



The preprint wars

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Received: 13 May 2017; Accepted: 26 May 2017; Published: 16 June 2017.

doi: [10.21037/amj.2017.05.23](https://doi.org/10.21037/amj.2017.05.23)

View this article at: <http://dx.doi.org/10.21037/amj.2017.05.23>

The age of preprints is upon us

Crossref provides a succinct and accurate definition for a preprint: “original content which is intended for formal publication, including content that has been submitted, but has not yet been accepted for publication” (1). Preprints thus represent a precursor version of a document (scientific paper, project report, or other) that has not yet been peer reviewed, but that may, if corrected and submitted to a scholarly journal for peer review, have a similar content to the final published version. That very same news alert by Crossref just over one year ago was a game changer in the world of preprints because it basically shattered the Ingelfinger Rule, which was established almost 50 years ago to prevent the submission, or publication, of duplicate papers within the biomedical and scientific literature (2). In fact, some biomedical ethics organizations like the ICMJE (International Committee of Medical Journal Editors) had already established, as part of their guidelines (3), that preprints would constitute an exception to the “duplicate submission” or “duplicate publication” rule, most likely because preprints, for example those at arXiv (4) or bioRxiv (5) carried a digital object identifier (DOI), which would distinguish different versions of that preprint, or even the initial preprint and the final published paper, with a different DOI, i.e., even if their content was similar, they had different identification numbers. In some cases, preprints represent the final version of a paper.

This DOI-related policy made preprints more attractive to academics and publishers, and also allowed several aspects to be more closely integrated, such as DOI and ORCID (Open Researcher and Contributor ID). Preprints would thus allow academics to publish a “first version” of their papers to the public, in open access (OA), and at no cost (in most cases at present), provided that initial

screening by an advisory board was approved. In cases such as bioRxiv, a direct transfer service from the preprint server to a journal has already been formally established with 101 journals, including traditional print and OA journals, including some major publishers like EMBO, PNAS, and PLOS. Both preprint advocates and publishers approving the initial publication of a preprint prior to submission to their journal see preprints as a form of additional screening by the wider public and peer pool prior to formal peer review, so in this sense, preprints represent a positive complement to traditional peer review (6). Unlike 5 or 10 years ago, there is now a real possibility that preprints may gain wider traction among biomedical scientists, as part of the regular publishing process, but as a pre-publication screen that functions independently of blind or anonymous peer review, offering them a greater ability to gain control of the process of scientific and scholarly quality control, which has traditionally remained in the hands of a limited number of exclusive *status quo* individuals. Finally, a study’s reproducibility may improve by increasing confidence in the content and findings of an early version of a paper (i.e., a preprint) by exposing it to greater scrutiny by more random individuals.

The preprint wars have begun

With increased investment, coordination and integration comes increased competition. This concept is no different in the evolving preprint market. Originally devised as a way to bring latest information to the public, freely, and openly, the original objectives have already started to become distorted, causing tensions and opening up preprints as the new frontier for publishing abuse, and possibly fraud. As more and more publishers (7) and journals (8) embrace

preprints, so too will those who see preprints as a way to cheat the system, abuse publishing protocol and ethics, also increase. For example, it was recently highlighted how false academic incentives such as the impact factor and other metrics may be gamed, in a pay-to-publish rewards scheme, as a way to compensate researchers for their efforts and publishing productivity, leading some to cheat by creating false identities, false email accounts or even false peer reports (9).

On 17 May, 2016, Elsevier bought the Social Science Research Network (SSRN) (10). On or near May 10, 2017, Elsevier launched its own preprint server, expanding SSRN to include biology, and launching its preprint server Biology Research Network (BioRN). At around the same date, a firestorm brewed on Twitter (11) and at least on one blog (12), with exchanges between defenders of classic preprint servers like arXiv or biorXiv, critics of Elsevier, William Gunn (Elsevier Director of Scholarly Communications), and proponents of new emerging preprints such as Brian Nosek, the Executive Director of the Center for Open Science, which has launched 10 new preprint servers (13). In fact, BioRN is not the only preprint launched by a publisher. MDPI launched its own preprint in May 2016 (14). Although PeerJ (15) also has a preprint server that functions along similar lines as bioRxiv, it is the F1000Research functionality that has garnered attention because it is now used by the Wellcome Trust (16) and soon to be used by the Gates Foundation (17) for their preprint servers that will be used exclusively by researchers funded by these organizations. SciELO, a massive OA cooperation representing research primarily from South American and Iberian countries, will also be launching a preprint server (18). bioRxiv has received generous funding from the Chan Zuckerberg Initiative (19). ASAPbio is a preprint lobbying group that has been actively advocating and promoting the use of preprints in the biomedical sciences, proposing the creation of a central server to integrate all preprint servers (20). These competing preprint servers, each now vying to secure the submission of preprints of academics to justify the preprint movement and their own preprint servers, suggests that an increasing number of publishers, institutes, funding agencies and other private or government entities may begin to develop and launch their own preprint servers in the not-too-distant future.

Preprints: quo vadis?

Although the concept of preprints is not new, and even

though the infrastructure for the submission of preprints is well established, including the transfer to journals for regular review simultaneously or after a certain period of time, the battle lines for control of the preprint market are already starting to be set, with publicly visible tensions already beginning to emerge between preprint competitors. Even though a central preprint service is being discussed, what remains to be seen is if publishers that are perceived as “predatory”, i.e., that do not hold high ethical or publishing standards, as well as unethical academics, will begin to abuse this new boom in preprints, creating thus a new crisis of trust. This is because the current preprint system may be easy to abuse, being in a highly experimental and thus volatile stage. As for other aspects of the publishing industry, even though good intentions are meant to benefit academics, ultimately, with this preprint tug-of-war, academics may in fact land up being, to some extent, victims (21).

Acknowledgements

Funding: None.

Footnote

Provenance and Peer Review: This article was commissioned by the editorial office, *AME Medical Journal*. The article did not undergo external peer review.

Conflicts of Interest: The author has completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/amj.2017.05.23>). The author has no conflicts of interest to declare.

Ethical Statement: The author is accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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doi: 10.21037/amj.2017.05.23

Cite this article as: Teixeira da Silva JA. The preprint wars. *AME Med J* 2017;2:74.