The objectives for this assignment:

- Construct a clinical question about a patient or population with a specific clinical problem, perform a literature search, read the appropriate article, and critically appraise the article.

- Receive feedback on search techniques individually through Canvas and through group participation during the literature review conference session.
Download and complete the Pediatrics Clerkship Interactive EBM Worksheet located in the Pediatrics Clerkship Course Assignment on Canvas. **Canvas login is required.**

1. Ask a focused clinical question in the PICO format.
2. Search for clinical studies in PubMed@UCI.
3. Critically analyze the most relevant study from your PubMed search results.
Is your clinical question answerable?

- "What is the overall best approach to head trauma in children?"
  - is so broad that a meaningful answer is difficult to find due to the large number of articles you may retrieve addressing many possible treatments, diagnostic tests, and clinical outcomes.

- "In children with mild head injury, does the use of immediate CT Scan vs. admission for observation affect identification and diagnosis of intracranial hemorrhage?"
  - is more focused and will lead to a doable search strategy and a meaningful search result.
Step 1: Ask a Focused Clinical Question

- Express your clinical question in the PICO format

  - **P** - Patient or Population AND Problem
  
  - **I** – Intervention: *a treatment, a diagnostic test, an exposure* to a known or presumed risk factor, etc.
  
  - **C** – Comparison: treatment, placebo, gold standard diagnostic test, absence of risk factor, etc.
  
  - **O** – Clinical outcome of interest

The PICO terms come from and should match your clinical question.
PubMed Clinical Queries will filter your search results according to several pre-defined clinical study categories:

- Therapy
- Diagnosis
- Etiology/Harm
- Prognosis
- Clinical Prediction Guides (not used for this exercise)

Results can be further limited by scope:

- Sensitive/Broad – More articles, less restricted to specific study type
- Specific/Narrow – Fewer articles, more focused on exact study type

This is merely a tool, and is not always the best approach
**Example of a Therapy Question**

*In children with recurrent UTI, is cranberry juice effective in reducing the number of recurrences and related antibiotic use?*

<table>
<thead>
<tr>
<th><strong>PICO -- Therapy</strong></th>
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<td><strong>Methodology</strong></td>
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</tbody>
</table>
In children with recurrent UTI, is cranberry juice effective in reducing the number of recurrences and related antibiotic use?

- Your search terms should be derived from your clinical question/PICO, for example:
  - Children with recurrent Urinary Tract Infections
  - (Vaccinium macrocarpon OR Cranberry)
  - Placebo (no treatment)
  - Recurrence (UTI OR Urinary Tract Infections)

- Correct use of resource specific features:
  - capitalize Boolean connectors in PubMed (AND, OR, NOT)
  - avoid prepositions, or other minor parts of speech as search terms
  - avoid acronyms, initialisms, and other abbreviations as search terms
PubMed Search Objectives

- Do your search *first* in **PubMed Clinical Queries**.
  - If you do not find any relevant results, then do your search in the PubMed regular search, but indicate this in your comments.

- Locate a clinical study that applies to the patient/population, clinical problem, and outcome(s) of interest.

- Provide the
  - *exact* search strategy from the **PubMed Advanced Search page**.
  - *full citation & abstract* of one relevant article.

- Evaluate the selected clinical study.
PubMed Clinical Queries: Two Search Examples

- (Therapy/Narrow[filter]) AND (vaccinium macrocarpon OR cranberry) AND (UTI OR urinary tract infections)
  Filters: English; **Child: 0-18 years**

Another search approach

- (Therapy/Narrow[filter]) AND (vaccinium macrocarpon OR cranberry) AND (UTI OR urinary tract infections) **AND (child OR children OR infant OR adolescent)**
  Filters: English

- Briefly discuss why your results are relevant.
Recurrent urinary tract infection and urinary Escherichia coli in women ingesting cranberry juice daily: a randomized controlled trial.
Stapleton AE, Dziura J, Hooton TM, Cox ME, Yarova-Yarovaya Y, Chen S, Gupta K.
Cranberry juice for the prevention of recurrences of urinary tract infections in children: a randomized placebo-controlled trial.
Saño J, Uhan M, Heiminen M, Korpi M, Nieminen T, Pokka T, Kontokan T.
Cranberries vs antibiotics to prevent urinary tract infections: a randomized double-blind noninferiority trial in premenopausal women.
Cranberry juice fails to prevent recurrent urinary tract infection: results from a randomized placebo-controlled trial.
Barbosa-Cesnik C, Brown MB, Buxton M, Zhang L, DeBusscher J, Foxman B.
Inhibitory activity of cranberry extract on the bacterial adhesiveness in the urine of women: an ex-vivo study.
Tempesta G, Corseil S, Genovese C, Caruso FE, Nicolosi D.
Recurrent urinary tract infection.
[Clinical practice guidelines. Recurrent infection of the urinary tract in women. Colegio Mexicano de Especialistas en Ginecologia y Obstetricia]
Urinary tract infections in healthy women: a revolution in management?
Del Mar C.
Overview on cranberry and urinary tract infections in females.
Rossi R, Porta S, Canovi B.
Cranberry is not effective for the prevention or treatment of urinary tract infections in individuals with spinal cord injury.
Opperman EA.
Effects of cranberry juice on uropathogenic Escherichia coli in vitro biofilm formation.
Di Martino P, Agniel R, Gaillard JL, Denys P.
Cranberry juice for the prevention of pediatric urinary tract infection: a randomized controlled trial.
Afshar K, Stothers L, Scott H, MacNeily AE.
PMD: 22910239 [PubMed - indexed for MEDLINE]
Related citations

