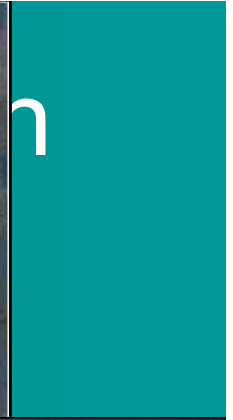
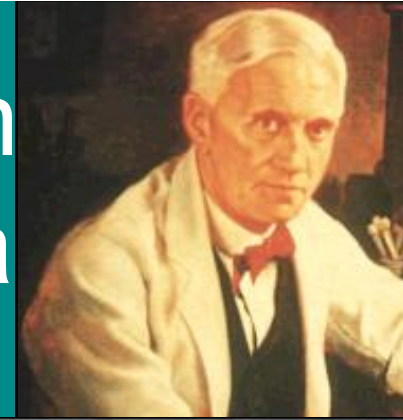
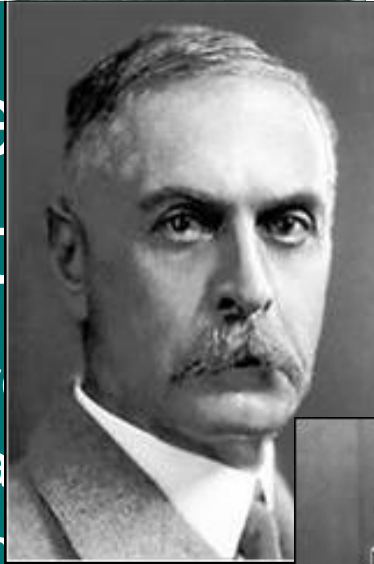


What were the 10 path-breaking discoveries in medicine in the last 500 years?



- 4. Anesthesia: Joseph Priestly N_2O
- 5. Vaccination: Edward Jenner
- 6. X Ray : Wilhem Roentgen
- 7. Blood Groups: Karl Sandsteiner
- 8. Penicillin: Alexander Fleming
- 9. DNA: Watson & Crick
- 10. EBM

1920

1959

1991

Evidence based medicine
&
Contemporary Orthopedic practice

K V Menon

Lecture plan

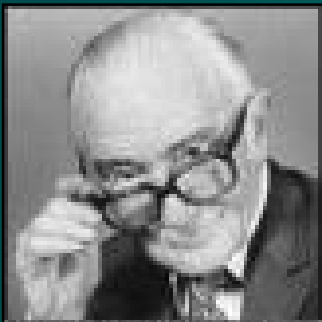
- History of EBM
- Alternatives to EBM
- Definition
- Application/ Limitations
- Levels of evidence
- Summary

History of EBM

- Cochrane reviews 1988
- McMaster University 1990 started EBM
 - “enlightened skepticism towards application of diagnostic, therapeutic & prognostic interventions”
- 1991 the term EBM was used by Gordon Guyatt
- Zurich, Keil, Boston, Toronto univ.
- JBJS in 2003 adopted EBM in grading papers

Cochrane reviews

- Archie Cochrane, a British epidemiologist, observed in 1972 that most treatment related decisions were based on either ad hoc selection of vast and variable quality scientific literature or on trial and error. Cochrane proposed that all the best clinical trials should be systematically reviewed, specialty by specialty. This led to the development of the Cochrane Library of Systematic Reviews.



Archie Cochrane

Cochrane collaboration



Archie Cochrane

- Cochrane's call for "critical summary" of research 1979
- Perinatal epidemiological studies 1981-1986
- Cochrane reviews 1988
- Cochrane database of systematic reviews 1993

7 alternatives to EBM

Basis for clinical decisions	Marker	Measuring device	Unit of measurement
Evidence	Randomised controlled trial	Meta-analysis	Odds ratio
Eminence	Radiance of white hair	Luminometer	Optical density
Vehemence	Level of stridency	Audiometer	Decibels
Eloquence (or elegance)	Smoothness of tongue or nap of suit	Teflometer	Adhesin score
Providence	Level of religious fervour	Sextant to measure angle of genuflection	International units of piety
Diffidence	Level of gloom	Nihilometer	Sighs
Nervousness	Litigation phobia level	Every conceivable test	Bank balance
Confidence	Bravado	Sweat test	No sweat

David Isaacs, Dominic Fitzgerald. BMJ.319 (7225) Dec 1999.

