The internet. Part two: a resource for critical care nurses

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SUMMARY

- This is the second of two articles about the internet, highlighting its significance for critical care nurses world-wide.
- The previous article (Øyri & Ward, 2003) gave a brief overview of the structure and functionality of the internet, described tools commonly used to access information and pointed out a few of the most useful starting points for critical care nurses.
- This paper deals with some useful web sources for evidence-based literature and focuses on quality and ethical guidelines and how the user can assess quality of content on websites.
- It also presents some important international organisations working within the field of nursing informatics and healthcare informatics.

EVALUATION OF RESOURCES, THEIR QUALITY AND ETHICAL STANDARDS

Many worries have been expressed about using information from the internet for courses and personal development – but especially in relation to patient care. Kiley (2001) highlights 'the perennial problem many health professionals face when using the internet – namely how difficult and time consuming it is to find high-quality, information-rich websites.' He also notes that 'too often a search of the internet will direct the user to web pages where the information is inaccurate, biased, out-of-date, and irrelevant.' This section introduces some of the issues associated with healthcare information available via the internet, and provides an overview of current initiatives for ensuring quality, focusing on various approaches.

Concerns about information quality

An initial problem is the massive volume of health information available. Attempting to locate useful material is made more difficult by the limitations of many search tools, notably the indiscriminate and unwieldy retrieval from search engines. Search engines can be valuable tools for helping find what you require. In particular, they are automatically developed and maintained, resulting in up-to-date coverage of large percentages of the total web. However, they are indiscriminate in their retrieval, and therefore result in vast quantities of sites in response to any search, with no indication of the quality of the material that has been retrieved. A related problem is the transitory nature of much of the available information. It remains a common problem that 'hits' in search engine results, or links from one site to another, lead to nowhere but a 'file not found' message.

Much of the material available via the internet has not been through any process of peer review or evaluation prior to its availability. Cader (2000) describes the differences between professional journals and commercial publishers, and information available via the internet. Professional journals and commercial publishers have a tried and tested system of editorial review and external refereeing which helps to ensure quality, whereas anyone can disseminate information via the internet with no regard to its accuracy, validity or bias. The internet has broken down the traditional barriers to publishing – on the one hand, this is positive in terms of ensuring freedom of access to information, but at the same time, anyone can become an author and publisher, not just reputable writers.

Accuracy of health information

Accuracy is an area of particular concern in relation to health information available via the internet, and several studies highlight the extent of the problem. For example, in one study, two search engines were used to find parent-oriented information on the web relating to the management of fevers in children at home (Impicciatore et al., 1997). The authors compared the material they retrieved with published guidelines on the minimum temperature of a child that should be considered as feverish, the optimal sites for measuring temperature, and the pharmacological and physical treatment of fever. Of the 41 web pages that were evaluated, the authors found only four that closely adhered to the main recommendations in the published guidelines. The largest deviations were in sponging procedures and how to take a child's temperature. In addition, 28 pages provided a temperature above which a child is feverish. The authors therefore conclude that, 'only a few websites provided complete and accurate information for this common and widely discussed condition', which 'suggests an

urgent need to check public oriented healthcare information on the internet for accuracy, completeness, and consistency'.

A more recent study used ten search engines to search for 'depression and treatment' (Lissman & Boehnlein, 2001). The first 20 sites listed by each tool were evaluated to assess whether they mentioned the nine symptoms and five major criteria of a major depressive episode, and whether they made any of the three basic treatment recommendations. The authors conclude that, 'the quality of the information on the internet produced by the search was quite low'. In particular, 'for-profit websites appeared much more frequently than not-for-profit sites…and they contained the poorer information'.

Among the mass of health information on the internet, there are thousands of high quality resources produced by reputable individuals and organisations that are supported by appropriate literature and research, that are up-to-date, and that have possibly also been through a process of peer review. The problem is identifying useful information and evaluating it to ensure its quality. Sites are regularly encountered that offer 'cure-all' claims for diseases such as cancer and AIDS – such sites are generally linked to a commercial product, and the inaccuracy of the information is easy to identify. However, other inaccuracies may be more difficult to spot. The 'end user' may be a member of the public looking for information of personal interest, or a healthcare professional looking for information to support their clinical practice. Whoever the end-user might be, the accuracy of health information available via the internet is a serious concern due to the potential consequences of acting on false information – it could be a matter of life or death. In general, domains .gov and ac.org are controlled by official institutions, and the information reveals the credibility of the institution or organisation presenting the material.

