

# Searching web based medical information

*Ibrahim Mansoor, MBBS.*

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### ABSTRACT

Searching for references is part of everyday life in medicine. Since the arrival of the Internet, it has provided great promise for clinicians because of its ability to access and consolidate large amounts of knowledge and information quickly and easily. But because of the overload of the huge amounts of information, searching for particular information has now become a tedious task, which is also very time-consuming and frustrating. This article describes effective ways, tips, tools, detailed search techniques and strategies for searching medical information. It also lists some useful resource and database sites that can provide a lot of help for seeking accurate information.

**Keywords:** Internet, web-based medical information, search engines.

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The Internet is a massive collection of computer networks that connect millions of computers, people, software programs, databases and files. Though it is comprised of various sections from newsgroups through email services, by far, the most popular and fastest growing is the World Wide Web (WWW or just "Web"), cited as most important by two-thirds of the users, followed by electronic mail.<sup>1,2</sup> The Web has accelerated the growth of the Internet by giving it an easy to use, point and click, graphical interface and it contains a universe of network accessible information. In February 1999, the Web contained approximately 800 million pages of information, increased up from 320 million in December 1997.<sup>3,4</sup> Adding to this, the fact that the Web lacks the bibliographic controls standards. There is no equivalent to the ISBN to uniquely identify a document; no standard system of cataloguing or classification; and there is no central catalogue that point to all of the Web's holdings. In fact, many, if not most, Web documents lack even the name of the author and the date of publication.<sup>5,6</sup> Now with 800 million publicly available documents — an amount that is doubling in size every 6 to 12 months, the Internet has become a vast, global storehouse of information. The only problem is: how

do you find what you are looking for? This paper deals with this problem of finding particular medical information on the Internet. The paper presents a detailed discussion of different types of search tools, with the main features of these major tools, their strategies, techniques and tips for the users on how to interact with these tools, available on the Internet.

**Search tools on the web.** Finding information on the Web may be difficult, but it's not impossible. As an alternate to a central catalogue the Web offers a choice of dozens of different Search Tools, each with its own database, command language, search capabilities, and method of displaying results. The Search Tools, also known as Search Services, find documents matching your interests. Each search tool operates on its database of Uniform Source Locator (URLs), texts and descriptions that point to the actual documents on the Web.<sup>2,7</sup> An important point to clarify is that whenever you search with the help of a search tool, you actually view data extracted from the database of this search tool and not from the whole Web. Since none of these search tool databases include the whole Web, you get different results from different search tools. All search tools provide the search results as list of Web documents with hypertext links; which when clicked takes us away to

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From the Department of Histopathology, King AbdulAziz University Hospital, Jeddah, Kingdom of Saudi Arabia.

Address correspondence and reprint request to: Dr. Ibrahim Mansoor, c/o Mansoor Ali, PO Box 1432, Jeddah 21431, Kingdom of Saudi Arabia. Fax. +966 (02) 661 3164. Email: ibm979@hotmail.com

that particular Web document from the search tool. The search tools on the Web fall into 2 main categories: Subject Directories, which rely heavily on the human element as part of their indexing strategy, and Search Engines, which keep human/data interaction to a bare minimum. Both use software robots called "Spiders" that crawl the Web, newsgroups, and gopher, file transfer protocol (FTP) and wide area information servers (WAIS) sites, extracting URLs (addresses) and keywords to add to the search tool's database. Both of these search tools have benefits and drawbacks, depending on what you are willing to sacrifice.<sup>2,7-9</sup> New MetaCrawlers have now emerged, as the best way for querying multiple engines at once. They do not maintain their one database; instead, they act as middle agents and pass on your query to many major search engines.<sup>7-26</sup>