Eminence

“making the same mistakes with increasing confidence over an impressive number of years.”

Vehemence

“effective technique for brow beating your more timorous colleagues and for convincing relatives of your ability”

Eloquence

Sartorial elegance and verbal eloquence are powerful substitutes for evidence.

“ silk tie, Armani suit, and tongue should all be equally smooth”.

Providence

Too many clinicians, unfortunately, are unable to resist giving God a hand with the decision making.

Diffidence

The diffident doctor may do nothing from a sense of despair

Nervousness

Fear of litigation is a powerful stimulus to over-investigation and over-treatment.

Confidence

This is restricted to surgeons

Bravado



Definition

“Evidence based medicine is the conscientious, explicit, and judicious use of the current best evidence in making decisions about care of individual patients”

Sackett 1996

Current application

- “the integration of our clinical expertise and judgment with patients’ expectations and social values and with best available research evidence”
- “it is the objective & accumulated scientific and statistical wisdom derived over time”

Misconceptions

- EBM is not possible without RCTs
- EBM disregards clinical proficiency
- One needs to be a statistician to do EBM
- EBM applied to patient care is limited
- EBM is not cost effective
- EBM updating is impossible for busy clinicians

Misconceptions

- EBM looks at best available evidence
Pleural Mesothelioma study
- EBM can be very clinician friendly
- Elementary statistical knowledge is essential
- Evidence based “patient choice”
- EBM is perhaps the only sustainable cost effective methodology for the future
- Database of systematic reviews

Need for EBM

- Daily need for secure info on diagnosis, therapy and prognosis
- Traditional info paths are inept
 - Text books out dated
 - Expert opinions wrong or ineffective
 - Information too extensive
- Discrepancy between diagnostic skills, clinical judgment and most modern knowledge
- Lack of time for elaborate examination
- Impossibility to spend more than a few hours a week on reading

Sackett et al 2000

Criticism

- No new measurement tools provided
- Propogandized by politicians, health managers, insurers, economists etc
- Ranks epidemiologic evidence before basic research, clinical findings, intuition
- Medical research and practical medicine cannot be reduced to evidence checklists
- EBM is not a new paradigm; only sharpens our sight for clinical studies

Charlton & Miles 1998

Criticism

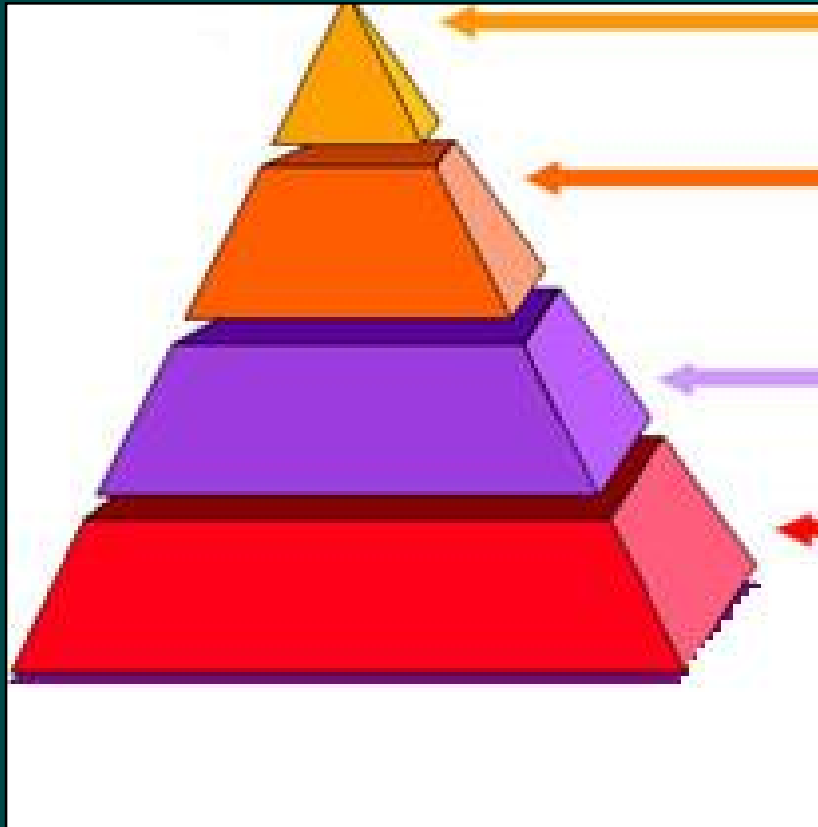
- EBM evaluates the methodological quality of the study; but does not answer questions.
- Does not provide quality criteria for research
- Clinical experience and consensus are not considered
- EBM can be set aside if medical guidelines are developed

