



Utilizing information technology tools to provide affordable access to evidence-based resources in the developing world

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Utilizing Information Technology Tools to Provide Affordable Access to Evidence -based Resources in the Developing World

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ABSTRACT

Since the establishment of Global Forum for Health Research, there is an increased recognition to the 10/90 gap. However, there is an equally important gap between the developed and developing countries in access to already conducted research. Lack of access to knowledge resources makes it difficult to link research to healthcare decision-making, resulting in the know-do gap. The World Report on Knowledge for Better Health calls for adoption of strategies that can enable “science to be turned into action to improve people’s health.” Fortunately, with the advent of third generation cellular technologies (3G), wireless connectivity and its associated outreach capabilities, internet access is no more a distant or unaffordable dream for the developing countries. In this light, this paper will review the recent developments in the area of elearning and knowledge management that can provide support for evidence based policies and practices.

Citing examples from their work, the authors will describe how Really Simple Syndication (RSS) and weblogs (blogs) can help subscribe to current “headlines” from a website or journal, which can be invaluable in disasters and epidemics. In addition, these technologies carry other distinct advantages over traditional means of communications. First, their content can easily be delivered for various mobile platforms, such as cellular phones, which might play a predominant role in developing countries. Secondly, they can be integrated with entrez tools of Pubmed and can automate the process of querying new research. Thirdly, their information can be readily archived, indexed and retrieved for future use and shared with colleagues and researchers across the world.

This paper will also review development of the virtual health sciences libraries. Virtual/digital libraries provide full text access to selected journals and books. Since, the needs of researchers and academicians cannot be met from any single source of information, integrating RSS with virtual health sciences libraries can help provide more comprehensive, up-to-date and full text information. This can prove valuable in meeting the health information needs of providers and decision-makers in developing nations, helping close the know-do gap.

KEY WORDS

Information Storage and Retrieval, Information and communication technologies, Knowledge management, RSS, Blogs, Digital Libraries, Evidence -based public health

INTRODUCTION AND PROBLEM STATEMENT

The core public health functions involve: problem definition, development and implementation of interventions, and evaluation of their effectiveness. However, many public health decisions are made intuitively or politically. Evidence-based public health (EBPH) hopes to achieve improved health outcomes and save scarce human and financial resources by helping make rational decisions based on proven strategies documented in literature.¹ EBPH can be defined as a public health endeavor in which there is an informed, explicit, and judicious use of evidence that has been derived from any of a variety of science and social science research and evaluation methods.²

There are two main prerequisites for practicing EBPH. First, the creation of evidence-based knowledge through research; and secondly, the dissemination of research to policy makers and public health practitioners. Currently, 98% of the journals indexed by MEDLINE are published from the developed world.³ The problem of lack of resources for health issues faced by the developing world (also referred to as the 10/90 gap) is increasingly being recognized and many initiatives are being launched that promote R&D on neglected tropical diseases.⁴ However, there is an equally important gap between the developed and developing countries in access to research that has already been conducted and published. The World Report on Knowledge for Better Health calls for adoption of strategies that can enable “science to be turned into action to improve people’s health.” To accomplish this, evidence-based literature not only is to be created, it needs to be available to key policy makers and public health practitioners. Till recently, as much as 56% of institutions in the lowest income countries had no current subscriptions to international journals and 21% averaged only two journal subscriptions,⁵ partly because the cost of print subscriptions is prohibitive. Subsidized libraries are suggested as possible solutions but they do not provide for new information customized to one’s area of interest. For example, a health services researcher dealing with HIV related issues in Africa may not be interested in latest chemotherapy advances for lung cancer published in LANCET, even if s/he has free access to this journal. In 2004 alone, MEDLINE added around one million citations from more than 4,800 biomedical journals, raising the total number to well over 15 million citations! The challenge for the near future is to present the vast array of information sources in an acceptable and useable format.

