic commentaries about why they decline invitations to review based on personal events.[17] Pharmacy Practice has started an in-depth analysis of its peer review selection process, with the aim of identifying differential characteristics of the accepters and decliners. Apart from the "I'm buried in reviews" argument and individuals who simply do not respond to the invitation email, other explanations for declining to serve as peer reviewers were as follows:

- I'm at the end of the semester
- I'm about to go on vacation
- I'm on vacation
- I've just returned from vacation
- I'm at the beginning of the semester

So, if in the six-month period of a semester we exclude these four or five month vacation-related periods, not a lot of availability to review remains, especially if we add leaves of absence, sabbaticals, and conference abroad attendance justifications.

As scientists, and before killing the traditional (a.k.a. conventional) peer review system, let us make some calculations to explore what should be the real burden of the system for authors invited to review other's manuscripts. This is to say, let us calculate the number of reviewers required per article published, using the conventional peer review system (following Kovanis *et al.*'s terminology), and considering that a manuscript, if rejected, is submitted to a different journal with the same rejection rate. The first journal received A articles and assigned R reviewers to each article, resulting in A*R total reviewers assigned. With a T rejection rate, that first journal will publish A*(1-T) articles. The remaining A*T articles will be submitted to a second journal that will assign the R reviewers to each article, resulting in a total of R*A*T reviewers, publishing (A*T)*(1-T) articles and rejecting A*T*T articles that will be submitted to a third journal. So, the total number of reviewers assigned to the initial A articles after a series of N journals will be:

$$total\_reviewers = (R * A) + (R * A * T) + (R * A * T * T) + \cdots + (R * A * T^N)$$

$$total\_reviewers = \sum_{1}^{N} R * A * (T)^{N-1}$$

And the number of articles published will be:

$$published = A * (1 - T) + A * T * (1 - T) + A * T * T * (1 - T) + \cdots + A * T^{N-1} * (1 - T)$$

$$published = \sum_{1}^{N} A * T^{N-1} * (1 - T)$$

So, the total number of required peer reviewers per published article will be:

$$reviewers\_per\_article\_published = \frac{R * A * \sum_1^N T^{N-1}}{A * (1 - T) * \sum_1^N T^{N-1}}$$

$$reviewers\_per\_article\_published = \frac{R}{(1 - T)}$$

In fact, the number of reviewers per article published depends only on two variables: the number of peer reviewers assigned per manuscript and the journal's rejection rate. The latter is expected to have an inverse (negative) correlation with the "climbing upwards" number of existing journals alleged by Rohn.[17] Thus, with a commonly used number of three reviewers assigned to each manuscript received, a journal with an 80% rejection rate will need 15 reviewers to complete the task in order to publish one article.[18] Figure 1 provides the shape of the series with two to five reviewers assigned per manuscript received.

In plain language, to keep the scholarly peer reviewing publishing wheel spinning, the authors of each article published in a journal with an 80% rejection rate should review 15 manuscripts; and if the same research team published five articles in a given year, they should have reviewed 75 manuscripts. Considering an average of five authors per article, each author, in theory, should have to review three manuscripts per every article that they publish. This does not seem to be an unreasonable number of manuscripts to review.

So, what makes authors perceive that they are overwhelmed with the number of invitations they receive to act as peer reviewers? The answer is quite obvious: to maintain the quality of the peer review system and avoid the overwhelming

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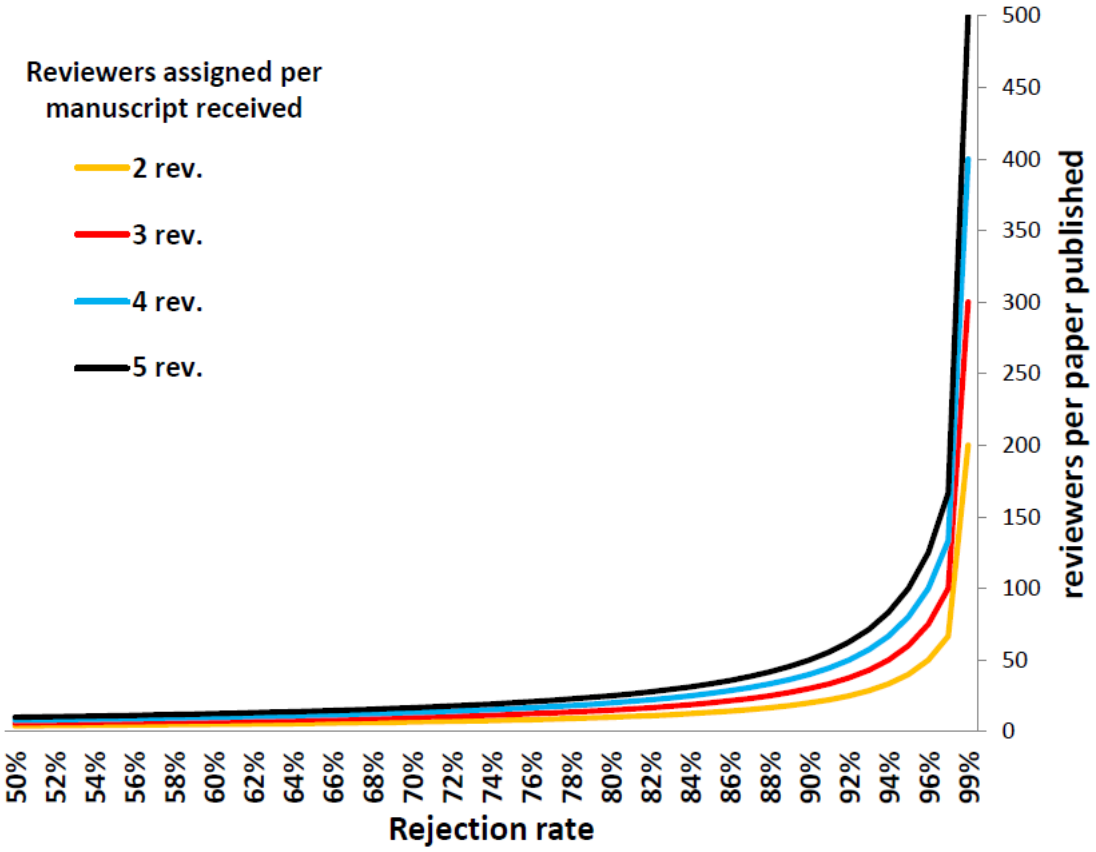


