

Preprint publications: waste in haste or pragmatic progress?

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What are preprint publications?

The traditional route of publication in journals involves the cycle of submission, peer review and acceptance (followed by publication) or rejection.¹ Inevitably, the processes of peer review and copyediting following acceptance takes weeks to months.¹ Therefore, it takes considerable time for a completed research project to become available in the public domain. Preprints help to bypass this cumbersome cycle by directly making available study results when the authors post them on the preprint servers. While these studies might eventually be published in a peer-reviewed scientific journal, preprint publications enable the rapid sharing of information. Preprints are quite commonly used for disseminating research in areas such as physics and mathematics, however, they have recently garnered considerable attention in the field of biomedical publishing.² Preprints might be particularly relevant during public health emergencies such as the ongoing coronavirus disease 19 (COVID-19) pandemic. Preprints related to biomedicine might be posted on medrxiv.org or biorxiv.org, or on preprint servers handled by major scientific journals such as Scholarly Services Research Network (operated by the Elsevier group of journals) or Research Square.² Results of clinical trials available on clinical trial registries such as clinicaltrials.gov are also a form of preprints.³ In this paper, we discuss the pros and cons of preprint publications, critically evaluate the role of preprints during the COVID-19 pandemic, and suggest measures to be adopted to enable the best use of preprints in biomedical publishing.

Advantages of preprints

Preprints have advantages both for the field of science at large as well as for the authors posting them. The rapidity of sharing of scientific findings enables findings of major relevance to be immediately available for further evaluation

by peers as well as relevant policy-makers. Therefore, findings that are controversial or which challenge conventional thinking are rapidly disseminated, which otherwise might require considerable rounds of to-and-fro discussions with peer reviewers before they can be published. Posting preprints therefore, in a way, enables pre-publication peer review. This in turn assists the authors to critically evaluate their own studies before submitting them to a journal. Conversely, research that is not evidence based and which is unlikely to be publishable is also easily identifiable based on pre-publication comments. As most preprint servers attach timestamps to preprints, the primacy of an idea or observation can be easily established, even if it takes time for the idea to become published in a peer-reviewed journal.²

Disadvantages of preprints

Authors might be concerned that their ideas might be subjected to breaches of intellectual property rights if they are posted via preprints. The feature of timestamps on preprint publication generally helps to avoid this problem. Fatal mistakes in research methodology or in analysis might be identified if research is posted as a preprint and this might preclude publication. However, such mistakes would generally be picked up during the peer review. Therefore, such flawed studies are unlikely to be eventually published in peer-reviewed journals. Moreover, scientists have a chance to redo their experiments to avoid such errors before submitting such research for publication. Authors might perceive that preprint publication might preclude the publication of such papers eventually in scientific journals. However, nowadays many journals encourage preprint publication or posting in a preprint server either preceding journal submission or concomitant with journal publication. As an example, certain journals have an association with Research Square, which provides the option of automatically posting a preprint of the paper during or after submission to a peer-reviewed

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Box 1 Proposed best practices for preprint publications

1. Consider posting preprints to establish the primacy of an idea or to rapidly share novel findings.
2. Ensure the results are final before submitting a preprint.
3. Link the preprint to the eventual journal submission.
4. If eventually published in a peer-reviewed journal this should be indicated at the website where the preprint is located.
5. Undertake reasonable efforts to publish preprints as peer-reviewed journal articles.
6. Address major concerns raised during pre-publication peer review in the manuscript submitted to a journal.
7. Cite peer-reviewed journal publications rather than preprints.

journal. In this context, it is important to understand that if a manuscript is published in a peer-reviewed journal following preprint publication, the authors should add a link to the full paper along with the preprint. Furthermore, other authors should take care to check that a preprint has not been published elsewhere as a journal article before citing the preprint. In such instances, it is best to cite the final version published in a journal, as well as cross-check any data published in the preprint with that available in the journal article. At times, authors might wish to withdraw their preprint to perform additional analyses. Not all preprint servers allow this, and withdrawal or modification of preprints might be dated and stamped by the preprint server to enable continuity of the record.²


