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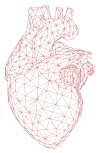
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Metrics for Medical Journals

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It has been said that, other than professional athletes, academicians are the only group that places great value on metrics. This is certainly true of most aspects of academic medicine, and especially of medical journals. Grading the performance of medical journals has not only been important in and of itself, but has also become a major factor in promotions and grant awards. It is not surprising, therefore, that the metrics for evaluating medical journals have come under increasing scrutiny, and that alternate methods for measuring quality are evolving.

The process of evaluating journals is occurring in the midst of a very challenging environment for medical publications. There are now 128 journals listed by the International Scientific Institute (ISI) just in cardiology, and more are being started all the time. Much of this expansion exists in the field of open access journals, some of which are of questionable quality. The quantity of submitted and published manuscripts has resulted in a readership that is overwhelmed, and reviewers and editors who are very fatigued. Libraries are under increasing financial pressure, as are advertisers who are reevaluating their options. The concept of conflict of interest is changing, particularly with regard to relations with industry. Finally, and perhaps most importantly, the medical literature is in transition from print to online, and this is contributing to the ever-increasing importance of social media. These issues create both challenges and opportunities for the medical literature, and will also likely have a substantial effect upon how it is evaluated.

A variety of parameters exist by which to evaluate the performance of medical journals. The number of submissions received is indicative of the esteem with which a journal is held, and is therefore a reasonable criterion for success. Since literature is published to inform readers, readership satisfaction is a crucially important metric of performance. The promptness and especially the excellence of reviews is a definite measure of quality. Many journals are official publications of medical societies, and service to these organizations can be an important parameter of achievement. Good financial performance is a requisite condition for any publication, whether it be on behalf of a society or otherwise. Last, but very certainly not least, the impact factor is the metric that is nearly universally used to assess the quality of medical periodicals. In fact, the impact factor can be considered to be “the ejection fraction of journals,” a single number that is understood by all and is taken to convey the status of that

publication. In actuality, the impact factor currently outweighs all of the other factors combined in the eyes of most physicians.

The impact factor is, of course, a citation index that is the ratio of the citations received to publications in the 2 years after publication. Therefore, it has a numerator (the number of citations) and a denominator (number of citable articles), the latter of which has variable definitions. It is less important to readers than to authors, and has come to play an inordinate role in academic promotions and grant awards. I have been told that in some countries, the renewal of contracts for faculty is strongly influenced by multiplying the number of papers of an individual by the impact factors in the journals in which those articles appeared. The impact factor has great inertia, reflects publications 2 years earlier, and is self-perpetuating and very difficult to change. Unfortunately, the ability or lack thereof of a submitted article to raise the impact factor may constitute a criterion for acceptance or rejection. It is regrettable that the impact factor, a metric that is said to have been initially conceived as an aid for librarians to select those periodicals that they would subscribe to, has been applied for purposes for which it was not intended.

There are a number of significant limitations to the impact factor. The number of journals from which citations are recorded is restricted. Guidelines, Societal Reports and Consensus documents have enormous influence, and now usually far outweigh the ability of even review articles to garner citations. Journals without a societal affiliation to produce guideline documents are at a definite disadvantage. Self-citation is possible, and can serve to elevate the impact factor. The criteria for determining whether material is “citable” and therefore should be included in the denominator are open to some interpretation and may not be done in a uniform fashion. Articles can be formatted so that they can receive citations but are not considered citable. Topics can become very “hot” and thus the subject matter of numerous articles, therefore presenting a better opportunity for citations. The impact factor covers citations for only 2 years, neglecting the value of articles with sustained significance or whose value is only revealed years after initial publication. Finally the impact factor reflects the cumulative citations of all papers that are published, ignoring the fact that some papers are highly referenced while others may not be cited even once. In this way a few extremely frequently cited articles can yield a high



impact factor even if the other articles are substantially weaker.

It is obvious that the aforementioned limitations provide an opportunity to unduly influence or “game” the impact factor. Thus, publishing many guidelines, frequently self-citing, formatting articles to be non-citable, and publishing articles primarily in hot topic areas can all elevate the impact factor disproportionately. Such behavior has existed in the past and the impact factor is certainly susceptible to such behavior at present. The impact factor is a good example of Goodhart’s Law: when a measure becomes a target, it ceases to be a good measure.

