

## Strategies for Searching the Literature Using PubMed



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**CE Credits:** 2 hours

**Intended Audience:** Dentists, Dental Hygienists, Dental Assistants, Dental Students, Dental Hygiene Students, Dental Assisting Students

**Date Course Online:** 03/20/2024

**Last Revision Date:** NA

**Course Expiration Date:** 03/19/2027

**Cost:** Free

**Method:** Self-instructional

**AGD Subject Code(s):** 130

**Online Course:** [www.dentalcare.com/en-us/ce-courses/ce682](http://www.dentalcare.com/en-us/ce-courses/ce682)

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- Participants must always be aware of the hazards of using limited knowledge in integrating new techniques or procedures into their practice. Only sound evidence-based dentistry should be used in patient therapy.

### Please Note:

- **Louisiana Dentists:** This course has been approved by the Louisiana State Board of Dentistry to fulfill the mandatory opioid management CE requirement.

### Conflict of Interest Disclosure Statement

- Dr. Jane Forrest has done consulting work for P&G. She is a member of the P&G Oral Care Global Dental Hygiene Advisory Board.
- Ms. Miller reports no conflicts of interest associated with this course.

### Introduction – Substance Use Disorders

This continuing education course is a follow up to the course, [Evidence-Based Decision Making: Introduction and Formulating Good Clinical Questions](#). The primary learning objectives for this course are to increase your skills in conducting an efficient computerized search using PubMed to answer a specific clinical question, the second step of the Evidence-based process.

## Course Contents

- Overview
- Learning Objectives
- Structuring a PubMed Comprehensive Search Using a PICO Question
- Understanding PubMed Key Features
  - PubMed Home Page
  - MeSH (Medical Subject Headings)
- Understanding PubMed Advanced Search Features
  - Boolean Operators
  - Advanced Search Builder and Search History Feature
  - Conducting a Traditional or Comprehensive Search and the Use of Filters
  - Searching with PubMed Clinical Queries
- Conclusion
- Course Test
- References
- About the Authors

## Overview

Finding relevant evidence to answer clinical questions requires conducting a focused search of the peer-reviewed professional literature. To assist professionals in keeping up with the literature and in making it possible to quickly find needed information without leaving your location, online access to MEDLINE, the premier scientific database provided by the National Library of Medicine, is available at no cost through PubMed. The purpose of this course is to outline the steps involved in conducting a PubMed search using the traditional comprehensive PubMed search mechanism, including the MeSH database to answer clinical questions. A case scenarios will demonstrate the application of the skills involved. To gain hands-on experience learning the skills, open a second window in your browser and complete each step as you read about it in the course.

## Learning Objectives

**Upon completion of this course, the dental professional should be able to:**

- Identify key search terms using the components of a PICO question (Patient/Population Problem, Intervention, Comparison and Outcome).
- Navigate PubMed's home page.

- Apply PubMed's Filters and Advance Search Features in conducting an efficient search.
- Search the PubMed MeSH Database to find the correct indexing terms.
- Describe how to use Boolean operators (AND, OR and NOT) to combine search terms.
- Discuss how using the PubMed 'Filters' feature assists in finding the highest levels of evidence.
- Explain how to combine previous search queries using the Advanced Search History feature.
- Effectively use PubMed to find evidence to answer a question using the PubMed features including: MeSH, Boolean Operators, Filters, and the Advance Search History.

## Structuring a PubMed Comprehensive Search Using a PICO Question

The first course, [\*Evidence-Based Decision Making: Introduction and Formulating Good Clinical Questions\*](#),<sup>1</sup> demonstrated how to construct a PICO Question from a case scenario. The following is a brief review of the case, the PICO question and key terms that will be used to illustrate a comprehensive PubMed search.

### Case Scenario

Your new patient, Mr. Nathan Baker, is a 20-year old college student-athlete who has been swimming competitively since he was 12-years-old. His chief complaint is about the smooth, yellow areas near his gum line that he recently noticed. He wants to know what might be causing this and if there is anything he can do to fix and/or prevent it from getting worse. When reviewing his health history and behaviors, you learn that Nathan is a vegetarian, frequently snacking throughout the day on healthy fruits and vegetables. He also consumes sports drinks and an occasional energy drink with his hectic student/athlete schedule.

Nathan currently uses a manual toothbrush right after every meal, flosses nightly, and uses whatever fluoride toothpaste is on sale when he goes to buy one. Since you suspect his chief complaint is due to erosion, you perform the Basic Erosive Wear Examination (BEWE),<sup>2</sup> and calculate his BEWE score to be 10, indicating he is at medium risk for erosive wear.

From Nathan's assessment, we suspect the erosion is due to multiple risk factors including his diet and dietary habits, oral health regimen, and his competitive swimming. After discussing each of Nathan's risk factors, he realizes that some of his habits are contributing to his oral health problem. He had always thought being a vegetarian was healthy and that it was good to brush right after meals. He did not know that his diet was acidic and eating too frequently could contribute to erosion.<sup>3,4</sup> Nor did he realize that he should wait 1-2 hours before brushing his teeth after an acid exposure,<sup>5</sup> or that as a competitive swimmer, if he is training in water with a pH lower than the optimal (7.2-8.0) he may be subject to further erosion.<sup>6</sup>

You both agree on changes that he can make with his eating and oral care habits but realize there are some things that aren't going to change – like the fact he is a competitive swimmer and plans to remain a vegetarian. He then asks you about the toothpaste he should be using. He asks you about Sensodyne Pronamel® (a sodium fluoride toothpaste with potassium nitrate), since he recently heard a TV commercial stating that it helps with erosion. You typically recommend a stannous fluoride toothpaste, like Crest Pro-Health, but are not sure which one will be more effective in preventing the initiation and further progression of dental erosion.

To find the answer, you structure Nathan's question following the PICO formula: "For a patient with *erosive tooth wear* (P), will *Sensodyne Pronamel®* (a sodium fluoride toothpaste with potassium nitrate) (I), as compared to Crest Pro Health (a stannous fluoride toothpaste) (C), be more effective in *preventing the initiation of further erosive tooth wear* (O)?"

Key search terms are derived from the PICO components comprising the PICO question. In this case, they include the Intervention (I: sodium fluoride toothpaste with potassium nitrate or Sensodyne Pronamel), and the Comparison (C: stannous fluoride toothpaste or Crest Pro-Health toothpaste). In this specific example, including the Problem (P), erosive tooth wear, as part of the search will be important since the two different fluoride toothpastes may be compared for other reasons, e.g., occlusal or root caries, or

dental hypersensitivity. Without including the P, which narrows the search to the specific problem, the search would include different answers/outcomes other than their comparison for tooth erosion. However, in general, the two main search terms are the I and C since you will want studies that compare the two to determine which is more effective. Next, identify any additional terms or phrases (synonyms) related to the already identified P, I, C, and O (See Table 1 – Mr. Baker's PICO Worksheet). By generating these words, alternative key terms are identified that facilitate finding evidence to answer the question.