There are currently a number of organisations considering the issues associated with the quality of healthcare-related resources on the internet, with many publishing criteria on what to look for when evaluating a website.

THE INTERNET AS A SOURCE FOR EVIDENCE-BASED LITERATURE

Cochrane Collaboration

This organisation *(http://www.cochrane.org/index0.htm)* was founded by the British epidemiologist Archie Cochrane in 1993. The Cochrane Collaboration presents itself as 'an independent and international non-profit organisation dedicated to making updated and accurate information about the effects of healthcare available worldwide. It produces and disseminates systematic reviews of healthcare interventions and promotes the search for evidence in the form of clinical trials and other studies of interventions' *(http://www.cochrane.org/docs/descrip.htm)*.

The Cochrane Collaboration has produced the Cochrane Database of Systematic Reviews, published each quarter as a part of the Cochrane Library *(http://www.cochrane.org/reviews/revstruc.htm)*. The reviews are made by healthcare professionals who establish voluntary groups to focus on a variety of topics. Most medical libraries and some countries have access to the reviews presented in one of the seven databases in The Cochrane Library collection. The Cochrane Collaboration has a worldwide network of national branches which present comprehensive information on their internet sites.

Cochrane reviews have a formalised structure, and are meta-studies based on thorough and systematic search strategies. Reviews evaluate research results, mostly randomised controlled trials, and explore the quality of the studies, including their specific characteristics.

Figure 1. The Cochrane Collaboration logo illustrates the results from a meta-study, presenting seven randomised controlled trials (RCT) comparing active treatment with placebo. Each horizontal line represents a study, and the shorter the line, the stronger the evidence, with 95% confidence intervals. The dot shows the average results. If a horizontal line touches the vertical line, there is no evidence for effect of the investigation. Lines on the right side show more harm than good. Studies on the left side are dominant, indicating effective treatment in those not touching the vertical line.

Figure 2 shows the screen from The Cochrane Library website. The figure illustrates a protocol for a systematic review made by members of the Cochrane Anaesthesia Group. It is presented under the topics Anaesthesia, Postanaesthetic Unit/Intensive Care, Circulatory Care, and is entitled 'Pulmonary artery catheters for adult intensive care patients'.

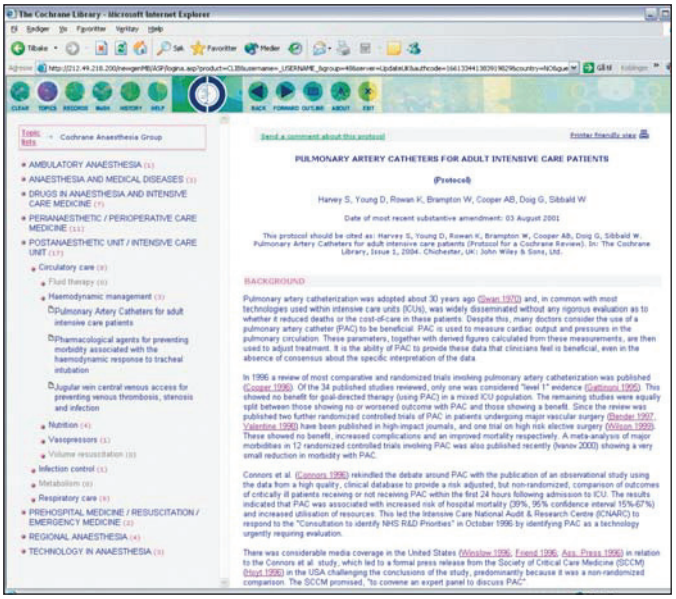

Figure 2 The Cochrane Library Search Screen

National Library of Medicine

The National Library of Medicine (NLM) (http://www.nlm.nih.gov/) is located at the National Institutes of Health (NIH) in Bethesda, Maryland, USA. The NLM website presents substantial content under the topics health information, library services, research programmes, new and noteworthy general information. This site is a valuable resource, and is a strongly recommended starting point for a variety of updated and trustworthy, free healthcare-related information.

The Medical Subject Headings (MeSH) system

NLM has developed MeSH, 'a controlled vocabulary thesaurus consisting of sets of terms naming descriptors in a hierarchical structure that permits searching at various levels of specificity' *(http://www.nlm.nih.gov/pubs/factsheets/mesh.html)*. The MeSH system is used for indexing and cataloguing books, documents and audiovisuals in most medical libraries, and has both an alphabetical and hierarchical structure. The system has 11 levels, from general to narrow and specific. There are 22,568 descriptors, and more than 139,000 headings or supplementary concept records.

