In the Name of God

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EVIDENCE BASED PRACTICE????

INTRODUCTORY LECTURE: OBJECTIVES

1. What
+ What is evidence-based medicine?
+ What does it look like in practice?

2. How
+ **Formulate Clinical Questions**
1. Search for Evidence
2. Appraisal of research
3. Apply to clinical problem

WARM UP

☼*Why me?*

☼ *What can I learn?*

☼ *How do I learn it?*

☼ *How can I learn to teach it?*

LEARNING IS A NATURAL PROCESS

TEACHING FACILITATED THE PROCCESS

✖ Less is more

(DIGGING A HOLE IN THEIR BRAINS FOR SEEDING)

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Quick summaries of evidence-based medicine.

We are a group of physicians that have developed a framework and rating system to evaluate **therapies** based on their *patient-important* benefits and harms as well as a system to evaluate **diagnostics** by patient sign, symptom, lab test or study.

We only use the highest quality, evidence-based studies (frequently, but not always Cochrane Reviews), and we accept no outside funding or advertisements.

theNNT Rating System

- Benefits > Harms
- Unclear If Benefits
- No Benefits

Caution ⚠ Harms > Benefits

Learn More →

Take a Tour of a Review

Therapy (NNT) Tour

Diagnosis (LR) Tour

From theNNT Blog:

Delusions of Benefit in the International Stroke Trial

Results of the largest and arguably most important trial ever of thrombolytics (clot-busting drugs) for acute stroke were published last week in The Lancet, and the study's conclusions are breathtaking. Not because of the study results, which are unsurprising, but because the authors' conclusions suggest that they have gone stark, raving mad.

Aspirin to Prevent a First Heart Attack or Stroke

In Summary, for those who aspirin daily for a year:

Benefits in Percentage

- 99.94% saw no benefit
- 0% were helped by avoiding death
- 0.05% were helped by preventing a non-fatal heart attack
- 0.01% were helped by preventing a non-fatal stroke

Harms in Percentage

- 0.03% were harmed by developing a major bleeding event*

*Required hospital admission and transfusion

View As: NNT | %

Details for this Review

Source: Antithrombotic Trialists Collaboration. Aspirin in the primary and secondary prevention of vascular disease: collaborative meta-analysis of individual participant data from randomised trials. Lancet. 2009; 373(9678); 1849-60

Efficacy Endpoints: Heart attack, stroke, death

Harm Endpoints: Bleeding, death

Narrative: Aspirin blocks the action of platelets, reducing clots and ostensibly lowering the risk of heart attacks, strokes, and deaths. This review examined and summarized the magnitude of benefits from daily aspirin when compared to placebo for 'primary prevention', i.e. among patients who have never had a heart attack or stroke.

Aspirin did reduce certain clotting events (all of them nonfatal) but it also increased bleeding events. In the end the miniscule potential benefit does not seem worth it in comparison to the harms and in light of the aggregate impact.

Caveats: The apparent failure of aspirin to be helpful in this population highlights an important fact about medical treatment and the results of research on medical treatments: the more likely that patients in a study will have an event (a heart attack or a stroke, etc.) the more likely it is that they can potentially benefit from an effective intervention. Conversely
www.thennt.com roup of healthy patients who are unlikely to have a heart attack or stroke, it is very difficult for a drug to successfully

Screening Mammography for Reducing Deaths (and Specifically, Breast Cancer Deaths)
No benefit found

In summary, for those who received mammography screening:

Benefits in Percentage

- 100% saw no benefit

Harms in Percentage

- 100% saw no benefit
- 50% were harmed by a false positive
- 20% were harmed by an unnecessary surgical procedure

View As: NNT | %

Details for this Review | **Further References**

Source: Gøtzsche PC, Nielsen M. Screening for breast cancer with mammography. Cochrane Database Syst Rev. 2006 Oct 18;(4):CD001877. Review. Update in: Cochrane Database Syst Rev. 2009;(4):CD001877. PubMed PMID: 17054145.

Efficacy Endpoints: Mortality, breast cancer mortality

Harm Endpoints: Unnecessary surgical procedure, false positives, overdiagnosis leading to treatment

Narrative: Screening mammography (mammography in women without any signs or symptoms of possible breast cancer) has been studied in large randomized trials of nearly a half million women. The theoretic basis for the intervention is sound. It is presumed that therapeutic intervention at a point when cancer is visible on a mammogram but not yet palpable in the breast will, for a small number, result in earlier, ultimately life-saving, therapy. Overall mortality rate, however, was not improved in the groups in these studies assigned to receive regular mammograms. When aggregating data from those trials in which randomization was appropriate (resulting in balanced groups), there was also no identifiable reduction in deaths due to breast cancer.

