



Standing on the shoulders of giants: 50 years of EJNM and EJNMMI

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The role of a scientific journal: of authorship and the politics of knowledge

A scientific journal such as EJNMMI is the medium through which nuclear medicine scientists make knowledge claims public, and at the same time constitutes a reliable archive of nuclear medicine-related scientific knowledge. The integrity of this archive is an essential value, with the Editor and Editorial Board having the responsibility to prevent defective or illegitimate papers to be published. Ideally, we expect journals to be public and open to all, but expanding access to the scientific literature and building prestige journals to identify qualified experts in relevant fields is not without significant costs. In the current era of intense experimentation, the scientific article has become the base unit for sizing careers, for making decisions about hiring, tenure, and grants. Despite the debates around scientific publication, the role of the scientific journal remains to bring to the public the breaking news and to offer a robust permanent archive of scientific knowledge [1].

Nuclear medicine scientists have always used a variety of media and formats to communicate, including letters, conversations, conferences, databases, email, and many new networked platforms. But still submitting work to a journal such as EJNMMI, refereeing, having a paper accepted or rejected by major journals, remains the core of scientific communication, and largely influences the modes and structure of scientific collaboration. The EJNMMI has a prominent role in public representation of expertise in the field and objective judgment of scientific issues, based on a careful scrutiny exercised by the nuclear medicine scientific community of what makes it into printing. This is particularly important in the era of massive publishing, when even companies have appeared that dare to offer publishing of papers if a certain

amount of money is paid by the author. More than ever, it is necessary that published articles represent a faithful and legitimate scientific opinion. Journals and authors including those in the field of nuclear medicine and molecular imaging have a social responsibility, as the scientific literature is a key component of the public and democratic nature of scientific life. Modern democratic states use credible published knowledge to decide what findings should be seriously considered in policy discussions or where to provide financial support with public criteria of accountability.

Major scientific journals, such as the EJNMMI, are largely based on papers that bring original contributions to knowledge, with claims that are not speculative opinions or synthetic reviews of others' investigations. The authors take the primary credit and responsibility for the contents. The editors are responsible for the quality and integrity of what is being published. Although scientific publication is not the only means of scientific communication, no doubt that the scientific journal is the dominant mode of communication and has become central to everyday scientific life and public representation of scientific knowledge. The EJNMMI has developed over the years to become a major journal in the field. All the credit must go to the many authors that published their original investigations. Successive editors have taken the responsibility while the journal has evolved with time (Figs. 1 and 2).

The need for metrics in scientific publication

After publication, who is evaluating the value and impact of the research that is published? The Institute for Scientific Information (ISI) impact factor has been dominating the metrics of scientific journals for many years [2], since 1967, when the ISI, a company based in Philadelphia, was responsible for the Science Citation Index. Over the years, Thomson Scientific, part of Thomson Corporation, enjoyed a monopoly of scientific citation reports. Currently, the Journal Citation Reports in the Web of Science is given by Clarivate Analytics. Such private companies may have a

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Fig. 1 The editors



vested interest in what is evaluated and in the results of the evaluation. In addition, new systems and figures to evaluate the quality of research and the performance of scientific journals are rapidly emerging, with academics and companies producing and developing more sophisticated and efficient citation metrics to assess scientific quality. Obviously, it will take some time to understand and eventually adopt all these new tools properly. Probably the simultaneous use of various indices will provide a more balanced estimate of scientific quality than the impact factor alone. Whether these metrics should influence decisions on where to publish, or even whom to promote or hire in academia or industry, will remain the subject of further burning debate within the scientific community.

Certainly, publication metrics provide a quantitative method to analyze published research. However, there is growing evidence that quantitative methods alone cannot do

justice to the richness of research culture while there is consensus that researchers and institutions should use reliable metrics responsibly. Along this line, new initiatives such as The San Francisco Declaration on Research Assessment [3] have appeared with the intention to further modulate existing metrics and to set out principles for improved assessment and evaluation of research quality. The declaration was initially formulated in 2012 during at the Annual Meeting of the American Society for Cell Biology in San Francisco, and it has become a worldwide initiative covering all scholarly disciplines and key stakeholders including funders, publishers, professional societies, institutions, and researchers. The general philosophy of the initiative is that research should be assessed on its own merits rather than based on the type and rank of the journal in which the research is published. Similarly, The Independent Review of the Role of Metrics in Research Assessment and Management was set up in

Fig. 2 The journal cover over the years



April 2014 to investigate the current and potential future roles that quantitative indicators can play in the assessment and management of research. Its report, *The Metric Tide*, was published in July 2015 [4]. The review identified 20 recommendations for further work and action by stakeholders across the UK research system. These recommendations are underpinned by the notion of “responsible metrics” as a way of framing appropriate uses of quantitative indicators in the governance, management, and assessment of research.

