Learning Objectives

1. Definition of Evidence-Based Dentistry/Practice
2. Five steps of the EBD process
3. Development of a clinical question using PICOTT
4. Hierarchy of evidence
5. PubMed search strategies
6. Appraisal tools to determine validity of a study
Evidence Based Dentistry

What is Evidence Based Dentistry?

The American Dental Association defines evidence based dentistry as:

"an approach to oral health care that requires the judicious integration of systematic assessments of clinically relevant scientific evidence, relating to the patient's oral and medical condition and history, with the dentist's clinical expertise and the patient's treatment needs and preferences."

EBD integrates:
- the dentist's expertise,
- the best available scientific evidence,
- and the patient's needs and preferences.

EBD 5 Step Process

The EBD process is a structured approach to identifying and using the best information relevant to a particular clinical problem. It follows 5 steps:

1. **Question**
   Articulate a clear question based on the patient's clinical problem.

2. **Find**
   Conduct a comprehensive search for the latest relevant research.

3. **Appraise**
   Critically assess the evidence.

http://guides.lib.unc.edu/ebd
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Evidence Based Dentistry

**EBD integrates:**
- dentist’s expertise
- best available scientific evidence
- and the patient's needs and preferences
1. A question arises during care of a patient.

2. Completely articulate all parts of the question.

3. Conduct a thorough focused search and select the highest quality evidence.

4. Evaluate the evidence for validity and clinical applicability.

5. Use clinical expertise to integrate applicable evidence with attention to patient values.

Lifecycle of Clinical Questions
Unanswered Clinical Questions

“The majority of providers (84%) encountered clinical questions at least a few times per week. More than half of the respondents (61%) stated that their clinical questions arose from unusual cases, and even more (73%) encountered questions through routine reading. Many clinical questions were initiated by patients (53%) or arose from colleagues and learners (24%), and about half (51%) of respondents reported encountering clinical questions that were important to the situation but were outside the respondents’ area of expertise. Most respondents (57%) indicated a preference to investigate their clinical questions right away, although many also preferred to write down the question (53%) or make mental notes (45%).”

A framework called **PICO(TT)** can be used to make the process of searching for evidence to answer a question a bit clearer.

<table>
<thead>
<tr>
<th>PICOTT stands for:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P</strong> Patient or Population</td>
</tr>
<tr>
<td><strong>I</strong> Intervention or Indicator</td>
</tr>
<tr>
<td><strong>C</strong> Comparison or Control</td>
</tr>
<tr>
<td><strong>O</strong> Outcome</td>
</tr>
<tr>
<td><strong>T</strong> Type of Question</td>
</tr>
<tr>
<td><strong>T</strong> Type of Study</td>
</tr>
</tbody>
</table>
ASK: Use PICO(TT)

**PICOTT** is a tool used to:

- Help you clarify and focus your question by identifying all the key concepts in complex clinical questions
- Organize words related to the parts of the question
- Think about how best to combine the words into a logical search process
- Name appropriate study design limits
Ask: Consider this Clinical Question

Does brushing with toothpaste that includes both xylitol and fluoride prevent caries more effectively when compared to brushing with toothpaste containing only fluoride?
Ask: Identify the Key Concepts

Does brushing with toothpaste that includes both xylitol and fluoride prevent caries more effectively when compared to brushing with toothpaste containing only fluoride?
<table>
<thead>
<tr>
<th><strong>Patient / Problem</strong></th>
<th>Describe population / group of patients / disease / condition</th>
<th>No specific population</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intervention</strong></td>
<td>What is the main intervention or therapy you wish to consider?</td>
<td>Fluoride-xylitol toothpaste</td>
</tr>
<tr>
<td><strong>Comparison</strong></td>
<td>Is there an alternative therapy or intervention to compare?</td>
<td>Fluoride toothpaste</td>
</tr>
<tr>
<td><strong>Outcome</strong></td>
<td>What is the outcome being studied?</td>
<td>Prevent caries</td>
</tr>
<tr>
<td><strong>Type of question</strong></td>
<td>What type of question is this? Ex: Diagnosis? Therapy? Prognosis?</td>
<td>Therapy</td>
</tr>
<tr>
<td><strong>Type of publication</strong></td>
<td>What type of study design would most accurately answer your question?</td>
<td>systematic review of RCTs&gt; individual RCTs&gt;cohort studies</td>
</tr>
</tbody>
</table>
Levels of Evidence for Prevention and Treatment

1. Systematic Reviews of Randomized Trials
2. Single Randomized Trials
3. Systematic Reviews of Cohort Studies
4. Single Cohort Studies
5. Systematic Reviews of Case-Series or Case-Control Studies
6. Single Case-Series or Case-Control Studies
Beyond Evidence Hierarchies

• Consider publication date in the selection process. A systematic review published a number of years ago that found inconclusive evidence should lead to a search for newer RCTs.