The statistical result is slightly different when one accepts all trial data rather than restricting data to appropriately randomized studies. While overall mortality remains unchanged, in this analysis breast cancer mortality is reduced by approximately 15%. If accurate, this would represent a NNT of approximately 2000. However, breast cancer mortality is not as important as overall mortality, because individuals deciding whether to undergo screening mammography will typically want to avoid death, rather than simply avoiding death from one possible cause. The lack of overall mortality benefit with

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WHAT IS YOUR REAL PRACTICE?

- ✖ Water for preventing urolithiasis?!
- ✖ Water& fluid for and Diuretics for acute uretric colic?!

Water for preventing urinary stones.

Bao Y, Wei Q.

Department of Urology, West China Hospital, Sichuan University, Chengdu, China.

Abstract

BACKGROUND: Urinary stones are a common condition characterised by high incidence and high recurrence rate. For a long time, increased water intake has been the main preventive measure for the disease and its recurrence. This is an update of a review originally published in 2004.

OBJECTIVES: To assess the effectiveness of increased water intake for the primary and secondary prevention of urinary stones.

SEARCH METHODS: We searched the Cochrane Renal Group's specialised register, CENTRAL, MEDLINE, EMBASE, and the Chinese Biomedical Disk using a search strategy developed in conjunction with Cochrane Renal Group's Trials Search Co-ordinator. No language restriction was applied. Date of last search: April 2012.

SELECTION CRITERIA: Randomised controlled trials (RCTs) and quasi-RCTs of increased water intake for the prevention of urinary stones and its recurrence were included.

DATA COLLECTION AND ANALYSIS: Two authors independently assessed risk of bias and extracted data. Statistical analyses were performed using the random effects model and the results expressed as risk ratio (RR) for dichotomous outcomes or mean difference (MD) for continuous data with 95% confidence intervals (CI).

MAIN RESULTS: No studies of increased water intake for the primary prevention of urinary stones met the inclusion criteria. One study with 199 patients provided results of increased water intake for the recurrence of urinary stones. The stone recurrence was lower in the increased water intake group than that of the no intervention group (12% versus 27%; RR 0.45, 95% CI 0.24 to 0.84). The average interval for recurrence was 3.23 ± 1.1 years in increased water intake group and 2.09 ± 1.37 years in the no intervention group (MD 1.14, 95% CI 0.33 to 1.95). There were insufficient data to assess selection, performance, detection or attrition bias.

AUTHORS' CONCLUSIONS: The evidence from only one study indicates that increased water intake reduces the risk of recurrence of urinary stones and prolongs the average interval for recurrences. However further research is required. Due to the lack of appropriate RCTs, no conclusions can be drawn on increased water intake for the primary and secondary prevention of urinary stones.

Fluids and diuretics for acute ureteric colic.

Worster AS, Bhanich Supapol W.

Division of Emergency Medicine, Department of Medicine, McMaster University, 237 Barton East, Rm. 250a McMaster Clinic, Hamilton, Ontario, Canada, L8L 2X2.

Abstract

BACKGROUND: Acute ureteric colic is commonly associated with severe and debilitating pain. Theoretically, increasing fluid flow through the affecte kidney might expedite stone passage, thereby improving symptoms more quickly. The efficacy and safety of interventions such as high volume intravenous (IV) or oral fluids and diuretics aimed at expediting ureteric stone passage is, however, uncertain.

OBJECTIVES: To look at the benefits and harms of diuretics and high volume (above maintenance) IV or oral fluid therapy for treating adult patients presenting with uncomplicated acute ureteric colic.

SEARCH METHODS: We searched the Cochrane Renal Group's specialised register (3 January 2012). Previously we searched the Cochrane Centr Register of Controlled Trials (CENTRAL The Cochrane Library), MEDLINE (from 1966), EMBASE (from 1980) and handsearched reference lists of nephrology and urology textbooks, review articles, relevant studies, and abstracts from nephrology scientific meetings.

SELECTION CRITERIA: All randomised controlled trials (RCTs) and quasi-RCTs (including the first period of randomised cross-over studies) looking at diuretics or high volume IV or oral fluids for treating uncomplicated acute ureteric colic in adult patients presenting to the emergency department for the first time during that episode were included.

