Open Access: The Alternative to Subscription-Based Medical Publishing

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Since the inception in 1655 of *The Philosophical Transactions of the Royal Society*,[1] one of the world's first scientific journals,[2] the subscription-based journal has been the traditional model for disseminating scientific and medical knowledge.[3,4] Granting access only through subscription can place significant barriers to information sharing, thus putting research, teaching and patient care at risk. While the internet age has made information universally available, medical and scientific knowledge has proven to be an exception. Subscription rates to scholarly journals continue to increase annually by 8-10%, far exceeding inflation rates measured by the Consumer Price Index.[5,6] Publishing in science, technology and medicine is a seven-billion dollar global industry[7] with publishers averaging 20-30% profit margins.[8] In 2003, the University of Iowa paid nearly 1.1 million dollars to Elsevier, one of the largest publishing companies in the world, and Cornell nearly 1.7 million.[9] The University of California libraries collectively paid eight million to Elsevier and 64 million for all their scholarly material.[8,10] With a growing number of libraries, including Cornell, Harvard, North Carolina and MIT, forced to cancel subscriptions,[11,12,13] it is clear that we are in a crisis situation. One potential solution is the open access model. According to the 2003 Bethesda Statement on Open Access Publishing,[14] an open access journal must fulfill two criteria: 1) the author and any copyright holder must grant free access to the publication and a license to copy, use and distribute the work publicly, and 2) the work must also be deposited immediately upon publication to at least one online repository.

While the concept of open access has been around for years, only recently has it gained traction within the scientific community. In 1998 the Association of Research Libraries (ARL) launched the Scholarly Publishing and Academic Resources Coalition (SPARC) with the specific intent of stimulating change to correct imbalances in the traditional scholarly publishing model.[4,15] SPARC has advocated tirelessly for new methods of scholarly communication such as open access, launching initiatives and partnering with scientific societies with the intent of decreasing the costs of publication/subscription and improving scientific communication.[3,15] The Budapest Open Access Initiative (BOAI) in 2001 resulted in the Budapest Statement, the first such declaration advocating and defining the principle of open access. Illustrating the widespread growth of open access, over 5,000 signatories as of now have agreed with the principles stated in the BOAI.[16] In 2003 the Howard Hughes Medical Institute, the largest private, non-profit funding organization for U.S. biomedical research,[17] drafted the Bethesda Statement, which has become the predominant definition of an open access publication.

Similarly, the World Health Organization has taken steps to expand access to biomedical literature in Third World countries by initiating a unique program, the Health InterNetwork Access to Research Initiative (HINARI). In 2002 HINARI was launched with the express purpose of providing free to low-cost online access to biomedical journals to non-profit organizations in developing countries.[18,19] Institutions in countries with a gross national income (GNI) per capita of less than $1,250 (BAND 1) are given free access to the journals provided in the HINARI database.[18,20] Institutions in countries with a GNI per capita between $1,250 and $3,000 (BAND 2) must pay a yearly fee of $1,000 to access these journals. Currently, over 2,500 institutions in 109 countries have access to more than 3,750 journals in an effort to benefit health workers and researchers and improve the quality of health in the world's poorest nations.[21]

However, HINARI has not been entirely successful. One problem is that access is dependent on an infrastructure that is often lacking or broken due to undependable power supplies and faulty internet connections,[22] which can be so

slow that articles take days to download.[23] Also, current copyright laws prohibit reproduction, dissemination, translation, etc., which provide an additional burden to the local institutions in countries where internet access is already unreliable.[24] In Peru, researchers are finding it hard to justify the $1,000 subscription fee when they are unable to access many of the promised journals sponsored by the major publishing companies in HINARI.[20] Lastly, the GNI per capita requirements themselves severely limit access to these journals in countries such as China, Brazil, and India that do not meet the requirements yet have a pressing need for up-to-date medical/scientific information.[24] HINARI's mixed performance lends further credence to the idea that open access can provide an effective solution to global access inequities and should be the future of publishing. An open access journal would bypass many of these limitations, as anyone with an internet connection anywhere would be able to access the information at anytime.

On a more positive note, large and influential funding organizations such as the National Institutes of Health (NIH), the Wellcome Trust, European Research Council, and the Canadian Institutes of Health Research have begun requiring open access as a stipulation for funding.[25] In 2006 the Wellcome Trust, the largest biomedical research charity in the world,[17] mandated that all their funded research be archived in PubMed Central and UK PubMed Central (open access online repositories of biomedical and life sciences journal literature) within six months.[25] A year later, the European Research Council, the major funding body of the European Union, followed suit, requiring that all research funded by them be put in an online repository such as PubMed Central.[25] Since December 2007, NIH-funded research must be open access through PubMed Central no later than 12 months after the official date of publication.[26] These major funding organizations realize that intellectual property produced in part by their funds should not be transferred over to a publishing company for profit, but should be free for the public's benefit.

Most universities recognize the importance of faculty keeping copyright to their written work, ideally in order to share that work with the rest of the world. For instance, the University of California policy grants copyright ownership to their faculty for their original scholarly work.[27] The copyright owner has exclusive rights to reproduce, prepare derivative works, distribute, perform and display publicly. The purpose of this policy is to fulfill the university's mission of "contributing to the body of knowledge for public good." The University of California also "encourages the creation of original works of authorship and the free expression and exchange of ideas." With authors ceding copyright ownership to publishing companies only to buy it back with subscription, one has to consider whether this promotes the public good. Information in the subscription-based model is at the consumer's cost. By contrast, open access encourages the free exchange of ideas and supports the idea that scholarly work is a public resource that should be available without impediment for the public's benefit.

Open access detractors argue that it devalues research because it does not produce enough capital to create a formidable publication. Granted, while financing remains a challenge for the open access model, a publication's value does not come from the extrinsic monetary value of a subscription but from the value of the research being published. Financing open access can be achieved in various ways, including having authors pay for publication, advertising, or charging for print copies. If an open access journal can find the means to finance its operations, it remains a viable alternative to the traditional publishing model, and with the growing support for open access it may just be the future of scientific publishing.

A 2006 study showed that the majority of emergency medicine physicians favored the open access model,[28] and it is easy to understand why. For too long, the traditional publishing model has constrained the spread of scientific knowledge. Changes in technology and society have provided us with the means to alter this dynamic, especially given the fact that global access to the internet has increased approximately 300% over the past eight years.[29] Despite its limitations, open access provides greater access to scientific knowledge. This is especially important for not only emergency medicine practitioners, but all of science, technology and medical publishing. As such, it has a strong potential to improve the quality of healthcare throughout the world.

To the best of our knowledge, the *Western Journal of Emergency Medicine* (*West*JEM) is the only peer-reviewed emergency medicine open access journal in the world that allows authors to keep their copyright and does not charge authors a publication fee. With limited access to emergency medicine research and only four major emergency medicine journals accessible by subscription, *West*JEM is paving the way for a new publication model, one in which anyone can access its cutting-edge research information.

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