• All evidence must be critically appraised. A poorly conducted or reported randomized trial does not provide stronger evidence than the results of a well conducted cohort study.
ACQUIRE: Efficiently Search

Select words from the PICOTT concepts to guide the development of a PubMed search. Remember:

• Start with key concepts. You do not need to use all of the concepts or all the words.
• Gender and specific age limits are usually added after a preliminary search unless they are central to the clinical question.
• Consider alternate word endings, especially for key concepts. For example: (prevent OR prevention)
• Consider synonyms.
<table>
<thead>
<tr>
<th>Key Concepts</th>
<th>Add Synonyms &amp; Alternate Word Endings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P</strong></td>
<td>No specific population</td>
</tr>
<tr>
<td><strong>I</strong></td>
<td>Fluoride-xylitol toothpaste</td>
</tr>
<tr>
<td></td>
<td>Fluoride AND Xylitol AND (toothpaste OR toothpastes)</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>Fluoride toothpaste</td>
</tr>
<tr>
<td></td>
<td>AND</td>
</tr>
<tr>
<td><strong>O</strong></td>
<td>Prevent caries</td>
</tr>
<tr>
<td></td>
<td>(Prevent OR Prevents OR Prevention) AND Caries</td>
</tr>
<tr>
<td><strong>T</strong></td>
<td>Systematic Review of RCTs, individual RCT</td>
</tr>
</tbody>
</table>
Boolean Basics

**Boolean AND**

College **AND** High School

Combine concepts to focus the search.

**Boolean OR**

(College **OR** High School)

Combining synonyms to search comprehensively. Usually expands results.

**Tips**

- Use All Caps for AND / OR
- Wrap OR sets in parentheses
ACQUIRE: Efficiently Search

Select words from the PICOTT concepts to guide the development of a PubMed search. Remember:

• Start with key concepts. You do not need to use all of the concepts or all the words.
• Gender and specific age limits are usually added after a preliminary search unless they are central to the clinical question.
• Add alternate word endings, especially for key concepts. For example: (prevent OR prevention)
• Add synonyms.
Go to the Advanced Search Builder by clicking on the Advanced link under the main PubMed search bar.

(((fluoride) AND xylitol) AND (toothpaste OR toothpastes)) AND (prevent OR prevents OR prevention)) AND caries
Search results

Items: 5

Filters activated: Systematic Reviews. Clear all to show 26 items.

   Twetman S.
   PMID: 26392204   Free PMC Article
   Similar articles

2. Xylitol and caries prevention.
   Duane B.
   Evid Based Dent. 2015 Jun;16(2):37-8. doi: 10.1038/sj.ebd.6401088.
   PMID: 26114781
   Similar articles

3. Evidence of Effectiveness of Current Therapies to Prevent and Treat Early Childhood Caries.
   Twetman S, Dhar V.
   PMID: 26063553
   Similar articles

   Riley P, Moore D, Ahmed F, Sharif MO, Worthington HV.
   PMID: 25809586
PubMed Clinical Queries Tool

PubMed

PubMed comprises more than 20 million citations for biomedical literature from MEDLINE, life science journals, and online books. Citations may include links to full-text content from PubMed Central and publisher websites.

Using PubMed
- PubMed Quick Start Guide
- Full Text Articles
- PubMed FAQs
- PubMed Tutorials
- New and Noteworthy

PubMed Tools
- Single Citation Matcher
- Batch Citation Matcher
- Topic-Specific Queries

More Resources
- MeSH Database
- Journals in NCBI Databases
- Clinical Trials
- E-Utilities
- LinkOut
PubMed Clinical Queries

Results of searches on this page are limited to specific clinical research areas. For comprehensive search results, please visit PubMed.

Fluoride AND Xylitol AND (Toothpaste OR Toothpastes) AND (Prevent OR Prevents OR Preventing)

Clinical Study Categories

Category: Therapy
Scope: Broad

Results: 5 of 19

Xylitol-containing products for preventing dental caries in children and adults.
Riley P, Moore D, Ahmed F, Sharif MO, Worthington HV.

The effectiveness of xylitol in a school-based cluster-randomized clinical trial.

Systematic Reviews

Results: 3 of 3

Evidence of Effectiveness of Current Therapies to Prevent and Treat Early Childhood Caries.
Twetman S, Dhar V.

Xylitol-containing products for preventing dental caries in children and adults.
Riley P, Moore D, Ahmed F, Sharif MO, Worthington HV.
About the Systematic Review Filter

• The Systematic Review filter may include articles in the results that are not systematic reviews, so look closely when selecting.

