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## Editorial

### Peer Review Journals in the Digital Age

#### Revistas con revisión externa (peer review) en la era digital

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It is hard to understate the effect that the Internet is having on scholarly publishing and on the delivery of medical and scientific information. Over the last fifteen years nearly every peer medical journal has gone online. Initially, that consisted mainly of establishing a Web site and posting the content of the print version for wide and easy access. In that early phase, many thought of Web sites as a way to expand readership and bring readers to the content as an added convenience or even as supplement to the print version. Today, traditional print subscribers consist largely of the older generation, and digital delivery has become the norm. The younger generation doesn't want it any other way, and the movement from print to digital continues in steady and inexorable fashion. That shift is having more effects that anyone could have foreseen on scholarly publishing, including on both the process and the goals of publishing and even on the rules and expectations of publishing.

Today, even for medical and scientific information, more searches begin with Google than with PubMed. Competition is keen for priority on Google's search results. Information providers have learned that if one's site does not come up on the first page of those search result, it may as well not exist. And in this game traditional journals have to compete with a wide array of information providers, from commercial medical sites to disease-specific sites to pharmaceutical or device company sites. In addition, the open Wiki sources of information that have emerged seemingly on their own have wide use, great utility, and a surprising degree of credibility, especially when one considers that few know or understand how these sites run or who is writing what. Still, the free and convenient Wiki sites have been successful enough to make long established encyclopedias and perhaps even some textbooks virtually irrelevant. More resources and more information have been made possible by the digital revolution, but more noise, competition, and chaos has been produced in this process. Even the simplest search yields more results than anyone can use or analyze. Users have learned to rely heavily on the name and the reputation of the site, and a trusted name attracts users. One consequence of this is to make entry into

the information marketplace more difficult and more expensive for newcomers.

With digital publication there are virtually no limits on space, although someone has to pay the costs for the Internet servers and for digital storage. Supplementary online-only information allows for much more detailed documentation of the methods and results. For many articles the amount supplementary information greatly exceeds what is in the article itself. At the larger medical journals every publication now includes the detailed financial disclosure statements online for every author. The mandatory registration of clinical trials, such as at ClinicalTrials.gov, has been strongly supported by medical editors. The creation of that repository would have been impossible before Internet access became established as the convenient norm for all in the scholarly community. At least for clinical trials, the freely available prior registration information means that the results and interpretation an article consist not just of what the authors say, but also of the reality check with what hypotheses, question, and methods they had to document at the outset when that trial was registered. Authors can use online supplements to provide scholars with access to original data and even full databases of information. There are lessons in this from the success of the Human Genome project, which thrived from open and complete sharing of research information. There is increasing discussion pressure and expectation for researchers in all fields to provide open access to their databases. This ideal may not be practical or even wise in many areas, especially for clinical research where the data are far more difficult to define and reproduce than in the Human Genome project. However, it is feasible for researchers to use online-only supplements to make public their research protocols, especially for large, clinical trials. Many medical editors believe that access to protocols should become a required part of publishing in a peer review journal.

Ironically, digital delivery of information is greatly increasing access to the historical archive of what was published decades and even centuries ago. If paper documents are scanned in, using high quality techniques, those electronic files can then be searched and delivered with great efficiency. At the New England Journal of Medicine we have recently completed a project that captured the entire archive of our content back to the first issue in 1812! The

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classics and as well as the curiosities of this part of medical history are now readily available to users, most of whom will access this content under the subscription of a library or medical school. Electronic conversion can help to preserve the historical record that has been on paper that is crumbling and hard to preserve. Of course, the scholarly community also has a responsibility to preserve the electronic record and keep it alive and useful for future generations that will be using devices and formats that we cannot even imagine.

Digital options are expanding publishing far beyond what can be communicated by the print system invented centuries ago by Gutenberg. Multimedia is moving into scholarship. Videos of procedures or clinical abnormalities are becoming common, and video discussions and interviews are increasing on the Web, including on medical sites. For instruction about technical skills videos are a much more effective medium than print descriptions. At the New England Journal of Medicine approximately thirty Videos in Clinical Medicine have been well received and are viewed heavily.<sup>2</sup> These videos are authored by experts who show and explain the correct way to do procedures such as lumbar puncture, insertion of a chest tube, or paracentesis. Each of these videos has been through a process of peer review and critical revision analogous to that for a traditional article, and each accepted video is listed as a publication in Medline and can be cited. Our journal is also producing interactive features such as timelines and maps that showed the spread of H1N1 over time.

On many sites readers can comment on articles, sometimes in anonymous fashion and sometimes with the commenter's name and institution listed as always been done with letters to the editor. Some feel that the peer review process itself should be entirely open, which can certainly be done with current technology. At first that approach may sound more fairer, more equalitarian, and more democratic than the traditional approach of confidential comments to the editors by experts selected by the editors. However, especially in clinical medicine, "open peer review" has hazards and could prove unwise. If the role of reviewers gets taken over by anyone who wishes to post comments, that could turn the process into a popularity contest [or in some cases an unpopularity contest].

At many journals only a small fraction of submitted articles make it through the selection process and are published, and the

decisions and revisions involve a great deal of editor time and attention. If a trusted journal simply posts an article for comment, the posting itself implies some degree of approval, and often research proves to be flawed or misinterpreted. With open commenting, everyone sees who comments are coming from, but even experts may be reluctant to be completely frank and critical if they will then be open to public scrutiny and, inevitably, criticism and even accusations. There will be pressures, to congratulate more than to criticize, which makes for a peer review process that is more form than substance. Moreover, there may be temptations to manipulate such a system for personal gain and in some cases even for financial gain. With so much at stake, it would be hard for authors not to encourage friends and colleagues to post positive comments and vote in its favor. Peer review could become more analogous to a political campaign, with talking points, email strategies, work to bring out one's supporters. What if there are few or no substantive comments during an open peer review process? And in an open peer review system who actually makes the decision to accept and publish? Even trickier, how would a decision to reject an article be made? What will it mean for an author's reputation and credibility, if his or her research report is reviewed publically and found unworthy of official publication by that journal? At our journal we decline about 15 times more manuscripts than we publish. Most of these are worthy and reasonable research reports that are declined on priority grounds and end up being published elsewhere, which is entirely appropriate and in the interests of science. Open peer, though technically feasible, may be better suited for communities such as theoretical physics where by definition only a small group of true experts can even enter the process. Experiments in open peer review are also certainly welcome in areas such as Shakespearean studies<sup>3</sup> that are in another world, unconnected to science, medicine, and patient care.

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