



BRIEF REPORT

Developing a Search Engine for Pharmacotherapeutic Information that is Not Published in Biomedical Journals☆☆

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Abstract

Objective: To identify publishers of pharmacotherapeutic information not found in biomedical journals that focuses on evaluating and providing advice on medicines and to develop a search engine to access this information.

Methods: Compiling web sites that publish information on the rational use of medicines and have no commercial interests. Free-access web sites in Spanish, Galician, Catalan or English. Designing a search engine using the Google "custom search" application.

Results: Overall 159 Internet addresses were compiled and were classified into 9 labels. We were able to recover the information from the selected sources using a search engine, which is called "Alquimia" and available from <http://www.elcomprimido.com/FARHSD/Alquimia.htm>

Conclusions: The main sources of pharmacotherapeutic information not published in biomedical journals were identified. The search engine is a useful tool for searching and accessing "grey literature" on the Internet.

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☆☆ Preliminary results for this project were presented in poster format at the 53rd Congress of the Sociedad Española de Farmacia Hospitalaria (Spanish Society of Hospital Pharmacy), held in Valencia in October 2008. The posters were titled "Desarrollo de un motor de búsqueda de "evidencia gris" para la selección y posicionamiento terapéutico de los medicamentos" and "Evaluación del rendimiento de un motor de búsqueda de información para la selección y posicionamiento terapéutico de los medicamentos".

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PALABRAS CLAVE

Información
de fármacos;
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de fármacos;
Internet;
Google

Desarrollo de un buscador de información farmacoterapéutica no publicada en revistas biomédicas

Resumen

Objetivo: Identificar productores de información farmacoterapéutica no publicada en revistas biomédicas orientada a la evaluación y posicionamiento terapéutico de los medicamentos y desarrollar un buscador para el acceso a dicha información.

Métodos: Recopilación de sitios web productores de información sobre uso racional de los medicamentos e independientes de los intereses promocionales. Páginas web de acceso libre, y en castellano, gallego, catalán o inglés. Diseño de un buscador mediante aplicación «búsqueda personalizada» de Google.

Resultados: Se han recopilado 159 direcciones de Internet y se han clasificado en 9 etiquetas. El buscador, denominado *AlquimiA* y accesible desde <http://www.elcomprimido.com/FARHSD/AlquimiA.htm>, permite recuperar información de las fuentes seleccionadas.

Conclusiones: Se han identificado las principales fuentes de información farmacoterapéutica no publicada en revistas biomédicas. El buscador constituye una herramienta útil para la búsqueda y acceso a las publicaciones de «evidencia gris» en Internet.

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Introduction

Articles published in medical journals constitute the basic information pool for creating evidence-based recommendations, and access to those articles is crucial for the development of hospital pharmacy activities relating to drug evaluation and selection.¹

Biomedical database search systems assist in locating references and access to full-text publications via free access or subscription. However, another type of information is also extremely useful and is not accessible through traditional biomedical databases.

In recent years, there has been a substantial increase in the number of organisations and institutions that gather information for the purpose of improving decision-making processes. Both in Spain and abroad, there are numerous agencies regulating and evaluating medical technology, drug evaluation committees, and pharmacy and treatment committees²⁻⁴ that produce quality drug treatment information. Other publishers of this type of information are medical societies, which often elaborate clinical recommendations and guidelines.

Locating all of this information is complicated and time-consuming, as it is scattered across a number of websites that form part of the traditionally "grey literature".⁵ Recovering this information can entail the use of general search engines such as Google or Yahoo, but drawbacks of such searches is that they are not systematic and searching requires a considerable amount of time.

The aim of this study was to identify publishers of drug treatment information that is oriented towards drug evaluation and positioning and that is not published in biomedical journals, and to develop a search engine for systematically locating and accessing such information on the Internet.

Method

The initial list of URL addresses was based on sources of information recommended by numerous publications^{2,4} or included in evaluation procedures used in hospitals,¹ and

on authors' experience in teaching and participating in drug evaluations.

