Three Decades of Peer Review Congresses

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Journal peer review is often time-consuming, arduous, and fraught with suspicion, not least because the identities of reviewers usually remain hidden from the authors. Despite these flaws, and the fundamental problem that the efficiency and effectiveness of peer review have yet to be measured satisfactorily, authors, editors, reviewers, and readers have become comfortable with it.1,2 Editors like anointing colleagues as experts, reviewers appreciate peer review because it tends to confirm their own impressions of themselves as experts, and no one has created a better system to vet the validity of scientific reports. Authors may complain but also may be grateful for expert appraisal and criticism and subsequent improvement in their manuscripts. They realize that their work has been taken seriously and recognize that the incorruption of authors when reporting science.7,8 Most importantly, in medicine, the clinical stakes are particularly high, so the pressure to get things right was intense. For example, the best evidence for effectiveness of health care treatments derives from the results of randomized clinical trials. As the methods for performing clinical trials have been refined over the past 70 years, the underlying expectations have been extended. Clinical trial registration at inception is now required by US law, and it is assumed from the start that the data and analysis behind each trial report will become part of a wider meta-analysis and made accessible for tests of reproducibility and other secondary analyses. Studies of all types, including trials and meta-analyses, have increased in volume and complexity, making the need to evaluate the quality of their reporting ever more important.

Moreover, the congresses took place during an era of explosive growth in the speed and volume of communication. The internet was developing rapidly during the 1980s, but in 1989, few who attended the first Peer Review Congress would have heard of internet service providers, email, and instant messaging. In 1993, 1% of 2-way information was carried by the internet, but by 2007, this had increased to more than 97%.9 The World Wide Web became publicly available in August 1991.10 These developments radically changed the mechanics of journal peer review and scientific publication. The processes sped up substantially, but the quality of peer review and publication actually have little to do with speed.11 In scientific publication, quality depends on the critical eyes and integrity of peer reviewers and editors, and that is difficult to reconcile with speed.

From 1989 to 2017
Having secured from the owner of JAMA, the American Medical Association, the crucial financial backing to allow us to proceed with the first Peer Review Congress, we had decided on a few simple rules. First, the object was to present
research into the processes of selection and refinement of scientific manuscripts. What it was emphatically not was an attempt to set up rules governing publication or to settle matters by consensus, or to dictate how scientists and journal editors should conduct themselves. Second, with few exceptions, the congress program would be determined by the abstracts submitted by researchers, with priority given to data-driven studies. Third, there would be no simultaneous breakout or parallel sessions. All attendees could hear every presentation and participate in every discussion. And fourth, the audience would be given equal time to debate the presentations. Participants who have responded to postmeeting surveys have resoundingly told us that this format is one of the keys to the success of the congresses.

The number of registrants has increased from fewer than 300 in 1989 to nearly 600 in 2017. When the congresses began, the world literature on scientific peer review and publication amounted to fewer than 5 articles a year. This rapidly changed and by 1999 was around 200 articles per year. The number of abstracts submitted to the Peer Review Congresses increased from 50 in 1989 to 260 in 2017. A striking change has been in the proportion of women at the congresses. In 1989, 24 papers were presented from the podium, with 3 (13%) by women. At the eighth congress, of the 50 plenary session presenters, 29 (58%) were women. In addition, 7 studies evaluated the role of gender bias in peer review conducted by journals and funders.

The 1989 congress included 3 influential presentations on the history of peer review. Several papers were given on specific aspects of the peer review process, such as blinded review and on the extent and importance of publication bias and research misconduct. Several important trials on blinding during peer review were presented at subsequent congresses. It was also noted at the time that there was a need for further studies on the registration of trials at inception to prevent bias in publications as well as on blinded peer review. This in part contributed to the adoption by the International Committee of Medical Journal Editors of the requirement that all clinical trials be registered prior to enrollment of the first patient.

