Ariadne's thread: biomedical gateways to not get lost in the Internet labyrinth

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The more the Internet grows, the more a researcher has to cope with the so called "information overload", or "data deluge". Reliability, updating, authoritativeness of a Web site ought to be a requirement, all the more reason for the biomedical field. During the past years libraries and information specialists have been developing projects, such as gateways and virtual reference desks, aimed at supplying trustworthy health information in Web sites. Purpose of this contribution is to present these tools, in order to improve one's search skills.

KEY WORDS: Internet - PubMed - Databases, bibliographic.

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biomedical field. Here are presented gateways and initiatives aimed at supplying trustworthy health information in Web sites - this time we're not talking about medical literature or article in journals, indexed in Medline, but about Internet resources in general.

HON Code: medical information you can trust

Health On the Net (HON) Foundation is a Swiss non-profit, non governmental organization created in 1995 and accredited to the Economic and Social Council of the United Nations (http://www.healthonnet.org/). HON is the leading organization promoting and guiding the deployment of useful and reliable online medical and health information, and its appropriate and efficient use. To address one of Internet's main healthcare issues - the reliability and credibility of information - HON has elaborated a *Code of Conduct* (HON Code) to help standardise the reliability of medical and health information available on the World-Wide Web. The HON code is not an award system, nor does it intend to rate the quality of the information provided by a Web site. It only defines a set of rules both to hold Web site developers to basic ethical standards in the presentation of information and help make sure readers always know the source and the purpose of the data they are reading. HON code states 8 principles:

1. authoritative (indicate the qualifications of the authors);

No doubt that the Web, with its about 143 millions sites (according to Netcraft as to November 2007, http://news.netcraft.com/archives/web_server_survey.html) (all Web sites last accessed on December 7th, 2007), in the last ten years has represented a real Copernican revolution in the information search end retrieve: the user is in the centre now, he/she can access information – no matter where it is based in the world - just typing few words on the keyboard, and can build his/her own virtual library each time collecting documents answering to a specific question. After the first justified enthusiasm, now we have to cope with the so called "information overload": a matter of quantity, indeed, but mainly of quality. How many times did a search engine give back to us a commercial page, or a page "last updated 2004", or a page whose webmaster is unknown? Reliability, updating, authoritativeness ought to be a requirement, all the more reason for the

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Figure 1.—Health On the Net Foundation's homepage with the search box, the 6 labels and the 3 profiles tabs, above.

2. complementarity (information should support, not replace, the doctor-patient relationship);

3. privacy (respect the privacy and confidentiality of personal data submitted by the visitor);

4. attribution (cite the sources of published information, data and medical and health pages);

5. justifiability (site must back up claims relating to benefits and performance);

6. transparency (accessible presentation, accurate email contact);

7. financial disclosure (identify funding sources);

8. advertising policy (clearly distinguish advertising from editorial content).

Medical Web sites that apply for HON code are submitted to an accreditation process in order to evaluate the compliance with the 8 principles. Then they receive the HON logo that they have to put on their web page and they are included in the HON site and in the MedHunt database, both searchable from the HON's homepage.

On the HON's homepage, (Figure 1) you find a search box and a hub of other projects: News and events – a link to Continuing Medical Education events, conferences…- HON Dossiers, in-depth reports on medical topics – and WRAPIN, a project of a new medical metasearch engine whose results will not only be relevant to the search query, but will also allow the user to determine the quality - credentials, reliability - of the underlying documents.

The search box directs by default a query within the

HON code sites database, giving a guarantee of trusted information. You can redirect your query simply by choosing one of the labels above the search box: the "All sites" label transfers your query into MedHunt, a search engine specialized in medical sources (not necessarily evaluated by HON).

If you choose the "HONSelect" label you will access a service that combines 5 information types - MeSH terms, authoritative scientific articles, healthcare news, Web sites and multimedia - a sort of medical virtual encyclopaedia in a "one stop shopping" logic.

So, if you run a search for "scoliosis", in the first case you will find directly only the sites compliant with the HON code, in the second you can see those one (38) and all the others retrieved by MedHUnt (1257); while with HONSelect you'll find also a definition, Web resources, images and videos, news and events, articles from medical journal as indexed in Medline, and clinical trials. If you want to run a simple search for news, or conferences, or images (that is HONMedia, shown below), just choose the corresponding label above the search box.

Notice that above the search box you have also a string with 3 profile tabs: if you make the system recognize you as a "Medical professional" you will be shown other tools, such as HONMedia for images, or an acronym database. HONMedia is a repository of about 6 800 medical images and videos. You can run a search with your keyword, or you can browse following the steps that the system purpose to you (select a category, a subcategory and a term, *i.e.* Diseases, Musculoskeletal Diseases, Intervertebral disk displacement, finding 37 images).

