HHS Public Access

Author manuscript

Circ Cardiovasc Qual Outcomes. Author manuscript; available in PMC 2017 February 23.

Published in final edited form as:

Circ Cardiovasc Qual Outcomes. 2015 November ; 8(6): 533–534. doi:10.1161/CIRCOUTCOMES.115.002415.

The End of Journals

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Medical journals are approaching their end. For hundreds of years, journals have served as arbiters of the quality of medical research. But the traditional peer-reviewed publication model is fraying. The hierarchical gateway to publication, historically in the hands of experts, is at odds with the ubiquitous democratization of data and information in the 21st Century. The impending revolution in the approach to evaluate and disseminate scientific findings is not an indictment of the talent, intentions, or products of current and past editors and reviewers, but rather a response to a model that simply may have run its course given societal and technological change.

The *Circulation: Cardiovascular Quality and Outcomes* team has had the privilege to found and lead this publication. My thoughts about the state of publication derive from my experiences as an editor, an investigator, an avid reader of the medical literature, and a seeker of ways to improve health care. My observations are as much or more about my own journal as they are about others. As our group approaches the end of our terms, it seemed to be a good time to reflect on the state of medical journals.

Those of us involved in the publication process are fundamentally facing the end of a long-running era. Journals are facing fundamental challenges that can only be overcome through relentless innovation and a willingness to leave the security of an outdated model. There are at least nine deficiencies in the current model that are fueling a sense that journals as we have known them are approaching their final act.

Too slow

The publication process is a long one. The time from the initial submission of a manuscript to its publication can be half a year or more. There are exceptions, and some papers are expedited, but that is not the typical experience. Despite efforts to streamline the process, obstacles remain in the timeliness of publication. Improvements such as online posting and digital transactions with reviewers and editors have reduced times, but it still takes many months even for papers that require only one round of review. Moreover, many articles cycle through multiple journals and take a year or more to be publicly available. The idea that much of the medical literature lends itself to this leisurely timeline raises the issue that if

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new knowledge in medicine is not time sensitive, perhaps it is not important enough to be published. Other fields provide the opportunity for public posting of new publications and a public peer review process long before the print version. In the future, delays in the transmission of new knowledge will likely not be acceptable.

Too expensive

From the perspective of authors, the expense of publishing in a journal is growing rapidly. Page charges, even from journals that produce profits, drain vital resources from the research enterprise. These funds often must derive from sources other than grants and can become an obstacle for many investigators. It is not uncommon for a publication to cost in the range of three to five thousand dollars, particularly for open access. From the perspective of journals, even though their value derives from content investigators give to them and from reviewers who donate their time, costs of maintaining a model that requires a web presence and an infrastructure of editors and staff, along with sales personnel, are increasing. From the perspective of libraries and subscribers, the price of the journals can become prohibitive. In the future, medical knowledge will likely be considered a social good and cost barriers will not play their current role.

Too limited

The configuration of scientific articles within most medical journals prohibits a comprehensive and in-depth approach to a scientific question. The format generally requires the investigators to chunk their work into contributions that fit within three to five thousand words and no more than a handful of tables and images. Supplementary files are allowed, but a published article, a vestige of the paper journal era, typically must be limited to executive summary length. Therefore, for substantive pieces of work, the published content represents only a fraction of the knowledge that was generated to address the research question. Executive summaries have utility, but a more expansive presentation of findings can, in many cases, have value. In the future, investigators will want to fit the structure of the presentation of new data to the needs of the project; constraints on format, beyond those that improve readability and community, will be unnecessary.

Too unreliable

Peer review and the journal decision-making process occur without much external scrutiny and transparency. The way that journals select or eliminate contributions is rarely evaluated and routine metrics of success are absent. The reliability of the processes is mostly untested. Investigators have a common experience of similar-tier journals coming to different decisions about the same manuscript. Reviewers donate time and have little accountability or consequence for their performance. The quality of reviewers varies substantially. Moreover, biases can go unappreciated. The impact of articles published in high-profile venues may derive as much from the venue as from the quality of the science. In the future, there will be a growing interest in a more reliable and open process, one that can be subject to iterative improvement and public comment.