Levels of evidence

- Seem to be evolving/ growing with time
- Appears to be growing out of proportion

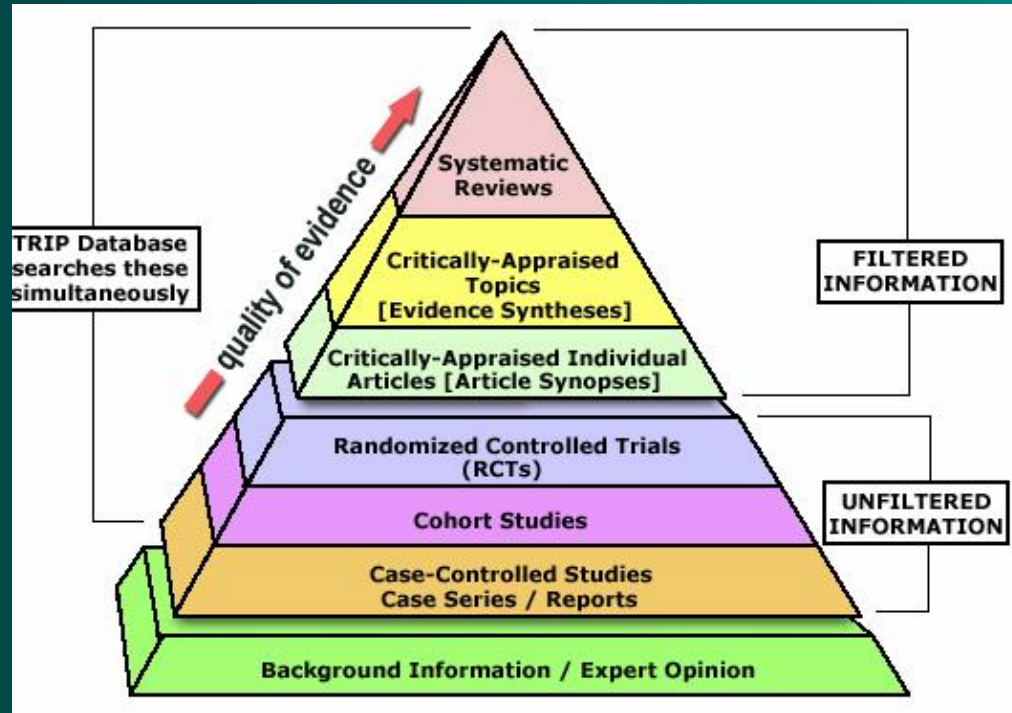
Canadian task force 1994

- 1. RCT
- 2.1. Controlled trials without randomisation
- 2.2. Well designed cohort/ case control studies
- 2.3. Comparisons that are uncontrolled
- 3. Descriptive studies, expert committee reports



