

## Technical development

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We describe in brief the methods used to develop the portal e-medication.org: We gathered information regarding the relevant WWW resources with Internal Medicine, infectious diseases, antimicrobial resistance, control of nosocomial infections, Hepatitis B, Orthopaedic infections and obstetrical and gynecological infections by making use of popular Internet search-engines (Google, AltaVista, and Yahoo). We used various relevant keywords in different combinations in our searches and reviewed the web pages found in depth of the first 2000 results. We also performed searches of the PubMed and Current Contents databases in our attempt to identify additional relevant electronic sources. In addition, we reviewed the information provided in web sites of major universities and institutions to find additional Internet links to WWW sites presenting educational material. We chose to include in our indexes English language WWW resources, which are updated in a regular basis and have been active for more than a year. Criterion for inclusion of a potentially relevant WWW site was compliance with the open access movement principles. The goal of this effort was to track web sites including case-based education, photo-quizzes, photo and video banks, practical guidelines resources, established knowledge reviews and clinical practice teaching points. We excluded sites offering original research such as medical journals with open access, which are already known and easily accessible to the large medical community. To assure the integrity and quality as well as increase the accessibility of our web research output, we submitted the produced results in journals relevant to each of the above fields for peer review. Some of this work has already been published<sup>1-6</sup> and the rest is under consideration for publication in peer-reviewed biomedical journals of the relevant fields.

Another major source of online medical education material is video sharing services such as youtube and google video. Those are large banks of videos of all kind, freely distributed and available to view download and redistribute, in compliance with the open access principles. Among those videos one can find medical videos and animations of various quality and educational value. Following the principles described above we started a process of filtering and reviewing those videos for their quality, categorizing and presenting them along with a short description, interesting remarks, teaching points and relevant web links.

Internet has been revolutionised by the search engine technology presented by Google in September 1998. We used the co-op service<sup>7</sup> to create a custom medical search engine integrating Google's core search technology and restricting search results based on websites and pages that we specified, reflecting this way the medical oriented Internet. The websites included in this custom search engine are those selected by the process described above. Really Simple Syndication (RSS) is a web feed format used to publish frequently updated digital content, such as journals scientific articles and news feeds<sup>8</sup>. Most medical journals and institutions websites containing dynamic and updating content offer RSS feeds. We compiled a list of important medical RSS feeds grouped into categories permitting the user to review in a glance tens of major medical websites for news headlines, abstracts and links to the full articles and immediately retrieve the content he is interested in.

Furthermore we created our own section of case based education. The chief complaint, history of present illness, medical history, physical examination, and diagnostic work up are presented in a succinct way in the first part leading to a question for the reader about diagnosis or management (the usual question is: "What is your diagnosis?"). Differential diagnosis, final diagnosis, treatment, teaching points, references, and acknowledgements are presented in the second part that appears by clicking on the "Read more" link. This content section is frequently updated with new cases and therefore supported by a RSS feed.

Finally, we developed a database of international evidence-based clinical guidelines. The guidelines are available free on the Internet in full text and are issued by international or national medical specialty associations, relevant professional societies and government agencies. The guidelines are browsable by medical specialty or through the search engine feature that queries for certain keyword. We registered the domain <http://www.e-medication.org> and bought a web-hosting plan. The dynamic and frequently updated content of the site did not permit the use of static html web design. We needed a content management system (CMS) in order to exploit the full potential of Internet and integrate all the content and services described above with efficacy. A CMS is a computer software system used to facilitate the process of content management. The organization, control and publication of a large body of documents and other content, such as images and multimedia resources is much easier than when using static web design and can be collaborative integrating the end user into the site building and updating process<sup>9</sup>. The development of e-medication.org was made using internal funds of the Alfa Institute of Biomedical Sciences (AIBS). To keep cost low we used Joomla!, open source CMS<sup>16</sup>. Joomla! is free, open, and available to all under the GPL license<sup>10</sup>. We tried to make e-medication.org known to the end user healthcare professional using Internet marketing strategies. We submitted the URL to popular search engines developing at the same time extended meta-tags, meta-description, keywords and index maps for all content, to permit search engines to crawl the website. We also submitted e-medication to directories and medical associations' web sites and posted informative messages to medical newsgroups and discussion forums. A targeted email campaign was launched to reach physicians. Finally e-medication was promoted in medical conferences with posters and video presentations.

In order to assure the reliability and credibility of the information published in e-medication.org we applied and received the accreditation of "trustworthy health and medical information" issued by the Health On the Net Foundation (HON). HON is a non-profit organisation that has elaborated a Code of Conduct to help standardise the

reliability of medical and health information available on the WWW11. E-medication is also listed by Intute, a UK online service that provides access to quality web resources evaluated and selected by a network of subject specialists for education and research12.References

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