

## **PubMed reloaded: new interface, enhanced discovery**

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### **Abstract:**

Aim of this contribution is to present the redesigned version of the worldwide known PubMed interface. The changes relate to a simplified visualization, in order to require less efforts to find resources; they do not concern the functionalities or the search processing. We shall focus on the main differences between the old and the new version.

### **Medline/Pubmed: fact sheet**

MEDLINE [1] is a large biomedical database of references to journal articles covering the fields of medicine, nursing, dentistry, veterinary medicine, the health care system, and preclinical sciences. MEDLINE is only one of the many databases produced by the National Library of Medicine (NLM) of the United States, part of the National Institutes of Health (NIH). The database includes journals citations and abstracts from the 1940s to the present from more than 5,000 health sciences journals and magazines. Coverage is worldwide, but most records are from English-language sources or have English abstracts. MEDLINE is the electronic version of the Index Medicus, Index to Dental Literature and International Index Nursing and is freely available on the Internet and searchable via PubMed since 1997.

PubMed (<http://www.ncbi.nlm.nih.gov/pubmed>) is the free interface to MEDLINE; it does not require registration [3]. It is an information retrieval system based on World Wide Web technology developed by the National Center for Biotechnology Information (NCBI), which enables to search databases. It provides access to the MEDLINE database and others NLM databases and currently includes over 19 millions bibliographic citations. Each citation or record represents one journal article and each citation is composed of many fields, such as authors name, article title, journal title, abstract, address, year, volume, issue and page numbers. PubMed is not only the software system used to access MEDLINE but also the system plus content that includes some additional material beyond just MEDLINE [2]. PubMed also contains links to the full-text of articles, when they are deposited in PubMedCentral or when they are freely accessible from the publisher's homepage.

The traditional PubMed interface we all were used to search is no longer available since October 27<sup>th</sup>, 2009. We are going to present the new features, in comparison with the old ones, to help better orient oneself in the search.

### **PubMed Homepage**

Essential, streamlined, the new PubMed homepage (fig. 1) is structured in:

- a blue NCBI header, with a pull-down **Resources** menu for all the Entrez databases now clustered by topic; a new **How to** menu, including instructions and suggestions for effective searches within the listed Entrez databases; and the traditional **My NCBI Sign in**, always in the upper right end (fig. 1 part A);
- the Search Bar, with the **Search box** with a **Search button** instead of the Go button; the pull down selection menu for the active database; the links to **Advanced search** and **Help** and, after a run search, the **RSS** feed and **Save Search** links (fig. 1 part B);
- a three-column point of access to the former PubMed blue sidebar tools, labelled respectively **Using PubMed** (for Quick Start, Animated Tutorials with audio, Tutorials in pdf, News...), **PubMed tools** (Single citation Matcher, Clinical Queries, Topic-Specific queries, i.e. former Special queries); **More resources** (MeSH database, Journals database, Clinical queries, E-utilities) (fig. 1 part C);
- a shortcut box to collected resources for hot topics (e.g. at the moment of writing H1N1 influenza), not shown in the figure.
- a footer, which includes links to other NCBI resources (e.g. PubMed Central, Bookshelf, Human Genome) help, tools, contacts, not shown in the figure.

Figure 1: Figure 1: PubMed new Homepage. **A:** NCBI header; **B:** search bar; **C:** tools columns.

One of the most evident difference is that there are no more **Limits**, **Preview/Index**, **Details**, and **History** tabs: all these features have actually been consolidated into the Advanced search. **Details** appears also in the results list (see below).

### PubMed search and Advanced search

Search process was not altered, including the Automatic Term Mapping. This means that the systems as usual maps the entered untagged words against a MeSH term (and next a Journal title, and next an Author's name etc.), and then performs also a query in [All fields] to catch even the most recently added items which are not yet indexed.

A useful **Auto suggest** feature appears while typing in the search box. It is possible to turn it off once signed into My NCBI.

Being active the "**Sensors**" introduced in 2008, if the typed keyword refers to a gene or a protein a yellow box is shown as a gate to other NCBI or external databases supplying genes or protein additional information or sequences or tools (like BLAST or the KEGG Pathway database). For example typing "*BRCA1*" will get all the citations about BRCA1 and a box above the results with the links to gene information.

As usual, the default Boolean operator is AND: e.g., if you type "Negrini scoliosis" the system automatically runs a query for Negrini as author AND scoliosis as MeSH term or journal title (being active another "sensor" for journal titles).

The Advanced search is now divided into sections (each one collapsible if not fitting) and is to be used for:

- **Search History**, to combine or save searches as usual;
- **Search by fields** as Author, Journal, Date, all the former "Add more citation Search Fields";
- **Limits**, to narrow the search. When active, a yellow alert icon appears in the upper right end of the results list (fig. 2 part B), instead of the yellow bar we were used to. Please

notice that the icon is small, and you have to get used to its presence to avoid ineffective searches with unsuitable limits;

- **Index of fields and fields value**, replacing the former Preview/Index tab;
- a further point of access to **More resources** (Clinical queries, Topic-specific queries, Single citation matcher, MeSH).