### Understanding PubMed Key Features

After structuring a specific clinical question, the next step in the evidence-based process is finding the evidence through conducting an online search of the scientific literature. As familiar as many dental professions have become in searching the Internet, most have not had a specific course on searching biomedical databases, such as PubMed. These require a basic understanding of the PubMed features, including the MeSH (Medical Subject Headings) database. All features can be used with a traditional PubMed Comprehensive search, which begins on the homepage.

### PubMed Home Page

Understanding how PubMed is structured begins with its Home Page (Figure 1). Three important areas that are most often used include:

1. A Search Box where terms are entered for conducting a traditional or comprehensive PubMed search.
2. Links to using the MeSH Database, and the User Guide providing directions to using each of the features.
3. A link to the Advanced Search feature (below the Search Box).

PubMed is a free web based retrieval system developed by the National Center for Biotechnology Information (NCBI) at the National Library of Medicine. It is part of the larger NCBI system known as Entrez. PubMed includes over 36 million citations from MEDLINE, which comprises the largest part of PubMed. PubMed includes links to full text articles through PubMed Central and to publisher web sites that

**PICO Worksheet for Mr. Baker's Case**

**Define your PICO Components (OUTCOME MUST MATCH THE PROBLEM).**

*Your question should be used to help establish your search strategy*

- Problem: erosive tooth wear
- Intervention: sodium fluoride + potassium nitrate toothpaste (Sensodyne Pronamel®)
- Comparison: stannous fluoride toothpaste (Crest Pro-Health)
- Outcome: more effective in preventing erosive tooth wear

**5. Write out your question using the formula. (USE PICO COMPONENTS).**

For a patient with erosive tooth wear, will sodium fluoride + potassium nitrate toothpaste (Sensodyne Pronamel®), as compared to stannous fluoride toothpaste (Crest Pro-Health), be more effective in preventing erosive tooth wear?

**6. Identify the Type of question. Circle one:**

**Therapy/Prevention**     Diagnosis     Etiology/Causation/Harm,     Prognosis

**7. Identify the type of study to include in your search.**

<input checked="" type="checkbox"/> Meta-Analysis	<input checked="" type="checkbox"/> Systematic Review	<input checked="" type="checkbox"/> Randomized Controlled Trial
<input checked="" type="checkbox"/> Clinical Trial Cohort Study	<input checked="" type="checkbox"/> Practice Guidelines	<input type="checkbox"/> Case series or Case Report
<input type="checkbox"/> Cohort Study	<input type="checkbox"/> Case Control Study	<input type="checkbox"/> Literature Review
<input type="checkbox"/> Other: _____		

**8. List the main topics and alternative terms from your PICO question that can be used for your search.**

<u>Erosive tooth wear, tooth erosion, tooth wear,</u>	<u>tooth attrition, tooth abrasion</u>
<u>Sodium fluoride + potassium nitrate toothpaste</u>	<u>Stannous fluoride toothpaste/dentifrice</u>
<u>Sensodyne Pronamel® dentifrice</u>	<u>Crest Pro-Health toothpaste</u>

**9. List inclusion criteria – e.g., gender, age, year of publication**

<u>Competitive swimmer</u>	<b>List irrelevant terms</b>
<u>Vegetarian</u>	<u>Sodium fluoride (FL) toothpaste, FL mouthrinses</u>
_____	<u>Sensitivity or hypersensitivity, FL varnish, gels</u>
_____	<u>Crest sodium FL or MFP toothpaste,</u>
_____	<u>Sensodyne toothpaste, dental caries</u>

**10. List where you plan to search, e.g., MEDLINE, PubMed, Cochrane Database, Trip, Other:**

PubMed, Trip, ADA Center for EBD and Cochrane database

**Table 1. Completed PICO Worksheet for Mr. Baker's Case.<sup>1</sup>**

offer full-text articles, however, there may be a fee to access the full text. As technology has advanced, so have improvements to PubMed. The latest version of PubMed includes more available resources than the former version, which is no longer available (referred to as Legacy). Some of the new resources include "About PubMed" and the "User Guide," both of which can be found on the homepage under Learn. These upgrades were made along with enhancements to the mobile version with 40% of users accessing PubMed from a mobile device.<sup>7</sup>

### MeSH (Medical Subject Headings)

PubMed has an online User Guide (<https://pubmed.ncbi.nlm.nih.gov/help/>), which includes YouTube tutorials that walk through the steps of a search and explain each PubMed feature

and tool so users understand how to conduct a search and the language for how information on the database is indexed. For example, PubMed and MEDLINE use the MeSH (Medical Subject Headings), a controlled vocabulary thesaurus or indexing language, which allows there to be consistency in the key terms assigned to the articles indexed from journals. Each reference is associated with a set of MeSH terms that describe the content of the item.

The MeSH Database can be accessed from the PubMed home page (Figure 1). By opening this browser, a word(s) can be entered in the search box. Although when typing in 'stannous fluoride' a pull-down list of other terms appears, do not mistake these for MeSH terms (Figure 2). They are just terms others have typed in.

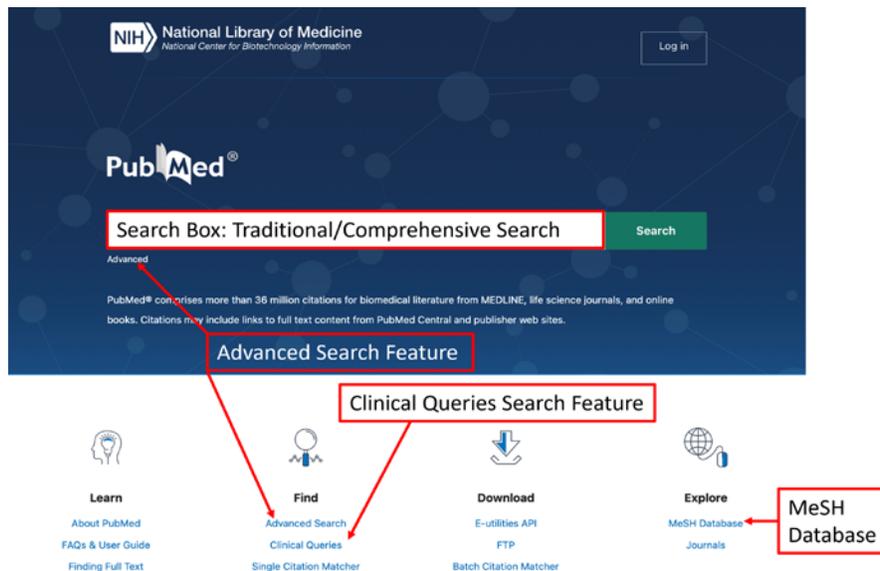


Figure 1. PubMed Home Page.