- RCT
- Cohort studies
- Case control studies
- Case series

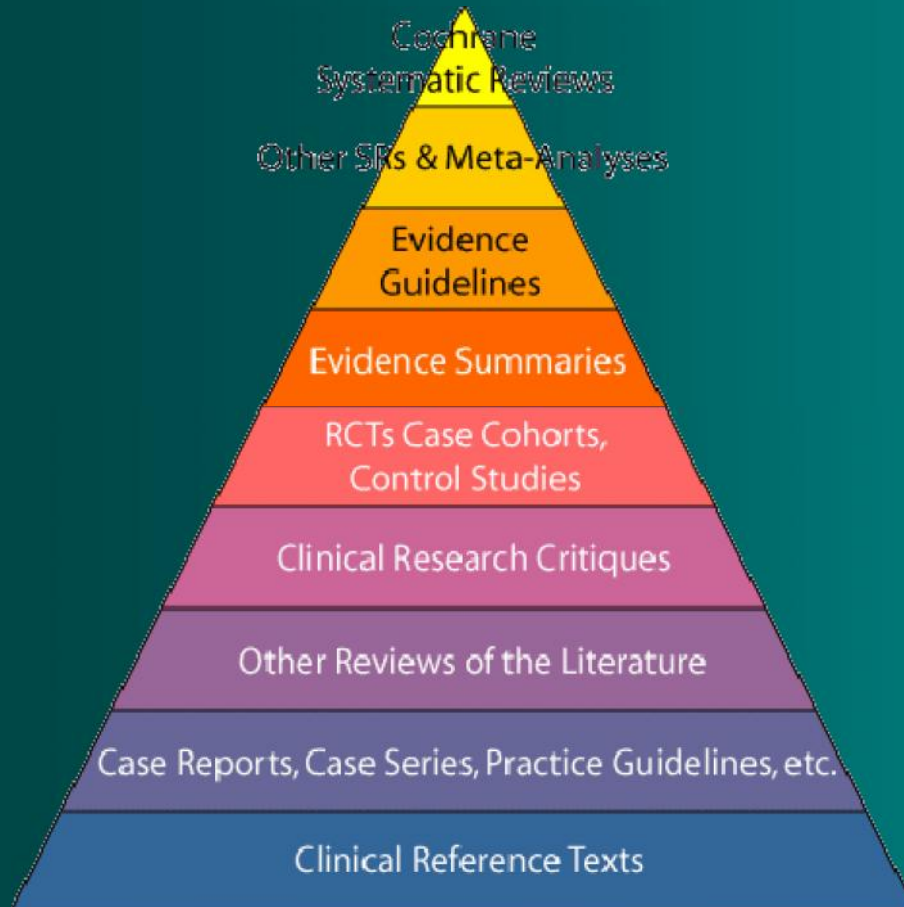
6 levels



U C Davies, Sacramento

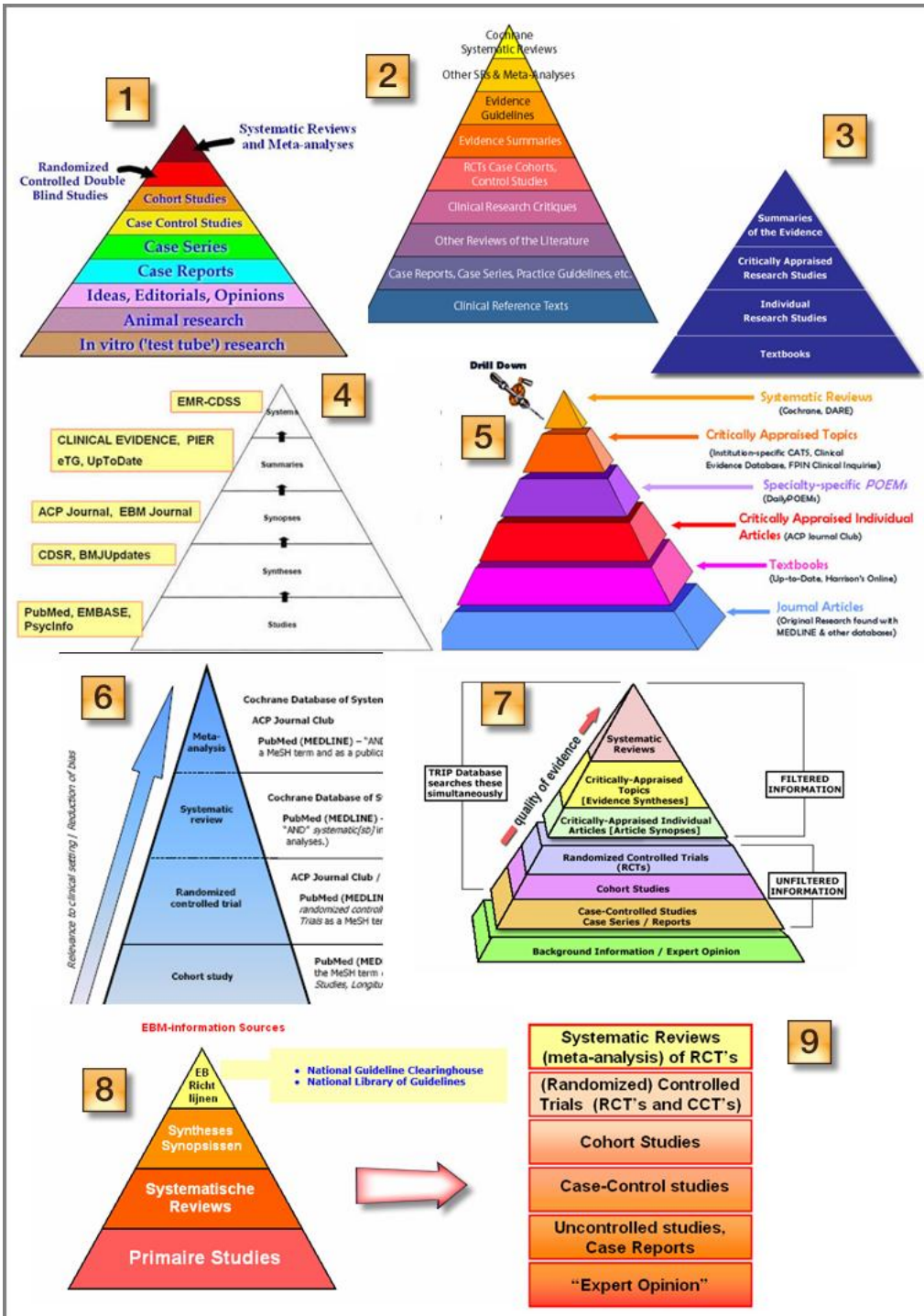
Growing pyramid

- 7 levels



Evidence

- Recommendations for diagnostic tests
- Recommendations for interventions
- Recommendations for prognosis
- Mc Master criteria for worksheets
- Keith Posley guide to reading medical literature



The evidence jungle

- Case reports
 - Editorials, ideas, opinions
 - Animal studies
 - In vitro tests
- ↑
- Specialty specific reports
 - Critically appraised articles
 - Text books
 - Journal articles
- ↑

Levels of evidence for Orthopedic literature

- Class I : Good quality RCT
- Class II : Moderate quality RCT/ good quality cohort
- Class III: Moderate/Poor quality cohort, Case control
- Class IV: Case series

Good quality RCT

- **Concealment**

 - **Blind the therapist to allotment**

- **Blinded assessment for important outcomes**

- **>85% follow up rate**

- **Adequate sample size**

- **Intent to treat**

 - **Dropouts and cross-overs to be counted in their original groups**

Moderate/ poor RCT

- Violation of 1 or more of above

- Cannot have class 1 evidence (RCTs) for everything: example



Levels of evidence

- Class 1 : Good quality cohort
- Class II : Moderate quality cohort
- Class III: Poor quality cohort, Case control
- Class IV: Case series

Good quality cohort

- Blind assessment of data or reliable data in retrospective studies
- >85% follow up rate
- Adequate sample size
- Control for possible confounding

Key concepts

(5 “A”s)

- Ask: formulate the question
- Acquire: conduct an efficient study
- Appraise: evaluate the results
- Apply: the best available evidence to the patient situation
- Act: take your results back to the patient

