

Introduction to Evidence-Based Medicine

“It is astonishing with how little reading a doctor may practice medicine, but it is not astonishing how badly he may do it.”





Case 1

- 2 m/o, rural clinic T°= 103.4, exam otherwise WNL
 - transportation: \$5,000 (not covered)
- Risk bacterial meningitis or other serious bacterial disease ~0.5% and 1.5% respectively; clinical guidelines provide solid evidence for close ambulatory f/u of low-risk infant (WBC 5-15K, no shift, nl U/A, <5 WBC per field if diarrhea)



Case 2

- 50 y/o construction worker with mallet finger
- Dueling specialists



Case 3

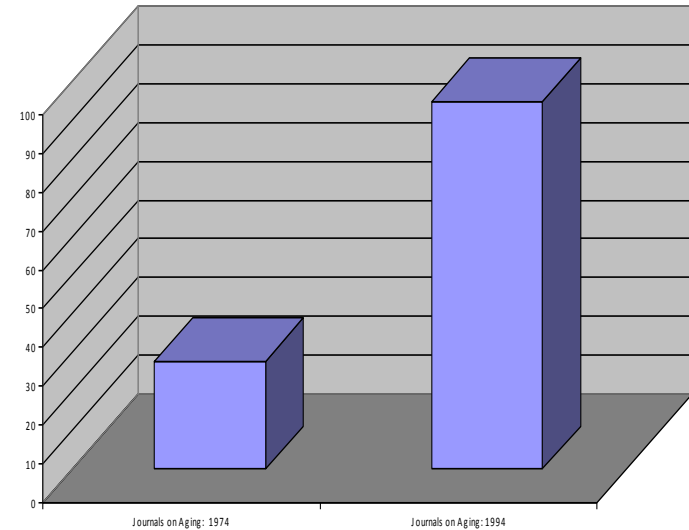
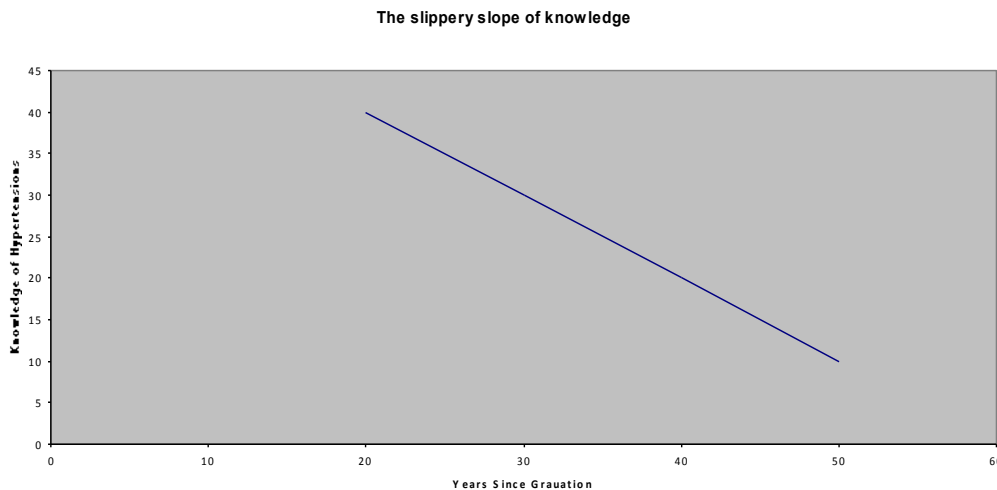
- 2 patients same afternoon ask for HCV screen
 - Married, monogamous male received 2 units whole blood in 1969 for ruptured spleen
 - Single, female college student volunteers in day care impoverished area
- Requirement for a screening test
 - Condition c early recognizable phase
 - Effective treatment available (improves prognosis)
 - Relatively simple, not harmful and acceptable test
 - Balance between false + and false -



The “Birth” of Evidence

- Has always been a search for evidence
 - Hippocrates, Galen, Fracastore, Paracelsus, Graunt, Farr, Louis, Snow, Cochrane
- 1980s, Pauker, Kessiere – JAMA Series
 - Clinical Decision Analysis, Sensitivity and Specificity, Pre-Odds x Likelihood Ratio
- 1992, David Sackett gives birth to EBM
 - Same concepts, accessible to clinicians
 - Emphasized absolute vs ratio measures, e.g. NNT
 - Hierarchical Evidentiary Pyramid
 - Role of Observational Studies?