**Subject directories.** The subject directories are hierarchically organized indexes of subject categories that allow the Web searcher to browse through lists of Web sites by subject in search of relevant information. They are often called subject "trees" because they start with a few main categories and then branch out into subcategories, topics, and subtopics. For example, if you are looking for any medical information related to "Saudi Arabia" at Yahoo, select "regional" at the top level, then "countries" at the next level, then "Saudi Arabia" at the 3rd level, and "medical information" at the 4th level. This hierarchy could be represented as: regional / countries / Saudi Arabia / medical information.<sup>27</sup> The subject directories, simply called directories, are compiled and maintained by humans, and therefore you can often find it a good starting point for your topic. They are also useful for finding information on a topic when you don't have a precise idea of what you need. Furthermore, because their maintenance includes human intervention, they greatly reduce the probability of retrieving results out of context. As the subject directories are categorized, they give links to the top levels or main pages of a Web site rather than to individual pages and they cover only a small fraction of the pages available on the Web. They are best suited for searching information about a general subject for example, information required about medical fields such as pathology, ophthalmology etc or about main organs like breast, kidney etc, rather than for a deeper and more specific piece of information. Many large directories also provide an option to search by a keyword, which takes us directly to a specific topic and usually eliminates the need to work through numerous levels of topics and subtopics. The directories rely on the judgment and expertise of the people compiling them and here it is obvious that subject experts would have different and more professional selection criteria than a hobbyist or a casual user.<sup>26</sup> Because directories cover only a small fraction of the pages available on the Web they are

most effective for finding general information on popular or scholarly subjects. If you are looking for something specific, use a search engine.<sup>26</sup> It is also important to remember that no one has categorized the entire web. There are millions of web pages on the Web and it is simply impossible to organize everything, especially at the rate at which the Web is expanding. Examples of subject directories include: About.com [<http://www.About.com>], Look Smart [<http://www.looksmart.com>], WebCrawler [<http://www.webcrawler.com>], Yahoo [<http://www.yahoo.com>].

**Search engines.**<sup>7-26</sup> The Search Engines are very different from directories. While humans organize and catalog subject directories, search engines rely on computer programs called spiders or robots to crawl the Web from one link to another, and log the words on each page into its database. When any keyword related to a topic is typed into a search box, the search engine scans its database and returns a file with links to websites containing the word or words specified. It is important to note that when you are using a search engine you are not searching the Internet "live", as it exists at this very moment. Rather, you are searching a fixed database that has been compiled some time previous to your search.<sup>18,26</sup> While all search engines are intended to perform the same task, each perform it in a different way, which leads to sometimes amazingly different results. Factors that influence results include the size of the database, the frequency of updating, and the search capabilities. Search engines also differ in their search speed, the design of the search interface, the way in which they display results, and the amount of help they offer. In most cases, search engines are best used to locate a specific piece of information, such as a known document, an image, or a computer program, rather than a general subject. Examples of search engines include:<sup>26</sup> MSN Search [<http://search.msn.com/>], AltaVista [<http://www.altavista.com/>], Ask Jeeves [<http://www.askjeeves.com/>], Excite [<http://www.excite.com/>], Fast Search [<http://www.fast.no/sitesearch.html>], Google [<http://www.google.com/>], HotBot [<http://www.hotbot.com/>], Infoseek [<http://www.infoseek.com/>], Lycos, [<http://www.lycos.com/>], Northern Light [<http://www.northernlight.com/>].

**Meta search engines.** The growth in the number of search engines has led to the creation of "meta" search engines, often referred to as multi-threaded or multi-search engines. These search engines allow a user to search the databases of several major search engines in parallel (at the same time). They do not crawl the Web or maintain a database of Web pages. Instead, they act as a middle agent, passing on the query to the major engines like AltaVista, Excite, Lycos, WebCrawler, Yahoo and HotBot, and then returning the results.<sup>23-28</sup> The meta-search engines work best with simple searches. They do not offer the

same level of control over the search interface and search logic, as do individual search engines. They vary in ability to interpret complex searches and for the most part, they strip the advanced search syntax and logic from your queries when they submit them to the search engines. This is because the interface of the meta-search engine must be programmed to interpret your search syntax for each and every search engine it queries. Most of the meta-search engines are very fast. Some of them include such useful features as the ability to select which search engines to include, and the ability to modify results. Some of the meta-search engines can also sort results by site, by type of resource, or by domain. Because the major search engines often produce very different results, meta-search engines provide a quick way to determine which engines are retrieving the best match for your information needs. Popular meta-search engines include: Dogpile [<http://www.dogpile.com>], Inference Find [<http://www.infind.com>], Internet Sleuth [<http://www.isleuth.com>], Metacrawler [<http://www.metacrawler.com>], ProFusion [<http://www.profusion.com>], Savvy Search [<http://www.savvysearch.com>].