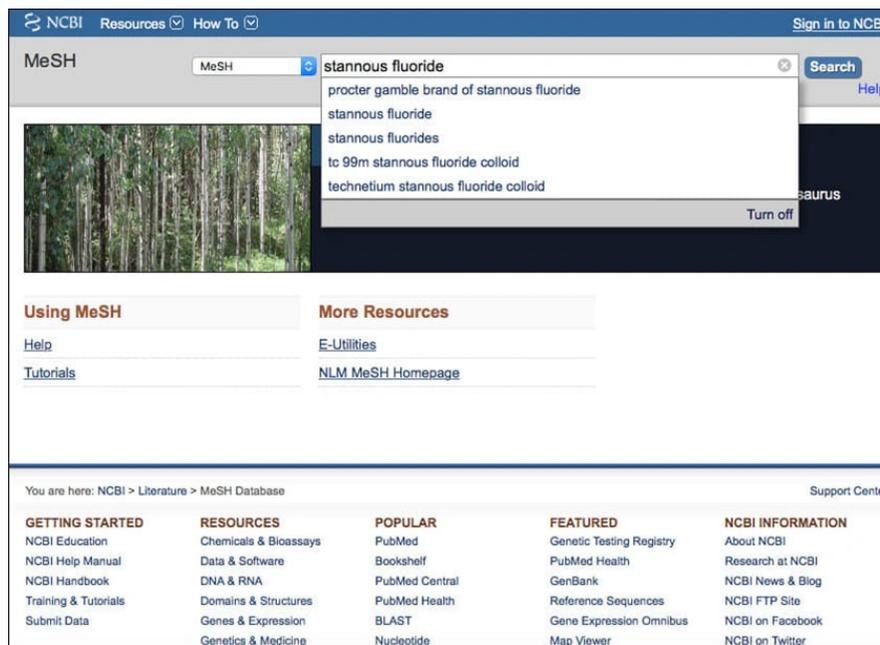


Figure 2. MeSH Database Search Page.

Click on Search and the MeSH indexing term(s) that is/are used appear (Figures 3). Next, click on Tin Fluorides since this appears to be the applicable term. Additional information is displayed related to subheadings, different entry terms, previous indexing and where the term is structured in the hierarchical “MeSH tree” (Figure 4). This is a helpful tool when an original search does not yield enough results. It will often provide additional terms related to a search, which may

lead to more relevant information. For example, in searching for evidence on stannous fluoride, type in the term ‘stannous fluoride’ to determine if it is the correct MeSH term.

The results from using the MeSH Browser indicate that Tin Fluorides (vs. stannous fluoride) is the MeSH indexing term, however stannous fluoride is an entry term. If there were an inadequate number of citations then

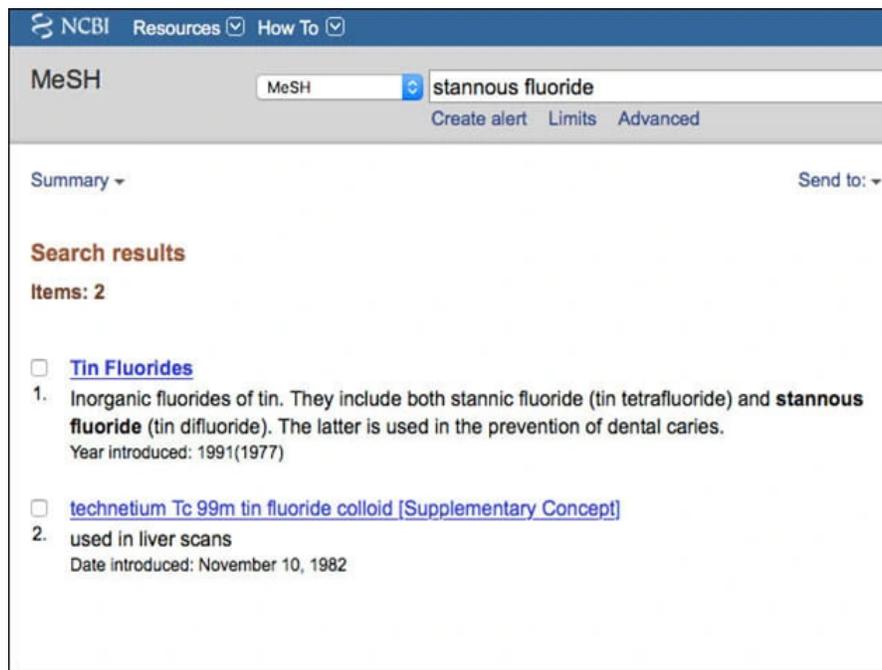


Figure 3. MeSH Database Search – Stannous Fluoride Results.

according to the MeSH Tree, the search would need to be broadened using the term Fluorides – one level up from Tin Fluorides.

When conducting the same search using the term Sodium Fluoride, the term Sodium Fluoride is identified as the MeSH term. Again, if there were an inadequate number of citations then according to the MeSH Tree, the search would need to be broadened using the term Fluorides – one level up from Sodium Fluoride.

### Understanding PubMed Advanced Search Features

The Advanced search feature includes the Search Builder using Boolean Operators and the Search History. A link to the User Guide is available on the upper right side of Advanced Search (Figure 5) and explains the Advanced search feature.

### Boolean Operators

Boolean logic refers to relationships among search terms. Boolean operators limit results of a search by letting the user combine search terms or concepts. The three Boolean operators are the words “**AND**,” “**OR**,” and “**NOT**” and although PubMed states they should be capitalized,

you may also retrieve the same citations not capitalizing them.<sup>8</sup> The **AND** operator is used to retrieve **results that contain the entered search terms** in a citation. A search for “stannous fluoride toothpaste **AND** sodium fluoride and potassium nitrate toothpaste” will retrieve only citations that reference **BOTH**. The **AND** is the default operator used in PubMed, so if a Boolean operator is not specified between two or more terms, PubMed will automatically use **AND** between terms.<sup>8</sup>

The **OR** operator looks for citations that have **at least one of the terms** and combines them together in one result. The **OR** operator is used to combine articles on similar topics or broaden your search. A search for “tooth erosion **OR** tooth wear” will retrieve citations that reference at least one of the terms. The **OR** Boolean operator is helpful to use when there are synonyms, e.g., tooth erosion **OR** erosive tooth wear. The **NOT** operator excludes the retrieval of terms from your search results. Typing “dental erosion **NOT** dental caries” excludes results about dental caries that also cause enamel damage. However, if articles refer to how enamel damage can occur, the **NOT** Boolean operator could eliminate relevant citations. Of the 3 Boolean operators, be cautious about using **NOT**.