The Problem: Keeping up With Medicine



- The slippery slope of knowledge
 - Best predictor of correct HTN Rx is # yrs from graduation
- Too many journals
 - 25,000 in print
 - Biomedical knowledge doubles q 19 yrs



Global Judgment by Experts

- Experts see different patients
 - 2nd seizure after primary febrile seizure
 - 1.5 – 6% in population-based studies
 - 77% in seizure clinic studies
- Geographic Variations (Wennberg)
 - Tonsillectomy rates 8% in one Vermont county vs 70% in another
 - Hysterectomy rates range from 20% to 70% in Maine

What about textbooks?

- 2 years from manuscript preparation to publication
- Several year lag between editions
- In 1986 Harrison's did not have an entry for AIDS



What about CME?

- Didactic CME does not change MD behavior (Davis, JAMA 1999)
- RCT of CME had no effect on clinical behavior (Sackett)





Implications

- Outdated or incorrect treatments
- Incorrect or missed diagnoses
- Incorrect information
- Costly, wasteful, and ineffective practice



Endarterectomy

- Should a newly symptomatic pt. c severe carotid stenosis have endarterectomy?
 - 8 out of 10 primary care docs said no
 - 19/100 untreated will suffer major stroke or death
 - 10/100 treated will have same complications
 - Only have to treat 11 pts to prevent one stroke or death (clear and substantial benefit)