PubMed (a MeSH application)

PubMed *(http://www.ncbi.nlm.nih.gov/entrez/query.fcgi)* was developed by the National Center for Biotechnology Information. PubMed is a text-based search and retrieval system including several databases aimed at providing access to citations from biomedical literature. It not only offers abstracts, but also provides links to full-text journals and other related web resources.

One of the databases, MEDLINE, is the premier NLM bibliographic database and covers the fields of medicine, nursing, dentistry and the healthcare system *(http://www.ncbi.nlm.nih.gov/entrez/query/static/overview.html)*. President Bill Clinton decided to make the information in MEDLINE available as a free public service in 1996. MEDLINE lists 4,600 journals from over 70 countries, and has more than 12 million citations in the database. Figure 3 illustrates a PubMed search with the search terms 'stress and ICU'. There are 1,207 items in the search results, and the first 20 are listed on the screen. When the names of the authors are clicked, abstracts (if available) appear along with any links to full text articles, or related articles for each individual listing are presented.

Access to online journals is often based on subscription, and a

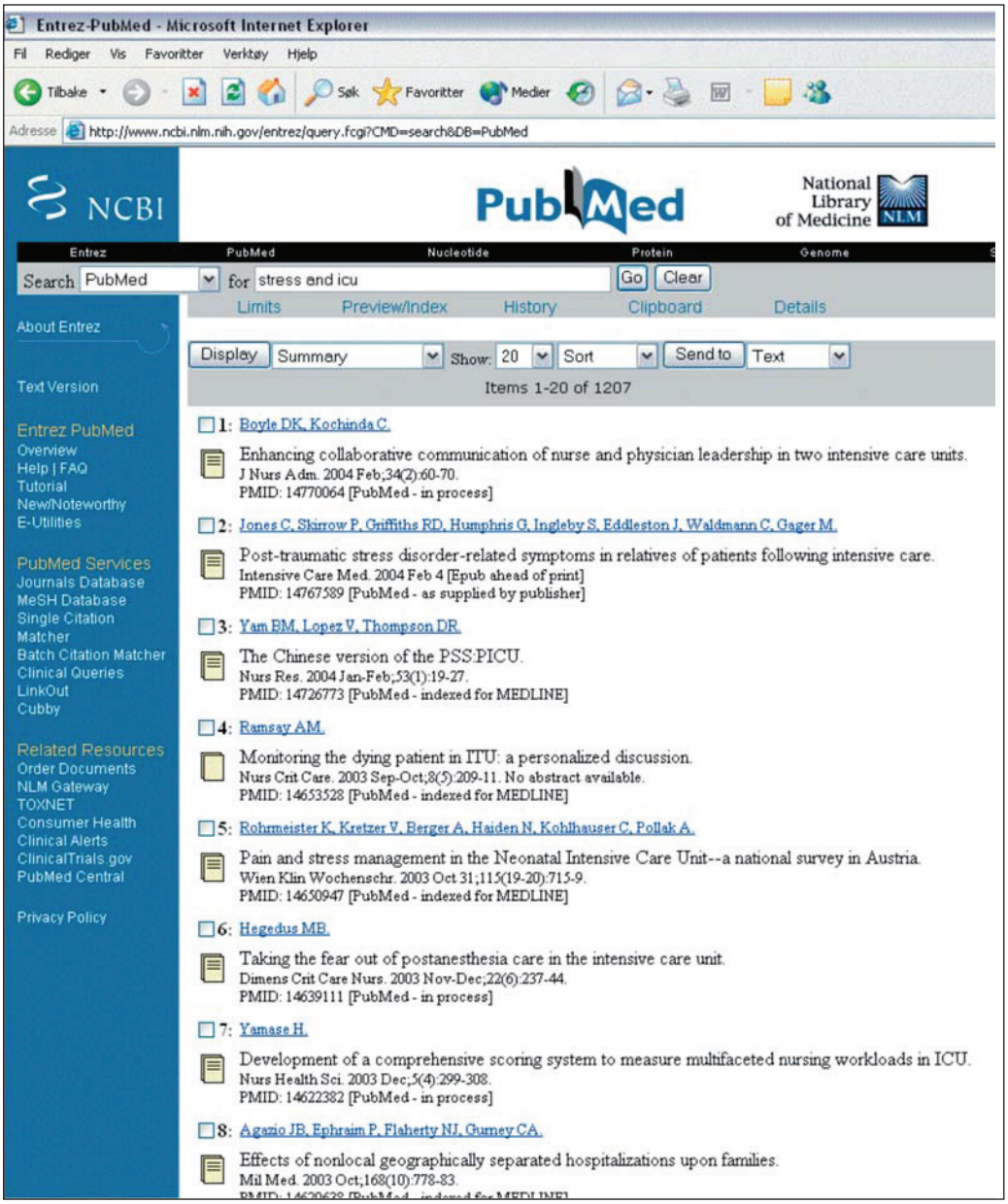

Figure 3 PubMed Search Screen

good tip is to check with the medical library at your institution, hospital or university and get access to their list of subscriptions and log-in passwords.

Health On the Net Foundation

Health On the Net Foundation *(http://www.hon.ch/)* was established in 1995 in Geneva, Switzerland, by a group of experts during an internet and telemedicine conference. A programme to 'promote effective and reliable use of the new technologies for telemedicine in healthcare around the world' was initiated. In March 1996, http://www.hon.ch/Global/ was launched as one of the first URLs to guide both lay users and healthcare professionals to reliable sources of information on the internet. HON is now one of the most respected non-profit portals to medical information online. It is a Swiss foundation closely co-operating with the university hospitals of Geneva and the Swiss Institute of Bioinformatics. The web team hails from several European countries and the USA. Among the most important HON features are the two search tools: MedHunt (http://www.hon.ch/MedHunt/) and HONSelect *(http://www.hon.ch/HONselect/)*. HON has also developed the HON Code of Conduct for the provision of trustworthy and authoritative web-based medical information.

HON Code of Conduct (HONCode) for medical and health websites

HON reviews all websites applying for approval by the organisation. The approved websites have to comply with a set of principles ensuring their ethical and qualitative standard. The criteria are as follows:

Authority

Any medical or health advice provided and hosted on this site will only be given by medically trained and qualified professionals unless a clear statement is made that a piece of advice offered is from a non-medically qualified individual or organisation.

