Burdens without blessings: Peer reviewers get no respect

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Peer review pressure.

Central Message

Peer review is the only accepted method of research validation. The peer review process benefits authors and readers but offers less benefit to peer reviewers. Criticism of the process is common.

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Some 350 years ago, the editor of the *Philosophical Transactions of the Royal Society* solicited opinions about potential journal articles from knowledgeable peers.[1] Arguably, this was the beginnings of the peer review process. Since then, the peer review process has evolved to a universally accepted means of validating published scientific studies. The notion that peers can assess the worth of articles submitted to journals for publication gained enormous traction in the mid-20th century, especially after World War II. Before World War II, peer review was largely confined to learned societies, such as the Royal Society of England. With the expansion of scientific research after World War II, especially stimulated by the US National Institutes of Health, peer review became a dominant part of evaluation of scholarly research publication. Peer review exchanged the dominant position of journal editors for a different type of journal article validation that valued recommendations by peers of journal authors.

There are many perspectives on peer review. To authors, the peer review process presents a challenge that creates hurdles and is viewed as a necessary annoyance that can, in some cases, strengthen an article before publication. To journal editors, the peer review process is necessary to provide journal content that will be accepted and valued by readers. To peer reviewers, the job of critically evaluating articles submitted for publication is a burden with little tangible reward, except for indirect learning about fields of interest.

WHO SHOULD DO PEER REVIEW?

Who should do peer review? In many ways, this question verges on an oxymoron. Peers should do peer reviews. The article by Nason and coauthors[2] in this issue of the *Journal* presents a guide for peer reviewers. In their article, Nason and coauthors[2] list the components of a good scientific article. In reading their manuscript, I thought not only that this is something that peer reviewers should read but also that it is a great resource for potential authors. This points out an important fact that gets lost in the mix. Reviews are performed by peers. An important logical implication of the definition of peers is that reviewers of medical articles are also authors of medical articles. To be a true peer reviewer, one should also be an author. My experience during the last 35 years is that the best peer reviewers are also the best authors. Arguably the most valuable thing that a peer reviewer gets from doing journal article assessments is learning how to construct their own articles to include all the elements that peer reviewers are looking for in a scientific article. To be a true peer reviewer, one must also be an author.

It is an important critique of the peer review process that the peer review burden is not evenly distributed among all authors and peer reviewers (Table 1). Some but not all scientists who are active in publishing tend to be the least responsive to requests to review.[3,4] This hurts the scientific community in many ways. If certain peers refuse to do peer review, this puts an unfair load on those peers who do agree to review articles. Several authors have pointed out that refusal to do peer reviews makes it much more difficult to obtain reviews by true peers with appropriate expertise.[3,4] Overall, journal quality suffers as a result.

CRITIQUES OF THE PEER REVIEW PROCESS

There is no lack of criticism of the peer review process (Table 1). Much of the criticism of the peer review process revolves around misbehavior of peer reviewers.[5] There are isolated incidents of reviewer misconduct, including plagiarism.[6] There is inevitable bias (both negative & positive) among peer reviewers. There are long delays in the review process stemming from reviewer delays.

An equally important critique of the peer review process is the lack of recognition that peer reviewers receive. Several authors have pleaded for some quantitative recognition of peer reviewers' efforts.[7,8] So far, none of these pleas

TABLE 1. Critiques of the peer review process

Critique	Reference
Reviewer bias	Manchikanti[5] 2015
Editors and reviewers unable to understand article content	Margalida[22] 2016
Key errors escape peer reviewers and editorial process	Margalida[22] 2016
Plagiarism, duplication, corruption, reviewer scientific misconduct	Dansinger[6] 2017; Fanelli[23] 2009
Many academics do not do their fair share of reviews	Petchey[4] 2014; Hochberg[3] 2009
Lack of recognition for peer reviewers (R-index may help)	Cantor[9] 2015

