How to improve your PubMed/MEDLINE searches: 3. advanced searching, MeSH and My NCBI

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Summary
Although the basic PubMed search is often helpful, the results may sometimes be non-specific. For more control over the search process you can use the Advanced Search Builder interface. This allows a targeted search in specific fields, with the convenience of being able to select the intended search field from a list. It also provides a history of your previous searches. The search history is useful to develop a complex search query by combining several previous searches using Boolean operators. For indexing the articles in MEDLINE, the NLM uses a controlled vocabulary system called MeSH. This standardised vocabulary solves the problem of authors, researchers and librarians who may use different terms for the same concept. To be efficient in a PubMed search, you should start by identifying the most appropriate MeSH terms and use them in your search where possible. My NCBI is a personal workspace facility available through PubMed and makes it possible to customise the PubMed interface. It provides various capabilities that can enhance your search performance.

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Introduction
The aim of this series of articles is to provide an overview of PubMed/MEDLINE, to introduce some of the recent features and to provide readers with hints about more efficient searching. Part 1 summarised the history of PubMed and introduced basic search operation. Part 2 explained how to manage search results and to search for particular topics and types of papers. Part 3 covers advanced searching, MeSH, Automatic Term Mapping and My NCBI.

What is an advanced search?
Although the basic PubMed search is often helpful, the results may sometimes be non-specific. To have more control over the search process, you can conduct an advanced search using the Advanced Search Builder interface (Figure 16). This page is accessible from the Advanced link under the search box. It allows searching by field tags with the convenience of choosing the search fields from a list. The performance of PubMed relies heavily on effective use of field tags. However, a recent analysis of PubMed searches showed that only 11% of total queries used field tags. This suggests that users are generally unaware of the advanced search techniques available in PubMed, or simply prefer to rely on Automatic Term Mapping (see below) by using untagged search terms.

Search history
The Advanced Search Builder provides the history of your searching during the current PubMed session, showing the search query and the number of results produced by each search. This allows you to combine previously performed searches. Perhaps the most common use of the search history is when you need to perform a search whose query is too complex to be easily entered into the search box all at once. Instead, you can break down a complex query into several simpler queries. Each query can then be added to the search box using one of the Boolean operators (AND, OR, NOT) by a click of mouse (Figure 17 – A).

This approach is most useful in performing a search for the purposes of a systematic review, where the exact queries and steps taken to search for potentially relevant
papers need to be clearly documented in the review paper. For example, consider a search for articles pertaining to telemedicine or telehealth or ehealth in the context of the three chronic diseases of diabetes, asthma and hypertension. To conduct this search, you can first search for all the PubMed articles on telemedicine, telehealth or ehealth using the OR operator. In the next step, you can search for all the articles regarding the three diseases, again using the OR operator. Finally, you can combine the two previous searches with the AND operator using the search history (Figure 17 – B).

**Unexpected search results**

Although PubMed searching seems quite simple and straightforward, the results of searches can sometimes be rather unexpected. This is especially important if the PubMed search represents a critical component of the research, such as in a systematic review study. For example, searching for articles concerning electronic health (e-health) can produce very different results, see Table 4. Here the behaviour of PubMed is unexpected: searching for three terms that appear quite similar, produces very
different results. To understand what is behind a PubMed search, you need to understand two important concepts: the Medical Subject Heading (MeSH) and Automatic Term Mapping (ATM).

**What is MeSH?**

The Medical Subject Heading (MeSH) is the controlled vocabulary system that the NLM has developed for subject analysis of biomedical literature. It is used for indexing journal articles, and cataloguing books and audiovisual materials in the life sciences. Since different authors use different terminologies for the same concept (e.g. “telemedicine” and “telehealth” are often used interchangeably in papers), a standard vocabulary system is needed for efficient retrieval of information. The MeSH database, which can be accessed from the PubMed homepage, provides a controlled vocabulary and index terms. It is also possible to search the MeSH database directly from PubMed, simply by selecting MeSH from the drop-down menu just before search box.

There are three main concepts in MeSH: Subject Headings (also known as descriptors), Entry Terms and

<table>
<thead>
<tr>
<th>Search term</th>
<th>No. of results</th>
</tr>
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<tbody>
<tr>
<td>electronic health</td>
<td>37,435</td>
</tr>
<tr>
<td>ehealth</td>
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</tr>
<tr>
<td>e-health</td>
<td>1272</td>
</tr>
<tr>
<td>e health</td>
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**Table 4.** Results of a search for articles concerning electronic health (e-health).