Cranberry juice for the prevention of recurrences of urinary tract infections in children: a randomized placebo-controlled trial.
Salo J, Uhari M, Helminen M, Korppi M, Nieminen T, Pokka T, Konttikari T.
Related citations

Cranberry juice fails to prevent recurrent urinary tract infection: results from a randomized placebo-controlled trial.
Barbosa-Cesnik C, Brown MB, Buxton M, Zhang L, DeBusscher J, Foxman B.
Related citations

Cranberry juice for the prevention of recurrent urinary tract infections: a randomized controlled trial in children.
PMD: 19921981 [PubMed - indexed for MEDLINE]
Related citations
<table>
<thead>
<tr>
<th>Search</th>
<th>Add to builder</th>
<th>Query</th>
</tr>
</thead>
<tbody>
<tr>
<td>#14</td>
<td>Add</td>
<td>Search (Therapy/Narrow[filter]) AND ((Vaccinium macrocarpon OR Cranberry) AND (UTI OR Urinary Tract Infections)) Filters: Humans; English; Child: 0-18 years</td>
</tr>
</tbody>
</table>

Items found: 0
Time: 17:08:32
Cranberry juice for the prevention of recurrences of urinary tract infections in children: a randomized placebo-controlled trial.

Sala J, Uhari M, Helminen M, Korppi M, Nieminen T, Pokka T, Kontiokari T.
Department of Paediatrics, Oulu University Hospital, University of Oulu, Finland. jarmo.salo@oulu.fi

Abstract

BACKGROUND: Cranberry juice prevents recurrences of urinary tract infections (UTIs) in adult women. The objective of this study was to evaluate whether cranberry juice is effective in preventing UTI recurrences in children.

METHODS: A double-blind randomized placebo-controlled trial was performed in 7 hospitals in Finland. A total of 263 children treated for UTI were randomized to receive either cranberry juice (n = 129) or placebo (n = 134) for 8 months. Eight children were omitted because of protocol violations, leaving 255 children for the final analyses. The children were monitored for 1 year, and their recurrent UTIs were recorded.

RESULTS: Twenty children (16%) in the cranberry group and 28 (22%) in the placebo group had at least 1 recurrent UTI (difference, -6%; 95% confidence interval [CI], -16 to 4%; P = .21). There were no differences in timing between these first recurrences (P = .32). Episodes of UTI totaled 27 and 47 in the cranberry and placebo groups, respectively, and the UTI incidence density per person-year at risk was 0.18 episodes lower in the cranberry group (95% CI, .31 to .01; P = .035). The children in the cranberry group had significantly fewer days on antimicrobials (-8 days per patient-year; 95% CI, -7 to -5; P < .001).

CONCLUSIONS: The intervention did not significantly reduce the number of children who experienced a recurrence of UTI, but it was effective in reducing the actual number of recurrences and related antimicrobial use.

PMID: 22100577 [PubMed - indexed for MEDLINE]
Example of a Diagnostic Question

- In infants with possible sepsis, is physical exam sensitive and specific in diagnosing pneumonia, when compared to the gold standard of chest x-ray?

**PICO -- Diagnosis**

<table>
<thead>
<tr>
<th>Patient / Problem</th>
<th>Infants with possible sepsis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>Physical Exam</td>
</tr>
<tr>
<td>Comparison</td>
<td>Chest x-ray</td>
</tr>
<tr>
<td>Outcome</td>
<td>Diagnosing pneumonia</td>
</tr>
<tr>
<td>Methodology</td>
<td>Prospective, blind comparison to a gold standard</td>
</tr>
</tbody>
</table>

Evaluating and applying the results of diagnostic tests: **validity of the study**, **expression of the results**, and **assessment of the generalizability of the results**. Validity requires an independent, blind comparison with a reference standard.
### Example of a Prognosis Question

Among young children with Acute Otitis Media, is living in a passive smoking environment an important factor in predicting frequency of disease compared to a smoke-free environment?

<table>
<thead>
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</table>
Do otherwise healthy young children who attend daycare, compared to children who do not, have an increased incidence of Otitis Media in the first two years of life?”

<table>
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Step 3: Critical Analysis

- Complete sections IV: Critical Appraisal, answer questions 7-15 regarding the clinical study you have selected from your PubMed search results.

- Upload your completed worksheet to Canvas.
Ask Us!

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