Lidocaine for PVCs

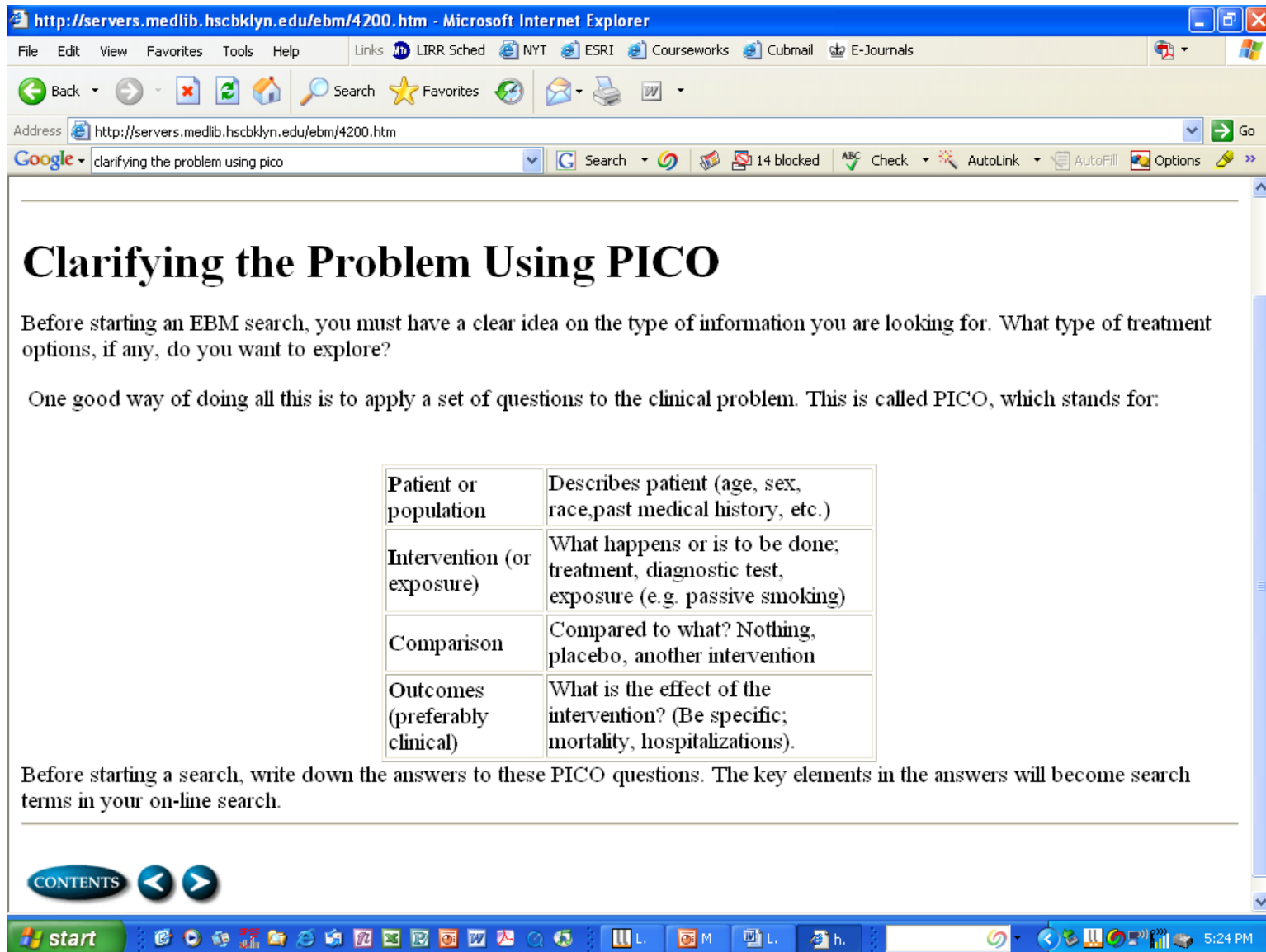
- Once routine post-MI
 - To prevent “R on T” V-tach
- RCT showed *increased* risk of death in group randomized to prophylactic lidocaine
- Other discredited treatments
 - Routine tonsillectomy, phenobarbital for febrile sz' s, portal bypass procedure for esophageal varices, HRT



A Proposed Solution: Evidence-Based Medicine

- Ask, Answer, Appraise, Apply
- Ask: The PICO Approach
- Answer and Appraise:
 - PubMed
<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi>
 - Ovid, SliverPlatter, ACP, Cochrane Collection
- Diagnosis, Treatment, Prognosis, Harm

Ask: PICO



The screenshot shows a Microsoft Internet Explorer browser window. The address bar contains the URL <http://servers.medlib.hscbklyn.edu/ebm/4200.htm>. The search bar contains the text "clarifying the problem using pico". The webpage content includes a title "Clarifying the Problem Using PICO", a paragraph about EBM search, a definition of PICO, a table with four rows, and a final paragraph about writing down answers to PICO questions. At the bottom of the page, there is a "CONTENTS" button and navigation arrows. The Windows taskbar at the bottom shows the start button and several application icons, with the system clock displaying 5:24 PM.



Clarifying the Problem Using PICO

Before starting an EBM search, you must have a clear idea on the type of information you are looking for. What type of treatment options, if any, do you want to explore?

One good way of doing all this is to apply a set of questions to the clinical problem. This is called PICO, which stands for:

Patient or population	Describes patient (age, sex, race, past medical history, etc.)
Intervention (or exposure)	What happens or is to be done; treatment, diagnostic test, exposure (e.g. passive smoking)
Comparison	Compared to what? Nothing, placebo, another intervention
Outcomes (preferably clinical)	What is the effect of the intervention? (Be specific; mortality, hospitalizations).

Before starting a search, write down the answers to these PICO questions. The key elements in the answers will become search terms in your on-line search.