![Figure 18. Subject headings for telemedicine in the MeSH database. There are three main concepts in MeSH: Descriptors, Entry terms and Qualifiers (18A, B, C). The descriptor “telemedicine” appears in three branches of the MeSH hierarchy (18D).](image-url)
Subheadings (also known as qualifiers) (Figure 18-A, B, C). There are also some other types of terms in the MeSH database, such as the Supplementary Concept, that are beyond the scope of this paper.

The subject headings in MeSH are commonly referred to as MeSH terms. MeSH terms are arranged in a hierarchical structure (forming a tree-shaped structure called the MeSH tree), from very broad terms to very narrow terms, as well as in alphabetical order. MeSH 2013 comprises 26,853 MeSH terms in 12 levels of hierarchy. The main branches of MeSH 2013 are shown in Table 5. Any given MeSH term may appear in several branches of the MeSH tree. For example, “telemedicine” appears in three branches of the MeSH hierarchy and has three narrower terms underneath (i.e. Remote consultation, Telepathology and Teleradiology) (Figure 18-D).

There are also more than 213,000 other terms, called Entry Terms, that help with finding the most appropriate MeSH subject heading. Entry terms are basically the terms that MeSH considers as synonyms for each subject heading. These are translated into subject headings during the search pre-processing step. For example, there are four entry terms in the MeSH database which PubMed will translate to the MeSH term Telemedicine:

1. Telehealth
2. eHealth
3. Mobile Health
4. Health, Mobile

From a practical point of view, there is no difference between subject headings and entry terms. That is why a PubMed search for ‘telehealth[mesh]’ returns exactly the same results as ‘telemedicine[mesh]’ – telehealth is an entry term in MeSH that is translated to telemedicine, so the results will be the same. However, a search for ‘mhealth [mesh]’ returns nothing. The reason is that mhealth is not a MeSH term (neither a subject heading nor an entry term). Instead of the term mhealth, you should use mobile health (i.e. ‘mobile health[mesh]’).

In addition to subject headings and entry terms, MeSH utilizes another concept for indexing called subheadings or qualifiers. Subheadings that constitute a main branch of MeSH tree can be added to the subject heading to narrow down the search results by specifying a particular aspect of the subject heading. For example diabetes is a subject heading and diagnosis is a subheading, so using the combination of ‘diabetes/diagnosis[mesh]’ will only return those records which are categorized as diabetes related and sub-categorised as discussing diagnosis of diabetes. There are 83 different subheadings in MeSH, but not every subheading is meaningful for each subject heading.

There are 13 subheadings for the subject heading “telemedicine” in MeSH:

1. classification
2. legislation and jurisprudence
3. statistics and numerical data
4. economics
5. manpower
6. trends
7. ethics
8. methods
9. utilization
10. history
11. organization and administration
12. instrumentation
13. standards.

So to find all articles on the economic aspects of telemedicine, you can use ‘telemedicine/economics[mesh]’ as the search query in PubMed (this query returns 1388 records compared to 13,986 records returned by ‘telemedicine[mesh]’).

What you see in the results of a search, is usually the output of the PubMed search for a combination of your search terms and the related MeSH terms that PubMed adds to the search query. Nonetheless the ability of MeSH to improve a PubMed search depends on how the MeSH terms were originally assigned to each record in MEDLINE. Because this is a semi-automated task, some degree of human error and inconsistency can be expected. Such errors adversely affect search results in PubMed. MeSH terms are selected by information specialists at the NLM in consultation with experts in the relevant fields, but in an emerging field of study the newly introduced terms may need subsequent revision. The NLM updates MeSH annually.

### Searching PubMed using the MeSH database

The most efficient way to search PubMed is by using MeSH terms for developing the search query. This is

<table>
<thead>
<tr>
<th>Table 5. The main branches of MeSH 2013.</th>
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<tbody>
<tr>
<td>Analytical, Diagnostic and Therapeutic Techniques and Equipment</td>
</tr>
<tr>
<td>Anatomy</td>
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<tr>
<td>Anthropology, Education, Sociology and Social Phenomena</td>
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<td>Check Tags</td>
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<td>Chemicals and Drugs</td>
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<td>Diseases</td>
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<td>Health Care</td>
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<td>Organisms</td>
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<tr>
<td>Pharmacological Actions</td>
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<td>Phenomena and Processes</td>
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<tr>
<td>Psychiatry and Psychology</td>
</tr>
<tr>
<td>Publication Type*</td>
</tr>
<tr>
<td>Subheadings*</td>
</tr>
<tr>
<td>Technology and Food and Beverages</td>
</tr>
</tbody>
</table>