Hence, there is need for solutions that not only increase access to knowledge resources but facilitate filtering and delivery of information specifically tailored to the needs of researchers and practitioners.⁶ This will help link research to healthcare decision-making and bridge the know-do gap. This paper will shed light on the three low-cost Information and Communications Technologies (ICT) tools - RSS, blogs and digital libraries, that can enable ready access of evidence based information customized to the specific needs for public health officials across the globe.

THE NEW ICT TOOLS

1) RSS:

RSS stands for RDF Site Summary or Rich Site Summary and is an XML-based format to share web site content. According to Whatis .com,⁷ RSS is “a method of describing news or other Web content that is available for ‘feeding’ (distribution or syndication) from an online publisher to Web users.” Typically, RSS feeds contain updated news headlines and content summaries. RSS readers aggregate multiple feeds, making it easy for individuals to quickly scan information contained within each feed.

The major benefits of RSS are the following:

- It brings the information to the user, and don't require the user to go to the web sites to see what's new. For example, World Health Organization (WHO) provides for RSS feeds – “WHO news” and “Disease Outbreaks” which can help researchers and practitioners keep track of global public health news and outbreaks right from their browsers (<http://www.who.int/about/licensing/rss/en/>)
- RSS provides for ready access to up-to-date information at home, office or even in the field. The new cellular phones and PDA's have built in support for RSS feeds making information available to researchers in remote areas who may not have access to internet connection.
- As compared to emails and list serves, individuals can opt-in or opt-out of the content easily, totally controlling the flow of information that they receive.⁸ This helps prevent overload from non relevant information.
- When combined with other Information Retrieval tools, it can help researchers design their own queries to retrieve the latest evidence-based information. For example, one can set up multiple **PubMed** searches for RSS feeds, which can be delivered via email, read in a RSS reader or published in a web site.

To better illustrate this functionality of **PubMed**, we searched **PubMed** for latest health articles and then generated a customized RSS feed (FIGURES 1 and 2), and then rendered the feed in our browser with the help of a RSS reader (FIGURE 3).