**Choosing a search tool.**<sup>21</sup> In order to take advantage of the resources offered by the Web without spending many fruitless hours, it is necessary to familiarize yourself with the search tools. Every search tool on the Web is different. They vary in features, size, accuracy and flexibility. The most important features in selecting a search tool are those which allow you to refine or focus your search when you need to. The following is an overview of main features of major search tools:<sup>7-27</sup>

**About.com** [<http://about.com>]. About.com (formerly The Mining Co.) is a subject directory and people called Guides pick the sites for any particular topic. The names, faces, and qualifications of these people are also prominently displayed on the site. The About.com is not as comprehensive as Yahoo, but you may obtain better results by searching its topics if you are looking for general information on a subject, rather than trying to find the answer to a specific question.

**Alta Vista** [<http://www.altavista.com>]. Alta Vista has one of the largest database and extensive search options and these features make it a favorite for power searching. It is a good search engine for intermediate to experienced user but its interface is less user-friendly than the comparable search engines. AltaVista handles simple search terms very well and it has a powerful advanced searching feature for complex medical terms. The advanced searching feature can also be used to improve simple search results. AltaVista is very strong if your search needs are very focused and it is the best site for specialized medical needs. It can also search in a foreign language.

**Ask Jeeves** [<http://www.askjeeves.com>]. Ask Jeeves deals with plain English queries and it is good when you don't want to deal with complicated query syntax and overwhelmingly large result sets. It has a knowledge base that contains common questions and links to more than 7 million answers. It compares your query with templates within its knowledge base and then returns questions that most closely match yours with links to the answers. So Ask Jeeves is good mainly for general common topics.

**Excite** [<http://www.excite.com>]. Excite uses a combination of text and subject indices to search either by keyword or by concept. Concept searches find documents related to the idea of your search, and not just documents explicitly containing the search terms you enter. Excite offers easy searching techniques for beginning to intermediate users. Its advanced searching features from medical information is not as powerful as Northern Light or HotBot.

**FAST Search** [<http://www.fast.no/sitesearch.html>]. Fast Search has one of the largest database collections and it catalogs 200 million unique URLs, more than any other search engine. Fast is quick and efficient and it works best with simple focused searches.

**Google** [<http://google.stanford.edu>]. Google is an ongoing research project at Stanford University. It is strong competition for Yahoo if you're looking for just a few sites to answer your question. It has the ability for searching through its vast quantity of information and finding the specific piece you're looking for. It is very effective for searching specific medical information. What gives Yahoo the edge is its excellent directory structure, which allows for unexpected browsing of related subject categories. But Google's search capabilities are limited because it only offers simple keyword searching but it is very helpful at returning relevant results.

**HotBot** [<http://www.hotbot.com>]. HotBot is a valuable search tool for both experienced and novice searchers. It offers a sophisticated interface with a vast array of options. A unique feature of HotBot is the engine's ability to save a search, so that you can come back later to continue without going through all the documents again. The large Web index, advanced search capabilities, and graphical query-building aids make it a good choice for detailed queries. In addition to supporting boolean syntax, wild cards, and case-sensitive searching. HotBot also offers a variety of filtering options, including media type and page depth.

**Infoseek** [<http://www.infoseek.com>], **LookSmart** [<http://www.looksmart.com>] and **Lycos** [<http://www.lycos.com>]. These 3 are average search engines and do not have much to distinguish them from their many competitors. Their virtues are speed and ease of use and its defects are a lack of sophistication. The advanced searches form of Infoseek do a better job of finding useful information than the simple search

does. None of these have features or tools compelling enough to give them an edge over Yahoo.