*terms in these branches have special functions in PubMed. They are designated by specific field tags and are not commonly referred to as MeSH terms.
possible both from the MeSH homepage (http://www.ncbi.nlm.nih.gov/mesh) and from the PubMed homepage. If you are already at the PubMed page, you can search for MeSH terms by selecting MeSH from the dropdown menu which is located on the left-hand side of the search box. The autocomplete feature will help you to select the MeSH term of interest from a list of the top 20 terms. The terms that are shown can be either subject headings (descriptors) or entry terms, that will point to a subject heading.

Once a term is entered and searched, the resulting MeSH term(s) that match the entered term will be shown in a similar way to the PubMed result screen: 20 items per page in summary format. In this view, each MeSH term can be selected by ticking the box next to each term, and selected terms can be sent to search builder by clicking on the Add to search builder button. The search terms for other topics, if needed, can be searched and added to the search query by the appropriate Boolean operator (which, by default, is AND). Once the search query is complete, clicking on Search PubMed will launch the search, and the results will then be displayed in the PubMed interface.

For example, to search for articles about using telemedicine for diabetes, you need to search for the MeSH term for diabetes and send it to the search builder, then search for the MeSH term for diabetes and add it to the search builder (where it is combined using AND, by default), and then launch the search using the search terms that have been populated in the search builder box (in this case it will be something like: “Diabetes Mellitus”[Mesh] AND “Telemedicine”[Mesh]). The order of adding the terms to search builder does not matter. Note that double quotes are required around each MeSH term.

As mentioned earlier, MeSH also enables you to focus your search on particular aspects of the topic in question, such as the economic aspects of telemedicine for diabetes. For this purpose, you need to first search for telemedicine, but before sending the MeSH term to the search builder, select the proper subheading (qualifier) by ticking the appropriate check boxes. This will cause a combination of MeSH term and subheading to appear in the search builder box, which in this case is: “Telemedicine/economics”[Mesh]. The MeSH subheadings are attached to the subject heading using a forward slash (/) (Figure 19). Your search query will remain in the search builder window, allowing you to add other terms to the query, until you click on Search PubMed, or you leave the page. The search query can then be complemented by the MeSH term for diabetes, which is “Diabetes Mellitus”[Mesh] and the combination of these two terms can be sent for searching PubMed. This technique will drastically reduce the number of results compared to using the MeSH term without a qualifier. However the results will be more specific and thus more relevant to your question. This specificity is gained at the cost of lowering sensitivity, and thus it is not suitable for systematic reviews.

If you are interested in searching for several topics in parallel, say diabetes, asthma and hypertension as three important chronic diseases, you should search for each of them separately, and add the resulting MeSH term to the search builder using the OR operator. In this case, the final search query will be something like: “Diabetes Mellitus”[Mesh] OR “Asthma”[Mesh] OR “Hypertension”[Mesh].

Indexing of articles with MeSH terms

Some of the data elements in a MEDLINE record, such as the title, abstract, authors and their affiliations, journal name and date of publication, will have been provided by the publisher. In addition, a set of MeSH terms is assigned to each record by the NLM indexers and stored in the database. These MeSH terms play an important role in the search functionality of PubMed. However, the inconsistency in indexing articles with MeSH terms has been a concern both for the NLM and for users.

The process of assigning MeSH terms to articles is complicated. NLM indexers review the full-text of an article, and assign a set of MeSH terms that best describe
the concepts discussed in that article. Several validation algorithms are employed to ensure the quality of the indexing.2

The MeSH terms are arranged in a hierarchical structure from the broadest (most general) term at the highest level, to the narrowest (most specific) term at the lowest level. The most specific MeSH term which can describe the content of each article will be assigned to it by the indexers. For example, if a paper discusses the application of telemedicine in a radiology department, then the term Teleradiology will probably be assigned to that article, rather than Telemedicine. To see the MeSH terms assigned to an article, you need to look at the article in Abstract view, and then click on Publication type, MeSH terms (Figure 20-A). Articles which have been added to PubMed in the past few months may not have been fully processed yet, and thus there will be no MeSH terms listed for them.

The list of MeSH terms for each article is arranged alphabetically, but not all of them have the same weight for indexing an article. In a set of MeSH terms assigned to each article, those representing the central concepts of the article are identified with an asterisk (*) and called Major MeSH terms (Figure 20-B). A few major MeSH terms (usually 2–4) are identified for each article.