DATA COLLECTION AND ANALYSIS: Two authors independently assessed study quality and extracted data. Statistical analyses were performed using the random-effects model for multiple studies of the same outcomes, otherwise the fixed-effect model was used. Results were expressed as ris ratios (RR) for dichotomous outcomes or as mean differences (MD) for continuous data with 95% confidence intervals (CI).

MAIN RESULTS: Two studies (enrolling 118 participants) examined the association between intense hydration and ureteric colic outcomes. There wa no significant difference in pain at six hours (1 study, 60 participants: RR 1.06, 95% CI 0.71 to 1.57), surgical stone removal (1 study, 60 participants: RR 1.20, 95% CI 0.41 to 3.51) or manipulation by cystoscopy (1 study, 60 participants: RR 0.67, 95% CI 0.21 to 2.13) when no fluids over six hours was compared to three litres IV fluids administered over a six hour period. There was no difference in stone clearance (1 study 43 participants: RR 1.38, 95% CI 0.50 to 3.84), hourly pain score or patients' narcotic requirements (P > 0.05 for all comparisons) when forced IV hydration of two litres over four hours was compared with minimal IV hydration at 20 mL/hour.One study did not provide any details which would have allowed us to assess any of the risk of bias items (selection, detection, performance, attrition or reporting bias). The second study did not report the method of randomisatic or allocation (selection bias - unclear), they reported that the patients were blinded to therapy (low risk of bias), analgesics were administered according to predetermined pain score criteria (low risk), and assessment of stone passage was unlikely to have been biased by knowledge of group assignment (low risk). However the second study also reported a high percentage of participants excluded post randomisation (26%; high risk of bias We were unable to assess or ascertain any of the other risk of bias items.

AUTHORS' CONCLUSIONS: We found no reliable evidence in the literature to support the use of diuretics and high volume fluid therapy for people with acute ureteric colic. However, given the potential positive therapeutic impact of fluids and diuretics to facilitate stone passage, the capacity of

PROSTATE CANCER

* Most common cancer in North American men
* Life-time incidence is 1 in 6
* Prognosis of patients with PSA detected prostate cancer poorly defined
* Myriad of treatment options without head-to head studies
* Constant influx of new treatment modalities
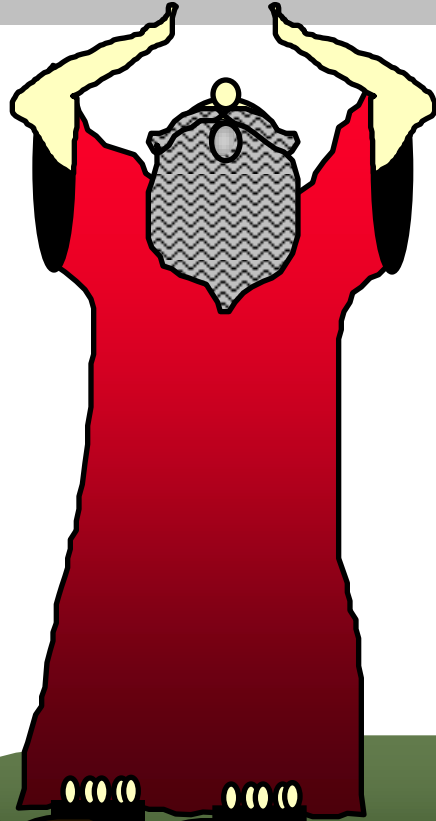* Choice of treatment largely market- and consumer driven
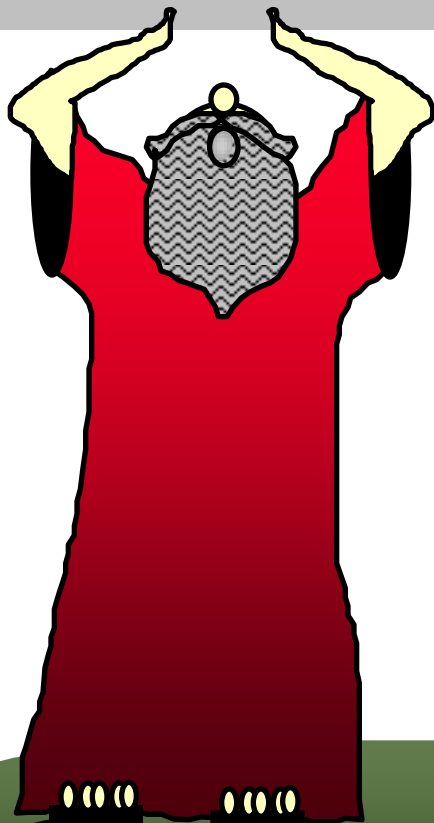
ROBOTIC ASSISTED RADICAL PROSTATECTOMY