Complementarity

The information provided on this site is designed to support, not replace, the relationship that exists between a patient/site visitor and their existing physician.

Confidentiality

Confidentiality of data relating to individual patients and visitors to a medical/health website, including their identity, is respected by this website. The website owners undertake to honour or exceed the legal requirements of medical/health information privacy that apply in the country/state where the website and mirror sites are located.

Attribution

Where appropriate, information contained on this site will be supported by clear references to source data and, where possible, will have specific HTML links to that data. The date when a clinical page was last modified will be clearly displayed (e.g. at the bottom of the page).

Justifiability

Any claims relating to the benefit/performance of a specific treatment, commercial product or service will be supported by appropriate, balanced evidence in the manner outlined above.

Transparency of authorship

The designers of this website seek to provide information in the clearest possible manner and provide contact addresses for visitors seeking further information or support. The webmaster will display their e-mail address clearly throughout the website.

Transparency of sponsorship

Support for this website will be clearly identified, including the identities of commercial and non-commercial organisations that have contributed funding, services or material for the site.

Honesty in advertising and editorial policy

If advertising is a source of funding, it will be clearly stated. A brief description of the advertising policy adopted by the website owners will be displayed on the site. Advertising and other promotional material will be presented to viewers in a manner and context that facilitates differentiation between it and the original material created by the institution operating the site.

All sites approved by HON have the right to use the HON Code logo on their websites. The logo has a direct and unique link to the HON Code application status, with details about initial review and last subsequent review. An example can be seen on the European federation of Critical Care Nursing association's website *(www.efccna.org)*, where the logo is placed on the home page. The use of the easily-verifiable, 'one-click' HON Code is a fast way for the visitor to check the credibility of the content on the visited site.

The HON search tools

Figure 4 shows how the MedHunt search screen looks when the

Figure 4 MedHunt Search Screen

search term 'critical care nursing' is entered. A lot of information is presented on this page, along with the actual 337 search results. It is easy to use the search tool, and there are different options for further submission of searches. First, all 21 HON subscriber pages related to the topic are presented; next, 63 sites visited and described by HON; and finally, 253 sites automatically retrieved by the HON search robot MARVIN are listed.