INTUTE:
access to the very best Internet resources

INTUTE (formerly the Resource Discovery Network) is a 10-year old collaborative project between 7 Universities in the United Kingdom, providing access to quality resources through a process of evaluation and collaboration (http://www.intute.ac.uk). For each of the 4 sections (Science and Technology, Art and Humanities, Social Sciences, Health and Life Sciences), a network of subject specialists brings together their expertise and evaluates Web resources in terms of quality and relevance. INTUTE provides for a single place where you can easily find Web information coming from different resources, different user inter-

faces, and different search mechanisms: information specialists face with this complexity with their search skills to find out the most relevant and appropriate material and store it in the INTUTE database.

The "Health and life sciences" page (http://www.intute.ac.uk/healthandlifesciences/) is split in many sections (Medicine, Nursing and Midwifery, Bioresearch…) as shown in Figure 2.

From the homepage you can run a search just by typing your keyword in the search box (your query will be performed in all the sections), or you can open one section and run your search in a more definite context, from the perspective of your interest.

The "Medicine" section (with 31 000 listed resources) is indexed by MeSH terms and MeSH subheadings, so you can browse the MeSH tree like in PubMed and find the resources related to your research field, in a more direct and precise way (*e.g.* search by keyword: "stroke, rehabilitation": 24 items; by MeSH term: cerebrovascular accidents / rehabilitation: 2 items).

You can also filter your search by resource type (guidelines, systematic review, patient leaflet, associations, e-book chapter, article…) from the results list, or, at the beginning, from the "Advanced search" page (option on the top left of the page).

On the navigation toolbars on the left side you can find also:

— virtual training suite: provides free Internet tutorials to help you learn how to get the best from the Web for your education and research;

— support materials: scroll the page until you get the Subject booklets, among which you find the .pdf version of the «Internet resources for physiotherapy and orthopaedics» (http://www.intute.ac.uk/supportdocs/physiotherapy.pdf), a selection of the most useful websites including clinical resources, teaching materials, databases, discussion groups and mailing lists…): a real mine of addresses;

— hot topics: each month links to key sites on a subject (e.g. The ethics of stem cells research, June 2007, http://www.intute.ac.uk/healthandlifesciences/hottopic_38.html);

— newsround: is a news aggregation service, which gathers together a wide range of subject-based newsfeeds from across the Internet and presents them in a single searchable interface (news from BBC, Medline plus, The Scientist…);

— timeline: a selection of notable events from prehistoric times to the present, broken down into separate subject areas and themes.
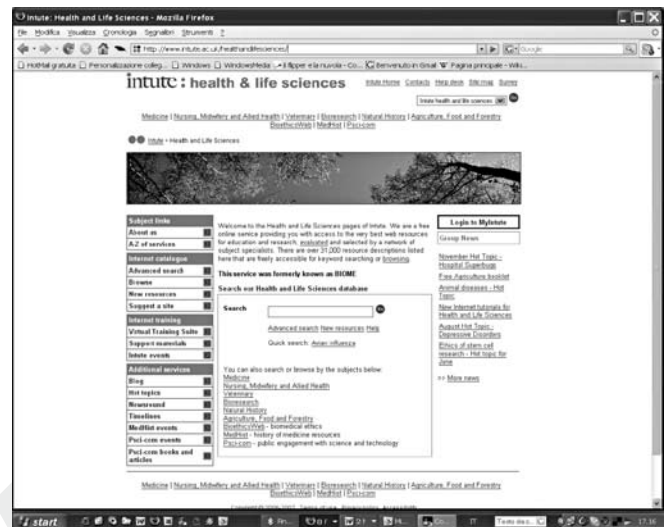

Figure 2.—INTUTE – Health and life sciences – homepage.

You can also freely register into "My INTUTE", so you can save your searches or records of interest, you can receive a weekly e-mail alert listing new records matching your specified subject areas, and you can export records.

CISMeF: Internet speaks French

CISMeF – Catalogue et Index des Sites Médicaux Francophones (http://www.cismef.org/) is a project of the University of Rouen cataloguing Internet resources in French. It is a useful tool, to navigate the Web from another perspective. You can search by keyword, or browse by MeSH term (in English or French), or search by resource type, as you can see in Figure 3.

There are also 3 major so called "axes" of interest: Best practices and consensus conferences, Teaching and learning, and Patient oriented information. Please notice, in Figure 3 on the left down, the HONCode logo, attesting the compliance with the 8 HON principles listed above.