**Entry Terms:**

- Fluoride, Tin
- Fluorides, Tin
- Tin Fluoride
- Tin Difluoride
- Difluoride, Tin
- Difluorides, Tin
- Tin Difluorides
- Stannous Fluoride
- Fluoride, Stannous
- Fluorides, Stannous
- Stannous Fluorides
- Cav-X
- Floran
- Florans
- Tin Tetrafluoride
- Tetrafluoride, Tin
- Tetrafluorides, Tin
- Tin Tetrafluorides
- Stannic Fluoride
- Fluoride, Stannic
- Fluorides, Stannic
- Stannic Fluorides
- Gel-Kam
- Gel-Tin
- Omnia-Gel
- Omnia-Med
- Stanimax
- Stanimaxs
- Fluoristan
- Fluoristans

Previous Indexing:

- Fluorides (1966-1976)
- Fluorides, Topical (1966-1976)
- Tin (1966-1976)

**Pharmacologic Action:**

Cariostatic Agents

All MeSH Categories  
Chemicals and Drugs Category  
Inorganic Chemicals  
Fluorine Compounds  
Hydrofluoric Acid  
Fluorides  
Tin Fluorides

All MeSH Categories  
Chemicals and Drugs Category  
Inorganic Chemicals  
Tin Compounds  
Tin Fluorides

All MeSH Categories  
Chemicals and Drugs Category  
Biomedical and Dental Materials  
Cariostatic Agents  
Tin Fluorides

All MeSH Categories  
Technology and Food and Beverages Category  
Technology, Industry, and Agriculture  
Manufactured Materials  
Biomedical and Dental Materials  
Cariostatic Agents  
Tin Fluorides

**Figure 4.** Stannous Fluoride / Tin Difluorides Entry Terms and MeSH Categories.

PubMed automatically processes Boolean connectors in a left to right sequence, so when using multiple Boolean operators with more than two terms it may be important to enclose terms in parentheses, (tooth erosion **OR** tooth wear) **AND** (stannous fluoride toothpaste) **AND** (sodium fluoride and potassium nitrate toothpaste). The terms inside the parentheses, which is referred to as nesting, will be processed as a unit and then incorporated into the overall strategy.<sup>9</sup>

Boolean Operators can be used when typing in terms in the Search Box on the Home Page (Figure 1) and when using the Search Builder on the Advanced Search Page (Figure 6), which is accessed from the Home Page (found under the search box). Later you will see that Boolean Operators also can be used in performing a search using Clinical Queries.

### Advanced Search Builder and Search History Feature

Another valuable tool for conducting an evidence-based search is the Advanced Search Builder, including the Search History feature. This allows you to view all the search strategies that have been run and their results. It also allows you to combine previous search queries using the Boolean operators with new search queries. PubMed may move a search statement number to the top of the History when it's used again, so the search queries may appear to be out of numerical order. Note when combining searches, the terms do not need to be spelled out again. Instead of typing out tooth erosion **OR** tooth wear, just type the number of the search, e.g., **#1 or #2**. Please note, **you MUST use the # sign before the actual number**.

Using the Advanced Search Builder, you can see that the terms tooth erosion (**#1**) **or** erosive tooth wear (**#2**) were then combined (**#3**), which then was combined with stannous fluoride toothpaste (**#4**). This limited the number of citations found to 42 (**#5**). Next, a search for sodium fluoride and potassium nitrate toothpaste (**#6**) identified 33 citations. It then was combined with **#3** to limit the findings to those related to tooth erosion/ erosive tooth wear. The final step was combining searches **#5 AND #7** to identify studies that included both types of fluoride toothpaste in relation to tooth erosion (**#8**). This resulted in

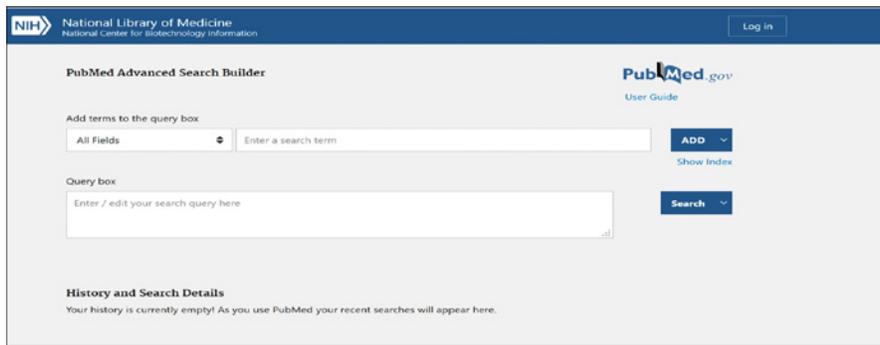


Figure 5. Top Portion of Advanced Search Builder Page.

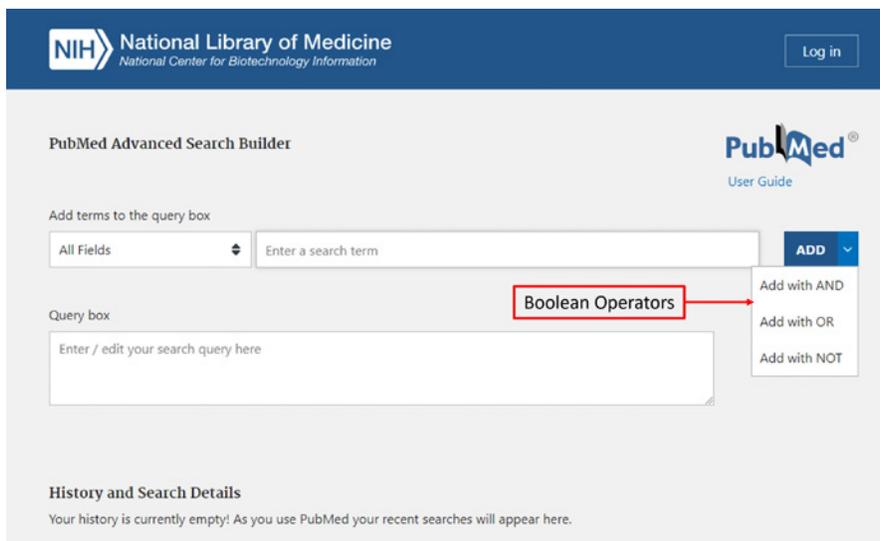


Figure 6. Boolean Operators as Part of Search Builder.

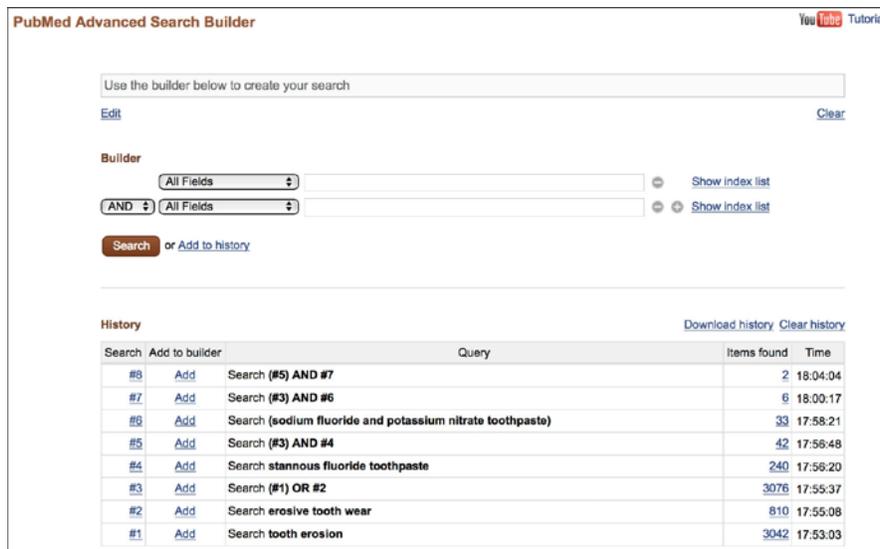


Figure 7a. Search History on Advanced Search Builder Page.

