Evidence-Based Medicine

Systematic reviews

WHO Reproductive Health Library

Cochrane Library

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Traditional medical practice

- Personal unsystematic observations from individual clinical practice
- Knowing basic mechanisms of disease and pathophysiology sufficient to guide practice
- "Expert opinion" and clinical experience are sufficient to generate guidelines for clinical practice

What changed?

- Developments in clinical research
  - Randomized controlled trials
- Developments in methodology
  - Meta-analysis
  - Recognition of bias in traditional reviews and expert opinions
- Explosion in medical literature
  - Methodological papers
  - Searching the literature
  - Electronic databases

Time spent reading around one's patients is slim:

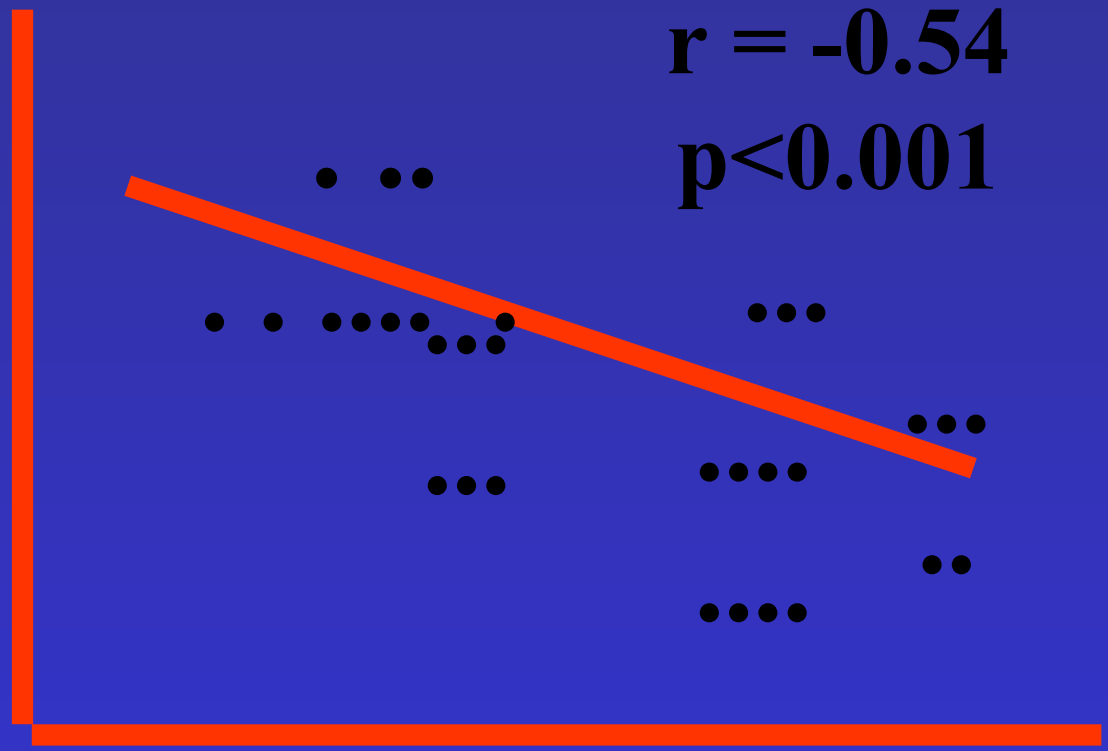
- Self-reports from Oxford (medians):
- Medical Students: 60 minutes per week
- House Officers: none
- S.H.O.'s: 10 minutes
- Registrars: 90 minutes
- Senior Registrars: 45 minutes
- Consultants:
  - Pre 1975: 30 minutes
  - Post 1975: 60 minutes

The problem

- Clinicians need information, but most of our needs are never met:
  - Our textbooks (on treatment/diagnosis) are out of date.
  - Our journals are disorganised.
- Consequently, our knowledge and performance deteriorate.

The Slippery Slope

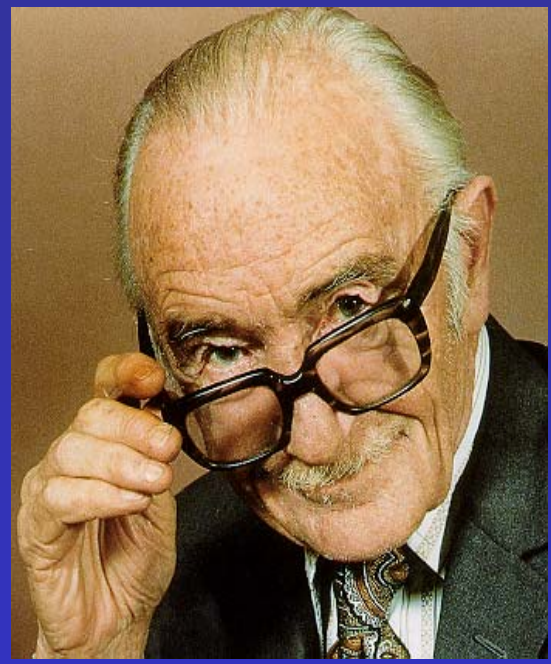
knowledge of current best care



years since graduation

CEBM web site:
http://cebm.jr2.ox.ac.uk/

Archie Cochrane



"It is surely a great criticism of our profession that we have not organised a critical summary, by specialty or subspecialty, adapted periodically, of all relevant randomized controlled trials"