HONSelect

HONSelect is a search integrator for strictly medical and health

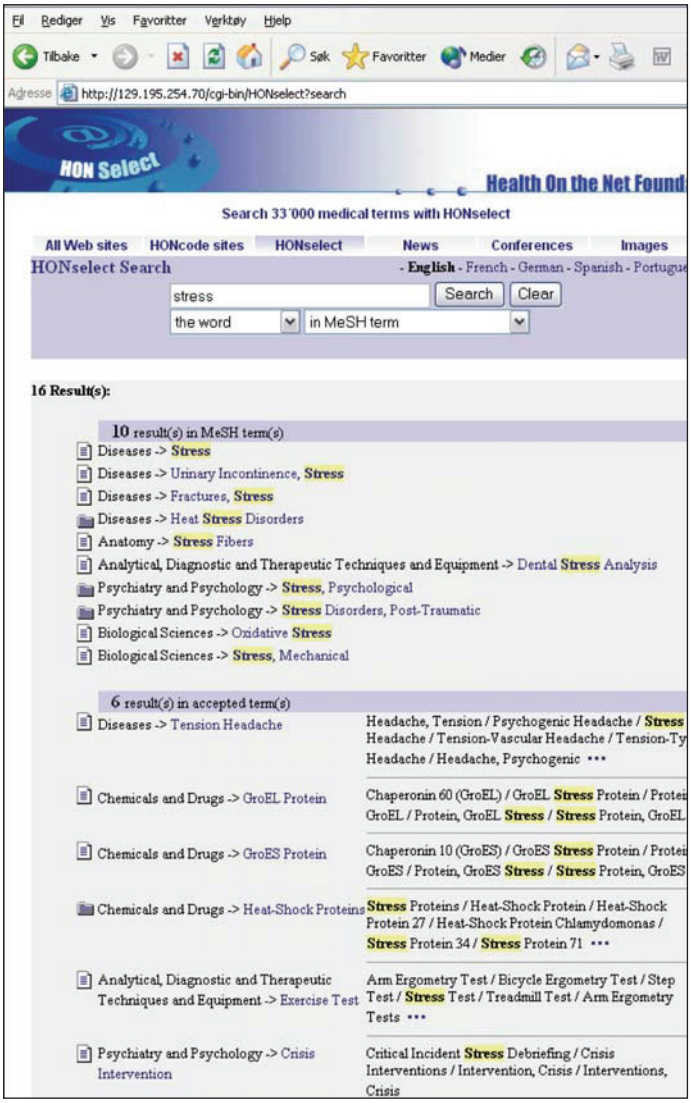

Figure 5 HONselect search page

queries. HONselect combines the five information types:

- ❖ MeSH-terms;
- ❖ Authoritative scientific articles;
- ❖ Healthcare news;
- ❖ Websites;
- ❖ Multimedia.

Figure 5 shows how this platform can be used for a fast and effective search for information when the search term 'stress' is used.

OMNI/BIOME approach to quality

BIOME *(http://biome.ac.uk/)* is a project that aims to provide access to only high-quality resources on the internet within the whole of the life sciences. This is achieved through the development of a number of gateways to the descriptions of selected and evaluated internet resources. Figure 6 illustrates the search screen from BIOME.