EVALUATING THE EVIDENCE: QUALITY OF REPORTING OF STUDIES ON RALP

- 54 original research studies (2000-2007)
- Study design:

69% case series

20% retrospective cohort studies

11% prospective cohort studies

No randomized controlled trial

- Reporting deficits include:

27% number of surgeons not identified

39% learning curve not addressed

48% median/mean FU missing
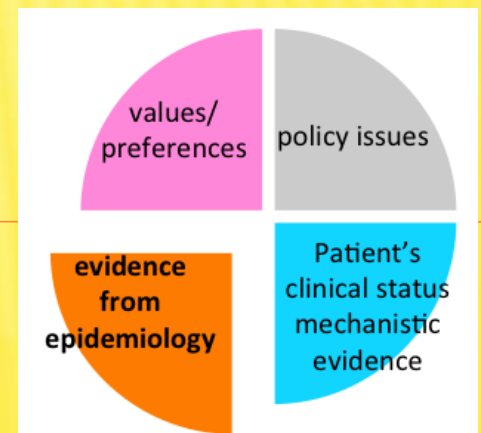
67% perioperative care not described

MY
EXPERT
OPINION

EVIDENCE-BASED PRACTICE

'informing decisions more **explicitly** with the **best up-to-date evidence,** particularly from epidemiology'

by using this evidence:

- more efficiently
- more critically
- more systematically

EBP: informing decisions with the best up-to-date evidence
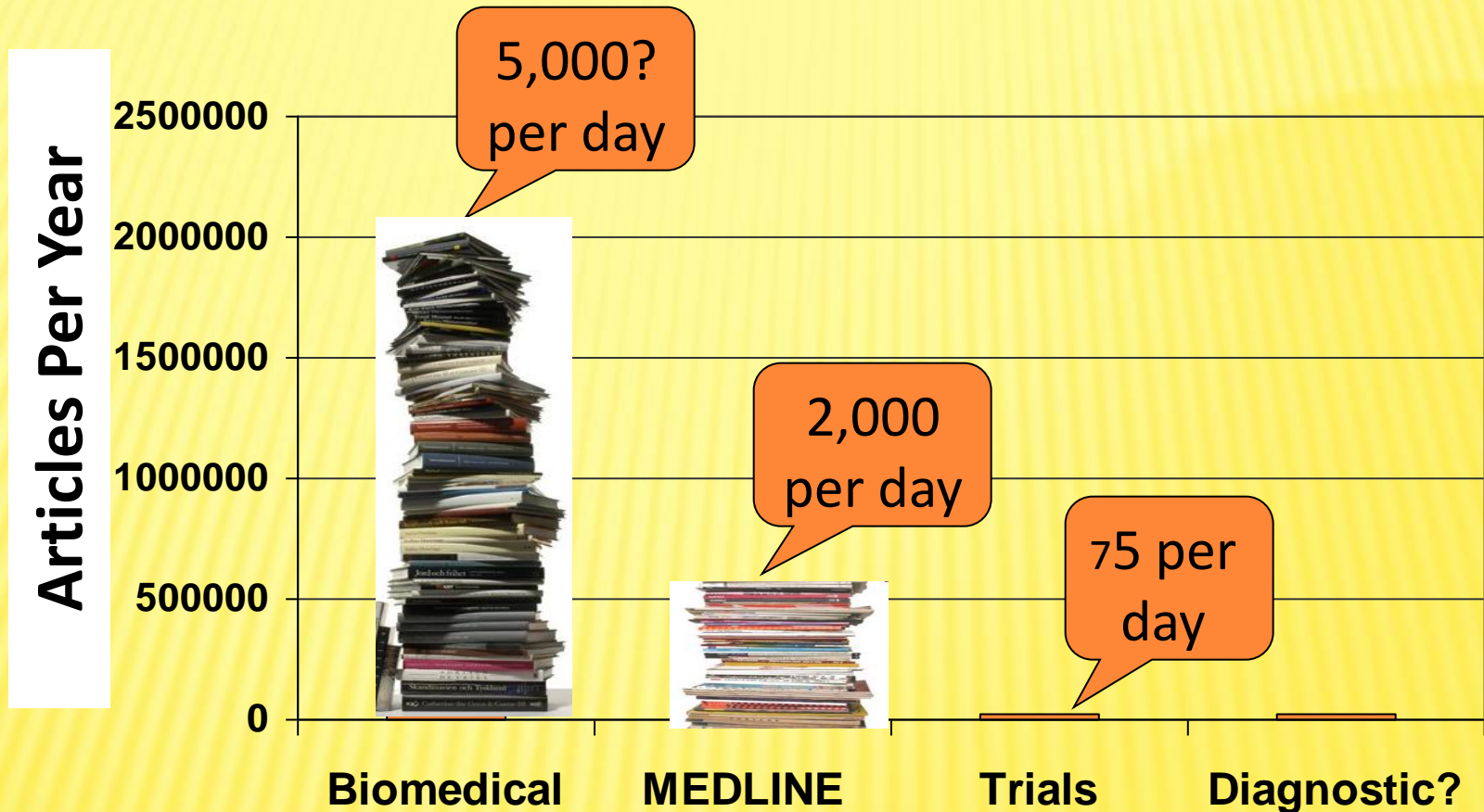
using evidence more critically