Figure 1. Total number of reviewers required per article published as a function of a journal's rejection rate. Colored lines represent the number of reviewers assigned per manuscript received.

feeling, every author has to serve as a peer reviewer. When one author declines an invitation to review, another author will be invited, and so on. Reviewing three manuscripts per article published is not a hard job, but reviewing 15 manuscripts per article published, which could result in 75 reviews a year if you publish five articles, may be overwhelming. However, this is not a system problem, but a neglect of duty from the other four co-authors who should be sharing the task.

In 2019, Pharmacy Practice sent out 891 invitations to act as a peer reviewer, with 36 returned as undeliverable emails. From the remaining 855 invitations, 13 (1.5%) colleagues declared that the topic of the manuscript was outside of their expertise, 4 (0.5%) declared that they had a conflict of interest, 209 (24.4%) declined because they were busy, and 411 (48.1%) ignored the invitation altogether and did not reply to the email. Additionally, 7 individuals who had accepted the review never completed the task (12 reviews were 'in progress' at the time this editorial was written).

Can we solve this peer review crisis? Yes, we can. Before killing the system, we can try some of the many possible solutions. First and foremost, conducting an educational effort to raise awareness among authors of scientific articles that all should act as peer reviewers, not only the lead or the corresponding authors. Then, a practicality that some journals are implementing, email addresses of all the authors should be available. At the end of the day, per authorship requirements, all authors are responsible for the entire content of the article published. A second potential solution is to compensate reviewers for their time. The job of peer reviewers was traditionally associated with generosity and collegiality, or even just as a moral obligation. Compensating the review effort is still an unsolved issue.[17,19] Third, we should accept that peer reviewers, when they perform a good review, contributed to the final version of the article more so than many of the individuals listed in the 'acknowledgements' section. Unfortunately, journals, indexers, academic institutions and funding bodies are not considering these contributions as curricular merits. Three years ago, Pharmacy Practice started a new practice of including all peer reviewers of the past year as part of collective author in the first editorial of the new year. Thus, their names are searchable in PubMed using the [IR] field descriptor.[15,20] Finally, a more complete and fair method of recognizing the contribution of a reviewer to the final version of the article, would be to list them in the article, which would require open peer reviews. Journals and indexers can organize systems to provide public recognition to open reviewers, but more educational efforts are required to change the mind of those defending the old-fashioned blind and double blind peer review processes.[21,22] More drastic solutions may exist, but hopefully they will not be necessary.

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Peer reviewed journals need peer reviewers, but authors also need peer reviewers to publish their articles. At the end of the day, authors and peer reviewers are the same people.

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**Pharmacy Practice 2018 peer reviewers**

Three reviews:

Margarida Castel-Branco, University of Coimbra, Portugal

Filipa A. Costa, ISCSEM, Portugal

Derek Stewart, Qatar University, Qatar

Two reviews:

Maria Cordina, University of Malta, Malta

Jack Collins, University of Sydney, Australia

Paul Dillon, Royal College of Surgeons, Ireland, Ireland

Sofia Kälvemark Sporrong, University of Copenhagen, Denmark

Damian Świeczkowski, Medical University of Gdansk, Poland

Van D. Tran, RUDN University, Russia

One review:

Qalab Abbas, Aga Khan University Hospital, Pakistan
Ali A. Al-Jumaili, University of Iowa, United States
Abdelmajid H. Alnatsheh, Parkview Regional Medical Center, United States
Moawia Altabakha, Ajman University, United Arab Emirates
Wasem Alsabbagh, University of Waterloo, Canada
Chioma Amadi, City University of New York, United States
Johanna Aponte-González, Colombia National University, Colombia
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