Orthogate:
the gateway to the orthopaedic Internet

Orthogate is a project developed between Canada and the USA aimed at improving orthopaedic care

Figure 3.—CISMeF homepage.

and musculoskeletal health, education and research using Internet technologies (http://www.orthogate. org/). It is compliant with HONCode. Orthogate provides for a sort of virtual community of specialists with a forum, a blog, mailing lists, and discussions online. Among the "Resources" listed on the navigation toolbar on the left, there is a very interesting «Orthopaedist's guide to the Internet», designed to provide researchers with self-teaching tools to improve the use of the Internet for obtaining orthopaedic information (http://www.orthogate.org/guide/ chapterl.html#guide)

The most useful instrument is a virtual reference desk, linked from the homepage as "Validated orthopaedic Web resources", called Orthopaedic WebLinks (direct URL: http://www.orthopaedicwe-blinks.com/), a very rich directory of more than 10.000 web sites about – among other 25 topics - Evidence based orthopaedics, Physiotherapy, General resources for orthopaedics (physicians and allied professionals).

Medical Virtual Reference Desks

A great number of medical institutions in the world edit a Virtual Reference Desk for their researchers: these are the "reference rooms" of the digital library, the library without walls. We shall have a look to some example of these directories of quality resources.

MedWeb, edited by the Emory University (Ga, USA), is a directory of thousands of selected and evaluated web pages, indexed by speciality, disci-

pline, health topic (http://www.medweb.emory. edu/MedWeb/ SPT— Home.php). As to December 2007, this Web site is being restyled and there is only the "Search" function in use, while browsing between the thousand of pages was the real strength of the project. The staff is re-cataloguing and weeding the database, and is adding new features according to the Web 2.0 (a blog, the possibility to post a comment, or to rate a resource): coming soon, MedWeb is going to become "MedWeb community", a more interactive web site.

The Library of the Swedish Karolinska Institutet edits a Directory of Biomedical resources (http://www.mic.ki.se/Other.html). Librarians have for years collected evaluated links to free medical Web resources. The result is an extensive directory of quality controlled links to Web sites and information resources on the Net (up to 16 000 links in the collection), categorised by subject and searchable by keyword. One of the most popular sections is the "Image collection", indexed with MeSH terms (http://www.mic.ki.se/MEDIMAGES.html). The section contains links to other pages and sites offering biomedically related multimedia material, mostly images as photos or illustrations. Occasionally, the material may be downloaded and used free of charge. Normally, however, the material is strictly copyrighted, and may be used only after first having obtained explicit permission by the rightful owner. This rule applies also for the HONMedia database seen above. The section "Diseases and disorders" (http://www. mic.ki.se/Diseases/index.html) presents a list of diseases: of particular interest the Musculoskeletal Diseases (http://www.mic.ki.se/Diseases/C05.html).

Jim Martindale, former consultant at the University of Irvine (Cal, USA), edits the Martindale's Health Science Guide (http://www.martindalecenter. com/ HSGuide. html) with resources listed by speciality. It is very rich in images and videos, clinical cases, and it has also a section with Medical Calculators (http://www.martindalecenter.com/Calculators1B.html).

Hardin MD (http://www.lib.uiowa.edu/hardin/ md/), edited by the University of Iowa (USA), was first launched in 1996, as a source to find the best lists, or directories, of information in health and medicine. Hence, the name Hardin MD comes from Hardin Meta Directory, since the site was conceived as a directory of directories: *i.e.*, searching for "sciatica", you will find quality sites collected by Hardin, but you will also be shown the list of the corresponding

page in Medline plus, the Directory of the Karolinska Institutet, Google pages, and so on, in the current logic of a "one stop shopping" tool.

In Italy, the Pinali Medical Library at the University of Padua edits a "Medical Links" page (http://www.pinali.unipd.it/online/link.htm) split by speciality and searchable with a customized Google application. The University of Rome «La Sapienza» edits an analogous medical Virtual Reference Desk (http://w3.uniroma1.it/vrd-medicina/).

A similar but a quite different project are the*. CARE pages edited by the Mario Negri Institute (Milan):

Pain.CARE (http://www.paincare.it/), Neuro.CARE (http://www.neurocare.it/), Onco.CARE (http://ww.oncocare.it/it/default.htm), Cardio.CARE (http://www.cardiocare.it/), and similar are accessible from the homepage of the Institute (http://www.marionegri.it/mn/it/index.html) by selecting the desired page in the "Gli altri siti dell'Istituto" window, down right. All these pages are HON Code compliant. You can find selected resources on the topic, grouped in the "Categorie" window, and, clicking on the "Articoli" link, you will find very useful preformulated searches in PubMed concerning the subject.