• For therapy questions, remember to first look for Meta-Analysis or Systematic reviews of RCTs.
Ask: Identify the Key Concepts

Is an **oral appliance** an effective alternative to **continuous positive airway pressure** for the treatment of **sleep apnea**?
<table>
<thead>
<tr>
<th>Patient / Problem</th>
<th>Describe population / group of patients / disease / condition</th>
<th>Sleep apnea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>What is the main intervention or therapy you wish to consider?</td>
<td>Oral appliance</td>
</tr>
<tr>
<td>Comparison</td>
<td>Is there an alternative therapy or intervention to compare?</td>
<td>Continuous positive airway pressure</td>
</tr>
<tr>
<td>Outcome</td>
<td>What is the outcome being studied?</td>
<td>Control symptoms</td>
</tr>
<tr>
<td>Type of question</td>
<td>What type of question is this? Ex: Diagnosis? Therapy? Prognosis?</td>
<td>Therapy</td>
</tr>
<tr>
<td>Type of publication</td>
<td>What type of study design would most accurately answer your question?</td>
<td>systematic review of RCTs&gt; individual RCTs</td>
</tr>
<tr>
<td>Key Concepts</td>
<td>Add Synonyms &amp; Alternate Word Endings</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------------------</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>Sleep apnea (Sleep apnea OR Sleep disordered breathing)</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Oral Appliance (“Oral appliance” OR “oral appliances” OR “mandibular advancement”)</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Continuous positive airway pressure (Continuous positive airway pressure OR CPAP)</td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>Control symptoms</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>Study Design Filters</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Systematic Review of RCTs, individual RCT</td>
<td></td>
</tr>
</tbody>
</table>
### PubMed Advanced Search Builder

#### Builder
- **All Fields**: Sleep apnea OR Sleep disordered breathing
- **All Fields**: “Oral appliance” OR “oral appliances” OR mandibular advancement
- **All Fields**: Continuous positive airway pressure OR CPAP

#### Search or Add to history

### History

<table>
<thead>
<tr>
<th>Search</th>
<th>Add to builder</th>
<th>Query</th>
<th>Items found</th>
</tr>
</thead>
<tbody>
<tr>
<td>#12</td>
<td>Add</td>
<td>(Sleep apnea OR Sleep disordered breathing) AND (“Oral appliance” OR “oral appliances” OR mandibular advancement) AND (Continuous positive airway pressure OR CPAP)</td>
<td>489</td>
</tr>
<tr>
<td>#11</td>
<td>Add</td>
<td>(((Sleep apnea OR Sleep disordered breathing) AND (Oral appliance OR oral appliances) AND (Continuous positive airway pressure OR CPAP))) NOT (((Sleep apnea OR Sleep disordered breathing) AND (“Oral appliance” OR “oral appliances”) AND (Continuous positive airway pressure OR CPAP)))</td>
<td>105</td>
</tr>
<tr>
<td>#10</td>
<td>Add</td>
<td>(Sleep apnea OR Sleep disordered breathing) AND (“Oral appliance” OR “oral appliances”) AND (Continuous positive airway pressure OR CPAP)</td>
<td>294</td>
</tr>
<tr>
<td>#9</td>
<td>Add</td>
<td>(Sleep apnea OR Sleep disordered breathing) AND (Oral appliance OR oral appliances) AND (Continuous positive airway pressure OR CPAP)</td>
<td>399</td>
</tr>
</tbody>
</table>
• Use left hand “Customize” / “Show additional filters” to see all the options for focusing your results.

• **Use a My NCBI account** to set up personalized customizations options: save searches; create alerts; save collections of articles; default to seeing all abstracts; turn on search term highlighting.
Critical Appraisal

- Sometimes critical appraisal can start with the PubMed record. Be sure to follow any links after the abstract that lead to comments on the article.
- Select a Critical Appraisal Checklist Tool for the study design of the selected article to help with this step of the EBM process.
- Evidence Based Dentistry "Original papers and relevant publications are condensed into digestible summaries, drawing attention to the current methods and findings."
- Journal of Evidence-Based Dental Practice "Presents timely original articles, as well as reviews of articles on the results and outcomes of clinical procedures and treatment."
Research and Other Evidence in Practice: The Importance of Our Professional Discourse and Social Relationships

“The first thing is to recognise that research is but one evidence source amongst many others when we make decisions. However, that shouldn't mean it is easily written off and always trumped by experience. Instead, in the places where we work, we need to encourage the conversations and develop the relationships that will mean useful research becomes part of the evidential melee in our context.”

Hurst D. Evid Based Dent. 2014 Jun;15(2):34
Anticoagulant therapy and dental extractions

This review the bleeding risk of patients continuing or discontinuing oral anticoagulant therapy found no increase bleeding risk in those continuing anticoagulant therapy.

[read the full story...]

Removable dental prostheses: Limited evidence on clinical performance

Only 19 small studies were identified for this review of the survival rate of removable dental prostheses. the Heterogeneity of the studies and evaluation criteria made comparisons difficult so findings should be interpreted with caution.

[read the full story...]