EBM Journal Process

- ✖ 140+ journals scanned
  - ➕ 60,000 articles
- ✖ Is it **valid**? (<5%)
  - ➕ Intervention: RCT
  - ➕ Prognosis: inception cohort
  - ➕ Etc
- ✖ Is it **relevant?**
  - ➕ 6-12 GPs & specialists asked: Relevant? Newsworthy?

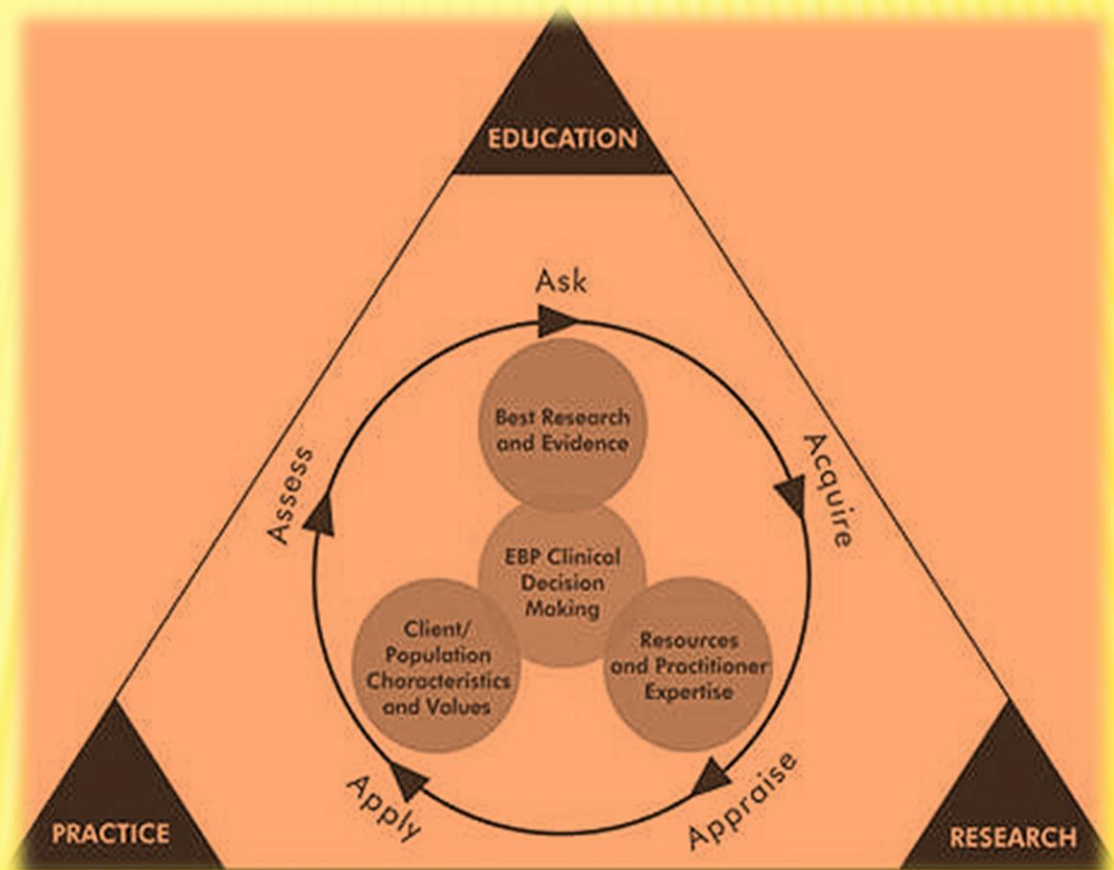- ✖ < 0.5% selected

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more critically

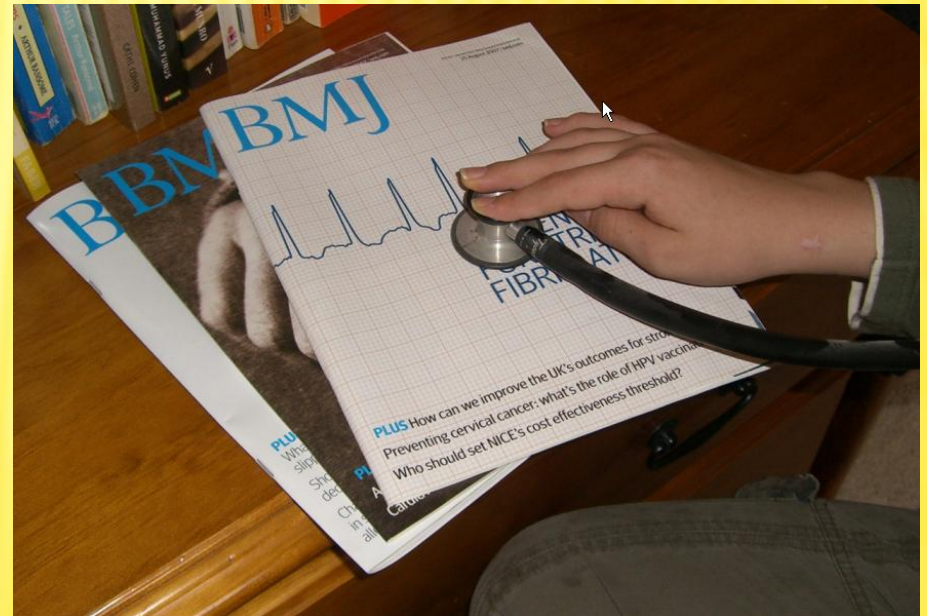*EBP: informing decisions with the best up-to-date evidence*

5 STEP OF EBM

1. Asking ✖
2. Acquiring ✖
3. Appraising ✖
4. Applying ✖
5. Assessing ✖

PART 2: THE 4 STEPS OF EBM

1. Formulate an answerable question
2. Track down the best evidence
3. Critically appraise the evidence
4. Individualise, based clinical expertise and patient concerns

THE "BEST" EVIDENCE DEPENDS ON THE TYPE OF QUESTION

Level	Treatment	Prognosis	Diagnosis
I			
II	Randomised trial	Inception Cohort	Cross sectional
III			

REVIEW THE RESULTS