Too focused on the wrong metrics

Journals vie for prestige, which brings them attention, authors, and revenue. The impact factor has gained an edge among all potential measures as a means of ranking journals. Many journals are internally and externally judged by their relative position on the impact factor list, which is issued annually to increasing fanfare. The drive toward simplified metrics that inadequately capture the performance of a journal can distort decisions about what to publish and encourage a culture of pandering to the citation rather than seeking to advance scientific knowledge and improve clinical practice. The flaws of the impact factor are well characterized, but its preeminence is unquestioned. In the future, the success of a vehicle to communicate scientific information will likely involve much more than a narrow view of performance centered on frequency of citations.

Too powerful

Except for a few scientific contributions with obvious and substantial importance for clinical practice, decisions about acceptance involve discretionary decisions. Much like college admissions, editors face thousands of submissions that could qualify for acceptance, and they must make choices for limited spots. That discretion and the importance of publication, particular among the journals with the greatest prestige, place the editors in a remarkably powerful position. Publication in such a journal can transform a career or influence millions of dollars or more in sales of a product. A bully pulpit for an opinion in journals can provide a means to influence the national dialogue in a way that a blog or a less visible venue could never approach. That concentration of power exerts substantial influence over perspectives and information that are disseminated broadly in the press, and that guide the public and policy makers. In the future, the scientific community may prefer that such influence is more broadly and openly distributed, rather than placed in the hands of the few.

Too parochial

Journals tend to lack diversity in their editorial groups. This issue is true with regard to sex and race/ethnicity, as well as national origin. Science knows no national boundaries yet journals seem to have national, and sometimes even regional, preferences with regard to their selection of submissions. Given the lack of transparency in the decision-making process, it is difficult to capture data to evaluate this perception, but it is commonly expressed that journals tend to favor contributions from their countries of origin. They may also prefer content that reflects the preferences and interests of their editors. In the future, the value of scientific knowledge will increasingly lie in its evaluation by the larger scientific community, uninfluenced by the imposition of favoritism - implicit or explicit - by a select group.

Too static

The journal publication is currently a static product. It is presented as a singular contribution, not a living document. It can be corrected or retracted, but it is not interactive and has no capacity for iterative change brought about by communications with the larger

audience. Many scientific projects might be better presented as an interactive web site with the opportunity for the community to probe the findings and provide feedback. Creative visualizations of data are often best presented in ways that allow images to be rotated and manipulated for better understanding. In the future, novel strategies for conveying knowledge and engaging readers will likely emerge, leaving behind the static presentation of results that offers limited options for interactive understanding.

Too dependent on a flawed business model

Journals have been very good business. For organizations and corporations, they have been cash cows. The model from the author perspective has been described in terms of a restaurant in which the customers cook the meal and then pay the bill. Despite the profits, page charges abound and reviewers are unpaid. The contributions in kind to journals are immense. In a few cases, the editorial support to improve the contributions is substantial, but often it is not. For those journals with hefty advertising revenues, there are issues – generally unexamined – surrounding conflict of interest. Journals rarely, if ever, expose their advertising revenue sources even as disclosure is mandatory for authors. Almost all journals separate their business and editorial functions, but every editor is aware of which articles are likely to produce revenue through reprints – and which companies are supporting advertisements. In the future, there will likely be interest in business models that rely less on revenues that tax authors and reviewers and depend on support from industry.

We have arrived at the juncture where medicine and science need new vehicles for the dissemination of knowledge. These new approaches will help us separate the wheat from the chaff in order to better serve the public. Only through an avid commitment to continual and transformational improvement will the notice about the death of the print journal as we have known it be greatly exaggerated (to paraphrase Twain). The question for all of us in medical publishing – and for those who consume medical knowledge – is how that would best be accomplished in a new world that is flat, digital, and transparent.

Acknowledgments

Funding Source

Dr. Krumholz is supported by grant U01 HL105270-05 (Center for Cardiovascular Outcomes Research at Yale University) from the National Heart, Lung, and Blood Institute.

Disclosures

Dr. Krumholz is the recipient of research grants from Medtronic and from Johnson & Johnson (Janssen), through Yale University, to develop methods of clinical trial data sharing, and a grant from Medtronic in collaboration with the Food and Drug Administration, through Yale University, to develop methods and facilitate best practices for medical device surveillance. He also chairs a cardiac scientific advisory board for United Healthcare.