**PubMed.gov** | US National Library of Medicine | National Institutes of Health  
 PubMed | (#5) AND #7 | Create RSS | Create alert | Advanced

**Article types**  
 Clinical Trial  
 Review  
 Customize ...

**Text availability**  
 Abstract  
 Free full text  
 Full text

**PubMed Commons**  
 Reader comments  
 Trending articles

**Publication dates**  
 5 years  
 10 years  
 Custom range...

**Species**  
 Humans  
 Other Animals

**Format:** Summary | **Sort by:** Most Recent | **Send to:**

**Search results**  
**Items: 2**

- [A randomised in situ trial, measuring the anti-erosive properties of a stannous-containing sodium fluoride dentifrice compared with a sodium fluoride/potassium nitrate dentifrice.](#)  
 Hooper S, Seong J, Macdonald E, Claydon N, Hellin N, Barker ML, He T, West NX.  
 Int Dent J. 2014 Mar;64 Suppl 1:35-42. doi: 10.1111/idj.12101.  
 PMID: 24571703  
[Similar articles](#)
- [Conventional and anti-erosion fluoride toothpastes: effect on enamel erosion and erosion-abrasion.](#)  
 Ganss C, Lussi A, Grunau O, Klimek J, Schlueter N.  
 Caries Res. 2011;45(6):581-9. doi: 10.1159/000334318. Epub 2011 Dec 8.  
 PMID: 22156703  
[Similar articles](#)

**Figure 7b.** Studies Identified Using Advanced Search Builder.

retrieving 2 studies. By clicking on 2 under the column Items found, you can see the two studies (Figure 7b).

If none of these studies answers Nathan’s question, then the search needs to be expanded by using broader or more generic terms as mentioned earlier.

As you can see from this search, terms were searched individually prior to combining them. This allows the user to see exactly what results were obtained for each term. Skipping the search for individual terms prior to combining them can result in missing important citations.

### Conducting a Traditional or Comprehensive Search and the Use of Filters

Without knowing about or using the MeSH or Advanced search features, the most common way of beginning a search is to type in the main search term, tooth erosion, on the Homepage (Figure 8).

Next click on Search to see the results, which result in finding 3483 citations (Figure 9a). To narrow these results to the most current and highest levels of evidence, use the filters that appear on the left-hand column.

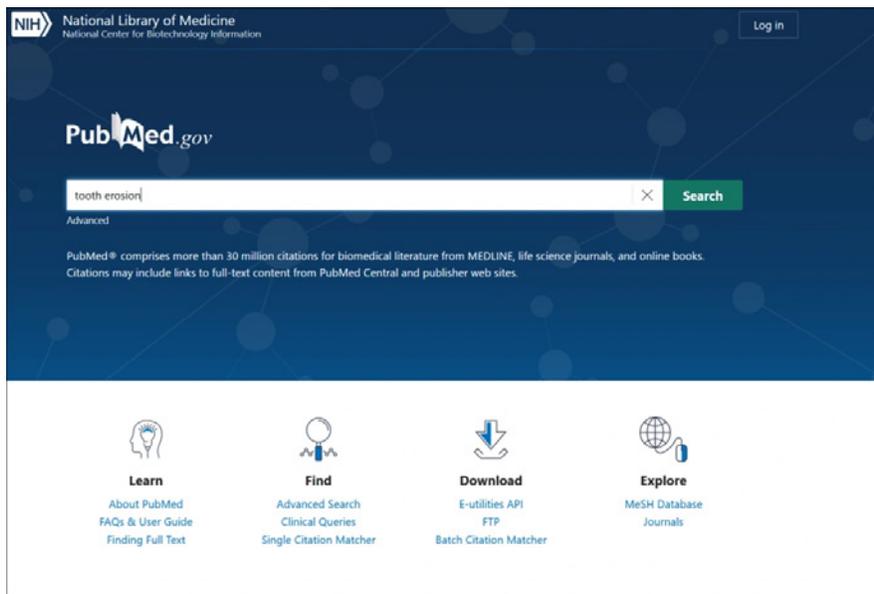
Scanning down the column you have choices related to Text Availability, Article Type, Publication Dates, and Additional Features (Figure 9b).

Clicking on Additional Features allows you to check off other Article Types, i.e., Practice Guideline and Comment, which are not a default publication type. Some of the other Additional Filters include Species, Languages, Sex, and Age (Figure 9c).

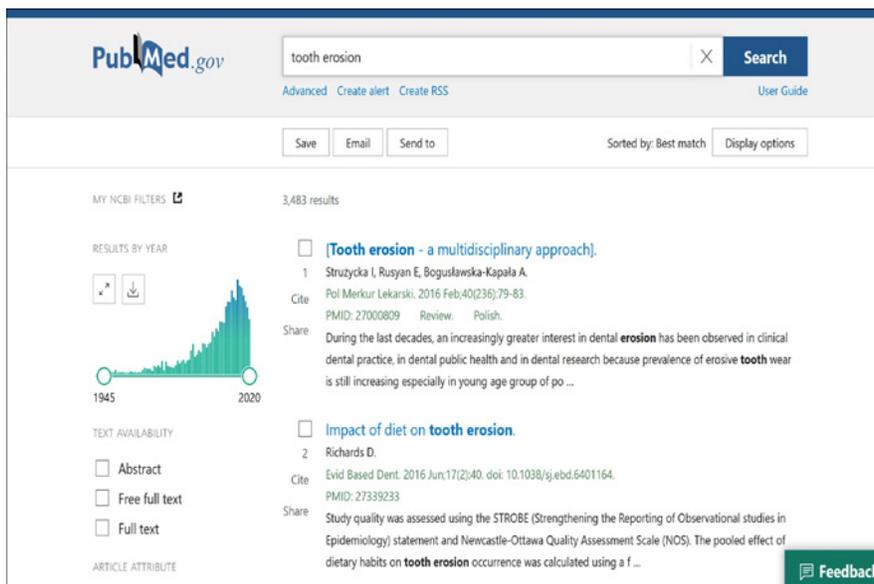
By clicking on SHOW, it places Practice Guideline and Comment under Article Type (Figure 9d). If you had clicked on any of the options under any of the Additional Filters, they too would appear on the main page.

Of all the filters, perhaps the most important is Article Type since it allows you to search for studies by levels of evidence. Beginning with clicking on Practice Guideline, the highest level of evidence, the 3483 citations are narrowed to 5 (Figure 10), which is much more reasonable to review. However, notice that the most recent one, #1, was published in 2008.