How can major MeSH terms improve my search?

The concept of the Major MeSH terms is most useful when you retrieve too many articles in a PubMed search. To make your search more specific and retrieve the most relevant results, you can indicate a MeSH term to be searched as the major topic of articles by clicking on the box next to “Restrict to MeSH Major Topic.” when building your search query in the MeSH database (Figure 18-E). This is also possible via the PubMed Advanced Search Builder by selecting MeSH Major Topic from the search field menu. Frequent PubMed users may prefer to put [MeSH Major Topic] or [Majr] tag after the search term when entering it in the search box (i.e. “telemedicine”[Majr]).

The following search results show the effectiveness of this technique:

diabetes: 450,021

diabetes[MeSH]: 304,538

diabetes[MeSH Major Topic]: 240,877

Figure 20. MeSH terms assigned to an article which is indexed in MEDLINE. The small arrows show the MeSH terms that are identified as Major MeSH terms for this article.
How does the MeSH tree structure affect my search?

The hierarchical arrangement of MeSH terms has an important effect on the results you retrieve. The PubMed search engine uses a concept called Automatic Explosion (Explode). Thus when MeSH terms are used in a search, PubMed “explodes” them and includes all the narrower terms under that specified term in the MeSH term tree for performing the search. For example, under the MeSH term telemedicine in the tree structure, there are three narrower terms: Telepathology, Teleradiology and Remote Consultation. When you search for telemedicine as a MeSH term, PubMed will automatically search for articles which carry telemedicine as a MeSH term, and also for articles which have been assigned telepathology, teleradiology or remote consultation as MeSH terms. This function can be stopped by ticking the box next to “Do not include MeSH terms found below this term in the MeSH hierarchy.” when selecting a search term in MeSH database (Figure 18-F) or alternatively by putting [Mesh:NoExp] tag after your search term (i.e. “Telemedicine”[Mesh:NoExp]).

Automatic explosion happens both when you enter a term explicitly as a MeSH term (e.g. ‘telemedicine[Mesh]’), or when an untagged search term is translated into a MeSH term by PubMed (e.g. ‘telehealth’). You should stop automatic explosion to obtain better results when you are searching for a concept (e.g. telemedicine) as a whole, and not any specific topics within that domain (e.g. telepathology or teleradiology).

What is Auto Term Mapping?

The terms you enter in the PubMed search box are categorised as Qualified or Unqualified. Qualified search terms will restrict the search to specific fields of the database: the search term is followed by a field tag in square brackets (e.g. smith[Author]). Unqualified search terms are untagged (i.e. plain terms without any field tag). In this case PubMed needs to find out (or guess) what you are looking for. For example if the search term is simply ‘parkinson’, are you looking for articles about Parkinson’s disease, or articles written by a person named Parkinson, or articles from a journal called Parkinson?

To do this, PubMed sends unqualified search terms through a search pre-processing step called Automatic Term Mapping (ATM). This enables PubMed to identify ‘diabetes’ as a disease not a person’s name, ‘lancet’ as a journal not a surgical tool, and ‘23092013’ as a paper ID not a date, for example.

To perform ATM, PubMed consults three levels of tables and indexes (in the order indicated below) to find a match for the terms that have been entered in the search box, before executing the search in the databases:

1. Subject names (MeSH)
2. Journal names
3. Author and Investigator names

If at any level, ATM finds a match in a table or index, the mapping process terminates and the result is sent to the search engine for the actual search to be performed. Otherwise the process continues with the next table, until all the tables/indexes have been searched. The matched terms found through this process will be added (combined using the OR operator) to the original search term that will be searched in all fields.

If at least one matched term is found in the MeSH table, the search query will be built by combining the MeSH term and the original search term (tagged as [All Fields]) using the OR operator. This strategy ensures that the highest number of results will be retrieved (i.e. it will be a highly sensitive search). However, searching in all fields will not be carried out if the search term is matched with a term in the Journal table or the Author/Investigator table. In this case, PubMed will search the term found in either of these tables. If the search phrase does not match any entity in the above mentioned tables/indexes, the phrase is broken into single terms and this process is repeated for each term. In any case, PubMed displays the final search query that has been used for searching the database in a box in the lower right hand corner of the web page as “Search details”. So if you are confused about the result of your search, the best way to see what has happened is to look at the search details.