Traditional vs alternative metrics

Traditional bibliometrics of journal and researcher impact are based upon numbers of citations received per paper published in a journal over a period. They may be weighted by other factors, or may not, depending on the specific measure. They focus on counting citations of individual journals or articles in comparison to peer journals or researchers. Such traditional metrics include the JCR Impact Factor that has been dominating the metrics since its appearance and which is only available from Journal Citation Reports from Clarivate Analytics, the SCImago Journal Rank, The Eigenfactor, the Author h index, and other.

SCImago Journal Rank is a measure of a journal’s impact factor that is openly available to all to use. It uses data from Elsevier’s Scopus database to determine its rankings. Note that the SJR ranks journals by “prestige” as determined largely by how many articles cite articles from that journal. This can create something of a self-fulfilling prophecy, as journals are determined to be important due to their high number of citations, which motivates people to use that journal more, which affirms its prestige. The “h” index, proposed in 2005, is a very widely used metric for scholarly impact based on analysis of publication data using publications and citations to provide an estimate of the importance, significance, and broad impact of a scientist’s cumulative research contributions. It intends to reflect both quantity and quality of a researcher’s entire research output using a single number based upon how widely and how many papers have been cited. However, a single number can never give more than a rough approximation.

Alternative Metrics or “Altmetrics” are a new and evolving type of bibliometric measures based on using impact on the Social Web for analyzing and informing scholarship. They employ algorithms based upon different measures of social media impact, article usage, citation, etc. Altmetric measures can include one or many of the following: saves or shares on social citation, article download or view statistics, blog mentions or pings, Facebook, Instagram, Wikipedia citations, and tweets.

“Publish or Perish” is an aphorism frequently used to describe the pressure to publish scientific work to succeed

in an academic career. Today, Publish or Perish is also a software program that retrieves and analyzes academic citations from Google Scholar and provides the h index among other metrics. The Altmetric Bookmarklet (Find Social Media Impact) offers metrics for social media shares and mentions in different areas of research. It offers a track online of research interest before citation data becomes available. Currently, the free Altmetric it! bookmarklet can show article metrics for any article with a DOI with a single click. The ImpactStory (Show Social Media Impact) Profile is an open-source site that helps researchers explore and share the online impact of their research. It builds on ORCID to pull together a given work with twitter and other social media to link its impact into a simple, findable profile that highlights the work and its impact.

Obviously, Altmetrics can show aspects of the impact of research and scholarship beyond what traditional bibliometric citation measures analyze. They can show interest and sharing of research much earlier than possible with citations and are increasingly being used in tenure review, research grant seeking, and research promotion. However, they should be used in conjunction with traditional metrics rather than in place of them.

Should all these multiple metrics and the obsession for the highest scores make us all sick? On the contrary, I believe that at the end of the day the vigorous authors and the clever readers somewhat know what is valuable and what is the work that beyond innovative and credible data will help them to improve their research and clinical practice.

The journal and the scientific society

Scientific societies such as the EANM provide numerous services to the scientific enterprise, including convening meetings, publishing documents, developing scientific programs, advocating for science, promoting education, and providing cohesion and direction for the discipline. The birth and development of the EJMNI is intimately related to the history and growth of the EANM. After the signing of the first contract between the EANM and Springer by Peter Ell and Ute Heilmann [5], the win–win situation resulted in mutual gains in which both parties worked together to meet interests and maximize the journal’s value and in consequence the service to the society members. The journal has been continuously growing, making the flagship publication in the field for European nuclear medicine and molecular imaging. For the EANM, as well as for most scientific societies, scientific publishing provides added value, visibility, and prestige. Scientific journals offer their authors and society members considerable value beyond their benefit to authors’ careers and support of the societies’ missions and activities.

Changes in the publishing industry over the last 15 years have also put scientific and academic journals under stress. The migration to electronic journals has required technology and expertise that often scientific societies or universities were not able to acquire because of insufficient financial resources. Consequently, further society journals contracted with independent, for-profit publishers. The societies benefit from the publisher's technological expertise and the publisher gains a reputable title and the opportunity to attract rejected manuscripts for its other specialty and related journals. The win–win relation between the EJNMMI and Springer provides a good example of long-lasting successful collaboration. It is important that these partnerships ensure the long-term health and protect the editorial independence of society or specialty-related journals.

Finally, the journal provides a most important learning tool for young specialists. Not only review articles and case examples help to build education in the specialty, but also the practice of journal writing, peer reviewing, and providing feedback in the research group promote critical thinking and strengthen research capacity among our young specialists and scientists.