If no Practice Guideline was identified or none of those found answer your question,



**Figure 8.** Beginning a Traditional/Comprehensive Search.



**Figure 9a.** Results of a Traditional/Comprehensive Search.

then re-run the search. First clear the filter by clicking on “Clear all” to remove its selection. Next, click on Meta-Analysis, the next highest level of evidence. In this case, 12 citations are identified (Figure 11). Again, it’s important to only click on one filter at a time so that you know what level of evidence you have found.

If no Meta-Analysis is found, then re-run the search again by clicking on “Clear all” to remove Meta-Analysis and click on Systematic

Reviews, the next highest level. There are 32 for this search. Continue this process so that you are able to identify the highest levels of evidence that answers your question. For a review of levels of evidence and the hierarchy that exists to guide clinical decision making see [Evidence-Based Decision Making: Introduction and Formulating Good Clinical Questions.](#)<sup>1</sup>

If there had been a large number of citations, another option is to use the “Publication Date”

ARTICLE ATTRIBUTE dietary habits on **tooth erosion** occurrence was calculated using a f ...

Associated data

ARTICLE TYPE

Books and Documents

Clinical Trial

Meta-Analysis

Randomized Controlled Trial

Review

Systematic Review

PUBLICATION DATE

1 year

5 years

10 years

Custom Range

**A Dental Hygienist's and Therapist's Guide to the Management of **Tooth Erosion**.**

3 Ariyanayagam Y.

Cite Prim Dent J. 2016 Aug 1;5(3):58-62. doi: 10.1177/205016841600500306.  
PMID: 28826465 Review.

Share Dental care professionals can support patients to prevent and manage **tooth erosion**. The role of the dentist is to restore the structure and function of teeth damaged by acid **erosion**, while the role of the dental hygienist therapist is to work alongside the de ...

**Tooth erosion and eating disorders: a systematic review and meta-analysis.**

4 Hermont AP, Oliveira PA, Martins CC, Paiva SM, Pordeus IA, Auad SM.

Cite PLoS One. 2014 Nov 7;9(11):e111123. doi: 10.1371/journal.pone.0111123. eCollection 2014.  
PMID: 25379668 **Free PMC article.** Review.

Share OBJECTIVES: The aim of this systematic review and meta-analysis was to search for scientific evidence regarding the following clinical question: Do eating disorders increase the risk of **tooth erosion**?  
METHODS: An electronic search addressing eating disorders and ...

**Etiology and pathogenesis of dental **erosion**.**

5 Kanzow P, Wegehaupt FJ, Attin T, Wiegand A.

Cite Quintessence Int. 2016 Apr;47(4):275-8. doi: 10.3290/j.qi.a35625.  
PMID: 27022647 Review.

Share The condition of dental **erosion** is defined as acid-related loss of **tooth** structure which does not involve microorganisms. ...By a thorough clinical examination and an accurate anamnesis, various **erosion**-related risk factors can be identified and strategies to ...

Figure 9b. Customizing Article Types.

ARTICLE TYPE

SPECIES

LANGUAGE

SEX

SUBJECT

JOURNAL

AGE

Clinical Trial Protocol

Newspaper Article

Clinical Trial, Phase I

Observational Study

Clinical Trial, Phase II

Observational Study, Veterinary

Clinical Trial, Phase III

Overall

Clinical Trial, Phase IV

Patient Education Handout

Clinical Trial, Veterinary

Periodical Index

Comment

Personal Narrative

Comparative Study

Portrait

Congress

Practice Guideline

Consensus Development Conference

Pragmatic Clinical Trial

Consensus Development Conference, NIH

Preprint

Figure 9c. Customizing Article Types (Continued).

TEXT AVAILABILITY

Abstract

Free full text

Full text

ARTICLE ATTRIBUTE

Associated data

ARTICLE TYPE

Books and Documents

Clinical Trial

Comment

Meta-Analysis

Practice Guideline

Randomized Controlled Trial

Review

Systematic Review

**Impact of diet on **tooth erosion**.**

2 Richards D.

Cite Evid Based Dent. 2016 Jun;17(2):40. doi: 10.1038/sj.ebd.6401164.  
PMID: 27339233

Share Study quality was assessed using the STROBE (Strengthening the Reporting of Observational studies in Epidemiology) statement and Newcastle-Ottawa Quality Assessment Scale (NOS). The pooled effect of dietary habits on **tooth erosion** occurrence was calculated using a f ...

**A Dental Hygienist's and Therapist's Guide to the Management of **Tooth Erosion**.**

3 Ariyanayagam Y.

Cite Prim Dent J. 2016 Aug 1;5(3):58-62. doi: 10.1177/205016841600500306.  
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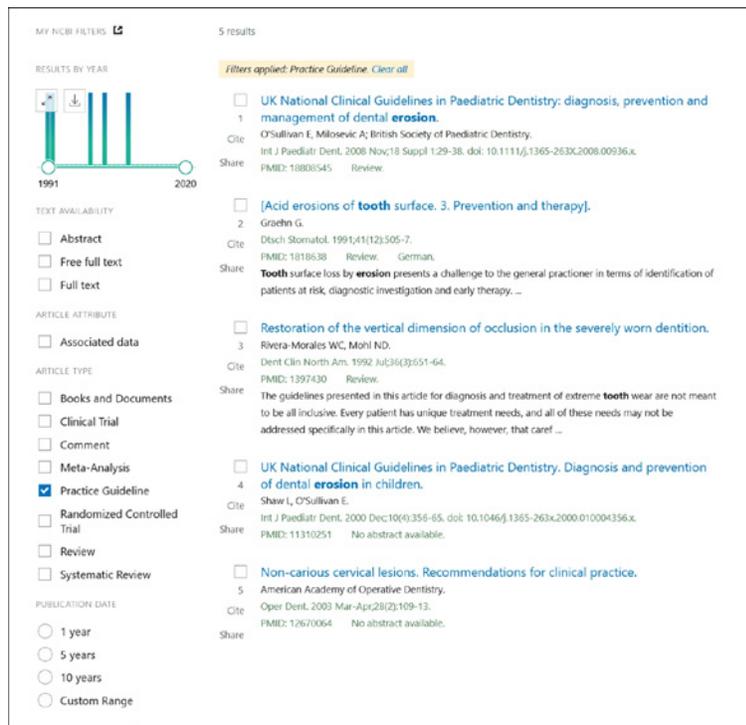
**Tooth erosion and eating disorders: a systematic review and meta-analysis.**