Preprints during the COVID-19 pandemic

The COVID-19 pandemic has brought into sharp focus the need to rapidly share information, particularly that which might be life-saving in nature. Preprint publications in biomedicine have undergone exponential growth since the onset of the pandemic at the beginning of 2020 when compared with the time period before this. This has also raised concerns regarding the possible spread of misinformation with preprints.^{4,5} Analyses of preprints posted during the pandemic have revealed interesting information of wider relevance to scientific publishing. A study analysed the proportion of preprints published as full articles. Of concern, only 5.7% of 5061 preprints related to COVID-19 had been published in peer-reviewed journals. Peer-reviewed publications were cited more than preprints. The numbers of citations received were

greater after full publication for those preprints which were eventually published.⁶ Another study compared 67 articles on COVID-19 identified to have been published as both preprints and journal articles. Only a third of papers had concordance between the results in the preprint and the peer-reviewed publication. The authors compared spin (i.e. distortion of facts from the observed results) and identified evidence of spin in 34% of articles in both the preprint and peer-reviewed publications, in 7% of preprints alone and in 3% of peer-reviewed publications alone.⁷ Thus, authors might exert more caution in findings expressed in peer-reviewed publications than in preprints, either inherently or due to peer review.

How to make the best use of preprints

Box 1 lists several points to consider before posting a paper as a preprint. Authors should critically analyse whether it is essential to post a preprint in the first place. If the research findings are completely novel or of considerable public health importance (such as the discovery of a new disease), then a preprint publication might be strongly considered to quickly share such a finding. Research validating previously known observations might not be of high priority for a preprint publication. Competition between such a preprint and the eventual peer-reviewed publication for citations might adversely affect the eventual citations of the research. The authors should also be clear that their data is final, since any further change in the results while submitting to a peer-reviewed publication might adversely affect its eventual publication in a journal. Similar considerations relate to ethical aspects of human or animal research, which should not be discordant between preprints and submissions to journals with respect to issues such as informed consent and research ethics committee approval.⁸ The authors should also undertake reasonable efforts to address major concerns regarding the scientific work raised during pre-publication peer review. During submission to a journal, the authors should clearly mention the preprint publication in the cover letter as well as provide a link to the same in the main manuscript. Authors should also link a preprint with the eventual publication in a peer-reviewed journal. It is also preferable to cite the final peer-reviewed publication rather than the preprint version.

To conclude, preprints represent important progress in the landscape of scientific publishing provided they are optimally utilised. Guidance from societies regulating scientific publishing should be generated and updated to recommend best practices for preprint publications. 

References

- 1 Misra DP, Ravindran V. Revisions, rejections and rebuttals: the show must go on! *J R Coll Physicians Edinb* 2020; 50: 362–4.
- 2 Advice from the Committee on Publication Ethics regarding preprint publications. https://publicationethics.org/files/u7140/COPE_Preprints_Mar18.pdf (accessed 01/11/21).
- 3 Gianola S, Jesus TS, Barger S et al. Characteristics of academic publications, preprints, and registered clinical trials on the COVID-19 pandemic. *PLoS One* 2020; 15: e0240123.
- 4 Gupta L, Gasparyan AY, Misra DP et al. Information and misinformation on COVID-19: a cross-sectional survey study. *J Korean Med Sci* 2020; 35: e256.
- 5 Gupta L, Gasparyan AY, Zimba O et al. Scholarly publishing and journal targeting in the time of the coronavirus disease 2019 (COVID-19) pandemic: a cross-sectional survey of rheumatologists and other specialists. *Rheumatol Int* 2020; 40: 2023–30.
- 6 Añazco D, Nicolalde B, Espinosa I et al. Publication rate and citation counts for preprints released during the COVID-19 pandemic: the good, the bad and the ugly. *Peer J* 2021; 9: e10927.
- 7 Bero L, Lawrence R, Leslie L et al. Cross-sectional study of preprints and final journal publications from COVID-19 studies: discrepancies in results reporting and spin in interpretation. *BMJ Open* 2021; 11: e051821.
- 8 Misra DP, Agarwal V. Integrity of clinical research conduct, reporting, publishing, and post-publication promotion in rheumatology. *Clin Rheumatol* 2020; 39: 1049–60.