

## Part 6: Finding Evidence Using PubMed

Throughout these modules, we have looked at some valuable tools for finding answers to clinical questions. Many would argue that the most important (and certainly the largest) resource of all is the one we have saved for last: PubMed. Unlike several of the other resources, PubMed includes articles at all levels of the evidence hierarchy from evidence based guidelines and systematic reviews to case reports and opinion pieces.

PubMed is the largest health literature database in the world and includes nearly 20 million citations of articles from thousands of journals in all aspects of health science. Within PubMed one can find roughly:

13,000	practice guidelines
100,000	systematic reviews
200,000	randomized controlled trials
500,000	clinical trials

Because PubMed is sooo very large almost every search will retrieve dozens, if not thousands of articles at all evidence levels. So, it is essential to learn a few of the tools and features in order to have any chance of uncovering in an efficient manner the most relevant articles and the best evidence for any clinical question.

Let's jump into PubMed to look for articles relevant to our example scenario. PubMed is the library's most popular database and therefore is listed atop our database list.

Before we even enter anything into the search box, we need to check each of our concepts within a health thesaurus called MeSH. One of the most important and useful features of PubMed is MeSH. In a nutshell, MeSH stands for medical subject headings and it acts as a dictionary or thesaurus for finding the best terms to use in your search query. The health literature is replete with synonyms, acronyms, trade names, generic names, and abbreviations, and, therefore, it is critical that the terminology used in a search query will retrieve the relevant articles in PubMed.

So how do we know what term to use for a specific concept: well, check the MeSH thesaurus. For example, let's enter the MeSH thesaurus and search for the best term to use for the concept: Alzheimers disease.

Here we see that MeSH suggests we use the term Alzheimer disease (with no-s) when searching. If we do just that, we will be able to retrieve all articles on Alzheimers disease regardless of how the authors of the articles referred to it. The point is: if there is a MeSH term closely related to a concept you want to search: be sure to include the MeSH term in your query.

So now, let's enter our search into the PubMed search box using proper Mesh terms. I have checked the MeSH database for each of our concepts and here is my search in PubMed:

(alzheimer disease OR dementia OR amnesia) AND (atorvastatin OR Hydroxymethylglutaryl-CoA Reductase Inhibitors OR statins)

The only non-Mesh term is statins. Sometimes when a term is so commonly used it is not a bad idea to OR that term into the search query.

Despite being a very narrow search on a very new topic, this query retrieved a whopping 429 articles. Unfortunately many health practitioners might begin by perusing the very first article that popped up and scrolling on and on and on until they tired.

Fortunately, we have learned the basics of EBM, which tells us that the highest evidence is found in secondary literature; therefore, we should use the tools within PubMed to limit our results first to the secondary literature, that is, the practice guidelines and systematic reviews.

To do this we should make use of another valuable feature in PubMed: limits. You can reduce the number of results by utilizing any number of limits. In our case, we are interested in applying limits that will give us practice guidelines, and meta-analyses.

Let's first limit our results to practice guidelines. To do this click on the limits tab and scroll down to the type of article limit and select practice guideline. Once we have checked this limit, select <go>. We have reduced our results set to one practice guideline published in the American Journal of Cardiology. To get this article, you can just click on the FIND IT button, which will give you options to retrieve an electronic copy of the full article.

Since we did not find much, let's look for meta-analyses (remember a meta-analysis is the best type of systematic review). Again click on the limits tab and scroll down to the type of article limit. This time select meta-analysis. Click go and we find 5 meta-analyses published in the journal literature. Again to get to any of these, you can just click on the FIND IT button, which will give you options to retrieve an electronic copy of the full review.

Let's continue to go down the evidence hierarchy. To facilitate this PubMed offers a convenient EBM feature called Clinical Queries, which filters the results of any search query to systematic reviews (not just meta-analyses) and individual clinical trials.

Like the MeSH database, access to Clinical Queries is under PubMed Services along the left column. Note three search boxes appear. We will be using the top two. The lower of the two is designed to filter the results of a search placed in the search box to only systematic reviews. Let's do just that! I will paste our search into the search box and click go. We get 22 systematic reviews.

Let's just say that none of these were current or relevant. Our next step would be to search for Randomized Controlled Trials, which is one level below in the evidence hierarchy. To do this

we simply paste the same search into the box above. Click on the proper category or scenario. In our case we are looking at a therapy. Now you have the option of a Narrow, specific search, which means looking only for Randomized Controlled Trials or Broad, sensitive search, which means retrieving all clinical trials. Let's try both and see what we get.

29 RCTs and 329 Clinical Trials

So that is PubMed. For our clinical question PubMed retrieved: 1 practice guideline, 22 systematic reviews, 29 RCTs, and 329 clinical trials

So, just a reminder when using the PubMed:

Use MeSH terminology, if relevant

Use Type of Article limit for practice guidelines, meta-analyses

And Use Clinical Queries search filters:

- Systematic Reviews

- Clinical Study Category for individual studies