An understanding of ATM and MeSH allows you to see why a search for ehealth returns such varied results when the term is entered with or without a dash or space:

1. ehealth. When you enter ‘ehealth’ as the search term, ATM finds a match in the MeSH database which is Telemedicine, then adds the entered term with the [All Fields] tag producing this search query: “telemedicine” [MeSH Terms] OR “telemedicine” [All Fields] OR “ehealth” [All Fields]. This query returns 16,889 results that are relevant to the topic.

2. e-health. When you enter ‘e-health’ as the search term, ATM does not find any match in any of the three tables (MeSH, Journals, Author/Investigator), so it tries to search for it in all the fields of the database. This is not a good strategy because e-health is an unambiguous term, whereas telemedicine is ambiguous and may also be called telehealth. In this case, ‘e-health[All Fields]’ returns 1272 results, but only includes the articles where the exact phrase ‘e-health’ has appeared in any field; this field can be title, abstract, journal name or even the affiliation of the author. As there is still ambiguity in the definition of ehealth and authors may use other terms such as telemedicine or telehealth instead of ehealth, this search causes many potentially relevant articles to be excluded just because they did not use e-health in their title/abstract, or simply spelt it as e health, without the hyphen.

3. e health. The most unexpected result of the three searches is when you search for ‘e health’ using a space instead of dash. This produces just one result whose title is: “Baby boom. American anti-abortion politics blocks family planning funding around
the world”. The reason for this apparently strange result is as follows.

The search details section shows the search query as: “E”[Journal] AND (“health”[MeSH Terms] OR “health”[All Fields]). As the entered search term is not qualified, it goes through the ATM process. No match is found for the phrase in the MeSH, Journal or Author/Investigator tables, so the phrase is then broken into single terms (i.e. ‘E’ and ‘health’) and each single word goes through the ATM process again. It is evident that ‘e’ matches a journal name in PubMed. Further exploration reveals that MEDLINE has indexed three articles from a magazine called ‘E: the environmental magazine’ and the title of this magazine has been abbreviated to ‘E’. The second term, ‘health’, also goes through the ATM process, and matches a term in the MeSH database, so it is used both as a MeSH Term as well as searched in All Fields. Thus the final search query after the ATM process is: “E”[Journal] AND (“health”[MeSH Terms] OR “health”[All Fields]). This query returns a single result, which happens to be about the baby boom, rather than electronic health (Figure 21).

If a combination of qualified and unqualified terms is entered in the search box, the unqualified terms undergo the ATM process and the results will be combined with the qualified search terms. In this case, the unqualified terms must be distinguished from qualified terms, otherwise the result of the search can be unintended. One solution is to place the unqualified terms after the qualified terms in the search query. For example, to search for articles on diabetes written by Smith, the correct search query is ‘Smith[Author] diabetes’ which returns 3458 results, whereas ‘diabetes Smith[Author]’ returns zero results, because PubMed assumes the user is looking for articles written by a person named ‘Diabetes Smith’, and cannot find any article with this author name. Best practice is to indicate the qualified term with double quotation marks, even if it is a single-word term. For this example, ‘diabetes “smith”[Author]’ is the proper search query. The double quotation marks here indicate the term or terms that are associated with the field tag that follows.

What is My NCBI?

My NCBI is a personal workspace on PubMed and other NCBI databases. By registering with the NCBI portal, you can retain PubMed information, set your preferences and customise your interface to PubMed (and other NCBI databases). My NCBI provides several useful features that make working with PubMed more efficient and pleasant. To sign-up for an NCBI account, you can click on the Sign in to NCBI link at the very top-right corner of the PubMed page and then click on Register for an NCBI account. Creating an NCBI account is free of charge.

After signing-in to the NCBI portal, your username will appear in the top line of the page with the My NCBI hyperlink next to it. All the settings for your NCBI account and access to additional features will be through this link. By clicking on the My NCBI, a page with several boxes will appear that allow it to be customised for your use.

Save search

In this box you can see the list of your previously-saved searches and the date when each search was last run. When you log into your NCBI account, a Save search hyperlink appears just before the Advanced link, under the search box. This feature allows you to save the search query that has just run in your My NCBI space.
In addition you can set this search to be executed automatically on a daily, weekly or monthly basis, and to send the results via email.

This feature is most useful if you want to receive updates on topics/authors/journals of interest via email without the need to perform a PubMed search periodically. So if you are expecting the paper you have written and recently published to appear in PubMed, you can search on your name and save it, and set My NCBI to repeat this search daily and send you an update when a record with your name is added to PubMed.