**MSN Search** [<http://searchmsn.com>]. MSN Search, like HotBot, uses Inktomi search engine but it has fewer search options. Advanced search options require no special syntax and are entered using a series of pull-down menus with boolean, date, domain, language, and media search options.<sup>23</sup>

**Northern Light** [<http://www.northernlight.com>]. Northern Light is both an Internet search engine and a fee-based database service. It has powerful search capabilities and an innovative way of sorting results. Combined with its fee-based content, these features give it a strong edge over its competitors for research. Northern Light's uncluttered interface hides a wealth of powerful features, including support for Boolean syntax, nested queries, wild cards, and truncation. The Power Search page offers additional refinements such as field searching and the ability to limit a search by date, language, or domain. Northern Light's fee-based database offers full text of over 5,400 journals, reviews, books, magazines, news wires, and other sources, which you can search separately or in conjunction with the Web. Thus, with one search command, you can search the Web as well as the text of thousands of popular, scholarly, and specialized print resources. This is one of the very best sites for seeking medical information effectively and for reference collection.<sup>29-34</sup>

**Snap** [<http://www.snap.com>]. Snap is a subject directory but the searching is also well implemented, well documented, and well integrated into the site. Browsing through Snap's categories is generally more effective for broad, topical searches. For highly focused queries, Snap's search interface boasts power, precision, and ease of use.<sup>23</sup>

**Web Crawler** [<http://www.webcrawler.com>]. WebCrawler is a simple search alternative for less experienced users and it is part of Excite's network. It offers a "Natural Language Search" feature that allows you to enter a search like "highest mountain in the world". It is effective at simple searches but didn't really compare with some of its simple search counterparts such as Google. It also does not handle punctuation well, even with phrase searching. WebCrawler does support Boolean operators to help you with advanced searches, but the site has no advanced search page; you have to go to the help pages and learn the syntax.

**Yahoo!** [<http://www.yahoo.com>]. Yahoo! is the number-one Internet search site and is good for both novice and experienced users. With a collection of more than 500,000 handpicked sites classified into more than 25,000 categories. Yahoo! makes an excellent starting point for both browsing and searching. Yahoo is a great place to search, because it has the most comprehensive and well-organized directory. Because humans add and categorize the pages in Yahoo!'s database, a search always yields a

smaller but more focused results set with better quality returns.<sup>35</sup>

**How to select a search tool.**<sup>27</sup> The key to determining which tools to select depends on what type of information you're looking for. You should use a site like Yahoo! for broad, topic-level queries, where you are looking just for the best site on the Web on a subject. When you're looking for a very specific piece of information, you may want to use a search site like Northern Light, HotBot, or Alta Vista, which provides you with more unbridled power. Popularity engines like Google and DirectHit (integrated into HotBot, Looksmart, and Lycos) can be real time-savers if you're looking for a very popular term and you just want one or 2 sites to answer your query. You may also want to try a specialized search site that has assembled a narrowly focused database on a particular topic.

**How to use search tools.** It can sometimes be very time consuming and a frustrating effort to locate information on a particular topic. This is in part due to the factors listed below, which make it difficult to find relevant information. 1) The sheer size of the Web, currently estimated to contain over 800 million documents.<sup>1</sup> 2) The search engine's web coverage is on the downside. Due to explosive growth in the number of online documents, the total search engine coverage has fallen from 60% in December 1997 to 42% in February 1998, with no single engine indexing more than 16% of the web.<sup>2-4</sup> 3) All search tools are not created equal. Some tools index only Web page titles and URLs, others index the full text of the pages. Some of the databases are automatically generated; others rely on individuals to contribute URLs. Some allow Boolean searching, others use keywords only.<sup>5</sup> 4) None of the search tools claim to be able to pinpoint exact resources.<sup>2</sup> It is clear from these factors that the features, capabilities, and the contents of a search tool play an important role in searching information on the Web. If you know the features and use of various search tools, you can find information faster and easier.