Figure 2: PubMed new results list. **A**: Display settings (Format, Items per page, Sort by); **B** Limits alert icon (when limits are activated); **C** Filters; **D** Titles containing the search term.

## Results list and Display settings

Coming to the **Display settings**, there are noticeable changes. They appear now only at the top of the results list, at the bottom left end (fig. 2 part A). Brief, Citation, and Abstract Plus format are no longer available. The default setting is **Summary**. There is a new format, **Abstract**, which combines the features of Abstract Plus and Citation previous formats. This display includes expandable section for further information such as Publication Types, MeSH terms – accessible right from here now –, Substances, and Link Out data. There are two new Text formats, Summary and Abstract. The Links menu is no longer available, replaced by All links from this record.

The **Items per page** and **Sort by** (Recently added being the default choice) remained the same.

As to move from one page to another, options have been reduced to First, Last, Previous, Next. There is no option to change the number of page; this might turn out to be quite uncomfortable in case of long results list.

As to the single item, the Summary format now shows a checkbox above the number and a unified label “Free text”. The *status* indication remains the same; please remind that it contains basic information such as [In Process] or [As supplied by publisher], which means that the recently added article is being indexed so it has not yet a matching MeSH term.

The **Related Articles** link maintains its position at the end of each citation.

The main changes in the Results list are in the right side of the screen:

- **Filter your results**, which replaced the Filter tabs, provides a Manage filter to quickly vary selections (fig. 2 part C). By default are set now: All, Free full texts and Reviews.
- **Titles with your search terms**, to show immediately what are supposed to be the most pertinent items (fig. 2 part D);
- **Try also**, precious pre-set suggestions to refine the search;
- **Free full text in PubMedCentral**: this section immediately highlights the Open Access papers deposited in PubMedCentral and thus freely accessible (fig. 3 part A);
- **Find related data**, which replaced the Links menu, is a pull down menu of the Entrez databases: choosing an option for a specific database, a related search is automatically generated, with a brief description about the strategy data are to be retrieved with (fig. 3 part B);
- **Search details**, replacing the very useful Details tab, is available right here (fig. 3 part C) or accessible from the Advanced search link near its Search box. Remind that the Details feature is very suitable because it lets you know how the system translated your query. The Search details box being as usual rewritable, it allows you to refine your query just by adding or changing e.g. a Boolean operator or by deleting or adding a term;
- **Recent activity**, which tracks your searches and your downloads and lets you orientate (fig. 3 part D).

Each one of these sections is collapsible, if not applied.

Figure 3: PubMed new results list. **A**: Free full text in PubMedCentral; **B**: Find related data; **C**: Search Details, accessible from here or from the Advanced Search link; **D**: Recent activity.

### **Saving results or saving searches**

The **Send To** pull-down menu (fig. 4) has been reduced to five options:

- **Order**, a dialogue box to Loansome DOC, a document delivery service (by charge);
- **File**, to be used for reference management tools;
- **E-mail**, which allows you to send the selected items to your own e-mail box in your preferred format, as shown in fig. 4;
- **Clipboard**, to temporarily save items in the Clipboard for a maximum of eight hours and 500 items. A Clipboard icon appears on the upper right end of the screen after sending citations to the Clipboard, with the relative number, and a green notation appears under the selected titles;
- **Collection**, to definitely save items in a Collection in MyNCBI.

Figure 4: “**Send to**” pull down menu (the active option being E-mail).

**RSS feed** has been moved as a link near the Search box and **Print** is no longer available: the suggestion is to use the browser’s print options. When you are ready to print, select your desired format of the references from the Display Settings options and use your browser’s print function to print your search results.

**My NCBI** main features has not changed. Adjustments have been made to match the new set of available formats for saving options, of course. A preference on Abstract supplemental data has been added to open by default the information shown under this link (MeSH, publication type, grant number...), which is now set as “close”.

For more information on using PubMed please go to the PubMed home page and select the tools listed under **Using PubMed**.

[1] Here are some of the abbreviations used in the text:

NCBI: National Center for Biotechnology Information

MEDLINE: MEDlars onLINE

MEDlars: Medical Literature Analysis and Retrieval System

NLM: The National Library of Medicine of the United States

NIH: National Institutes of Health

PubMed: Public MEDLINE – Publisher MEDLINE.

MeSH database: Medical Subject Headings database

[2] Hersh, W. Information Retrieval: A Health and Biomedical Perspective. Springer; 3rd edition (November 6, 2008) p. 124.

[3] Fact Sheet MEDLINE: <http://www.nlm.nih.gov/pubs/factsheets/medline.html> (accessed November 7, 2009).