Given the limitations of the impact factor in assessing the quality of journals, many other metrics have been put forth and more are continuously being proposed. Several other citation metrics exist among the new measures. The CiteScore extends the evaluation period for citations to 3 years, and increases the number of publications from which citations are gathered compared to the impact factor, though it is not without its own controversy.¹ The immediacy index tracks citations for the first year after publication so as to assess how rapidly articles have an impact. The Impact Quotient is the percent of papers published that reached the top 1% of most-cited papers in the journal’s research area. This measure reduces the influence on the impact factor of the differing number of citations of individual articles; some of which are frequently referenced whereas many others are seldom cited.

A number of metrics have evolved to assess the performance of the publications of individual authors. The H-index captures output based on the total number of articles and the total number of citations to those works, providing a focused snapshot of an individual’s research performance. The m-index divides this metric by the number of years since an individual began publishing to reflect sustained productivity. It seems reasonable to account for the ranking of authorship in a publication (first, middle, or last author). Several measures, such as the eigenfactor, have been devised for this purpose. To account for the effect of differing numbers of citations for individual papers of a given author, the i10-index has been developed by Google. The i10-index indicates the number of academic publications an author has written that have at least 10 citations from others.

The above metrics are designed to address the limitations of the impact factor, or extend assessment to individual authors. All measures continue to be based upon citations in medical publications. None of them has thus far challenged the primacy of the impact factor as the major measure of the performance of journals, nor are they likely to do so in the future. However, with the widespread adoption of the Internet and social media, the metrics for assessing the performance of medical publications has begun to be expanded beyond citations in medical journals to a variety of scientific and non-scientific communications.

A number of non-citation metrics have evolved to evaluate performance based largely upon the Internet and online communication. The number of times an article is viewed online is one measure that has been applied; with the number of

times a paper has been downloaded being even more indicative of impact. The rate at which a paper is emailed is another parameter of effect. Interestingly, the frequency with which a paper has been mentioned in health blogs, Facebook postings, or even tweets on Twitter has been incorporated into metrics for medical publications. The number of times an article appears in the lay press or in venues such as Wikipedia has been used to assess impact, in recognition of the importance of the effect of papers on society in general.

The variety of alternative metrics to citations that has emerged is often referred to under the general term of altmetrics. Emerging interest in these non-citation parameters from the Internet and social media has resulted in at least one company, Altmetrics, being created to provide these data. Altmetrics are metrics and qualitative data that are complementary to traditional, citation-based metrics, and utilize data from social media as well as reference managers such as Mendeley. Since the results of medical investigation can now appear and be transmitted in many formats and on many platforms, it seems reasonable that the metrics to evaluate this research include this information. In addition, such information can convey the importance of research findings to society as a whole. *PLoS* has been at the forefront of providing data regarding the number of views and shares for the articles they publish.

At the current time, regardless of the availability of numerous alternative measures of publication performance, the impact factor remains far and away the predominant accepted and applied metric. However, as discussed above, the impact factor is imperfect and can be gamed. Nevertheless, despite these well recognized and publicly deplored limitations, every spring/summer when the impact factors are announced, there is usually widespread, public and vocal celebration by those with high or improved rankings. A number of alternate citation measures have emerged, and can serve to rectify many of the impact factor limitations. Clearly there is a strong rationale to use these parameters in addition to or in conjunction with the impact factor. Given the increasing presence and role of online publishing, the Internet, and social media, it seems certain that non-citation metrics will assume greater influence and importance in the future. Whether they will supplant the impact factor or diminish its status remains to be seen. However, the ejection fraction has been known to have major limitations in the assessment of left ventricular function and myocardial performance for many years, but continues to serve as the single number applied to characterize these functions clinically. Based upon this example, and many years of observation, it is likely that the impact factor will remain disproportionately influential for the foreseeable future.

Reference

1. CiteScore-Flawed But Still A Game Changer. The Scholarly Kitchen Web site. <https://scholarlykitchen.sspnet.org/2016/12/12/citescore-flawed-but-still-a-game-changer/>. Published December 12, 2016. Accessed September 10, 2017.