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Publish or Perish... but where? What is the value of Impact factors?

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Keywords

Impact factor

A major event for an Editor is the annual Impact Factor report for that Journal. In some institutions, the Impact Factors of the journals in which a scientist publishes their research are a consideration for promotion, as an indicator of the value of an academic program and even of an institution. Is this valid? Is the impact factor meaningful? What is an impact factor? The impact factor (IF) is one measure used by Thomson Reuters (originally ISI) to evaluate the relevance of a Journal over time. The IF is obtained by dividing the number of citations in a given year to articles from the previous two years of publication by the number of articles that were published in the past two years in a Journal. The IF was originally designed as a tool to aid in collection development but has become a tool for determination of merit.

Is IF meaningful? A survey of 264 internal medicine practitioners and researchers about 9 medical journals was used to measure the correlation between impact factor and the rated journal quality and concluded that impact factor may be a reasonable indicator of quality for refereed journals [1]. Correlations (r^2) were 0.62 for practitioners and 0.82 for researchers.

Is IF valid? Amin and Mabe, when directors of research for the publisher Elsevier, published a white paper on “Impact Factors: Use and Abuse” with an interesting perspective [2]. Among the points raised were that IF stability increases with the number of articles published, IF tends to be greatest for review journals and that typical IFs are greatest in the fundamental life sciences and lowest in the mathematical sciences. These correlations resulted because the rated quality of an article was based on the information from the IF. These biases led SCOPUS, the abstracting & indexing and citation database from Elsevier (who publishes NMB), to use three alternative impact metrics: IPP, SNIP and SJR* [3]. IPP is the Impact Per Publication. IPP measures the ratio of citations per article published in the journal and a measure similar to IF but averages over 3 rather than 2 years of data (as do

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SNIP and SJR) [3]. SNIP is a Source Normalized Impact per Paper that “measures contextual citation impact by weighting citations based on the total number of citations in a subject field” [4]. In other words, the SNIP claims to provide a correction for scientific fields with high citation rates. The SJR or SCImago Journal Rank is “a measure of the scientific prestige of scholarly sources”[5]. Graphs of the SNIP, IPP and SJR for NMB and some other nuclear medicine journals from 1999 through 2013 are shown below. What does this mean? By these factors, NMB is showing a consistent and growing impact in our field.

These metrics are important to understand because of their influence on our scientific endeavor. Scientific progress is built on previous work, but impact factor is open to manipulation and is limited. For example, a review article may lead to a high IF because many people will read it as an information tool to survey a field but it may not have much substantive impact in terms of new information or insight. The review article should be an unbiased but critical review of the work done in a specific field. If it is a well-written article, it is unbiased and provides the reader with expert evaluation of the work that has been done. How do we interpret the value of articles where the authors over-cite their own work as this leads to higher IF in some journals but multiple articles saying the same thing do not have added value. The SJR takes some self-citation into account by limiting self-citation to 33% of the references, limits bias due to citations in review articles and weights the impact based on the prestige of a journal as a function of the number of references in that field. Citations from higher ranking SJR journals have greater weight.

A pre-clinical study of a new radiopharmaceutical may have few citations, yet could lead to a huge impact on our field. Impact factor can help determine the Journals with the higher standards in a particular field of research but should not be compared across scientific fields. The SNIP normalizes the impact factor by the size of the field so that the larger scientific field bias is reduced. When promotion depends upon publishing in the most widely read Journals with impact factors (such as Science), this does a disservice to our field.

Publication is essential, otherwise our work is useless, but the impact has to be judged within the field, not on a global basis. No matter what statistical methods are developed based on citations, experienced scientists in a given field are necessary to evaluate the scientific merit of a submitted article. Likewise, promotion should depend upon evaluation by leaders in the field who can recognize the value of a scientist's work to that field of endeavor. We need strong peer review in all aspects of our work.

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*Definitions: IPP is the Impact Per Publication and counts citations in a given year to any item published in a journal during the previous two years, and divides this by the total number of articles and reviews published in the same three-year period. SNIP “is the ratio of a source's average citation count per paper and the “citation potential” of its subject field. Citation potential is an estimate of the average number of citations a paper can be expected to receive relative to the average for its subject field”. SJR is the SCImago Journal Rank. SJR is a prestige metric inspired by Google's PageRank™, whereby the subject field, quality and reputation of the journal have a direct effect on the value of its citations [5].

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Figure 1. SNIP, IPP and SJR Scores for 1999 through 2013 for the Journal of Nuclear Medicine (JNM), European Journal of Nuclear Medicine (EJNM), Clinical Nuclear Medicine (Clin NM), Nuclear Medicine and Biology (NMB), and Seminars in Nuclear Medicine (Sem NM).