

# Electronic Publishing in Anesthesia and Intensive Care Medicine

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## Abstract

Electronic publishing is undergoing a revolution. Computers and word processing programs have enabled authors to create electronic files of their articles and streamline their work more efficiently. The Internet gave everyone the opportunity to post articles and other content to be viewed by others at any time and from everywhere in the world. Electronic academic publishing might even be a threat to the traditional print publishing.

This lecture discusses a variety of issues involved in electronic publishing and introduces the reader to some of the technology that will soon impact the way we distribute educational content.

## WHAT IS THE WEB ANYWAY?

Is it a new technology that is changing our society or the way we communicate.... or is it a monster that not only destroys old established values but tries constantly to commit suicide (see the recent fallout of dotcom's) ... or is it just a toy that is fun to play with?

The web certainly started off being a very serious endeavor: an independent crash-protected communication line for the military and later, the research-enhancing network for scientists. Today, well-established hierarchies created by scientists and researchers have been thrown upside-down and the masses have taken over what was originally intended to serve only a few. The web has become a source for instant, free-of-charge (?), high quality (?), and credible (?) information for everyone.

## IS THE MEDICAL WORLD CONNECTED TO THE INTERNET?

According to the American Medical Association (AMA) in 2000, only 37 % of US physicians were connected to the Internet. Most of them used the web for E-mail, information gathering, for fun or for online trading. Interactive tools make it possible to search thousands of web sites within seconds for specific information. However, after a few seconds, the user is left with an overwhelming amount of web addresses pretending to offer the most up-to-date information on the requested topic. Nevertheless, never

before was it possible to get such instant information around the clock. It is estimated that the web usage among physicians around the world will substantially grow over the coming years and that doctors already using the net will expand their professional online activities.

## ELECTRONIC PUBLISHING - WHAT'S THAT?

Medical electronic publishing is the presentation of medical content in one of many digital formats. It can be retrieved from computers, CD-ROMs, floppy disks, TV, Palm pilots or pocket PCs, from Intranet's or from the plain "old" Internet. It can be digested in its digital multimedia format or simply printed from computers and handled the traditional way by reading from a piece of paper. However, there are many advantages of e- publishing: digital platforms usually have no or little restrictions in regard to color images, sound files, or movies. Turnover times for articles submitted to online journals are much shorter and its content can be retrieved 24/7 from all around the world. The visibility for authors is enormous and the publishing content is searchable, making it easy to be found by other physicians seeking about this specific topic. The times in which endless shelves are filled with enormous amounts of paper requiring lots of space and personnel or the need for photocopy machines to reproduce that little fraction of assembled information may come to an end. Interactive online search and printing of selected full text articles on the scientists

home/office printers 24/7 may replace the time consuming drive/walk to the library and ultimately save time and money. It really seems that electronic publishing is the way to go. Why are then electronic journals not more popular (yet)? It appears that there are a few more questions in need of answers.

## **ADVANTAGES VERSUS DISADVANTAGES**

**Figure 1**

Tables 1-4: Electronic Publishing Versus Traditional Publishing

<i><b>Advantages of Electronic Publishing</b></i>
<i>Availability, Accessibility</i>
<i>Interactivity, Searchable</i>
<i>New Dimensions</i>
<i>Low Cost Tool (?)</i>
<i>Speed, Instant Feedback</i>
<i>Quality of Print</i>
<i>Environmental Issues</i>

<i><b>Disadvantages of Electronic Publishing</b></i>
<i>Quality Assurance</i>
<i>Reliability</i>
<i>Credibility</i>
<i>Preservation</i>
<i>Low Academic Recognition</i>

<i><b>Advantages of Print Publishing</b></i>
<i>Something in your Hands</i>
<i>Better for your Eyes</i>
<i>Academic Recognition</i>
<i>Well Established</i>
<i>No Computer Required</i>

<i><b>Disadvantages of Print Publishing</b></i>
<i>Print is Expensive and Labor Intensive</i>
<i>Distribution is Expensive</i>
<i>Publishing Delays</i>
<i>No Multimedia</i>
<i>Requires Storage Space in Libraries</i>
<i>Expensive and Labor Intensive for Libraries</i>

## **QUALITY AND CREDIBILITY - WHY IS THIS SO IMPORTANT?**

Electronic publishers have to prove their credibility in order to compete with the traditional brick-and-mortar publishers.

