

The problem with scientific publishing

And how to fix it



PERIODICAL journals have been the principal means of disseminating science since the 17th century. Over the intervening three-and-a-half centuries journals have established conventions for publication—such as insisting on independent (and usually anonymous) peer review of submissions—that are intended to preserve the integrity of the scientific process. But they have come under increasing attack in recent years. What is wrong with scientific publishing in journals, and how can it be fixed?

The problems stem from the fact that journal publication now plays a role that was not part of the original job description: as indicators of a researcher's prowess, and thus determinants of academic careers. The incentive to withhold results for months or years until research is published is therefore powerful. But such delays can do real harm: during the Zika crisis, sponsors of research had to persuade publishers to declare that scientists would not be penalised for releasing their findings early. Nor are elite journals (such as *Nature* and *Science*) the guardians of quality that they often claim to be.

The number of papers so flawed that they need to be retracted has risen sharply in the past two decades, with glitzier journals pulling more papers than lower-profile counterparts. Worse, studies in elite journals are no more statistically robust than those in lesser ones.

Three sensible reforms could change this system, ensuring that researchers' results are made public more quickly and without any compromise on quality. Step one is for scientists to put their academic papers, along with experimental data, in publicly accessible "repositories" before they are sent to a journal. That would allow other researchers to make use of the findings without delay. Step two is to improve the process of peer review. Journals currently administer a system of organising anonymous reviewers to pass judgment on new research. But this process is murky. Better that reviewers are named and that the reviews themselves are published. Last, science needs to stop relying so much on journal publication as the only recognised credential for researchers and the only path to career progression. Tools exist that report how often a preprint has been viewed or whether a clinical data set has been cited in guidelines for doctors. Universities and government agencies that pay for research should use them.

If these reforms are taken up, they could improve and accelerate science. More importantly, it would help health agencies respond more quickly to epidemics and speed the development of new treatments, for example. That could save lives. "Whereas there is nothing more necessary for promoting the improvement of Philosophical Matters, than the communication of such." So began the first issue of the world's first scientific journal, *Philosophical Transactions*, on March 6th, 1665. Those words remain true. Journal publication, however, is no longer the best way of achieving that aim.

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