**Collections**

Another useful feature of NCBI for handling the results of PubMed searches is called the Collection. You can store all or a selection of any search result as a collection in your My NCBI space and have access to it from anywhere through the Internet. If no specific record has been selected from a list of results, the first 1000 records will be saved in the collection. In the second step of saving records in a collection, you can choose to create a new collection or add the records to an existing collection. Each new collection is, by default, private for the user in question, but this setting can be changed to public so that anyone can see it on the Internet by means of a unique URL that the NCBI assigns to it.

By default, there are two standard collections with each account: My Bibliography and Favorites. My Bibliography is intended for papers that you have written, although there is no restriction on the items you can add to this collection. Even if your papers have not appeared in PubMed you can enter them manually. Furthermore, the items in My Bibliography are not limited to articles: they can be books, chapters, meeting abstracts, presentations, patents or non-standard citations. My Bibliography is the only collection that you can manually add a record to, and has more display options than other collections.

Records of PubMed can be saved in collections by clicking on Send to and then choosing Collections, in the results screen. To make this command more readily available, PubMed has provided the Save items section at the top of right-hand sidebar when a record is displayed in abstract format (Figure 20-C). To add the current record to your favourite collection with just one click, you can click on the Add to Favorites button.

A collection can be saved locally on your computer as a text file or as a file in CSV (Comma Separated Value) format. The entries of each collection can be sorted by Date, Author or Title. This order can be ascending or descending.

**Recent activity**

By signing-in to My NCBI, all your recent activities in the NCBI portal during the last six months are stored. This feature allows you to go back and review your past searches, and take note of or re-run them if needed. Each activity can be selected and deleted, or all the activities can be cleared by clicking on Clear your Recent Activity. This feature can also be turned off (Figure 22).

**Filter options**

Filter setting allows you to limit the results of a search by selecting the filters that appear on the right-hand side of the search results. Four types of filters are available: Properties, LinkOut, Links and Popular.

There are 11 sub-groups of filters in the Properties groups. By using these filters, the results of a search can be limited by criteria such as age group, gender, human/animal, language or publication type. For example if you are interested mainly in economic studies, you may select the ‘Economic/Narrow’ filter from the Health Services Research Queries subgroup, so that this filter will appear on the right side of every search you perform in PubMed.
This will limit your results to the records that include economic information about the topic of your search (Figure 23).

The LinkOut group provides items that can appear in some records and link it to an external source. There are eight subgroups in this group. For example, if you are interested in articles that report trials that have been registered on the ClinicalTrials.gov website, you can select this filter from Clinical Trials, under Medical Resources. This limits your search results to studies that have provided their ClinicalTrials.gov ID number (Figure 24).

The Links group contains filters that will limit the results to the records with links to other NCBI databases.

Display preferences
A few other settings, which are grouped under ‘NCBI Site Preferences’, allow you to set your own preferences for several NCBI database including PubMed. There are four common settings that are applicable to all NCBI databases (links display, highlighting, auto suggest, shared settings) (Figure 25 – A) followed by preferences specific for each database. For PubMed, there are five preferences that can be set: abstract supplement data, document delivery, filters and icons, outside tool, and result display setting (Figure 25 – B). You can use each of these settings to customise the interface and make the PubMed search more pleasant.

Figure 23. Filters page in My NCBI. The box on the left shows the filters that have been selected, and the box on the right shows the 11 subgroups of available filters in Properties category. By selecting other categories, the contents of this box change.

Figure 24. Using favourite filters in the My NCBI account. The arrow shows that out of 16,189 results for the term telemedicine, 368 articles have provided an ID in the ClinicalTrials.gov database.
Conclusion

PubMed provides free access to more than 23 million records, of which over 20 million are from the MEDLINE database. Basic searches can be conducted very easily, although some knowledge of how the search engine operates (especially the MeSH terms) will give you more control on the sensitivity and specificity of searching. In addition, the free text of more than 2.8 million articles (roughly 10% of the articles accessible from PubMed) is available via PubMed Central; as Open Access publishing becomes more common, this percentage will increase.

A recent survey of health care providers in North America revealed that three-quarters of the respondents had provided care to the patient differently as a result of information mainly obtained via PubMed/Medline, and almost all of them reported that the information had helped them to make a better clinical decision. Making MEDLINE publicly-accessible deserves recognition as a splendid technical achievement (arguably, of greater humanitarian benefit than the moon landings).

References


Figure 25. My NCBI preferences.