4 Hermont AP, Oliveira PA, Martins CC, Paiva SM, Pordeus IA, Auad SM.

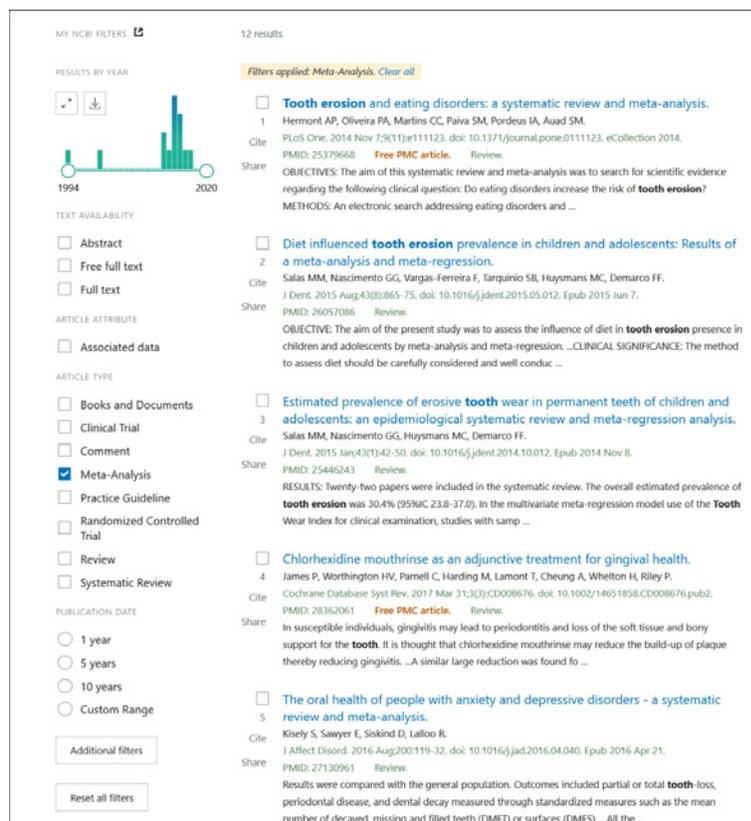
Cite PLoS One. 2014 Nov 7;9(11):e111123. doi: 10.1371/journal.pone.0111123. eCollection 2014.  
PMID: 25379668 **Free PMC article.** Review.

Share OBJECTIVES: The aim of this systematic review and meta-analysis was to search for scientific evidence regarding the following clinical question: Do eating disorders increase the risk of **tooth erosion**?  
METHODS: An electronic search addressing eating disorders and ...

Figure 9d. Result of Adding Options under Article Types.



**Figure 10.** Using Filters to Narrow Citations to the Highest Level of Evidence, Practice Guideline.



**Figure 11.** Using Filters to Narrow Citations to the Highest Level of Evidence, Meta-Analysis.

filter to limit the findings to the past 5 or 10 years. Also, if focusing on a specific age group, click on **Show additional features** and select the appropriate age group (Figure 12).

### Searching with PubMed Clinical Queries

Another feature for answering clinical questions for busy professionals and students is **PubMed Clinical Queries**. Click on the link found on the Homepage under Find (Figure 1). The Clinical Queries feature (Figure 13) provides specialized searches using evidence-

based filters to retrieve articles. The built-in evidence-based algorithms streamline the process of searching for clinically relevant articles.

Of the options on the Clinical Queries page, our focus is on using the main search box and the **Clinical Study Categories**. Special algorithms are designed to find relevant evidence under the each Category. The default category is Therapy, however by clicking on the drop-down menu, other Filters are found, such as Clinical Prediction

Figure 12. Additional Filters to Narrow Citations.

Figure 13. PubMed Clinical Queries.

Guides, Diagnosis, Etiology, and Prognosis (Figure 14). These can be searched with a broad or narrow focus (Figure 15). Broad is the default so by using the drop-down menu narrow can be selected.

Clinical Queries allows an individual with limited computer searching skills to find high levels of evidence by typing in a main topic or specific terms of interest. Using the same clinical

scenario, “tooth erosion OR erosive tooth wear” is typed into the search box (Figure 16a).

By changing the Scope to Narrow, one goes from over 1687 to only 226.

The abstracts found under the Clinical Study Categories use evidence-based search filters to find **individual studies** in the indicated category. The default settings are ‘Therapy’ under Category

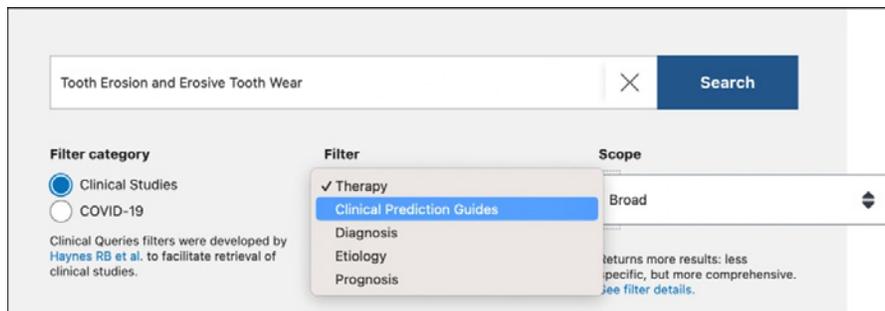


Figure 14. Clinical Queries Filters

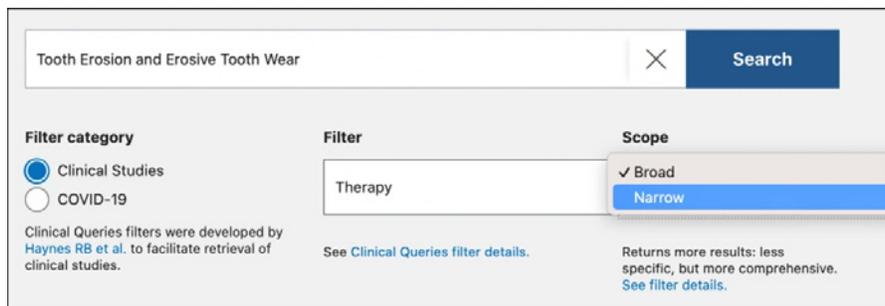


Figure 15. Clinical Queries Scopes.



#### Results for Clinical Studies: Therapy/Broad

5 of 1,687 results sorted by: Most Recent

[See all results in PubMed \(1,687\)](#)

[Association between salivary characteristics and tooth wear: A systematic review and meta-analysis.](#)

Madariaga Vi, et al. J Dent. 2023. PMID: 37678744 [Free article](#). Review.

Figure 16a. Clinical Queries Results of Searching for Tooth Erosion OR Erosive Tooth Wear, Broad Scope.

**Filter category**

- Clinical Studies
- COVID-19

Clinical Queries filters were developed by Haynes RB et al. to facilitate retrieval of clinical studies.

**Filter**

Therapy

See Clinical Queries filter details.

**Scope**

Narrow

Returns fewer results: more specific, but less comprehensive. See filter details.

[Reset form](#)

**Results for Clinical Studies: Therapy/Narrow**

5 of 226 results sorted by: Most Recent

[See all results in PubMed \(226\)](#)

[Longitudinal assessment of dental erosion-abrasion by cross-polarization optical coherence tomography in vitro.](#)

Romero MJR, et al. Braz Oral Res. 2023. PMID: 37672415 **Free article.** Clinical Trial.