After the first few congresses, there were fewer plenary session abstracts presented on peer review as a process, and by the sixth and seventh congresses in 2009 and 2013, there were no plenary abstracts on the actual process. Parallel developments that had led to the foundation of the Cochrane Collaboration had shown the considerable effects of bias on the published literature, and soon the papers presented at the Peer Review Congress were examining the nature of these biases and how they related to the peer review and publication processes. Many realized that how peer review was organized (eg, blinded or not, use of author-recommended reviewers or not) had become less important compared with the extraordinary distortions caused by biases. This understanding was confirmed by numerous studies that evaluated the causes and extent of bias in scientific publication, particularly, conflicts of interest, industry funding, and defective and often deceptive reporting. In addition, many studies examined the importance of transparency and accountability in authorship.

Problems

In 2017, researchers again found plenty to criticize. At earlier congresses, much evidence had been presented that financial conflicts of interest were a powerful reason so much industry-related research was demonstrably biased. Abstracts presented in the 2017 congress showed that these problems continue, and that biases undermine peer review by journals and funders. These biases are attributable to spin in the presentation of results; failure to publish final results; and gender, geographic, and author-prestige factors that distort the record across all sciences. Other researchers reported on specific problems with quality control of scientific images and nucleotide sequences. Several other studies documented the limited amount of data sharing actually taking place despite early experiences demonstrating demand for shared data and willingness to share.

Improvements

A major contribution of the congresses has been to get researchers to focus on where problems may exist and to identify and test solutions. For example, in 2017 an intervention study was presented that evaluated a common problem and potential improvement—the effect of the introduction of a simple but mandatory checklist into the editorial process for Nature journals publishing in the life sciences. The checklist included 4 methodologic criteria (randomization, blinding, sample size calculations, and exclusions) that if properly reported might reduce the risk of bias. In this before-and-after study, a substantial improvement in the reporting of these methodologic standards was seen in the participating journals. Another trial evaluated the effect of a mandatory 108-item checklist vs the standard editorial process for manuscripts submitted to PLOS One and found much less-favorable results. Discussants following presentation of these 2 complementary studies speculated that perhaps the shorter 4-item checklist was easier to implement and thus more successful. These multijournal initiatives provide a good model for future research into improvements in the publication process.

Other areas of inquiry into the state of improvements included assessments of early positive experiences with data sharing and the requirement for registration of randomized clinical trials and trial results and the effect of these requirements on complete and consistent reporting of results in trial protocols, registries, and publications. Some promises of improvement remain in limbo. For example, Zarin et al showed that of trials registered at ClinicalTrials.gov, 33% of completed trials and 57% of terminated trials had no corresponding published articles. Other studies evaluated trends in increased use of statistical review and appropriate reporting of statistical results. Also, in 2017, there was an encouraging burst of abstracts on the quality of peer review to assess grant applications and mechanisms to improve funder processes.
Innovations

While previous trials have compared the quality of various forms of peer review (double-blind, single-blind, and open), several 2017 studies evaluated new processes that offer authors, reviewers, and editors multiple options for choosing different forms of peer review across a range of scientific disciplines. These studies evaluated various rates of uptake and views of usefulness of different types of peer review across a range of scientific disciplines, multiple journals, and postpublication media. Several studies assessed the roles of preprints and new forms of postpublication metrics,\textsuperscript{20} online-only supplements,\textsuperscript{30} replacement of articles with pervasive errors,\textsuperscript{24} and online commenting,\textsuperscript{32} which continues to appear infrequently compared with the huge body of the world’s scientific literature.

What Is Next?

Although the eighth peer review congress saw improvements in the scope and diversity of research and participants, we were disappointed that we did not receive as many abstracts as expected on other important issues and threats to the scientific enterprise, such as reproducibility, fake peer review, and predatory journals. Research on these topics is important.

Peer review can be looked on as a test, and most tests are evaluated before they are used in practice with patients. However, as Moher\textsuperscript{33} lamented during his plenary address on their evolving forms. Peer review is counting on the continued existence, use, and need for assessment of peer review and publication in all their evolving forms.

ARTICLE INFORMATION

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REFERENCES


33. Moher D. Custodians of high-quality science: are editors and peer reviewers good enough? Presented at: Eighth International Congress on Peer Review and Scientific Publication; September 11, 2017, Chicago, IL.