STEP 4: APPLYING TO THE INDIVIDUAL

* What do the results mean on average?

* What do they mean for this individual?

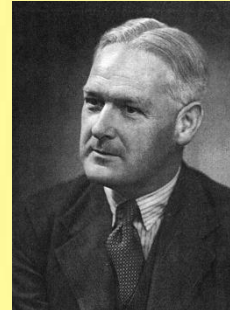# GO THROUGH.......

× Evidence Based Practice

evidence-based medicine (EBM)*: what it is?

'ITS ABOUT HOW TO BETTER INFORM YOUR CLINICAL DECISIONS WITH THE BEST UP-TO-DATE EPIDEMIOLOGICAL EVIDENCE'

Some milestones in the history of EBM

James Lind
publishes review &
clinical trial in
Treatise on Scurvy

Bradford-Hill
publishes *Principles of
Medical Statistics &*
MRC trial of streptomycin

McMaster University
Inspiring Innovation and Discovery
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900 AD	1780	1840	1937/48	1967	1970's

Al-Razi

Al-Rhazi

For I once saved one
group by it, while I
intentionally neglected
another group.
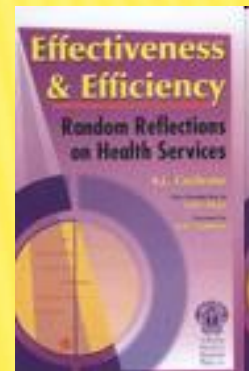<u>By doing that, I wished to
reach a conclusion</u> .

Pierre-Charles-Alexandre Louis (1787-1872).