Medical content should be of high quality when published online. However, it does not necessarily have to compete with the high-level research distributed by traditional publishers. It can fill the niche of hands-on multimedia content that is so highly popular among health-care providers. Nevertheless, credibility of the web site and high quality of the content has to be established by strategic alliances with known institutions/names and by serious peer review.

Names of partners/peer reviewers should be clearly visible to the readers (and authors). Quality control, high visibility, indexing by major medical databases, and ultimately recognition by academic institutions will convince authors to submit their high quality content to online publishers. No credibility/quality = no authors = no content = no readers = no online publishing.

Recognition by organizations such as the National Institute of Health (NIH) with its associated National Library of Medicine (NLM) and Medical Index Medline/PubMed is of outmost importance for the medical academic world. PubMed Central is an initiative started by NLM to categorize, support, and index medical online resources. Certain quality features are required by publishers to enable them to apply for inclusion in Medline or PubMed Central. Being indexed by PubMed will help to raise academic credibility and stimulate authors to submit their work to this new kind of information distribution (electronic publishing).

**Figure 2**

Figure 1: Important organizations for online publishers  
(ARL = Association of Research Libraries)



Organizations such as “Health on the Net Foundation” promote the voluntary acceptance of certain quality criteria. Once such quality criteria are implemented by the web site a HON logo can be posted on the site. Other organizations offer similar services.

**Figure 3**

Figure 2: HON Code of Conduct logo



### HOW SHOULD THE IMPACT OF EPUBLICATIONS BE MEASURED?

Harter measured in 1996 the impact of electronic journals on the scholarly community (<http://info.lib.uh.edu/pr/v7/n5hart7n5.html>). He analyzed the citations of 36 electronic journals and came to the conclusion that most of them had no or only little impact. However, he was able to measure some impact with e-publications in the fields of science, medicine and social science. In the same year he analyzed 4,317 references in 279 articles published in 74 electronic journals (<http://php.indiana.edu/~harter-asis96midyear.html>). Only 0.2 % referred to other electronic articles. Worse, 2 years

later only 50% of these electronic resources were available online. This has certainly changed with the acceptance of the Internet as a valuable academic resource. However, storage and availability of smaller online publication is still a problem currently addressed by scholarly storage initiatives in Harvard (MIT) and Stanford.

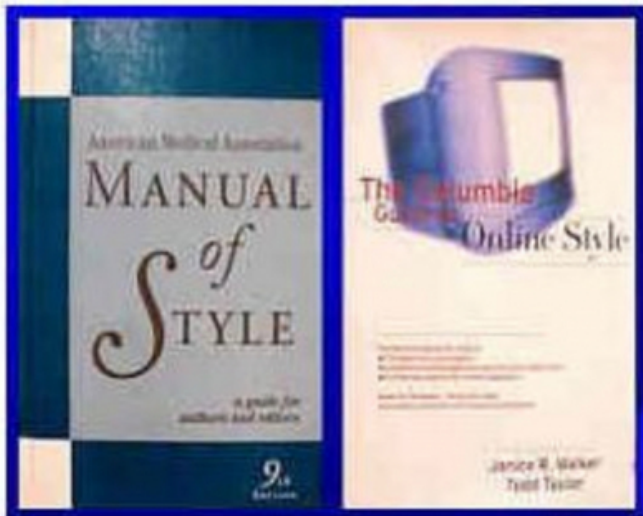
Traditionally, the importance of a publication or a journal is measured by the impact factor (IF). The IF for a given year (i.e., 1999) equals the amount of citations over two years (i.e. 1997/1998) divided by the amount of publications in those two years (1997, 1998). 60 % of all articles in anesthesia are submitted to the 2 top-rated journals (according to their impact factor) Anesthesiology (IF 4.62) and Anesthesia & Analgesia (IF 2.83). The remaining 40 % of submissions go to the other about 100 anesthesia-related journals. Scandinavian and Japanese anesthesia journals complain already about this increasing tendency of submitting articles to journals according to their rank in the IF. The result of this trend is the slow death of smaller or national journals. For the first time in publishing history, another potentially better factor evolves. The web and its digital way of publishing allow measuring how often an article is effectively chosen to be read. This can lead to a new way of measuring the global impact of an article: the reading factor (RF). Other ways to measure some of the impact of electronic publications are the amount of hits an electronic journal gets, or better than just simple hits, how many readers per day click on a specific electronic journal. A variety of search engines offer today the so-called popularity index in which web sites are rated according to their popularity and benchmarked against other similar sites. This index reflects certainly the visibility of an e-publication.

