



# Evidence Based Medicine

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# Definition



- Conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients
- "the use of mathematical estimates of the risk of benefit and harm, derived from high-quality research on population samples, to inform clinical decision-making in the diagnosis, investigation or management of individual patients

# What is evidence-based medicine?

“Evidence-based medicine is the integration of best research evidence with clinical expertise and patient values” Sackett DL



# WHY Evidence Based Medicine (EBM)?



- Best for Patients
- Protect Doctors (medico-legal cases)

# What Pushes Us ... ?



## Toward

- Risk of patient harm
- Want to do better
- Avoid litigation
- Curiosity
- Prove colleagues wrong
- Anxiety
- Internet informed patient

## Away

- Time
- We already know the answer
- Fatigue
- Access
- Inferiority complex-anxiety-afraid of admitting knowledge gaps
- Laziness
- Lack of support
- Previous failure at searching
- Lack of resources
- No one else does it
- Fear of change

# The Five Steps of Evidence Based Practice



1. Asking Focused Questions: *translation of uncertainty to an answerable question*
2. Finding the Evidence: *systematic retrieval of best evidence available*
3. Critical Appraisal: *testing evidence for validity, clinical relevance, and applicability*
4. Making a Decision: *application of results in practice*
5. Evaluating Performance: *auditing evidence-based decisions*

# EBM practice requires: 5 A's



- Asking
- Acquiring
- Appraising
- Applying
- Assessing

# Five steps in EBM



1. Formulate an answerable question
2. Track down the best evidence
3. Critically appraise the evidence for:
  - Validity
  - Impact (size of the benefit)
  - Applicability
4. Integrate with clinical expertise and patient values
5. Evaluate our effectiveness and efficiency
  - keep a record; improve the process

# 1. Asking Focused Questions: *translation of uncertainty to an answerable question*



- **Anatomy of a well articulated question**

1. the patient or problem being addressed
2. the intervention or exposure being considered
3. the comparison intervention or exposure, when relevant
4. the clinical outcomes of interest

## 2. Finding the Evidence: *systematic retrieval of best evidence available*



### Look for secondary sources:

- **Guidelines:** UK [National Library for Health](#), [NICE](#), [SIGN](#); US [National Guidelines Clearinghouse](#); [Canadian Medical Association](#); [New Zealand Guidelines Group](#). Royal college of Obstetricians and Gynaecologists ([www.rcog.org.uk](http://www.rcog.org.uk)), ACOG, وزارت بهداشت
- **CATs:** [CAT Crawler](#)
- **Evidence-Based Summaries:** [Bandolier](#), [Clinical Evidence](#)
- **Structured Abstracts:** [EBM Online](#), [ACP Journal Club](#)
- **Systematic Reviews:** [Cochrane Library](#)
- To search several of the databases simultaneously you can use: [www.tripdatabase.com](http://www.tripdatabase.com)

Search for Primary Sources e.g. [PubMed](#)

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**EVENTS**

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| <b>Sep</b><br>9 | <a href="#">Early Pregnancy and<br/>Gynaecological Ultrasound</a><br>RCOG event   ATSM course | <b>Sep</b><br>23 | <a href="#">Intrapartum Fetal<br/>Surveillance</a><br>RCOG event |
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### Find Guidance

#### Conditions and diseases

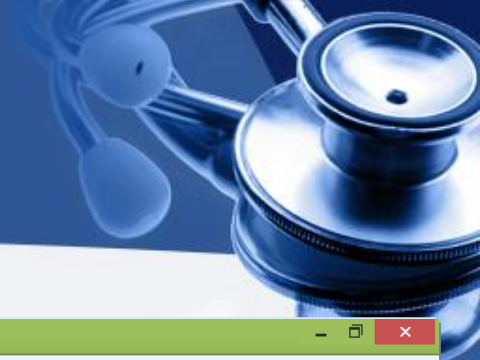
Blood and immune system • Cancer • Cardiovascular • Central nervous system • Digestive system • Ear and nose • Endocrine, nutritional and metabolic • Eye • Gynaecology, pregnancy and birth • Infectious diseases • Injuries, accidents and wounds • Mental health and behavioural conditions • Mouth and dental • Musculoskeletal • Respiratory • Skin • Urogenital

#### Public health

Accidents and injuries • Alcohol • Behaviour change • Cancer • Cardiovascular disease • Child health • Child social care • Chronic illness • Diabetes • Drugs • Environmental health • Infectious diseases • Maternal health • Mental health • Non-communicable diseases • Obesity and diet • Occupational health • Older people • Physical activity • Sexual health • Smoking and tobacco • Transport • Vaccine preventable diseases • Working with and involving communities

#### Treatments, Procedures and Devices

Bones and joint surgery • Cardiovascular surgery • Cardiovascular system drug treatments • Clinical devices • Diagnostic imaging • Diagnostic procedures • Digestive tract and other abdominal organs surgery • Drug treatments • Endocrine system and breast surgery • Eye surgery • Nervous system surgery • Radiotherapy • Screening • Surgical procedures • Therapeutic procedures • Tissue and organ donation • Urogenital surgery



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- [Trauma](#) (1052)
- [Vaccines](#) (1052)
- [Virology](#) (1052)
- [Women's health](#) (1052)

**SPECIAL COLLECTIONS**

- [Hospital-acquired infection](#)
- [World day for Safety and Health at Work 2013](#)
- [Tuberculosis](#)
- [Cochrane Evidence Aid: resources for earthquakes](#)