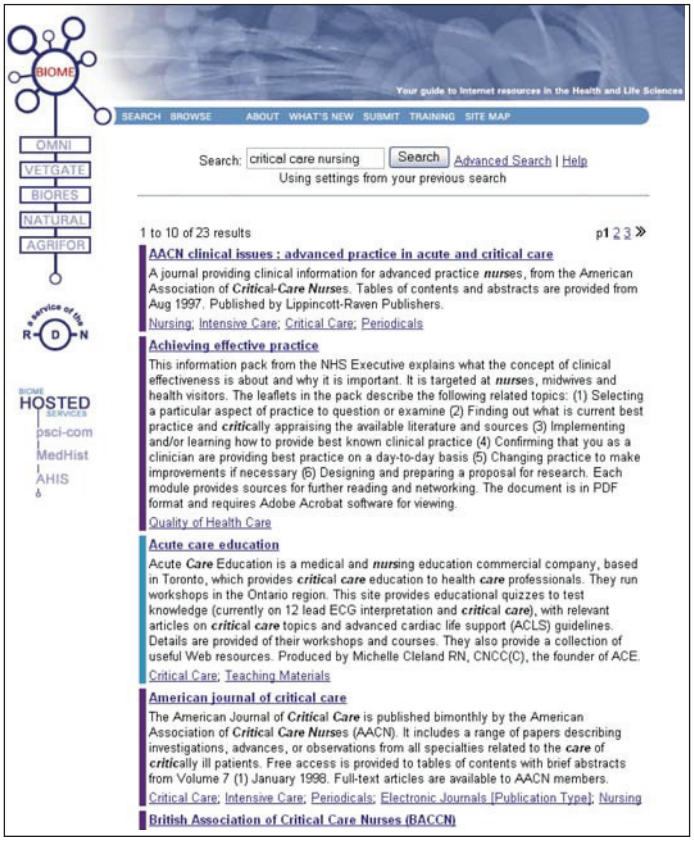

Figure 6 Search screen from BIOME

The gateways include OMNI (*http://omni.ac.uk/*), covering all areas of health and medicine, and its sub-set, NMAP *(http://nmap.ac.uk/)*, covering nursing, midwifery and professions allied to medicine. A team of content providers based in Nottingham, as well as partner institutions (Royal Free Hospital, University of the West of England, Chartered Society of Physiotherapists), identify, evaluate and describe resources for inclusion in the databases. Resources are evaluated using detailed criteria (discussed below), and a template is completed for each resource. The template contains a brief abstract about the content, including details of who has produced the information and its accessibility, as well as searchable subject headings.

OMNI/BIOME evaluation guidelines

A detailed set of evaluation criteria have been developed by the BIOME team for identifying and evaluating high quality resources *(www.biome.ac.uk/guidelines/eval/index.html)*. This is to ensure the quality of the resources that are included in the databases, as well as to ensure consistency in the decision-making by the different content providers. The criteria cover the following areas:

Context

- ❖ Scope – what is the subject scope and is it relevant to the user community?
- ❖ Audience – who is the resource intended for?
- ❖ Authority – who has produced the resource? What are their qualifications?
- ❖ Provenance – how long has the resource been available? Is it stable?

Content

- ❖ Coverage – what is the subject coverage of the resource? Is it at a suitable level for the user community?
- ❖ Indications of accuracy – has there been an editing process? Is there any evidence that the source may be biased?
- ❖ Currency – is the information up-to-date? How frequently is it updated?

Format

- ❖ Accessibility.
- ❖ Design and layout.
- ❖ Ease of use.

The guidelines include advice on the technicalities of conducting an evaluation, such as where to look to determine who has produced a source if it is not immediately obvious from the site itself. In addition, recent work has focused on the development of guidelines for evaluating resources relating to complementary and alternative medicine (CAM). Due to the controversial nature of this area, additional criteria are required to provide a direct yes/no assessment of whether a CAM resource should be included in either the OMNI or NMAP databases. The guidelines draw on external recommendations for categorising resources according to types of therapy, as well as hierarchies of evidence, to ensure a focus on the highest quality resources (further information is available in the guidelines themselves).

JAMA Benchmarks

In April 1997, an editorial in the Journal of the American Medical Association (JAMA) highlighted issues associated with the quality of health information available via the internet (Silberg et al., 1997). The authors advocate, 'the same set of quality moorings that help users of medical information navigate in print should apply in the digital world'. They therefore propose the following set of standards, now known as the 'JAMA benchmarks', for the provision of high-quality, health-related resources on the internet:

- ❖ Authorship: Authors and contributors, their affiliations, and relevant credentials should be provided.
- ❖ Attribution: References and sources for all content should be listed clearly, and all relevant copyright information noted.
- ❖ Disclosure: Website 'ownership' should be prominently and fully disclosed, as should any sponsorship, advertising, underwriting, commercial funding arrangements or support, or potential conflicts of interest. This includes arrangements in which links to other sites are posted as a result of financial considerations. Similar standards should hold in discussion forums.
- ❖ Currency: Dates when content was posted and updated should be indicated.

European Commission Guidelines

In June 2001, the European Commission held a workshop with invited participants from all member states, including governmental representatives, delegates from industry, medical, and patient groups, as well as key experts from the health information ethics field. The workshop aimed to draft guidelines on quality criteria for health-related websites that could be used to guide the member states in possible implementation measures. The work is on-going and the draft criteria are now available online: *(http://europa.eu.int/information_society/eeurope/ehealth/quality/index_en.htm)*. The guidance currently takes the form of a brief A4 document that both advises producers of information on how to comply with key quality criteria, and also aims to educate users as to what they ought to expect from a good quality website.