Proper citations of electronic resources will help the articles to find more acceptance and wider distribution. The Manual of Style published by the American Medical Association and The Columbia Guide for online Style are the common resources for authors. Inclusion of the URL (Uniform Resource Locator = Address on the Internet) or better IUI-Code (defines the online location of an article despite potential change of URL) facilitates the search for an online article.



Figure 4

Figure 3: Resources for Authors



### WHO PAYS THE BILL?

In 2000, only 2 of the currently over 100 anesthesia-related print journals were available in full text via the Internet (Anesthesiology, Anesthesia & Analgesia). The British Journal of Anesthesia (BJA) and the Australian Journal of Anesthesiology and others planned to follow soon. All these journals are limited in their online access (subscription, passwords). Only 3 full-text electronic anesthesia journals are currently available: “The Internet Journal of Anesthesiology” (IJA) from ISPUB.com, “The Educational Synopsis In Anesthesia” (ESIA) renamed to “Online Journal of Anesthesiology” from GASNet, and “Anesthesia Online” from PRIORY.com (not updated since 3 years). All are free of charge and easily accessible.

Figure 5

Figure 4: The Internet Journal of Anesthesiology and its URL



Figure 6

Figure 5: GASNet with The Educational Synopsis In Anesthesia (ESIA) and its URL



Many more would try to join this market if full text online publishing would generate a lot of money. However, it became quickly clear that it is not that easy to generate positive revenues with Internet publishing.

One of the leading medical content providers posted a net loss of approximately US \$ 38 millions in 1999 and predicted an even larger loss for 2000/2001. Dr. Koop.com is desperately fighting to survive. Healtheon/WebMD, the largest online health-care player needed some heavy cash infusions (approximately US \$ 220 millions) to continue its business. Medscape went bankrupt in early 2002. All these sites offer both, information for the public and content for professionals. The general public accounts primarily for the high traffic on these web sites. How can electronic publishers survive by only offering professional content, drawing much less traffic to their sites?

The so much hyped banner advertising on top of web sites is not anymore as attractive as it was in the past. 85 % of the users do not read it anymore and the click-through rates declined steadily from about 8 to 0.2 % over the last couple of years. It is very difficult for pharmaceutical or medical equipment companies to measure the “Return Of Investment” (ROI) of money spent in online advertising and marketing departments are not willing any more to give these dollars just away. Will in the near future the readers or even the authors have to pick up their share of the bill? The coming years will brutally select the survivors in e-publishing and will reveal what the best business model will look like.

### IS ELECTRONIC PUBLISHING HERE TO STAY?

Having said all above, one would wonder whether electronic journals are able to survive. Nevertheless, the transition from traditional to electronic publishing has begun. The many advantages of electronic distribution of content are too obvious and will continue to promote online publishing. The leaders in the field will be able to survive and flourish. A

few web sites will emerge as being the recognized platform for high quality academic publishing. Both, authors and readers will increasingly enjoy the possibilities of distributing rich multimedia such as color images, sound, or movies and authors will benefit from the high popularity and visibility of online publishing. Academic institutions and universities will soon recognize these emerging sites and except online publishing has an additional tool for academic promotion. Established medical databases will pick the leaders and include them into their index enhancing furthermore the visibility and attraction for authors.

A few questions remain unanswered:

- what is the best format for online publishing (HTML, XML, PDF, SGML?),
- who owns the copyright (author, publisher, nobody?),
- who pays the bill (advertising, grants, readers, authors?),
- how should the impact of electronic publishing be measured (hits, page views, readers, impact factor, reading factor?),
- who will survive the bursting Internet bubble (traditional publishers, electronic publishers, medical societies, universities, individuals?).

## **NEW TECHNOLOGIES IN ELECTRONIC PUBLISHING**

Electronic publishing is moving towards mobile and/or wireless technologies. Many anesthesiologists use already handheld devices in their daily practice. They are mostly used for drug information, download of daily news, and set-up of small databases about anesthesia services or patient information. The International Society for Computers in Anesthesia (SCIA), a subgroup of the Society for Technology in Anesthesia (STA) presented many of these tools and devices during their annual meeting in October 2001 and January 2002 for those interested in such technologies.