Pierre Louis
Develops his "numerical
method" and changes
blood letting practice in
France

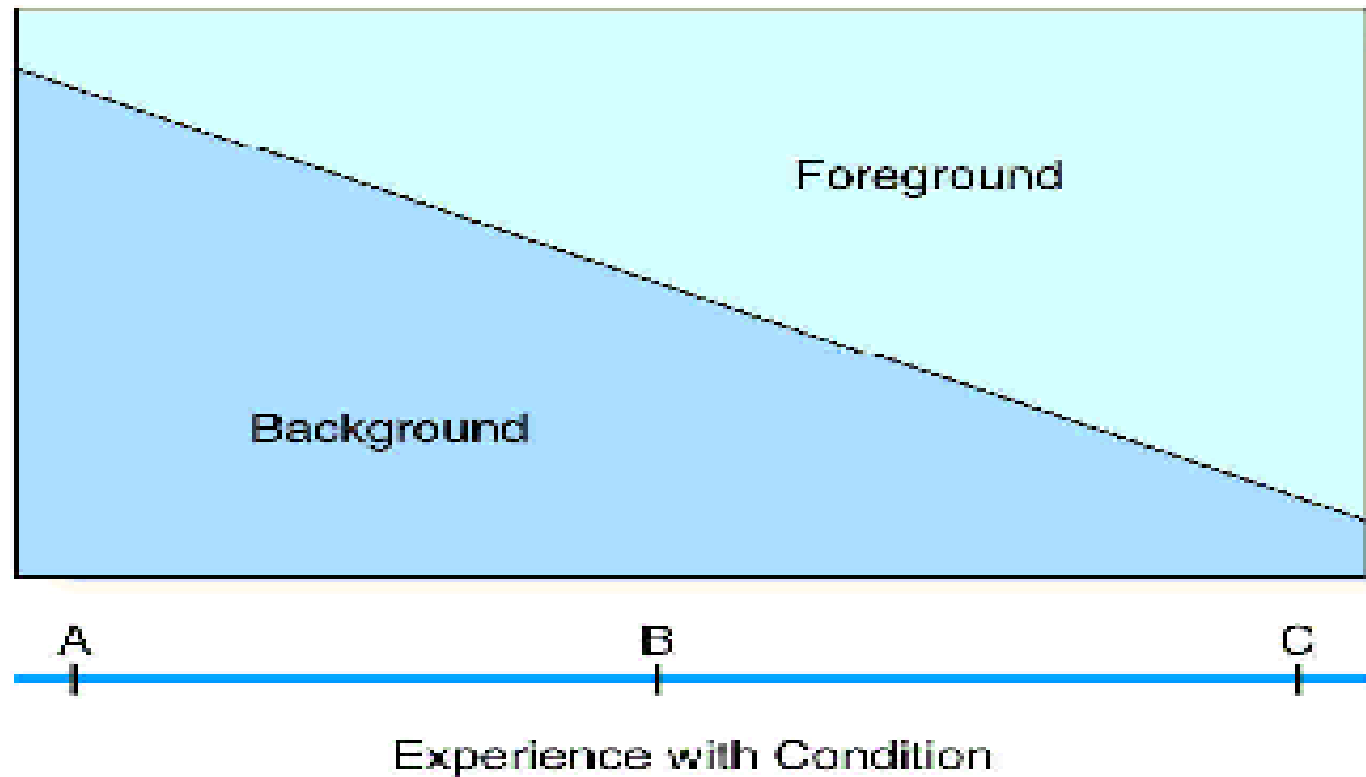**Alvan Feinstein**
publishes his book
Clinical Judgement

**Effectiveness
& Efficiency**
Random Reflections
on Health Services

ACTIVE

BACKGROUND & FOREGROUND

**Figure 1.1** Background and foreground questions.

CLINICAL QUESTIONS

- Background - "What is it?"
  - General information on a condition or disease
- Foreground – "What do I do for this patient?"
  - Patient
  - Intervention/Investigation
  - Comparison Intervention/Investigation
  - Outcome (Patient-Oriented)

QUESTION FORMATION - PICO

- **P**opulation (who are the relevant people?)
- **I**nterventions or exposures (diagnostic tests, foods, drugs, environmental hazards etc)
- **C**ontrol or Alternative intervention/exposure
- **O**utcome (what are the person-level consequences we are interested in?)

