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Analysis of free MEDLINE on the WWW

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Abstract. In the paper, a survey of free MEDLINE access on the WWW is given. We compared five different vendors that provide free unlimited access to MEDLINE. The comparison of different search parameters was made: number of search statements, number of search fields, ability to combine search statements, number of search limits. The possibilities of using MESH thesaurus during the search are also explored. At last, we compared and evaluated the results of two search queries, obtained with searching MEDLINE, provided by five vendors mentioned above.

1. Introduction

The aim of this survey was to overview MEDLINE vendors on the WWW. Among them, we were especially interested in vendors providing free unlimited access to MEDLINE. For these providers, we explored the search possibilities including the use of controlled terms and Medical Subject Headings vocabulary hierarchy.

MEDLINE [1] is a bibliographic database, which covers the field of biomedicine and is created and regularly updated by the National Library of Medicine in USA. It contains articles from 3,800 international medical journals. MEDLINE is weekly updated and 31,000 records are added each month. MEDLINE consists of three parts: OLDMEDLINE contains data from 1960 to 1965 and includes 770,000 records; MEDLINE contains data from 1966 to the present and at the present time (January 1999) includes above 9 millions records; and PREMEDLINE (MEDLINE in process) includes 25,000 to 100,000 records. The records are hold in PREMEDLINE only so long, that the indexing process is finished: after that, they are moved to MEDLINE.

The rest of the paper is oganized as follows. The survey of MEDLINE vendors on the WWW is given is Section 2. Next section gives the results of comparing the search possibilities of five free MEDLINE vendors. The results of two search queries are evaluated and compared in Section 4. Finaly, the comparison of different free MEDLINE is summarized in Section 5.

2. MEDLINE vendors on the WWW

We made a systematically survey of MEDLINE vendors that can be found on the WWW. First, we classify them in three categories: commercial vendors (paid access), vendors that require (usally on-line) registration and vendors that provide free unlimited access to MEDLINE. The example vendor in the first category is OVID [2]. They charge the users for every search query. The vendors in the second category require (usually on-line) registration and/or subscription to obtain username and password, which are necessary for MEDLINE access. There are number of vendors in this category, some of them are

listed in Table 1. Finally, vendors providing free unlimited access to MEDLINE including the corresponding URL address are listed in Table 2. All the URL addresses in Tables 1 and 2 were accessed in the beginning of January 1999.

Table 1: MEDLINE vendors that require registration

MEDLINE vendor name	URL address
Avicenna	http://www.avicenna.com
BioMedNet	http://www.biomednet.com
Community of science	http://medline.cos.com
Health communcation network	http://www.hcn.net.au
MEDSCAPE	http://www.medscape.com
PaperChase	http://fleming.bidmc.harvard.edu/MEDLINE/start.htm

Note here, that Table 2 includes only free vendors that contain all MEDLINE records and not subsets of them. Namely, there are also subsets of MEDLINE available on the WWW, which are specialised for particular medical field: ophthalmology (`http://www.ophthoguide.com/ophtho`), neurosurgery, dentistry, cardiology and orthopaedics.

Table 2: Free MEDLINE vendors

MEDLINE vendor name	URL address
DIMDI	http://gripsdb.dimdi.de/engl/guieng.html
HealthGate	http://www.healthgate.com/HealthGate/MEDLINE/search.shtml
HealthWorld	http://www.healthy.net/library/search/medline.htm
Infotrieve Online	http://www.infotrieve.com/freemedline
Internet Greateful MED	http://igm.nlm.nih.gov
MEDLINE Fool!	http://www.medportal.com
PubMED	http://www.ncbi.nlm.nih.gov/PubMed

3. Comparison of the search possibilities

After we collected links to different MEDLINE vendors on the WWW, we started the comparison of the free searchable ones. The examination of their home pages shows that there are only five really different search engines for accessing MEDLINE. Furthermore, for these five MEDLINE search engines, we evaluated the following parameters: maximal number of search sessions, possibility of combining the results of different search sessions, number of fields available for searching, posibility of limiting the search results and possibility of researching only in one appointed year. The results of the evaluation are resumed in Table 3.

Table 3: Free MEDLINE analysis

MEDLINE vendor	Num. of sessions	Num. of fields	Period
DIMDI	4	9	1998
HealthGate	5	4	last 2 years
HealthWorld	4	8	1993-1997
Infotrieve	4	8	1995-1998
Internet Grateful MED	3	3	1998
MEDLINE Fool!	1	12	1997-1998
PubMed	1	3	last 12 months

From now on, our analysis is concentrated on the five MEDLINE vendors providing different search possibilities: DIMDI, HealthGate, HealthWorld, Infotrieve and NLM (Internet Grateful MED, PubMed). The next step of our survey was the determination of

possible number of limits used for narrowing the search scope and diminishing the large number of retrieved records. This is reviewed in Table 4. In the same table we also showed the possibilities of searching with subject headings.