(Bhandari M. 2009)

How does all this affect us

- EBM is a manipulable term (Sackett 2000)
- Today it is not only a technique to evaluate research methodology

How does all this affect us



Evidence statement (NICE 2006)

- There is insufficient evidence to determine the effectiveness of sterile gowns compared to no gowns in preventing surgical site infection
- **The decision** to use full, minimal or no surgical attire to protect patients from surgical site infection should be made after appropriate risk assessment has been performed, **taking into account clinical judgment appropriate to the surgical procedure.**

Evidence statement (NICE 2006)

- There is insufficient evidence to determine the effectiveness of face masks to prevent surgical site infection
- **The decision** to use face masks to protect patients from surgical site infection should be made after appropriate risk assessment has been performed, **taking into account clinical judgment appropriate to the surgical procedure.**

Summary

- EBM is here to stay but will continue to evolve in modus & extent
- Beware of the misuse of EBM
- EBM is a tool to be judiciously used for the benefit of the patient



Thank you



Example

- 4 patients on bisphosphonates for osteoporosis developed osteonecrosis of the mandible.
- 4 out of 152 patients on bisphosphonates for osteoporosis developed osteonecrosis of the mandible.
- 4 out of 152 on bisphosphonates for osteoporosis developed osteonecrosis of the mandible, while a matched control population of 152 had no osteonecrosis.

Intervention recommendations

- A. Good evidence to support inclusion
- B. Fair evidence to support inclusion
- C. Poor evidence to support inclusion
- D. Fair evidence to support exclusion
- E. Good evidence to support exclusion