The growth of biomedical publications has been remarkable and brief relative to the initial thesis-type journal articles. The disadvantages are that the process is very slow and the readership is limited to subscribers. These limitations have been a major concern to many and have lead to the growth and popularity of online and open-access publishing.

Many have argued that scientific discovery needs to be widely shared to promote further advances. The concept of free open access, open data, and even open peer review are not new and have been the subject of discussion since the 1980s, but change has occurred slowly until now. The ready availability of medical information from the Internet and the widespread availability of smart phones, tablets, and computers have promoted greater access to scientific information. The move to online publication began with the widespread use of the Internet in the mid 1990s. Most major journals provided an online version of the print version of their journals and today, nearly all do. The conversion of readership from print-only to online-only has been a steady process fueled by the increased availability of Internet access. For the journal Circulation, online subscriptions began in 1995 and have grown steadily with 80% of subscribers electing to receive the journal online-only in 2005, and 90% currently. The new Circulation specialty journals have an even greater percentage of readers who have chosen online-only. Since its initial publication 4 years ago, Circulation: Cardiovascular Interventions has consistently had 99% of its readers subscribing to the online publication. Thus, it makes sense for our journal to stop providing a print version, as only a small percentage (1%) of our readers have asked for it. Therefore with our February 2013 issue of the journal, only an online version will be available.

There are many advantages to online-only publishing. For the publisher, the costs are less, as printing and mailing are expensive. The cost is not eliminated, however, as journal editorial staff, peer review, typesetting, and copyediting remain significant expenses that do not go away. For the author, it shortens the time from acceptance to publication by removing the time for the printing and mailing of the journal. We already publish online as soon as the article has been copyedited to reduce the delay inherent with waiting for a print journal. Online publishing also relaxes the page limits, as it is cheaper than print. For the reader, it provides a faster publication that is readily available for those with computer, tablet, or smartphone access. The online format can also provide innovative features, such as audio and video imaging, 3-D imaging, easier and more effective searching, hyperlinks to key information, references or data, pay-for-view for nonsubscribers, and customized journals. The imaging capacity is particularly an advantage for an interventional journal, where computed tomography, MRI, cineangiograms, and intravascular imaging can be readily displayed. In our iPad version of the journal, we now offer video imaging, and in the future, these images will be fully integrated into the articles. The journal format can
also be tailored to provide only topics of interest to the reader. New formats for the papers are possible as well. It has been suggested that journals should provide a much briefer paper of the key findings with the more detailed methods, results, supporting materials, and raw data linked for quick retrieval, if needed. This would reduce the size of the journal and allow easier reading online. In addition, the online format permits the journal to move beyond a static information platform to an interactive media. It is estimated that nearly 10% of journals now use some form of social media, such as blogs, Twitter, and Facebook pages (Circulation has both), so that readers can comment on articles. Some current interventional websites (such as VuMedi.com) offer video presentation of interventional cases with opportunities for comments from the readers with feedback from the authors. This case-based video presentation could be used in a journal format as well. Another attractive aspect of interactive formats is their use for performance improvement. The NEJM, for instance, has an interactive section called Interactive Medical Case, where readers can choose options for diagnosis or treatment. Several weeks later, a Clinical Problem-Solving article provides an in-depth discussion of the case in the step-wise fashion.

We think this type of case-based and interactive format is valuable and enhances learning for our readership. We plan to introduce a new section in the late spring entitled Clinical Dilemmas in Interventional Cardiology. The articles in this new section will describe a complex interventional case in a step-wise manner, similar to how clinicians care for patients. A focused discussion of the options of care will follow each step. We plan to provide for interactive comments on these cases through the Circulation Facebook page.

Online publishing has its drawbacks, however. The principle limitation is financial. Publishing in medical journals is largely paid for by institutional subscriptions, individual subscriptions, advertisements, pay-for-view, and reprints. Subscriptions and advertising are the lion share of revenue. To date, medical publishers have not been able to replace the lost revenues from print advertisements effectively in their online versions. Banner ads and pop-up ads are intrusive for the reader, and the pharmaceutical and device companies have not embraced this form of advertising as yet. However, the popularity of online access has increased subscriptions substantially, and this has partially compensated for the loss in advertising revenue.

The change that is anticipated in the future will be even more dramatic than the change to online-only. Open access or unrestricted free online access to articles without a subscription is here to stay and is attractive, as it can significantly increase access to medical knowledge. Since its introduction in 1993, open access has grown to 17.7% of all articles published worldwide in 2011. Open access can be provided by the publisher immediately on publication or, as many journals do, provided after a period of time, such as 6 or 12 months. On HighWire, the largest online publisher, there are 63 completely free sites, 285 sites with free back issues, and 1345 sites with pay-per-view. Circulation: Cardiovascular Interventions provides all articles for free 6 months after publication. The National Institutes of Health and the Research Councils of UK policy of making articles free online within

1 year if funded by these agencies has accelerated the growth of open access. The primary limitation of open access is that the cost of the publication is placed with the author and can range from $1500 to >$3000 per manuscript. Until grant funding and institutional funding mechanisms are fully developed to cover this charge, the growth of open-access publications will continue to be slow. The American Heart Association has launched its open-access journal, the Journal of the American Heart Association, and it has already seen significant growth and success.

Other forms of open access include open data repositories that allow free access to the raw data for reanalysis and sharing. Although common in the physical science arena, it has not taken hold yet in the medical field. Open evaluation or peer review after publication has also been suggested. In this model, preliminary articles would be published without peer review on an open-access site. Readers and designated reviewers would comment and these suggestions integrated into the final article. This multistage open peer-review process has been successfully used for 10 years by a few journals, such as Atmospheric Chemistry and Physics. The advantages are even more rapid publication, as the upfront peer review is avoided and potential bias of editor-chosen reviewers is avoided. The disadvantages are that high-quality review of the paper may not occur and premature publication of inaccurate information could be misleading. As only careful peer review provides the credibility needed to apply the findings to the care of patients and the urgency in publishing clinical science studies is less, this process is not likely to be acceptable for most medical journals.

It highly likely that medical publishing will be quite different in the future than it is today. Although open access will undoubtedly continue to grow in popularity, the greatest challenge for medical journals in the future will be how to present new discoveries, so that they can best be integrated into practice. The overwhelming growth of papers and the increasing difficulty for physicians to sort through the literature to find the critical information needed for practice or research is daunting and has not been adequately addressed by journals. The number of articles read per year have doubled over 12 years, whereas the average number of minutes spent reading has fallen in half. Most physicians spend <3 hours per week on any educational activity. Strategic reading through the use of navigation tools can help, but ways to provide the information rapidly, when it is needed, is a challenge. As William Osler said, “It is astonishing how little reading a doctor can practice medicine, but it is not astonishing how badly he may do it.” We look forward to working on ways to not only provide a high-quality journal to everyone, but the best ways to provide this information so it can be effectively used in practice. We hope you will enjoy the 2 timely changes that will be introduced this year, online-only and interactive case-based articles. We expect many more changes in the future. We, of course, welcome your feedback and suggestions in an effort to continue to improve our journal.

Disclosures

None.
References


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