Because of only some possibilities of limiting the search scope are offered the set of hits can not be narrowed to some reasonable size for purpose of displaying and/or printing. Therefore, unlimited searching can serve only for a purpose of getting quick and orientating results and not for getting answers to complex search queries.

Table 4: Number of limits and use of subject headings in different free MEDLINE vendors

MEDLINE vendor	Num. of limits	Subject heading
DIMDI	2	explode MeSH term
HealthGate	3	keyword
Internet grateful MED	7	subject
Infotrieve	5	MeSH term
PubMed	1	keyword

3.1. Searching with subject headings

The most important feature in searching MEDLINE is the use of subject headings and tree hierarchy. NLM creates the hierarchically organized vocabulary called Medical Subject Headings (MeSH) [1], which include about 18,000 controlled terms, named subject headings or MeSH terms. The location of a single MeSH term in the MeSH hierarchy is given in MeSH tree structures. Single subject heading can be broad or more specific. Exploring of MeSH hierarchy during the search can spare a lot of time. For searching specific aspect of MeSH terms we can add subheadings, also called qualifiers. However, none of the free MEDLINE vendors can make use of the subheadings during the defining of the search query. The DIMDI GRIPS-WEB Search engine allows user the use of the "explode" command to include all more specific MeSH terms from the MeSH hierarchy.

Some of the free MEDLINE vendors allow user to browse the MeSH hierarchy. Two different browsers are available: using the one we can see only alphabetic list of MeSH terms, and the other gives better insight into the tree location of the given subject heading through all categories.

4. Two example queries

At last we compare the search results, obtained with serarching MEDLINE from five vendors, on two example queries. Each example query consists of combination of two terms. Where available, we used MeSH term field for searching. Also, where possible, we limited the set of search results to the results from year 1998.The results of the queries are surveyed in Tables 5 and 6.

Table 5: Number of citations retrieved in different free MEDLINE for the query: ticks and lyme disease

MEDLINE vendor	ticks	lyme disease	Both	Period
DIMDI	289	279	63	1998
HealthGate	553	624	152	2 years
Infotrieve	1208	206672	592	1995-1998
Internet Greatful MED	374	119	100	1998
PubMed	456	424	120	1 year

The example queries could not be formulated equally for all MEDLINE vendors. Namely, the search results can not be limited to one-year period in some of the search engines, used by free MEDLINE vendors.

Table 6: Number of citations retrieved in different free MEDLINE for the query: mercury and environmental exposure

MEDLINE vendor	mercury	environmental exposure	Both	Period
DIMDI	222	2275	68	1998
HealthGate	826	3773	95	2 years
Infotrieve	1122	14559	314	1995-1998
Internet Grateful MED	489	2529	97	1998
PubMed	617	3127	111	1 year

5. Discussion

It is very hard to compare the number of search results obtained from different MEDLINE vendors. First, only two search engines allow the user to limit the results to the ones from the year 1998 (see Table 3).

The main differencies between MEDLINE providers can be noticed when the quality of the searching is being explored. Only DIMDI offers the use of the exploded MeSH terms. Internet Grateful Med enables searching by subject only. The subject comprises MeSH terms and keywords at the same time. Infotrieve enables searching by MeSH terms without using the MeSH hierarchy. Other two MEDLINE vendors (HealthGate and Pub Med) offer only keyword searching.

We are not aware of any other studies concerned with comparison of different free MEDLINE vendors. Surveys that consider the use of Internet Grateful Med [3], or measure the response times from different geographic locations (for Internet Grateful Med again) [4], can be found. Some of them describe only the possibilities of searching NLM databases on WWW [5, 6].

After the evaluation of different free MEDLINE vendors, we can conclude that free MEDLINE is appropriate to use for getting quick answers to simple search queries. The quality of search improves with the possibility of using the hierarchy of MeSH terms, and is even better, if the user is able to browse trough the MeSH tree hierarchy. The free MEDLINE vendors on the WWW make MEDLINE available to the great number of end-users and improve the accessibility of bibliographic information, but the quality of the search results is usually not very good. From all search possibilitites provided with the MEDLINE organizational structure, only a small part of them are freely available to the users.

References

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