The outreach and grow of EJNMMI: the family of journals

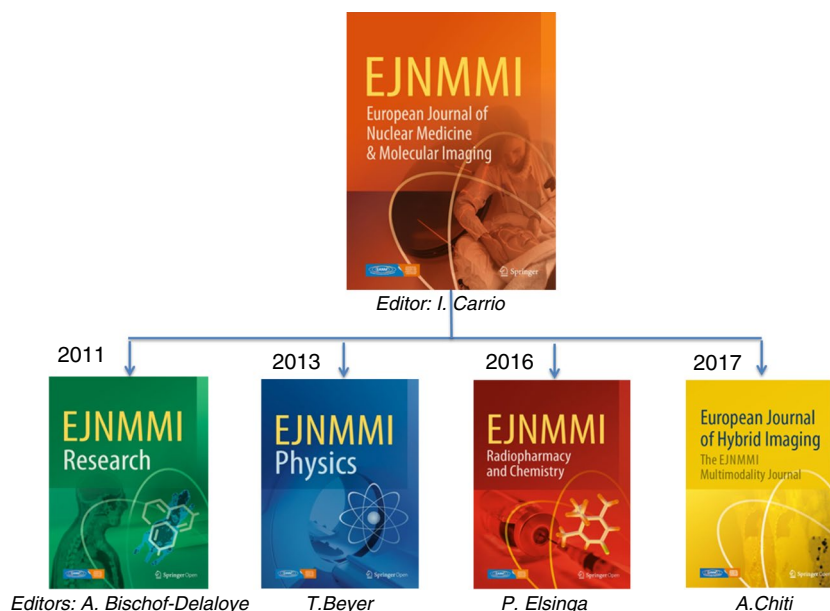
Researchers in all areas of science and medicine experience a painful pressure to publish scientific work to succeed in their careers. Such institutional pressure is generally strongest at research universities and large public healthcare institutions. Over the years the number of scientific journals has increased exponentially, with now more than 40,000 journals

worldwide offering opportunities to scientific researchers for publication of their work, and the number continues to increase by about 5% per year. Given these impressive numbers, do we really need more journals? Or in different words, why the EJNMMI developed a family of journals in nuclear medicine and molecular imaging? One could easily argue that we have enough opportunities to publish and therefore there is no need for further journals.

In many areas of science and medicine, there is an increasing number of fields of interest which despite belonging to the same scientific community, they work on different topics and often use their own language. In nuclear medicine and molecular imaging, basic scientists, physicists, radiopharmacists, and others have grown into communities of their own right, with specific educational and scientific needs. Although some of their research articles are of common interest for physicians and scientists working in nuclear medicine, others are only read by certain specialists. Objective numbers indicate that the EJNMMI, the flag journal of nuclear medicine and molecular imaging in Europe, only gives limited opportunity to publish for all these communities within the field. In fact, the EJNMMI has experienced an ever-increasing number of submitted manuscripts, while the acceptance rate has declined significantly. Often good papers that deserve to be published are declined because of space restrictions or because “limited” priority has been assigned after peer review. Obviously, the assigned priority is influenced by the interest of such papers for a broad readership, which puts highly specialized or technical papers in disadvantage as compared to manuscripts that address issues of common interest to physicians or scientists in the field of nuclear medicine and molecular imaging.

In response to the increasing scientific and publishing needs of the communities within nuclear medicine

Fig. 3 The EJNMMI journal family and the launching editors



and molecular imaging, the solution adopted by the EJNMMI, with the support of the EANM, was to develop the EJNMMI family of journals [6]. In addition to the mother journal, the family currently has four established journals, EJNMMI Research (started in 2011), EJNMMI Physics (started in 2013), EJNMMI Radiopharmacy and Chemistry (started 2016), and the European Journal of Hybrid Imaging (launched in 2017) (Fig. 3). The new journals in the family are named with the initials of the mother journal to take advantage of the prestige and reputation of EJNMMI as a brand name and are intended to offer additional opportunities for publication to the respective scientific communities.

Final note

I took over the EJNMMI Editorship in 2004 after the tenure of Peter Ell, who with intelligence and firm hand had mastered the journal into a modern and reputable journal. I tried my best to strengthen the journal, increase its impact and outreach, and make it grow to the EJNMMI family of journals. I would like to mention two key persons in Springer, Ute Heilmann and Sabine Ben-Gechir, who always supported me and were instrumental in the success of the journal. In 2017 the EJNMMI became the prime journal in the field, with the highest impact factor among nuclear medicine

journals worldwide. In 2018 I handed over to Arturo Chiti, who with his talent and natural leadership is guiding the journal and may sail a different way...

Declarations

Ethical approval Institutional Review Board approval was not required because the paper is an Editorial.

Informed consent Not applicable.

Conflict of interest The author declares no competing interests.

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