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Global Access to Literature on Trauma

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Abstract The trauma pandemic disproportionately kills and maims citizens of low-income countries although the immediate cause of the trauma is often an industrial export of a high income country, such as a motor vehicle. Addressing the trauma pandemic in low-income countries requires access to relevant research information regarding prevention and treatment of injuries. Such information is also generally produced in high income countries. We explored various means of making scientific information available to low-income country surgeons using the internet. If orthopaedic surgeons want to maximize their global impact, they should focus on writing about trauma questions relevant to their colleagues in low-income countries and ensuring these same colleagues have access to the literature.

Introduction

In the new millennium, society faces difficult choices in terms of allocation of scarce resources to medical research. As medical specialists we shoulder the responsibility to ensure research dollars are spent in an equitable manner. This means research information, particularly if publicly funded, should be as broadly available as possible.

Specifically, our orthopaedic colleagues in low-income countries are facing a trauma pandemic which will change the face of musculoskeletal care [1, 8, 9]. They need access to appropriate scientific information to begin to address this.

We report on different means of improving access to the scientific literature for surgeons in low-income countries. In a separate but related article, we have assessed whether the orthopaedic and general medical literature accurately reflects the burden of musculoskeletal disease which is due to trauma.

Access to the Literature

Progress against the trauma pandemic requires clinical care, education, and research of the highest quality and a good library is required for any of these activities. Low-income countries bear a high burden of trauma and often have substantial resource constraints limiting library access. Recognizing this, several different models to improve library access using the internet have been underway for several years and will be discussed here. Among them are the HINARI project of the WHO, the Ptolemy project of the University of Toronto, and the open access publishing movement.

Until about 1995, medical journals were primarily paper products. Rapid growth of the internet has resulted in two changes; both the indexing and abstracts of journals have become available on line, followed by the full text of the journals themselves. The typical surgeon never needs to

Each author certifies that he or she has no commercial associations (eg, consultancies, stock ownership, equity interest, patent/licensing arrangements, etc) that might pose a conflict of interest in connection with the submitted article. Dr. Howard runs the Ptolemy project described herein.

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physically enter a library now, but can access full text content from thousands of journals using a computer and an internet connection. Subscriptions to electronic journals may be individually held, but are often available at considerably reduced individual cost through institutional subscriptions (eg, medical societies, universities, hospitals). The advent of electronic subscriptions created a possibility to distribute journal content at low cost to doctors in low-income countries.

Access to the internet itself in low-income countries is variable and a rapidly moving target. For example, in Africa 51 million internet users are currently reported among a population of 955 million, meaning only 5.3% of the population has web access (compared with about 21% for the rest of the world) [7]. Shared institutional access may be so slow and overburdened as to be unreliable or impractical, and indeed in 2003 ¾ of African surgeons surveyed reported doing their internet literature searches mainly or exclusively from home [2]. A more recent survey showed that for medical postgraduate trainees in Africa, the sources of health information accessed were textbooks (70%), e-resources (29%) and paper journals (1%). The source of web access was web cafes (up to 90%) or institutional libraries (up to 78%) depending on the country, with access from home contributing a sizable minority (up to 24%) [13].

The WHO and a group of medical journal publishers recognized an opportunity to provide full text journals to doctors in low-income countries who might never be able to afford online subscriptions at high income country prices, but who nonetheless could make excellent use of medical research information. A negotiated agreement between WHO and the leading medical publishers resulted in the HINARI (Health InterNet Access to Research Initiative) [6]. To protect the interests of the commercial publishers involved HINARI is based on institutional access—accounts are granted to qualifying institutions in low-income countries which act as guarantors that the information downloaded is being used for legitimate academic purposes. Typically these institutions are libraries in medical schools or hospitals. So far over 3000 institutions have signed on to HINARI and millions of articles have been downloaded from 2500 major medical journals. Low-income countries have over 1.1 million physicians and over 2.5 million hospital beds [16], so the number of sites with access is still very small compared with the potential demand.

Recently a Peruvian group of HINARI users reported that of 150 HINARI journals with the highest impact factors, all of which were accessible in 2003, 57% could no longer be accessed in 2007 [15]. They questioned whether all of the publishers remained committed to the project, particularly as regards their most popular titles.

The University of Toronto's Office of International Surgery, in affiliation with the University of Toronto Library, has offered full text journal access specifically to surgeons in low-income countries through the Ptolemy project, which can be thought of as a complementary project to HINARI. Ptolemy began in 2000 and provides individual, rather than institutional, access. This means surgeons can use their accounts wherever and whenever they have internet access and they do not need to travel to a library during opening hours. The Ptolemy project has been developed in collaboration with the College of Surgeons of East, Central, and Southern Africa and provides access to 44,000 full text journals, 4000 full text medical textbooks, free training courses, a monthly review course (surgery in Africa) and review questions with CME credits.