**Tips for using search tools.** In most cases, an effective search strategy, the correct use of Boolean logic, and familiarity with the features of each of the search tools will lead to satisfactory results. The following search tips apply to one or more of the search tools discussed earlier:<sup>9-28</sup> 1. The more search keywords you use, the more accurate your search will become; 2. Good keyword selection is as much about excluding the irrelevant as it is about including the relevant. Being as specific as possible will yield the best results; 3. Since no single search tool will suit all your needs, use at least 2 or 3 different tools regularly. Learn the features and the capabilities of these tools so that you can use them effectively; 4. It is wise to check more than one search tool for any topic, because search results vary widely from one to another; 5. If you are more interested in broad,

general information, the first place to go is to a Subject Directory. If you are after narrow, specific information, a Web Search Engine is probably a better choice; 6. Most of the search engines return results with confidence or relevancy rankings. In other words, they list the hits according to how closely they think the results match the query. Consequently, it is often not necessary to browse through more than the first few pages of results, even when the total results number in the thousands; 7. Many search engines provide 2 different interfaces for searching the Internet; the Basic and the Advanced. The Basic or Simple search interface is a good place to start your search but it lacks many of the search engine's features. If you are looking for information that is hard to find, you can search more effectively by using the advanced search capabilities of the search engines; 8. Wherever possible, use Boolean commands in your search query. Boolean commands are specific words or symbols that allow you to include, combine, or restrict the keywords of your search. Some search engines will allow you to use Boolean commands only from the advanced search interface; 9. Some search engines do not support Boolean commands directly. They use the characters - and -instead of Boolean operators to include and exclude terms. Most search engines will allow you to use these implied Boolean commands; 10. Each engine catalogs information in different ways. Knowing how each engine works helps to use the right search engine for the job.

**Refining your search.** Search refining options differ from one search engine to another. Some of the possibilities include the ability to search on more than one word, to give more weight to one search term than you give to another, and to exclude words that might be likely to muddy the results. You might also be able to search on proper names, on phrases, and on words that are found within a certain proximity to other search terms. Many, but not all search engines allow you to use so-called Boolean operators to refine your search. These are the logical terms AND, OR, NOT, and the so-called proximal locators, NEAR, BEFORE and AFTER. Boolean Logic gives you an incredible amount of filtering control, and you can quickly obtain very targeted results. All the search engines have different methods of refining queries. The best way to learn them is to read the help files on the search engine sites.

**Search techniques and strategies.**<sup>15,20-25,28-40</sup> One recent study shows that two-thirds to three-quarters of all Web users cited the inability to find the information they seek as one of their primary frustrations.<sup>1</sup> Part of this frustration is the result of inability in applying proper search techniques.

**Effective search techniques.** Here is list of easy to follow techniques and strategies that can definitely boost your search engine's performance.<sup>7-11,12-28</sup>

**State what you want to find.** In one or 2 sentences, state what you want to find on the Internet. For example: 1. What are the recent findings about new drug therapy discovered for cancer treatment? 2. I want to find information on popular methods of losing weight. Using the information "contained" in these statements, you can see how an effective query can be built by following the guidelines.

**Identify keywords.** Break down the topic into key concepts and underline the main concepts in the statement. What are the recent findings about *new drug therapy* discovered for *cancer treatment*?

**Use nouns and objects as query keywords.** When conducting a search, the central keywords in your queries will be nouns. Though sometimes adverbs and adjectives can help refine your search, the key pivot point is a noun, or series of nouns. In our first example, the noun is Drug, drugs. Actions (verbs) and modifiers (adjectives, adverbs, predicate subjects) are very diverse, easily substitutable, and generally not universally applied in any given description. Search engines either return too many "hits" for these words that are not very useful or "throw them away". As a general rule, try to avoid using action terms and mostly try to avoid using modifiers in your queries.