**Figure 7**

Figure 6: Handheld Devices



Newer devices are just about to come to market. Microsoft, Sony and others are in the final stages of developing “Web-Boards”. These are interactive board-like computers that can easily be connected to the Internet or Intranet. They may be connected to a home PC or use a docking station. They are intended to be a mobile computer, web browser, eBook, and even television.

Another type of Web Boards may soon make its entry into the operating room: the Anesthesia Web Board. This board will be connected wireless to the patient monitor, the pharmacy, the billing office and other places within a hospital. The anesthesiologists will have its own board and will be able to sign on digitally when taking over a case. All patient data will automatically appear on the board. It is a digitized patient record system that signal at the same time to the pharmacy and billing office which and how drugs were used. An Australian company is currently developing such boards. They have even included a web-cam enabling to communicate to other colleagues via this board. A web browser included in the web board will allow anesthesiologists to browse anesthesia-related web sites for up-to-date information on problems occurring in the OR. Whether such features will distract anesthesiologists from their duties will have to be seen.

**Figure 8**

Figure 7: Anesthesia Web Board



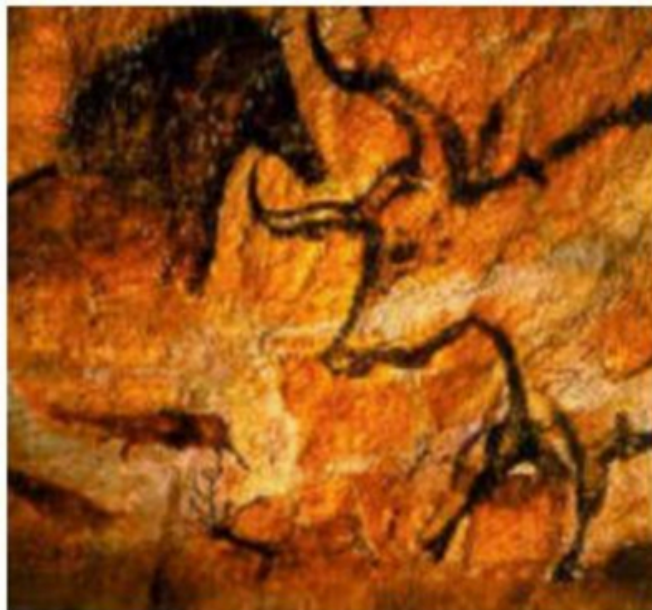
A new and very promising technology is electronic paper. Two companies are currently in the final stages of getting this e-paper ready for commercialization. One of them is Xerox with their technology called Gyrycon. Electronic paper is about 7x thicker than regular paper. It consists of thousand of small spheres lined up between two sheets. The spheres have each one side white and the other side black. Depending on the electric currents in the sheet, the spheres will turn their white or black side up and form letters or images. One sheet of e-paper could store information up to 10 years and can be used up to 10,000 times.

Electronic paper will allow generating electronic newspaper. Rolled up in a pipe and connected wireless to the publishing house such eNewspaper will be all on 1 sheet. Pages can be loaded wireless every day and made visible by pulling the sheet out of the pipe. Such technology will result in tremendous cost savings (no printing, no mailing, no distribution by distributors).

## **CONCLUSION**

**Figure 9**

The times of cave paintings are over...



...ePublishing will slowly replace many of the know print journals!

It will take some time but it will happen!

Electronic publishing is here to stay. A shakeout will select the few survivors that will provide high quality medical content for all health-care providers seeking such information including anesthesiologists. Traditional brick-and-mortar print publishing will continue to exist but will be threatened by the possibilities of online publishing. Electronic publishing initiatives will enable high-quality low-cost online publishing and support smaller publisher or individual scholars to compete with the large and financially strong traditional publishing houses. Most traditional publishers will offer both, print issues and some kind of electronic format. Medical societies will gain in importance because online publishing gives them the opportunity to offer value-added services to their members (CME content, e-commerce, electronic abstract submission, multimedia education, discussion groups,...). Electronic publishing will thrive and survive! Anesthesiologists around the world will find over time more online educational content.

## **DISCLOSURE**

The author of this article is the editor-in-chief of The Internet Journal of Anesthesiology (<http://www.ispub.com/journals/ija.htm>). In addition, he is the founder and current CEO of Internet Scientific Publications (ISPUB.com), a leading online medical publishing house. He truly believes in the future of

electronic publishing.

## **References**

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