POPULATION

Who are the relevant people?
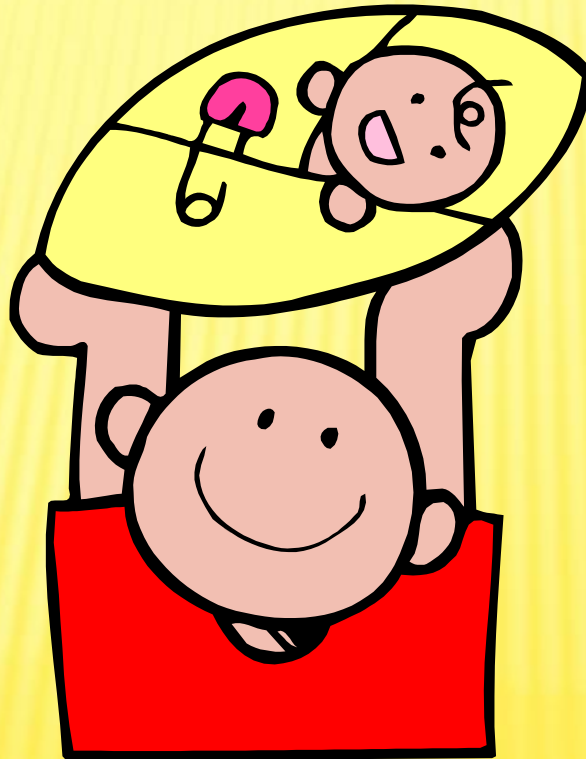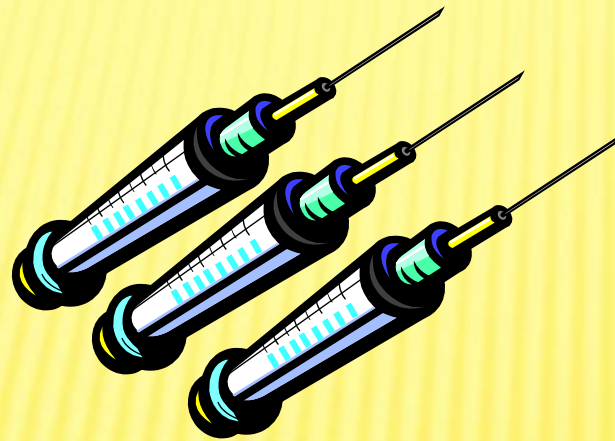
Intervention

What are they exposed to?

The **intervention or indicator.** What is the management strategy, diagnostic test or exposure that you are interested in (such as a drug, food, surgical procedure, diagnostic test or exposure to a chemical)?

ALTERNATIVE OR CONTROL INTERVENTION

OUTCOME (WHAT ARE THE PERSON-LEVEL CONSEQUENCES WE ARE INTERESTED IN?)

O The **outcome.** What are the patient-relevant consequences of the intervention?

CLINICAL QUESTIONS - "PICO"

Example:

- In a 5 year old child with conjunctivitis (*patient*) will topical antibiotics (*intervention*) compared to no treatment (*comparison*) lead to quicker symptom relief (*outcome*)?

- In a 5 year old child with conjunctivitis (*patient*) will topical antibiotics (*intervention*) compared to no treatment (*comparison*) lead to improved cure rates (*outcome*)?

The type of question is important and can help lead you to the best study design

Type of Question	Suggested best type of Study
Therapy	RCT>cohort > case control > case series
Diagnosis	prospective, blind comparison to a gold standard
Etiology/Harm	RCT > cohort > case control > case series
Prognosis	cohort study > case control > case series
Prevention	RCT>cohort study > case control > case series
Clinical Exam	prospective, blind comparison to gold standard
Cost	economic analysis

PICO

* Patient – 54 year old male with a cold
  Intervention – vitamin c

* Comparison – no vitamin c

* Outcome – prevent the common cold

* Type of Question: Prevention / Treatment

* Type of study design: RTC

CLINICAL SCENARIO 1

- 55-yr old female; history of hypertension; sudden onset of chest pain and shortness of breath
- Swelling in R leg for 2 days since return from recent vacation
- Current meds: estrogens and atenelol
- V/Q read as high probability for pulmonary embolism
- Patient started on Lovenox; treatment with coumadin initiated in hospital
- Sent home in stable condition; coumadin for 6 months

PICO EXERCISES

* Clinical Scenario 2: A 72 y/o male with osteoarthritis wants to take glucosamine and chondroitin sulfate instead of other meds. Is there any evidence of effectiveness?

* Clinical Scenario 3: A women in her mid 40s with a family history of breast cancer is scheduling her yearly breast exam. Should an MRI or a mammogram be scheduled?

PICO EXERCISES

- Clinical scenario 4: You have an infant with suspected congenital heart disease and order an MRI. The parents request an echocardiogram. Which test should be performed or both?

- Clinical scenario 5: In children with asthma, 2mg/kg of prednisone is commonly used. In other countries the usual dose is 1mg/kg. Which is more effective in reducing length of exacerbations?

LETS PLAY A GAME