**Use sufficient number of keywords in query.** One of the biggest mistakes you can make in preparing a query is not providing enough keywords. On average, most users submit 1.5 keywords per query. This number is insufficient to accurately find the information you are seeking. Thus, a central task in query formulation is for you to identify a sufficient number of appropriate keywords. In our first example, the possible keywords are new, drug, drugs, therapy, treatment, cancer, and neoplasm.

**Truncate words to pick up singular and plural versions.** One of the mistakes in query formulation is not using word stemming, or truncation, sufficiently. By using either only singular or plural version of a word, we would eliminate about half of the potential documents that we would like to use as our search basis. The better way to handle this problem is through truncation. Truncation is applying a wildcard character after the first few letters in a term (the "stem"). The asterisk (\*) is the almost universally accepted truncation wildcard. This wild card means any word or letter after this. Generally, you must also have a minimum of 3 characters at the beginning of the word as your stem basis. Once marked for truncation, then any matching characters after that will be picked up in the search query. In our examples, the keywords that can be truncated are as follows: Drug\*, discover\*, cancer\*, treatment\*, method\* and weight los\*. Remember, any words with characters after the stem will be matched to your query term if the search engine supports truncation. Thus, if we stem los\*, our search will match on the words lose, losing, loss and lost.

**Use synonyms and variant word forms.** Another way to increase your search effectiveness is to be as specific as possible; that is including as many terms and synonyms as you can think of to fully describe your topic. The best synonyms provide relatively complete coverage for the subject at hand and are "pitched" for the right informational objective. In our first example, the possible synonyms, alternate spellings, and variant word forms of each keyword are as follows: drug\*: therapy, treatment; cancer\*: neoplasm, malignant; discover\*: find; popular\*: common, favorite; method\*: way, technique; losing: lose, reduce, reduction; weight: fat, dieting, diet. A thesaurus, a dictionary, or personal knowledge can all be worthwhile places to find synonyms for the major subject(s) in your query.

**Combine keywords into phrases where possible.** A very effective way to increase the relevance or precision of "hits" is to search as a phrase. Phrases are combinations of words that must be found in the search documents in the EXACT order as shown. You denote phrases within closed quotes (""). Phrases should be used where the constituent terms are naturally married; like "lipo-protein" or "lipoprotein\*". It is a powerful search technique for significantly narrowing your search results, and it should be used as often as possible. Some other examples are "Ischemic heart disease", "Diabetes Mellitus", "Downs syndrome" etc. When using phrases, it is important to consider nuances of the phrase that wouldn't normally be of concern. For example, the spaces between words are as important as any other character. Some search tools provide specific options for phrases; some do not allow them at all, but almost all will allow you to enter a phrase in quotes, ignoring the quotations if not supported.

**Combine synonyms with Boolean OR.** Use Boolean OR to string together synonyms. For example discover\* or find; popular or common or favorite; method\* or way\* or technique\*; los\* or reduc\* weight or fat or diet\*.

**Combine 2 to 3 "concepts" in a query.** Triangulating on multiple query concepts narrows and targets results, generally by more than 100-to-1. For example, the concepts in our examples could be as follows "Cancer therapy"; "new drugs\*"; discover\* or find; method\* or way\* or technique\*; popular or common or favorite; weight or fat or diet\*; los\* or reduc\*.

**Distinguish "concepts" with parentheses.** Nest single query "concepts" with parentheses. Simple way to ensure the search engines evaluates your query in the way you want, from left to right: ("Cancer therapy") ("new drugs\*") (discover\* or find)(method\* or way\* or technique\*) (popular or common or favorite) (weight or fat or diet\*) (los\* or reduc\*).

**Order "concepts" with subject first.** Put main subject first. Engines tend to rank documents more

highly that match first terms or phrases evaluated: ("new drugs\*") (discover\* or find) ("Cancer therapy"); (popular or common or favorite)(method\* or way\* or technique\*) (los\* or reduc\*) (weight or fat or diet\*).