MedCIRCLE

A slightly different approach to identifying quality information is the use of 'seals of approval' and/or metadata. Seals of approval, usually taking the form of a kite mark, badge or logo, are displayed on websites to indicate third party approval of a site based on a particular set of standards. Metadata is information about a website contained in the HTML source code, and can be used to indicate the coverage of a resource, as well as its quality. MedCIRCLE followed on from the European-funded MedCERTAIN project *(http://www.medcircle.org)*, using a combination of kite mark ('trust mark') and metadata to indicate the quality of internet health resources. The project aims to, 'establish a fully-functional self- and third-party rating system enabling patients and consumers to filter harmful health information and to positively identify and select high quality information'.

There are several other guidelines available, or under development, for evaluating and ensuring the quality of health information on the internet. We have chosen to present some of the most authoritative information sources known to the authors. Many sources provided on the internet address health consumers. These sites are, in many cases, also highly relevant for healthcare professionals, but are outside the scope of this article.

Health technology assessment organisations

Most countries have official websites with public information, run by the Department of Health or similar governmental institution. In addition, most hospitals and universities are present on the net with a broad variety of high-quality information. Technology assessment in health care is a multidisciplinary field of policy analysis involving studies of medical, social, ethical, and economic implications of development, diffusion and use of health technology. Figure 7 shows the home page of the International Network of Agencies for Health and Technology Assessment (INAHTA, *http://www.inahta.org/)*.

INAHTA represents a global network of 40 agencies in 20 countries, and acts as a co-ordinator of their work. Among the features on the website are 'Publications', 'HTA-Database', 'HTA-Checklist' and 'Info Sources'. The mission of the organisation is to accelerate collaboration and exchange among the agencies, promote information sharing and comparison, and prevent unnecessary duplication of activities. Membership is open to any organisation that assesses technology in healthcare, is a non-profit organisation, relates to regional or national government and is funded at least 50% by public resources. The synthesis report 'Preoperative

Evaluation in Elective Surgery' (López-Argumedo & Asua, 1999) is an example of INAHTA's work. In the introduction, the following goals are presented:

'The routine ordering of a range of tests preoperatively, whether or not indicated by an individual patient's clinical features, has been a part of clinical practice for many years. The main objective of the report is:

- To carry out a report synthesising the evaluation papers published to date by INAHTA agencies on 'Preoperative Evaluation in Elective Surgery'. Specific objectives are to sum up the state of scientific knowledge about 'Preoperative Evaluation in Elective Surgery' in the published reports.
- To describe habitual attitudes and practices among surgeons and anaesthetists based on the surveys published in the assessment reports.
- To summarise the economic and legal implications analysed in the reports.'

Critical care nurses in search of evidence-based information might use the INAHTA website, including the links, for references and objective sources of clinical information.

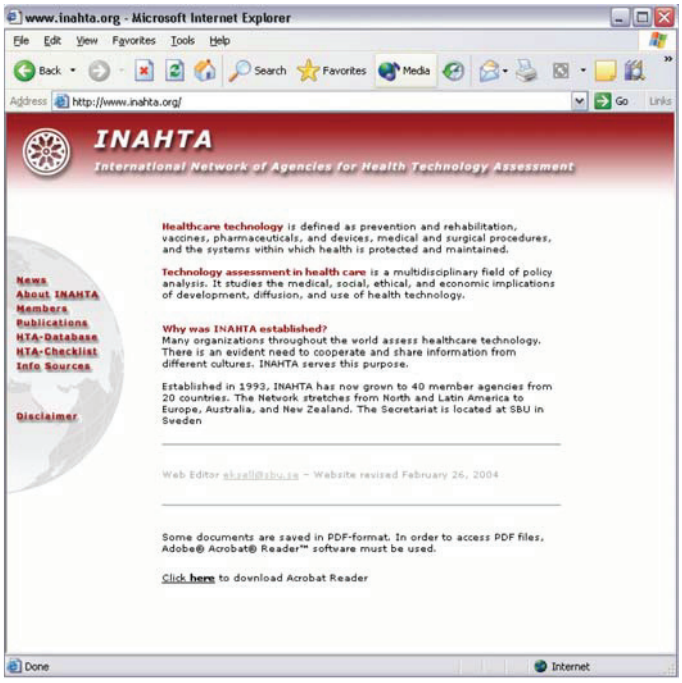

Figure 7 INAHTA Website

INTERNATIONAL ORGANISATIONS WORKING WITHIN THE FIELD OF NURSING INFORMATICS AND HEALTHCARE INFORMATICS

In this section of the article, we focus on some key organisations on the internet for critical care nursing and nursing informatics. Since most organisations are present on the net, we will point out some important topics and organisations, and provide a list of links that the reader can follow.