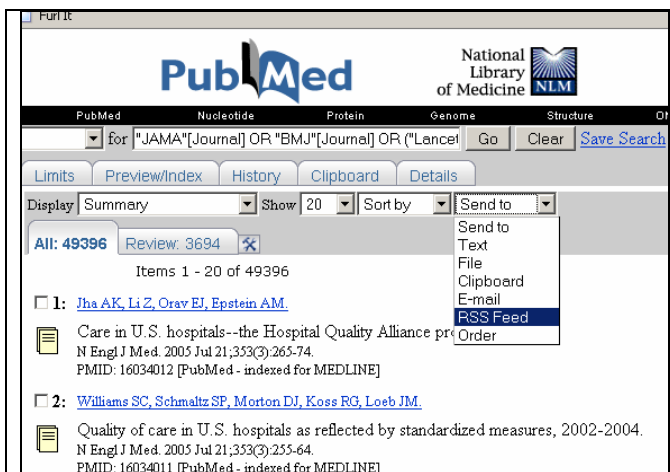


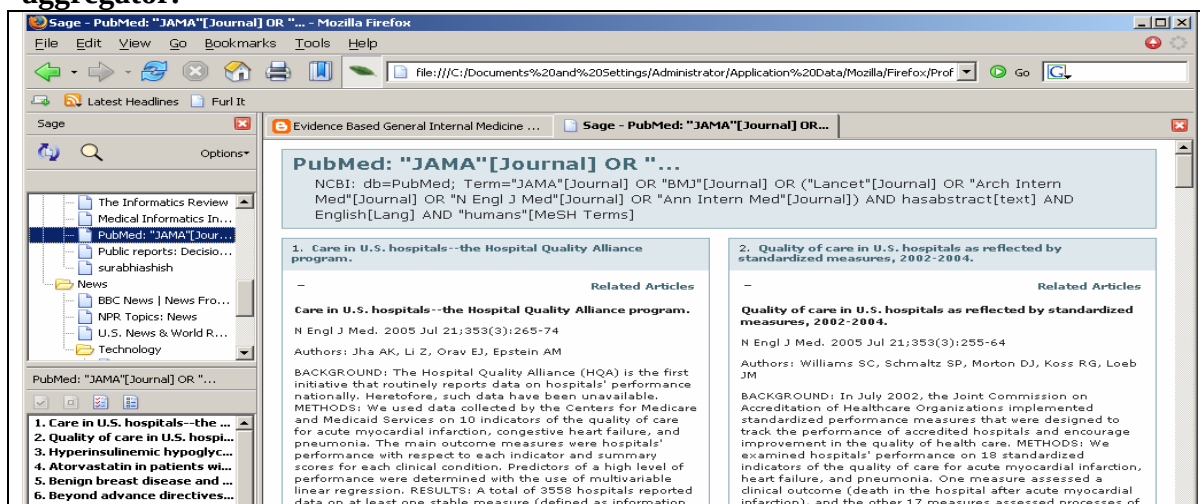
FIGURE 1. Generating a customized RSS feed using Pubmed with the search query:
"JAMA"[Journal] OR "BMJ"[Journal] OR ("Lancet"[Journal] OR "Arch Intern Med"[Journal] OR "N Engl J Med"[Journal] OR "Ann Intern Med"[Journal]) AND hasabstract[text] AND English[Lang] AND "humans"[MeSH Terms]"

FIGURE 2. Content and Structure of the XML feed generated by the PUBMED in FIGURE 1. This feed is available at:

http://eutils.ncbi.nlm.nih.gov/entrez/eutils/erss.cgi?rss_guid=0cs0yIPvmXLU5ifOQOuvMmDbRqDFqSENfcwEeAU7g_6

```
?xml version="1.0" encoding="UTF-8" ?> <rss version="2.0"> <channel>
<title>Evidence Based Medicine- Top Journal Articles for the week</title>
<description>NCBI: db=PubMed; Term="JAMA"[Journal] OR "BMJ"[Journal] ....
AND hasabstract[text] AND English[Lang] AND
humans"[MeSH Terms]</description>
<language>en-us</language> <item>
<title>Care in U.S. hospitals--the Hospital Quality Alliance program.</title>
<link>http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?tmpl=NoSidebarfile&db=
PubMed&cmd=Retrieve&list_uids=16034012&dopt=Abstract</link>
<description> <![CDATA[
<p><b>Care in U.S. hospitals--the Hospital Quality Alliance
program.</b></p>
<p>N Engl J Med. 2005 Jul 21;353(3):265-74</p>
<p>BACKGROUND: The Hospital Quality Alliance (HQA) is the first initiative that
routinely reports data on hospitals' performance nationally. ....</p>
<p>PMID: 16034012 [PubMed - indexed for MEDLINE]</p>
</description> <author>Jha AK, Li Z, Orav EJ, Epstein AM</author>
</item> </channel></rss>
```

FIGURE 3. The PUBMED XML feed rendered in the browser using a feed aggregator.



2) BLOG- the collaborating tool

Practicing evidence based health care involves critiquing and appraising the relevant literature. Even though customized feeds like RSS can help track new information, no individual has the time or energy to evaluate and internalize all the upcoming literature published in his/her field. Blogs, if implemented in the right way, can help address some of these issues. Simplistically speaking, a weblog or blog is a web site that can be updated regularly. Updating a weblog is as easy as using a word-processor and blogs can be updated from several times per day to just a few times per week or month. Blogs are usually created by just one author, but can be compiled collaboratively by a community of authors.