[The subsurface lesion in erosive tooth wear.](#)

Jadeja SP, et al. J Dent. 2023. PMID: 37544352 **Free article.** Clinical Trial.

**Figure 16b.** Clinical Queries Results of Searching for Tooth Erosion OR Erosive Tooth Wear, Narrow Scope.

and 'Broad' under Scope, since the majority of questions asked fall under the category of therapy. The type of studies retrieved for this category and scope are randomized controlled trials. Since there were over a thousand, change the Scope to Narrow (Figure 16b) and this will reduce the number of citations. A Narrow, specific search will return the most relevant citations, although it may miss some.

Although there is no one correct way to conduct a search, how search terms are entered influences the results and the number of steps needed to refine the search.

## Conclusion

Finding evidence to answer clinical questions requires skills that many professional programs are just now incorporating into curriculum. Although there is no one "correct" way to conduct a search, knowing how databases are designed and their key features allows you to be more efficient in quickly identifying relevant articles that can be used in clinical decision-making. The more successful you are, the more likely you will continue to search for the scientific evidence when it's needed.

PubMed offers two searching strategies, each of which can be conducted very efficiently if users take the time to learn how to use the Filters and Advanced Search features. Individuals with limited experience using PubMed can be successful in finding useful information as they develop or refine their searching skills.

Just as in learning any skill, practice in conducting searches is needed. Again, one suggestion to gain hands-on experience is to follow the case scenarios in this course by opening a second window in your browser and doing each step as you read about it in the course. Another suggestion is to print out the pdf file of the course and use it as a guide after completing the course.

To gain a more in depth understanding of PubMed, access Learn and their Online Training at <https://learn.nlm.nih.gov/documentation/training-packets/T0042010P/>. These include Quick Tours, which are brief animated tutorials with audio and cover a wide range of topics. Also, several areas have YouTube videos (in English and Spanish, scroll down to the end of the page) demonstrating different features, such as using the Advance search feature.

## Course Test Preview

To receive Continuing Education credit for this course, you must complete the online test. Please go to: [www.dentalcare.com/en-us/ce-courses/ce682/start-test](http://www.dentalcare.com/en-us/ce-courses/ce682/start-test)

### 1. Which 2 PICO components provide the primary searching terms?

- A. Problem and Outcome
- B. Intervention and Comparison
- C. Intervention and Outcome
- D. Comparison and Outcome
- E. Problem and Intervention.

### 2. Which best describes PubMed?

- A. A web based retrieval system part of the National Library of Medicine.
- B. Provides free access to MEDLINE, the premiere scientific database.
- C. Provides links to articles and other resources.
- D. Includes over 50 million citations from MEDLINE.
- E. A, B & C.

### 3. What area of the PubMed Homepage is used to initiate a comprehensive search?

- A. Search Box
- B. Feature Tabs
- C. MeSH Database
- D. Side Bar Links
- E. Tutorials

### 4. Which of the following tools is used to identify the PubMed indexing language?

- A. Boolean Operators
- B. Limits
- C. Clinical Queries
- D. MeSH Database
- E. History

### 5. What is the primary purpose of Boolean Operators?

- A. To make sure the largest number of results is identified.
- B. To make sure the least number of results is identified.
- C. To limit results of a search by combining terms or concepts.
- D. A and B.
- E. B and C.

### 6. Which Boolean Operator is used to exclude terms from a search?

- A. not
- B. or
- C. and
- D. never
- E. A and B.

### 7. Which Boolean Operator is used to include both terms in the search?

- A. not
- B. or
- C. and
- D. never
- E. B and C.

**8. Which Boolean Operator is used to include at least one of two terms in a search?**

- A. not
- B. or
- C. and
- D. never
- E. A and D.

**9. All of the following characteristics describe the Search History Feature except:**

- A. Allows you to view all the search queries and results.
- B. Allows you to combine previous search queries.
- C. Does not require you to capitalize Boolean operators.
- D. Requires you to write out search terms.
- E. Requires using the # sign when combining searches.

**10. Which PubMed feature allows you to limit the citations according to study type?**

- A. Filters
- B. Preview/Index
- C. History
- D. Clipboard
- E. Details

**11. Which Filter option(s) are used to limit citations to find the highest level of evidence?**

- A. Languages
- B. Species
- C. Article Types
- D. A and B
- E. B and C

**12. Which PubMed feature is used to identify search terms when the original term does not yield enough results?**

- A. Boolean Operators
- B. Filters
- C. Clinical Queries
- D. History
- E. MeSH Database

**13. Which of the following Clinical Studies Categories on the PubMed Clinical Queries page is the default category?**

- A. Clinical Prediction Guides
- B. Diagnosis
- C. Etiology
- D. Prognosis
- E. Therapy

**14. Which of the PubMed Clinical Queries options finds citations for individual randomized controlled trials?**

- A. Clinical Study Categories: Therapy and Broad scope
- B. Clinical Study Categories: Therapy and Narrow scope
- C. Systematic Reviews.
- D. COVID-19 Articles.
- E. A and B

- 15. Which of the following Clinical Studies Categories on the PubMed Clinical Queries page is the default Scope?**
- A. Broad scope
  - B. Narrow scope
  - C. A and B are equal in scope
  - D. A and B
- 16. In question #15, if too many citations are found, which Clinical Queries option should be used next?**
- A. Broad Scope
  - B. Narrow Scope
  - C. Article Types
  - D. Languages
  - E. Species
- 17. You are using the Article Type filter and have not found any Practice Guidelines. Which Article Type will provide you with the next highest level of evidence?**
- A. Books and Documents
  - B. Clinical Trial
  - C. Cohort Study
  - D. Meta-Analysis
  - E. Randomized Controlled Trial
- 18. Boolean Operators only can be used with a comprehensive PubMed Search.**
- A. True
  - B. False

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## Additional Resources

- No Additional Resources Available

## About the Authors



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Dr. Forrest is a Professor Emerita of Clinical Dentistry, Ostrow School of Dentistry of USC, Los Angeles, CA. She also is the Director of the National Center for Dental Hygiene Research and Practice, Inc. Dr. Forrest is an internationally recognized author and presenter on **Evidence-Based Decision Making (EBDM)**, receiving the 2017ADA/AADR EBD Accomplished Faculty Award. She also received the 2017 NJDHA Carol King Award for Advancing the Profession of Dental Hygiene and the 2021 Esther Wilkins Lifetime Achievement Award.

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Syrene has presented at national and international dental, dental hygiene and allied health conferences on Evidence Based Decision Making including as a faculty member in the pre-Conference workshop for the 1st International Conference on Evidence-Based Dentistry. Syrene is the co-author with Jane Forrest on EBDM journal publications and on textbook chapters, the last 4 editions of *Clinical Periodontology* (Newman, Takei and Carranza editors), the current editions of *Dental Hygiene Theory and Practice* (Darby & Walsh; and Bowen & Pieren editors). Ms. Miller also is the co-author of the new textbook, *Evidence-Based Decision Making: A Translational Guide for Dental Professionals*.

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