

Database Comparison: DrugBank and Consumer Health Complete

Christian Burris

3/29/2010

Introduction

As the Internet continues to develop into a resource for information and learning, certain forms of information have become available to users. Areas concerning medicine and health have always been topics for potential users, and the information concerning drugs has always been of considerable interest. Two such databases have become available to these potential users: DrugBank and the Drug and Herb Information Section of Consumer Health Complete. Both database present information about drugs, but each has a particular focus and scope that would satisfy a particular set of needs.

About *DrugBank*

DrugBank (accessible at <http://drugbank.ca/>) is a Canadian-hosted open source resource. It is largely supported by David Wishart of the Departments of Computing Science and Biological Sciences at the University of Alberta, Canada, the Genome Alberta and Genome Canada public projects, and GenomeQuest, Inc. in Massachusetts. Through these partnerships, the mission of DrugBank is stated on its website:

The DrugBank database is a unique bioinformatics and cheminformatics resource that combines detailed drug (i.e. chemical, pharmacological and pharmaceutical) data with comprehensive drug target (i.e. sequence, structure, and pathway) information.

DrugBank presents information about almost 4,800 drugs in its database with over 100 fields of data for each drug individually. These fields include, for

example, a brief description of its purpose, information related to chemical composition, FDA characteristics, and alternate names. Over 747 web sites are linked to the DrugBank, including educational and health oriented organizations. Although much of the database is focused on the seasoned researcher, portions of it can be read and understood by a more casual user.

About Consumer Health Complete: Drug and Herb Information Section

Consumer Health Complete (accessed from the “Databases” page of the Jackson Library home page) is a database that is part of the suite of products provided by EBSCO Industries. On its home page, it is described as a “comprehensive resource for consumer-oriented health content”, and it serves as gateway to specific categories of resources. It is a subscription based-service, however, and organizations that intend to provide access are required pay for it. It meets also the HONcode standard as a source of reliable health information on the Internet.

From the home page, drug information can be found under the link for “Drug and Herb Information”. Resources for content in the database are drawn from private sources such as MedLine, public sources such as the FDA, and third-party journals such as the Lexi-PALS Drug Guide. These sources serve as intermediaries with EBSCO to provide specific content. Results are provided in specific categories, such as brand names, key warnings, and safety precautions. This database examines details from the perspective of the consumer, and it tries to address the common questions and concerns that consumers may have in their searches.

Searching *DrugBank*

Direct searches can be conducted in DrugBank using a search box that appears on every page. This search box allows a Google-like search of the entire database, returning results for a particular drug on what is known as a DrugCard. This search also “forgives” spelling errors by suggesting alternate forms of a particular word that can be closer to the user’s original parameters for discovery. Additionally, DrugCards that mention a particular drug searched by a user are also presented in order to detail relationships such as interactions and potential conflicts.

Advanced searches can be made through several methods from the “Search” tab. ChemQuery is the first search, and users can either draw or write a chemical compound into a search field using a Java applet; the more accurate the drawing, the more likely that it will yield a partial or exact match to a drug within the database. Next is TextQuery, which supports Boolean searches, phrase searches (by quotation marks) and advanced parenthetical searches to combine differing groupings of texts. Also, TextQuery can be used to search a limited, but growing, of fields within a particular DrugCard. SeqSearch gives users the opportunity to enter specific protein sequences in order to match like sequences within DrugBank. Finally, Data Extractor is the most sophisticated search in DrugBank, as it allows for searches in the style of a relational database like Microsoft Access. Data Extractor gives users the opportunity to build their own searches and export the results for later study in either HTML or CSV format that can be opened by external programs.

The “Browse” tab features three different browse searches, each depending on the skill set of a particular user. The first is a DrugBank Browse, in which a list of all DrugCards is presented to the user one in the order that they were entered into the database. A PharmaBrowse Search sorts all drugs into three broad categories: Small Molecule (drugs with a low molecular weight made up of organic compounds), Neutraceutical (drugs that provide health and medical benefits), and Biotech (drugs that have been engineered at a genetic level). Each category is subdivided into smaller categories which identify a specific process such as cardiovascular, nervous system, and sensory organs. The last and smallest search is Geno Browse, which details specific drugs with and their interactions with a specific gene or enzyme within the human body. Based on the options available in each search, the DrugBank Browse is more accessible to casual users, as they can access the database without a formal search and explore at a their own pace. Librarians without a background in the sciences may find the DrugBank Browse more useful to assist potential users, as formal training in scientific minutia is not required for access.