The real value of blog is realized when it is used as a collaborating tool. Blogs can serve as an online journal club where different researchers with similar interests can appraise different articles for collective benefit. By facilitating communication and enhancing knowledge sharing, the burden of collecting, assimilating and critiquing up-to-date literature is shared among the group.⁹ The content of the blogs can then be archived for future need. This archived content can serve as an up-to-date information storage and retrieval resource for all the researchers. The utility of blogs is further enhanced by creation of customized RSS feeds. If someone adds a new entry to her or his blog, its RSS feed is updated immediately to inform all the subscribers. Blogs with RSS feeds have already played a vital role in recent Tsunami disaster fundraising efforts.¹⁰ To illustrate the use of blog as an online journal club and community knowledge resource, we have created a sample blog which can be accessed at <http://evidencebasedmedicine.blogspot.com/>

3) DIGITAL/ VIRTUAL LIBRARIES

The concept of digital or virtual libraries is not new.¹¹ Digital libraries are defined as “organized collections of digital information that combine the structuring and gathering of information, which libraries and archives have always done, with the digital representation that computers have made possible.”¹² The key benefits provided by digital library technology are characterized below.¹³

- Anywhere, anytime access to information. Digital libraries bring information to the user, at work or at home.
- Faster searching and browsing with search engines and hypertext linking.
- Use of resource by many potential users at the same time. Materials are never checked out, mis-shelved, or stolen.
- Easier access to current information (articles can be readily updated with corrections and errata as compared to paper-based format)
- Freedom from hassles of storage and retrieval
- Possibly more cost effective by savings on material, management and human costs.¹⁴
- Digital information can be readily distributed and integrated with Knowledge Management tools to facilitate collaboration and exchange of ideas.

In the last few years, there has been some commendable progress in providing access to full text digital libraries to researchers in developing countries. Health InterNetwork Access to Research Initiative (HINARI) is a millennium initiative of United Nations’ Secretary General Kofi Annan led by the WHO in partnership with six major biomedical publishers (<http://www.healthinternetwork.net/>). It that allows online access to more than 2,300 scientific publications in biomedical and related social sciences to non-profit institutions in developing countries.¹⁵ Many of these countries had no to very limited access to international medical journals. HINARI users can search and access full-text articles directly from the Pubmed (Medline) database. The Health InterNetwork India pilot also initiated several resource sharing mechanisms amongst libraries

(www.hin.org.in), by facilitating consortia for subscription to e-journals, and setting-up web based mechanisms for resource full text of journal articles.

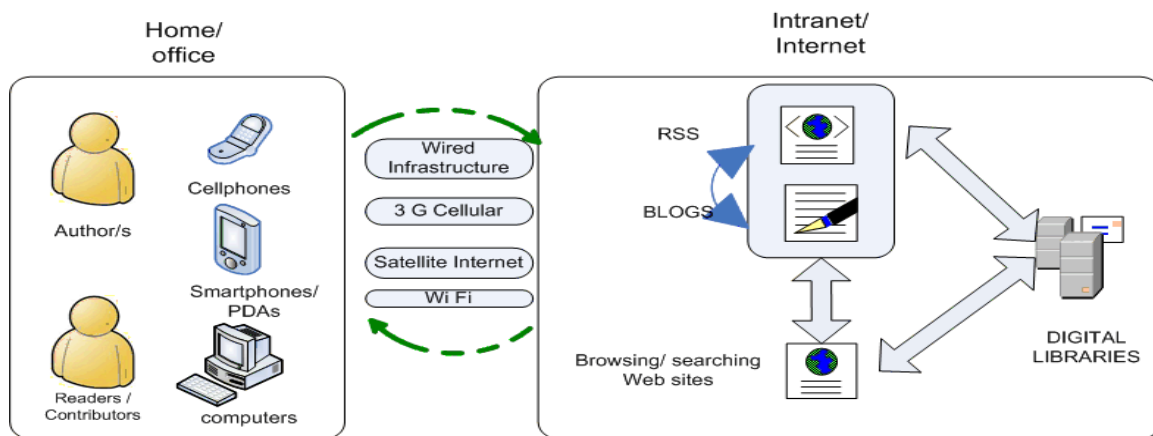
There have also been significant developments in open access publishing, with Medscape, **PubMed** Central, FreeMedicalJournals, BioMed Central and the Public Library of Science/Medicine, providing full-text, primary-source articles free to the health care practitioners. The experience of these initiatives has highlighted the importance of quality and cost of available internet access and training support provided to users, in enhancing the value of the access to content. The extent of access to the available content is expected to increase as users accumulate experience in using information.