Iain Chalmers

- Classified Bibliography of Controlled Clinical Trials in Perinatal Medicine 1940-84 (1985)
- Oxford Database of Perinatal Trials (1988-92)
- Cochrane Collaboration (1993-)

Evidence Based Medicine

- Based on following assumptions
  - Clinical experience is crucial BUT, systematic observations are necessary to summarise evidence
  - Knowing basic mechanisms of disease are necessary BUT, insufficient guide for selecting treatments for clinical practice
  - Understanding certain rules of ‘evidence’ is necessary to correctly interpret the literature

Evidence-based medicine is the systematic, scientific and explicit use of current best evidence in making decisions about the care of individual patients.

What evidence-based medicine is:

The practice of EBM requires the integration of

- individual clinical expertise

  with the

- best available external clinical evidence from systematic research.

EBM is not restricted to randomised trials:

- Practising EBM requires the best clinical evidence with which to answer our clinical questions.
  - On diagnostic tests: a proper cross-sectional study of patients clinically suspected of harbouring the target disorder, not a randomised trial.
  - On prognosis, a proper follow-up study of patients assembled at a uniform, early point in the clinical course of their disease.

EBM is not restricted to randomised trials:

- Sometimes the evidence we need will come from the basic sciences such as genetics or immunology.
- Only when asking questions about therapy do we shun the non-experimental approaches that routinely lead to false-positive conclusions about efficacy.
- The randomised trial and systematic review are the “gold standard” for judging whether a treatment does more good than harm.

Core principles

- Systematic review of evidence
- Critical appraisal with explicit and rigorous methodology

"Reviews"

- Why do we need reviews?
- Traditional (narrative) reviews
- Systematic reviews
- By definition a "review" is a retrospective study

Essentials of a systematic review

- Clear, explicit strategy
- Comprehensive
- Reproducible

What is a systematic review?

- A *review* of a clearly formulated question that uses systematic and explicit methods to identify, select and critically appraise relevant research, and to collect and analyse data from the studies that are included in the review. Statistical methods (*meta-analysis*) may or may not be used to analyse and summarise the results of the included studies.

What constitutes a systematic review?

- Clearly formulated question
- Methods to identify studies (searching)
- Selecting studies
- Critical appraisal

Review protocol

- To establish the methods of the review beforehand
- To make the process as rigorous as possible
- To obtain feedback and criticism for the review before it is finalised

Sections of a protocol

- Cover sheet
- Background
- Objectives
- Selection criteria
- Search strategy
- Methods

Selection criteria

- Participants
  - sex, age groups, community vs hospital
- Interventions
  - Treatment vs nothing? Placebo?
  - Treatment vs another treatment
- Outcomes
  - Substantive outcomes vs surrogate outcomes
  - Outcomes important for decision-making
  - Outcomes important for users (consumers)

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Search strategy

- Search terms
- databases
- handsearching

- expert help usually needed

Electronic searches

(1) MEDLINE

The National Library of Medicine MEDLINE database has been searched back to 1966, and is updated monthly. The method of access and search strategy have been adjusted from time to time. The current search strategy, using **OVID MEDLINE**, is as follows:

1. randomized controlled trial.pt.
2. randomized controlled trials/
3. controlled clinical trial.pt.
4. random allocation/
5. double blind method/
6. single-blind method/
7. or/1-6
8. clinical trial.pt.
9. exp clinical trials/
10. (clin$ adj25 trial$).tw.
11. ((singl$ or doubl$ or trebl$ or tripl$) adj25 (blind$ or mask$)).tw.
12. placebos/
13. placebo$.tw.
14. random$.tw.
15. research design/
16. or/8-15
17. comparative study/
18. exp evaluation studies/
19. follow up studies/
20. prospective studies/
21. (control$ or prospectiv$ or volunteer$).tw.
22. or/17-21
23. animal/ not (human/ and animal/)
24. 7 or 16 or 22
25. 24 not 23
26. exp pregnancy/
27. exp fetus/
28. exp infant, newborn
29. or/ 26-28
30. 25 and 29

Lines 1-25 identify all possible RCT/CCTs. Lines 24-29 identify those relevant to the scope of the group.

The MEDLINE search strategy was devised by Carol Lefebvre of the UK Cochrane Centre.

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Methods

- How will you decide to include or exclude a study from the review (critical appraisal)?
  - *A priori* description
  - Duplicate assessments
  - Quality assessment
  - Missing data

What is a meta-analysis?

- The use of statistical techniques in a *systematic review* to integrate the results of the included studies.

Sections of a Cochrane review

- Cover sheet
- Background
- Objectives
- Selection criteria
- Search strategy
- Methods
- Description of studies
- Methodological quality of included studies
- Results
- Discussion
- Conclusions
  - Implications for practice
  - Implications for research
- Acknowledgements
- Conflict of interest

Cochrane Library

- Cochrane Database of Systematic Reviews
- Database of Abstracts of Reviews of Effectiveness
- Cochrane Controlled Trials Register
- Information about Cochrane entities
- Internet links