TABLE 2. Guidelines for reporting different types of research articles

Type of study	Reporting guidelines
Animal studies	ARRIVE
Prognostic marker studies	REMARK
Diagnostic markers	STARD
Meta-analysis of observational studies in medicine	MOOSE; Stroup et al. *JAMA*. 2000;283:2008-12.
Systematic reviews and meta-analysis of health care interventions	PRISMA; AMSTAR
Cohort and case-control studies	STROBE
Genetic association studies	STROBE Extension STREGA
Tumor marker studies	Simon RM, Paik S, Hayes DF. *J Natl Cancer Inst*. 2009;101:1446-52.
Studies with biologic specimens	BRISQ
Rodent model studies	Hollingshead MG. *J Natl Cancer Inst*. 2008;100:1500-10.
Microarray-based studies for clinical outcomes	Dupuy A, Simon RM. *J Natl Cancer Inst*. 2007;99:147-57.

ARRIVE, Animal Research: Reporting of In Vivo Experiments; *REMARK*, Reporting Recommendations for Tumour Marker Prognostic Studies; *STARD*, Standards for Reporting Diagnostic Accuracy; *PRISMA*, Preferred Reporting Items for Systematic Reviews and Meta-Analyses; *AMSTAR*, Assessing the Methodological Quality of Systematic Reviews; *STROBE*, Strengthening the Reporting of Observational Studies in Epidemiology; *STREGA*, Strengthening the Reporting of Genetic Association Studies, an Extension of STROBE.

has ushered in a change in the peer review process. One intriguing form of recognition for peer reviewers appeared in an article in the journal *Royal Society Open Science*.[9] The authors of this article proposed a metric for quantifying peer reviewer contributions, called the *R-index*. This metric requires that journals provide a yearly list of the number of papers reviewed by each peer reviewer. Each reviewer is rated according to the editors' assessment, the journal impact factor, and the article length as a surrogate for the time spent in the review process. The authors used a complex formula to derive the R-index from these variables and tested this index in a sample of more than 2 million manuscripts. They concluded that reviewers with a high R-index value "are our communities' unheralded pillars and the R-index will provide academic recognition for their contributions."[9] There has not been a ground swell of enthusiasm for the R-index, or any other metric of tangible performance recognition for peer reviewers. It seems unlikely that meaningful change in recognizing peer reviewer performance will occur in the near term.

A Cochrane Review attempted to measure the value of the peer review process in improving the quality of reports of biomedical studies.[10] The authors found few studies of reasonable quality that addressed the efficacy of editorial peer review, and most of these were concerned with the effects of blinding reviewers or authors to each other's identities. They could not identify any convincing evidence assessing the effects of peer review. They called for urgent major research on this topic, especially given the information revolution and the need for quality assurance of the peer review process.

IMPROVING THE PEER REVIEW PROCESS

Some authors have suggested that a modern disease of academic science consists of an enormous increase in the number of scientific publications without a corresponding advance of knowledge.[11] This somewhat dark view of scientific publication is offset by an explosion of information available to scientists that was never thought of as recently as 50 years ago. After all, the randomized, controlled trial was a vision of Archie Cochrane after World War II, not something steeped in centuries of tradition.[12] Now we have reporting guidelines for every type of publication (Table 2).[13] There is little doubt that an information expansion occurred along with computer access and the World Wide Web. Rather than suggesting that academic publications increased out of proportion to new knowledge, it is more correct to suggest that publications lagged behind information expansion and the last 50 years has been a catch-up period. There are some concrete examples of improvements in information dissemination. The quality of summaries of large amounts of information has improved significantly during the last several decades. The reporting and methodologic quality of systematic reviews and meta-analyses has improved measurably since PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) and AMSTAR (Assessing the Methodological Quality of Systematic Reviews) checklists appeared in the public domain (Table 2).[14-16] Reporting of randomized trial data has improved significantly since the revised Consolidated Standards for Reporting Trials (CONSORT) was published and went into effect.[17]

DOES TRANSPARENCY ALTER THE PEER REVIEW PROCESS?

There is conflicting evidence regarding the value of blinding the peer reviewer identity. A randomized trial