INTEGRATING THE ICT TOOLS TO MEET THE CHALLENGE OF EBPH

The effort of international organizations (www.hin.org.in), individual country initiatives (www.indmed.nic.in), as well as the growing popularity of the open access archives movement, access is expected to steadily improve for the stakeholders on the wrong side of the digital divide. It is important to empower the users to exercise selectivity in accessing the information most relevant to them to prevent information overload. This is also because web connectivity costs are still high in many developing countries. Providing users alternative access interfaces and choice for determining and accessing what is most relevant to them will contribute to enhanced access and consequently, use of evidence based research in decision making.

Integrating the ICT and knowledge management tools may help enhance access to knowledge without creating information overload. For example, a researcher may use **PubMed** to create a customized RSS feed for his/ her search query, as previously demonstrated in Figure 1.¹⁶ This XML feed may then be accessed in email, or read through a feed reader. There are also free tools that can add RSS feed to a web page, blog or any valid HTML page. This blog can then serve as an online journal club where scientists with similar interests can get up-to-date information on latest journal articles through automated RSS feed and can appraise the literature critically by publishing on the blog. The discussion in a blog does not have to be restricted to published journal articles only; it can include discussion about latest news relevant to public health such as disease outbreaks, case reports, recently published books, unpublished manuscripts etc.

The blog can then link to relevant electronic resources available online, including web sites, video or static presentations and full text articles available through open access publishing or projects such as HINARI. Furthermore, with the use of IP range access that checks for institutional access, officials from different organizations or countries can retrieve full text articles using the same hyperlink authored in the blog or web site. In this respect, all the three ICT tools, RSS, blogs and digital libraries become part of the common solution- i.e. to provide better access to customized evidence-based resources for scientists and practitioners, irrespective of geographical location (see FIGURE 4).



Schematic Representation of the data flow in the emerging ICTs

THE PROBLEM OF INTERNET ACCESS AND THE DIGITAL DIVIDE

It can be argued that all the above mentioned tools will not make a major impact towards the practice of evidence based public health unless people in developing nations have access to the internet and related technologies.¹⁷ One of the ways to address this division, referred to as the digital divide,¹⁸ is to step away from the traditional concept of desktop computer and wireline infrastructure towards smartphones and other mobile platforms with wireless or cellular access.¹⁹ In fact, in developing countries without sufficient wireline infrastructure, wireless networks can be used for primary service since they have the advantage of being faster and cheaper. For example, In Africa more than half of all Internet subscribers are wireless subscribers. Increased use of mobile phones can enable cheap messaging (such as sms) to substitute for many e-mail functions. There are many kind of wireless options that could emerge as cost-effective solutions for developing world. One option is to use satellites for Internet and Data Broadcasting. For example, SatelLife uses low earth orbit satellite to provide information to about 4000 health professionals in 30 countries in Africa and Asia.²⁰ The other option is to use Terrestrial Wireless Technologies like Third Generation Mobile Services (3G) or Wireless Fidelity (WiFi). The Third generation (3G) and WiFi offer greatly increased bandwidth over existing mobile networks, with the possibility of Internet access to handheld devices such as portable phones, personal digital assistants, and small personal computers. Though the jury is still out about which one of the wireless technologies will become the preferred solution, affordable internet access is no more a distant dream for the majority of the developing world.

CONCLUSIONS

Information and communication technologies have not been harnessed systematically to improve the health of populations in developing countries. This paper presents an overview of three ICT tools – RSS, Blogs and digital libraries and sheds light on how we can utilize these tools to bridge the gap of access to EBPH resources between the developed and developing world. We believe that the new ICT tools coupled with emerging wireless technologies and increased use of handheld devices have the potential

to be great equalizer in today's knowledge based society. It now remains up to us, how best we utilize these tools to help bridge the digital divide and close the know-do gap.

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