The Ptolemy project has been evaluated with user surveys and by using log files from the library servers [2, 4, 5]. In October 2007, 209 users completed 300 web sessions per month where full text articles were retrieved. A cumulative total of 2047 distinct identifiable journal titles had been accessed and 40,457 full text articles downloaded. Fifty percent of the articles downloaded came from the 26 most popular journals, while the remaining 50% came from 2021 other journals—an access pattern showing the 'long tail' of the desired information and strongly reinforcing the need to provide an entire library over the internet. Interestingly, popularity of journals in Ptolemy bore no relationship to the impact factors of the journals and inspection of the list of journals and articles downloaded revealed the most common reason for using the library was clinical care for acute surgical problems, and that 'techniques' journals were popular for this use. Education and research related download patterns are also evident but are currently less common than access for clinical care and we suspect this is true of medical library access in high income countries as well.

Problems with the Ptolemy project have included the following: difficulties with logging on or with completing sessions due to slow internet connections, surgeons having limited time for education and research, and difficulty finding appropriate materials using PubMed or Medline (too much, too little, not relevant, or wanting a textbook not a journal). The latter problems are iteratively addressed by Ptolemy training courses run annually at the COSECSA meeting, and now run by a cohort of African trainers.

Open Access publishing is an attempt to redefine the relationship between research funders, authors, publishers, and readers. Under this model, authors would pay for the costs of publication, ideally using funds allocated by research funding bodies for this purpose. Subscription costs would disappear for all readers, and the entire contents of

the medical research literature would be available immediately in full text, free of charge for all readers in low-income as well as high-income countries. Such a model, if adopted, would render HINARI, Ptolemy, and similar initiatives irrelevant. So far, however, the open access model has not been embraced by the traditional medical publishers. Two main open access initiatives are Biomed Central and the Public Library of Science.

Biomed Central is a UK based initiative begun in 1999 which now boasts 184 clinical and scientific journals and has published over 30,000 primary research articles and over 17,000 other articles, all of which are available free on the internet [3]. Many BMC journals are indexed by MedLine. Publication charges range from $505 to $2345 depending upon the particular journal. The impact factor of BMC Medicine is 4.17 (ie the average primary research paper in BMC Medicine is referenced just more than 4 times). This group of journals is a credible and respectable addition to those produced by the traditional medical publishers.

The Public Library of Science is a more recent open access initiative based in the United States and publishing seven clinical and scientific journals since 2003 [11]. The leading journal, PLoS Medicine, has an impact factor of 15, impressive progress for a recent entrant. The publication charge for authors is $2750.

A final open access initiative is PubMed central which is a repository or archive of free full text articles provided by other publishers, usually with some delay [12]. There are 367 journals listed at PubMed central, with the majority being journals from the BMC or PLoS publishing groups. Compared with over 19,000 journals indexed in PubMed, fewer than 2% are freely available. Many commercial journal publishers provide open access in other ways—sometimes after a delay of 6 to 12 months, sometimes for selected articles only, and sometimes (for those with sophisticated websites) to low-income country users only. Limited 'open access' provided by commercial publishers is not a reliable way for low-income country surgeons to access the most useful clinical and research publications.

The open access movement has made some progress with government agencies which fund the majority of publicly funded medical research. The United States National Institutes of Health has now (as of April 7 2008) mandated that publicly funded research must be deposited in the open access site PubMed central [10]. This rule does not apply to the bulk of published medical research which does not receive public funding, and at present this rule applies only to US based publicly funded research. Health research funding agencies from almost all countries (including USA, Canada, UK, Australia, and many others) will pay open access publication fees for any manuscript resulting from a funded research project. Overall, 36 major health research funding agents have undertaken to pay publication charges for open access and 30 have explicit policies surrounding open access of which 27 either request or require open access publishing for publicly funded health research. Details in each country change rapidly and are currently well tracked by Biomed Central [14].

Open access to scientific information, particularly that which is publicly funded, has strong ethical and humanitarian appeal and would ideally create a scientific commons of value to all. Traditional commercial publishers have considerable infrastructure and experience dedicated to reviewing, editing, publishing, and distributing medical information in a "for profit" model, and they have adapted to run successful businesses in the internet age. The bulk of medical publishing, including the most prestigious journals, remains in commercial hands at present, despite considerable effort and support in the open access movement. Open access will grow and commercial publishing will change in response to increased access and capability of the internet. For the time being, explicit efforts such as HINARI and Ptolemy remain valuable bridges providing full text access to medical literature to surgeons in low-income countries who are attempting to deal with the burden of musculoskeletal trauma.

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