**Link "concepts" with the AND operator.** Combine keywords with Boolean AND. AND glues the query together. The resulting query is not overly complicated nor nested, and proper left-to-right evaluation order is ensured: ("new drugs\*") and (discover\* or find) and ("cancer therapy") (popular or common or favorite) and (method\* or way\* or technique\*) and (los\* or reduc\*) and (weight or fat or diet\*). Now issue these queries to a Full-Boolean search engine...

**Things to remember when searching the Internet:**<sup>24-26</sup> 1. Most search engines' interpret lower case letters as either upper or lower case. Thus, if you want both upper and lower case occurrences returned, type your keywords in all lower case letters. However, if you want to limit your results to initial capital letters or all upper case letters, type your keywords that way. 2. Most search engines are insensitive to whether you use upper or lower case for Boolean operators in your queries. 3. Many search engines interpret singular keywords as singular or plural. If you want plural forms only, make your keywords plural. 4. Some of the search tools support what is called stemming. That means they will find terms like "singing" even if you only enter "sing". This also means you may not need to use a wildcard symbol. 5. Avoid misspellings; search engines return websites with words that match your keywords. If you misspell a keyword, your results will contain websites where that word is also misspelled. 6. Not all search engines handle punctuation equivalently. When in doubt, you should consult the help file of the search engine you are using. 7. When searching hard-to-find information or difficult topics, use search engines with full Boolean support. With full Boolean searching, you will have complete control to find what you seek. 8. Some search engines present the Boolean operators as options like "include all the words", (AND operator)"include any of the words", (OR operator) and "exclude" (NOT operator). 9. The search engines like Google, HotBot, Lycos, MSN Search, and Northern Light default to an implied AND (which means if you enter 2 search terms it returns documents in which they BOTH occur). On the other hand, most of the major search engines like Alta Vista, Excite, GoTo, Infoseek, Look Smart, Snap, WebCrawler, and Yahoo default to an unhelpful implied OR (it returns documents in which EITHER occur). 10. After following a link to a document retrieved with a search engine, it is sometimes not immediately apparent why the document has been retrieved. This may be because the words for which you searched appear near the bottom of the

document. A quick method of finding the relevant words is to press Ctrl-F to search for the text in the current document.

**Some listings of Medical Websites/Resource Centers.** OVID: <http://gateway.ovid.com/>; The www Virtual Library: <http://www.ohsu.edu/clinweb/wwwvl/all.html>; List of Clearinghouses: <http://www.nlm.nih.gov/medlmeplus/clearinghouses.html>; National Health Information Resource Center- an index to health statistics web sites: <http://www.ari.net/nhirc/hds.html>; NIH: <http://search.info.nih.gov/>; AHRQ: <http://www.ahrg.gov/>; NIH/National Library of Medicine: <http://www.nlm.nih.gov/mcldlineplus/>; CDC National Prevention Information Network: <http://www.cdcnpi.org/>; National Center for Complementary and Alternative Medicine Clearinghouse: <http://nccam.nih.gov/nccam/clearinghouse/>; CancerNet (National Cancer Institute): <http://cancernet.nci.nih.gov/>; Clinical Trials: <http://www.nih.gov/health/trials/index.htm>; <http://clinicalstudies.info.nih.gov/>; Cancer Trials: <http://cancertrials.nci.nih.gov/>; The Combined Health Information Database: <http://chid.nih.gov/>

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**Search Engines/Strategies Listings,** WWW-Virtual Library: <http://www.ohsu.edu/clinweb/wwwvl/index.html>; <http://www.ohsu.edu/clinweb/wwwvl/all.html>; Library of Congress Listings: <http://lcweb.loc.gov/global/search.html>; Guide to Searching on the Web: <http://www.thewebtools.com/tutorial/tutorial.htm>; Search Engine Watch (listings and tips): <http://searchenginewatch.com/>; Search Engine features (at a glance): <http://searchenginewatch.com/facts/atagance.html>; How to Search for Medical Information: <http://204.17.98.73/midlib/www.htm>; To translate web pages: <http://babelfish.altavista.digital.com/chi-bin/translate?>

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