Searching Consumer *Health Complete- Drug and Herb Information Section*

The Drug and Herb Information Section of Consumer Health Complete has a default to a basic search on its starting page. A single search box is at the top of its page; below it are eight search terms that have been designated as the Top Searches within the database. (It is uncertain how this list was determined, but it may be dependent upon the searches that have been made at a particular location.) When a user begins typing into the search box, the database has a “type-ahead” feature that

“suggests” words that may comply with the text that has been entered. A separate link leads to the Advanced Search, which is capable of searching the other sections of Consumer Health Complete as well as the portion for Drug and Herb Information. Boolean searching is available in both search modes. Because this is an EBSCO-hosted database, the Merriam-Webster Medical Desk Dictionary is available for further reference.

As explained previously, results are presented as articles cross-referenced from external sources, such as entries from the Lexi-PALS Drug Guide and the Complete Guide to Prescription & Nonprescription Drugs. Each article appears to be routinely updated and replaced so that the only the latest information can be found in the database; while performing several test searches, recent articles were dated from March 2010. Fields in each article include brand names and pharmacological categories. However, other fields include data about a user can expect when taking specific drugs, side effects, and what to do if problems emerge. This information is clearly for the purpose of what users can be expected. By the nature of this database, entries are written in “plain English” that any user can understand and is presented in a format that is not meant to intimidate a possible user. Also, with a click, a user can display results in Spanish rather than English.

Further analysis

DrugBank presents information about specific drugs down to granular level. With over 100 descriptive fields, any drug that is listed in DrugBank can be analyzed molecularly, genetically, and other methods of physical analysis. DrugBank also

links to sources such as the user-driven Wikipedia, the Internet Drug Index at WebMD, and government agencies such as the FDA in the United States and the Drug Product database in Canada. Another unique capability of DrugBank is to record information about drugs in terms of its status as approved, experimental, illicit, or withdrawn and drugs can easily fall into two categories or more categories. (For example, LSD- also known as lysergic acid diethylamide- is a small molecule drug that is illicit and withdrawn.) Although much of the database would be far above the needs of a casual user, portions of it do have the capability to satisfy certain curiosities. This would not be a database for undergraduates or average patrons to begin any serious research; rather, it could be a place to continue research after following up from other sources.

Information in the Drug and Herb Information section of Consumer Health Complete is presented in a format that would not be a learning curve to seasoned searchers. As an EBSCO database, it has elements that are familiar to most users: abstracts, accession numbers, and persistent links. Articles can be saved to personal folders and e-mailed for later reference, and as mentioned previously searches can be extended to other areas of Consumer Health Complete, such as encyclopedias and pamphlets. However, the Drug and Herb Information section provides information that would be more valuable to those seeking specific information about a drug and what impact it could potentially have in their lives. This would be an excellent resource to send any users beginning their research or hoping to expand on existing information. Students pursuing advanced degrees in the hard sciences may not find

this resource as stimulating, but it has the possibility of being a starting point for students in the professions of nursing and health sciences.

Closing thoughts

DrugBank and the Drug and Herb Information section of Consumer Health Complete provide valuable about drugs. In practice, they fall on opposite ends of the scholarly spectrum, with DrugBank being directed toward those interested in the structure and composition of drugs, and the Drug and Herb Information section focused upon the impact of drugs on an individual. One element that both databases share is that they are not to be a consulted for actual medicinal purposes, but they are tools for users to understand more about these products. These are starting points for individual research, but the direction of that research ultimately depends upon the needs of the user.

Works consulted

1. EBSCO Industries, Inc. EBSCOhost. *Consumer Health Complete*. EBSCOhost, 2010. Web. 2 April 2010.
2. Wishart, David. *DrugBank: a knowledgebase for drugs, drug actions and drug targets*. David Wishart, 2008. Web. 2 April 2010.