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Answer: PubMed

Entrez PubMed - Microsoft Internet Explorer

File Edit View Favorites Tools Help Links LIRR Sched NYT ESRI Courseworks Cubmail E-Journals

Back Forward Stop Home Search Favorites Refresh Print

Address <http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?DB=pubmed> Go

Google clarifying the problem using pico Search 14 blocked Check AutoLink AutoFill Options

Limits Preview/Index History Clipboard Details

- To get started, enter one or more search terms.
- Search terms may be [topics](#), [authors](#) or [journals](#).

Set up an automated PubMed update in less than 5 minutes.

(1) Get a [My NCBI account](#). (2) Save your search.
(3) Your PubMed updates can be e-mailed directly to you.

Read the [My NCBI Help](#) material to explore other options, such as automated updates of other databases, setting search filters, and highlighting search terms.

PubMed is a service of the [National Library of Medicine](#) that includes over 15 million citations from MEDLINE and other life science journals for biomedical articles back to the 1950s. PubMed includes links to full text articles and other related resources.

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Matcher
Batch Citation
Matcher
Clinical Queries
Special Queries
LinkOut
My NCBI (Cubby)
Related Resources
Order Documents
NLM Mobile
NLM Catalog
NLM Gateway
TOXNET
Consumer Health
Clinical Alerts

start [Taskbar icons] 5:29 PM

Clinical Queries

The screenshot shows the PubMed Clinical Queries interface. The browser window title is "PubMed Clinical Queries - Microsoft Internet Explorer". The address bar shows the URL: <http://www.ncbi.nlm.nih.gov/entrez/query/static/clinical.shtml>. The page content is organized into sections:

- Search by Clinical Study Category**: This section explains that the search finds citations for specific clinical study categories, which can be broad and sensitive or narrow and specific. It includes a search input field and a "Go" button. Below this is a table of categories and their scopes.
- Find Systematic Reviews**: This section explains that the search finds citations for systematic reviews, meta-analyses, reviews of clinical trials, evidence-based medicine, consensus development conferences, and guidelines. It also includes a search input field and a "Go" button.

Category	Scope
<input type="radio"/> etiology	<input checked="" type="radio"/> narrow, specific search
<input type="radio"/> diagnosis	<input type="radio"/> broad, sensitive search
<input checked="" type="radio"/> therapy	
<input type="radio"/> prognosis	
<input type="radio"/> clinical prediction guides	

The left sidebar contains navigation links such as "Journals Database", "MeSH Database", "Single Citation Matcher", "Batch Citation Matcher", "Clinical Queries", "Special Queries", "LinkOut", "My NCBI", "Related Resources", "Order Documents", "NLM Mobile", "NLM Gateway", "TOXNET", "Consumer Health", "Clinical Alerts", "ClinicalTrials.gov", "PubMed Central", and "Privacy Policy". The Windows taskbar at the bottom shows the time as 5:30 PM.



Other Sources

- Google ‘Evidence Based Medicine’
- Ovid
- Silver Platter
- American College of Physicians
- Cochrane Collaboration



How to use PubMed Clinical Queries

Diagnosis	These are questions about the degree to which a particular test is reliable and clinically useful. Would your patient get enough benefit from the test (on average) to justify it's being done. Most good studies of diagnosis compare the test under study to some "gold standard" or definitive test.
Treatment	What therapy is best for a particular patient, and what are the possible outcomes of different treatment options
Prognosis	Closely allied to treatment questions, prognostic questions are about a patient's future health, and quality of life given a particular treatment option
Harm	Essentially questions of etiology; is a particular risk factor associated with a disease? How strongly? Can modifying risk factors have a benefit for your patient?



Help

- When in doubt consult a medical librarian.
- Trained in use of Filters, MESH Terms
 - Note: Filters and MESH terms built into PubMed clinical query page
- Aware of alternative sources