The requirements that must be met by all included websites are as follows: being freely accessible by Internet with no subscription necessary; being published in English, Spanish, Galician or Catalan; and belonging to organisations having to do with rational medication use. As secondary characteristics that provide added value, we also found pages with bulletins published in the *International Drug Society Bulletin* (IDSB), or bearing accreditation labels such as *Web Médica Acreditada* (WMA), Health on the Net Foundation (HONcode), *Webs Médicas de Calidad* (WMC), etc. The information to be gathered includes useful documents addressing drug positioning in clinical practice. These documents are created through comparative evaluations of different treatment alternatives, using primary selection criteria (efficacy and safety) and secondary criteria (convenience and cost), in addition to documents edited by institutions independent from the pharmaceutical industry's commercial interests.

To access information published on the selected web pages, we developed a search engine that uses the Google "custom search" tool,⁶ one of the functions of Google 2.0 described in recent publications.^{7,8} It includes search terms using Boolean operators and classifies URL addresses into several categories or labels.

URL addresses are constantly being selected and incorporated, and all of the included websites are revised at least once every six months.

Results

As of 1 September 2010, we had selected 159 URL addresses. Depending on the search target, they were classified into 6 general areas providing access to diverse sources of information, and into 3 specific areas, with access to specific, high-interest sources of information. The characteristics of each of these information areas called "labels", the main sources that may be accessed from each label, and the type of information offered are shown in Table 1.

Table 1 Labels, Number of URLs^a Included and Keywords for Each Label.

Label	Information Sources and Publishers	Information Type	No. URLs	Keywords
<i>General areas</i>				
Independent Spain-based evaluation	Drug documentation and evaluation centres and committees, pharmacy and therapeutics committees, healthcare technology evaluation agencies	Evaluations of drugs, bulletins and clinical protocols	55	evaluación OR eficacia OR boletín OR seguridad OR informe OR evidencia OR eficàcia OR avaluació OR seguretat OR hoja OR avaluación OR seguridade OR ficha
Independent international evaluation	Drug documentation and evaluation centres and committees, national or regional healthcare agencies	Evaluations of drugs, bulletins and clinical protocols	40	efficacy OR safety OR evaluation OR evidence OR advice OR recommendation OR appraisal OR bulletin OR monograph OR review
Pharmacovigilance	Spain-based and international pharmacovigilance centres	Safety bulletins and alerts	16	farmacovigilancia OR efecto OR adverso OR reaccion OR adversa OR adverse OR reaction OR effect OR pharmacovigilance OR boletín OR bulletin OR drug OR medicamento OR medication OR riesgo OR risk OR grave OR farmacovigilância OR farmacogivilància
Medical societies and CPGs	Spanish and international medical societies and organisations that issue clinical practice guidelines (CPGs)	Expert recommendations and clinical practice guidelines	31	practica OR practice OR clinica OR clinic OR guia OR guideline OR recomendacion OR recommendation
CATs (Critically appraised topics)	Information and documentation agencies and centres	Answers to clinical questions	5	pregunta OR respuesta OR question OR answer
Therapeutic interchange	All URL addresses included in <i>AlquimiA</i>	Information related to therapeutic interchange guidelines and protocols	159	“intercambio terapeutico” OR switch OR “therapeutic substitution” OR “drug interchange” OR “therapeutic interchange” OR “drug class” OR “class effect” OR “drug exchange” OR “efecto clase”
<i>General areas</i>				
FDA	Food and Drug Administration (FDA)	<i>Centre for Drug Evaluation and Research (CEDER)</i> upon the FDA	1	efficacy OR safety OR evaluation OR evidence OR “drug approval” OR “medical review”
AEMyPS and EMA	Spanish drug and healthcare product agency (<i>Agencia Española de Medicamentos y Productos Sanitarios</i> , AEM y PS) and European Medicines Agency (EMA)	Technical reports, monthly notes, prescription guidelines and the EMA's European Public Assessment Report (EPAR)	4	“scientific discussion” OR evaluación OR eficacia OR seguridad OR informe OR evidencia OR efficacy OR safety OR evaluation OR evidence OR epar OR “ficha técnica”
NICE	National Institute for Health and Clinical Excellence (NICE)	Assessments, clinical guidelines and recommendations	1	efficacy OR safety OR evaluation OR evidence

^a Uniform resource locator.