CRITICAL CARE NURSING ORGANISATIONS ON THE NET

World Federation of Critical Care Nurses (WFCCN)

The World Federation of Critical Care Nurses *(http://www.wfccn.org/)* exists to provide a global forum and network to link critical care nurses around the world as individual practitioners, and through their local and national professional associations. Over 20 critical care nursing associations now belong to WFCCN. This website aims to provide a description of the organisation and its activities. See Figure 8.

Figure 8. The WFCCN website

European federation of Critical Care Nursing associations (EfCCNa)

The EfCCNa website *(http://www.efccna.org)* is the official website of the European federation of Critical Care Nursing associations. It is the only formal network for critical care nursing organisations in Europe. See Figure 9.

Figure 9. The EfCCNa website

NURSING INFORMATICS ORGANISATIONS ON THE NET

Association for Common Nursing Diagnoses, Interventions and Outcomes (ACENDIO)

ACENDIO *(http://www.acendio.net/)* is a membership organisation established in 1995 to promote the development of nursing's professional language and to provide a network across Europe for nurses interested in the development of a common language to describe the practice of nursing.

International Medical Informatics Association – Special Interest Group for Nursing Informatics (IMIA SIG-NI)

IMIA SIG-NI *(http://www.imia.org/ni/index.html)* is the special interest group on nursing informatics of the International Medical Informatics Association (IMIA). IMIA SIG-NI has work groups on topics like Open Source (www.osni.info), research and so on.

European Federation for Medical Informatics WG 5 Nursing Informatics in Europe (EFMI SIG-NI)

The European Federation for Medical Informatics (EFMI) Working Group 5 *(http://www.nicecomputing.ch/nieurope/index.htm)* aims to support nurses and nursing organisations in Europe with information and contacts in the field of informatics.

Nursing Informatics Special Interest Groups

The Nursing Informatics Special Interest Group page (*http://nursing.umaryland.edu/~snewbold/skngroup.htm*) is compiled by Susan K Newbold and provides a comprehensive listing of nursing informatics organisations around the world.

INTERNATIONAL MEDICAL INFORMATICS ORGANISATIONS

International Medical Informatics Association (IMIA)

IMIA's goals and objectives *(http://www.imia.org/)* include:

- The promotion of informatics in healthcare and biomedical research;
- The advancement of international co-operation;
- The stimulation of research, development and education;
- The dissemination and exchange of information.

Inherent in this mission is the aim to bring together, from a global perspective, scientists, researchers, vendors, consultants and suppliers in an environment of co-operation and sharing. The international membership network of National Member Societies, IMIA Regions, Corporate and Academic Institutional Members, and the Working and Special Interest Groups that constitute the 'IMIA family', are uniquely positioned to achieve these goals.

Telemedicine Information Exchange Europe

The Telemedicine Information Exchange (TIE) (*http://www.tieurope.org)* Europe is a web-based resource for telemedicine and e-health activities both in the UK and Europe. It is a non-profit organisation aiming to become:

- The principal resource for UK and European telemedicine and e-health projects, both present and planned;
- The point of reference for health service managers and clinicians who are considering using technology to modernise healthcare delivery.

CONCLUSION

The internet has changed communication for good. The user-friendly functionality makes it attractive for the user, and the immediate and rapid response from searches, even across the globe, extinguishes traditional geographical borders. Differences in language and cultural background still exist, but international collaboration in critical care nursing has grown and is made easier by the internet. The nursing profession, as in others, benefits from the easy access to and exchange of professional material in the fields of education, clinical evidence practice and in research.

The first internet article in CONNECT focused on the structure, functionality and basic skill development relating to the net. This second article has focused on content and some dominant international organisations and brief background descriptions of quality information providers have been presented. Readers should use the relevant links to follow their personal professional interests.

The overwhelming variety of information calls for strategies for internet use. We have focused on credible, trustworthy and mostly governmental or official web sources. It is up to the individual critical care nurse to use the net for personal professional development, bearing in mind that such information should always be used with caution.

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