We subsequently developed a free-access search engine called *AlquimiA* that enables locating and recovering information from the URL addresses mentioned above. Each of the defined information areas was used to create a label in the search engine, available at <http://www.elcomprimido.com/FARHSD/AlquimiA.htm>. Here, you may also access the full list of organisations included, their URL addresses and their detailed characteristics.

The search engine has been active since February 2008, with a total of 23 175 searches and 11 455 different visits as of 31 August 2010.

Discussion

The best means of accessing documents which are not included in biomedical literature databases is to use specialised search engines or metasearch engines. To date, we have access to English-language metasearch engines that allow us to recover drug treatment information, including Trip Database, the metasearch engine belonging to the National electronic Library for Medicines (NeLM), or the recently launched NHS-evidence. The only comparable initiative that has been launched in Spain is the Ministry of Health and Social Policy's *Excelencia Clínica* metasearch engine. This tool provides information published in Spanish and other languages, which are co-official in Spain, but it includes very few resources with drug information.

In addition to these specialised search engines, general search tools are also highly appreciated by healthcare professionals. Recent studies⁹⁻¹² have shown that when retrieving information, these professionals prefer search engines such as Google to biomedical literature databases such as PubMed.

New Internet functions, combined with a new philosophy that stresses information sharing and availability, make up the phenomenon known as Web 2.0 or the "social web".⁷ Search engines are some of the tools that characterise Web 2.0.⁸ In addition to a vast array of other functions, Google offers the possibility of creating a custom search engine free of charge. Following this method, quality labels such as *Web Médica Acreditada* (WMA)¹³ have developed their own search engines, and other health care professionals have made lists of websites for purposes similar to that of this study.¹⁴ *AlquimiA*'s offers you a tool that includes resources in English, Spanish and other co-official languages in Spain. This option is not offered by the specialised metasearch engines mentioned previously.

The first issue that had to be resolved was selecting Internet resources offering information that would meet specific quality standards. The very nature of "grey literature" makes it difficult to develop a systematic search methodology. We selected known web pages and others that were located through free searches with different keywords. Although we established objective criteria for including a page in the search engine, the final decision to incorporate a web page or not was based on our experience and knowledge as experts in drug evaluation. This may have introduced a bias. New websites are constantly being selected and included, and all of the URL addresses that have been included are reviewed every 6 months at least.

Pernett et al.¹⁵ recently published an evaluation of 35 expert-recommended websites with information on

medications. Selection followed the Delphi method, and the results found that the information from the evaluated resources was of variable quality. *AlquimiA* includes 17 of the websites selected by that group of experts.

With regard to information sources from Spain, we gathered 55 free-access URL addresses with useful information. As for including web pages belonging to medical societies, we believe that the reliability of such pages varies greatly. They may have promotional biases due to being maintained by pharmaceutical industry sponsorships, and are therefore included under a separate label. Creating specific labels for information edited by the Food and Drug Administration (FDA), the European Medicines Agency (EMA) and the *Agencia Española de Medicamentos y Productos Sanitarios* (AEMyPS, Spanish drug and medical product agency) is justified due to the interest in evaluating the drugs listed in documents published by these organisations. Likewise, a separate label was used for the National Institute for Health and Clinical Excellence (NICE), as a reference in methodology, criteria, and reports.

Results may be classified according to keywords and the labels we created, but one of the search engine's limitations is that we cannot create filters for other criteria, such as the document's author or date of publication. We must also point out that although Google may well be the best search engine available at present, this does not mean that it is capable of gathering all information available on the Internet.

To conclude, we believe that we have identified the main publishers of the drug and treatment information that is not published in biomedical journals. *AlquimiA* is a useful, efficient and dynamic tool that provides access to "grey literature" sources having to do with drug evaluation and positioning.

Conflict of Interest

The authors have no conflicts of interest to declare.

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