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**EDITORIALS**

- [Mosquito larval source management: Evaluating evidence in the context of practice and policy](#)  
Robert D. Newman, Abraham Mnzava & Zsafia Szilagyi
- [Oxygen therapy in acute myocardial infarction – good or bad?](#)  
Pascal Meier, Shah Ebrahim, Catherine M. Otto & Juan P. Casas
- [Factor Xa inhibitors: a step forward in the treatment of atrial fibrillation?](#)  
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- اعلام اسامی تقدیرشدگان در عرصه ترویج با شیر مادر اعلام شد
- تغذیه با شیر مادر دو سوم مرگ و میر نوزادان را کاهش می دهد
- نوزاد حق دارد از شیر مادر تغذیه کند
- اعلام اسامی برگزیدگان پنجمین جشنواره فرهنگی دانشجویان علوم پزشکی کشور

آرشیو



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### 3. Critical Appraisal: *testing evidence for validity, clinical relevance, and applicability*



- Secondary sources e.g. RCOG guidelines
  - Appraisal has been performed with level of evidence clearly written next to each statement
- Primary sources e.g. Pubmed
  - Appraisal kits available on [www.cebm.net](http://www.cebm.net), **CATmaker** is a computer-assisted critical appraisal tool

## Classification of evidence levels

- 1++ High-quality meta-analyses, systematic reviews of randomised controlled trials or randomised controlled trials with a very low risk of bias
- 1+ Well-conducted meta-analyses, systematic reviews of randomised controlled trials or randomised controlled trials with a low risk of bias
- 1- Meta-analyses, systematic reviews of randomised controlled trials or randomised controlled trials with a high risk of bias
- 2++ High-quality systematic reviews of case-control or cohort studies or high-quality case-control or cohort studies with a very low risk of confounding, bias or chance and a high probability that the relationship is causal
- 2+ Well-conducted case-control or cohort studies with a low risk of confounding, bias or chance and a moderate probability that the relationship is causal
- 2- Case-control or cohort studies with a high risk of confounding, bias or chance and a significant risk that the relationship is not causal
- 3 Non-analytical studies; e.g. case reports, case series
- 4 Expert opinion

## Grades of recommendations

A

At least one meta-analysis, systematic reviews or randomised controlled trial rated as 1++ and directly applicable to the target population; or  
A systematic review of randomised controlled trials or a body of evidence consisting principally of studies rated as 1+, directly applicable to the target population and demonstrating overall consistency of results

B

A body of evidence including studies rated as 2++ directly applicable to the target population and demonstrating overall consistency of results; or  
Extrapolated evidence from studies rated as 1++ or 1+

C

A body of evidence including studies rated as 2+ directly applicable to the target population and demonstrating overall consistency of results; or  
Extrapolated evidence from studies rated as 2++

D

Evidence level 3 or 4; or  
Extrapolated evidence from studies rated as 2+

## Good practice point

✓

Recommended best practice based on the clinical experience of the guideline development group



## 4. Making a Decision: *application of results in practice*



- Internal validity refers to the extent a study properly measures what it is meant to.
- External validity refers to the extent to which we can generalize the results of a trial to the population of interest

## 5. Evaluating Performance: *auditing evidence-based decisions*



- Auditing your process and/or results

# Interested to learn more ?



- <http://www.cebm.net/>
- Centre for Evidence Based Medicine



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## CENTRE FOR EVIDENCE BASED MEDICINE



Quickfinder

### Welcome to CEBM

Welcome to the web site of the Centre for Evidence-Based Medicine in Oxford in the UK.

Our broad aim is to develop, teach and promote evidence-based health care and provide support and resources to doctors and health care professionals to help maintain the highest standards of medicine.

Learn more about [EBM](#) and the CEBM.



### What's New

#### 5th International Conference of Evidence-Based Health Care

This year's conference has been announced for Taormina (Italy).

[More News](#)

[Journal Watch](#) - research reviews  
[Evidence-Based Views](#) - latest blog  
[PaT Plot](#) - new EBM tool

#### CEBM in Action - Workshop Videos

[Paul Glasziou](#) - EBM in Practice  
[Carl Heneghan](#) - Diagnostic Tests

### EBM Tools & Resources

The latest FREE tools for effective practice and teaching of evidence-based medicine:



[CATmaker](#)



[PowerPoint presentations](#)



[More EBM Tools](#)

### Current Courses & Workshops

We offer a range of courses to clinicians and other healthcare professionals seeking to develop their EBM skills.

#### Title: **How to Practice Evidence-Based Medicine**

Duration: 3 days

Dates: 30th March - 1st April 2009

Venue: St Hugh's College, Oxford University

[Download Application Form](#)

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#### Title: **Teaching Evidence-Based Practice**

Duration: 5 days

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### EBM Journal

Evidence-based medicine is published by the BMJ bi-monthly. It alerts clinicians to the latest EBM advances.

[Find out more](#)



### Journal Watch





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**MSc in Evidence-Based Health Care**

The MSc in Evidence-Based Health Care is part of the Oxford International Programme in Evidence-Based Health Care, and is offered as a part-time course consisting of six taught modules and a dissertation.

This is a joint Programme with the [Department of Primary Health Care](#) and the [Department for Continuing Education's Continuing Professional Development Centre](#) and a particular aim of the Programme is to strengthen the natural links with the CEBM.

A former MSc in EBHC student, *Bradley Johnston*, wrote to us when he heard that the Masters in EBHC was being restarted. He said:



*"I enjoyed the learning environment immensely while in the MSc program. The teaching and learning philosophy (e.g., small group, self-directed, problem-based, interactive) fits very nicely with my own views and I hope to participate in this type of educational environment again very soon. I can't think of a learning environment that would be more exciting than that of the EBHC MSc course."*

To find out more please visit the [Department of Continuing Education](#) at Oxford University.

# Masters Programme



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#### EBM Powerpoint Presentations

Below are a list of Powerpoint presentations used in workshops at the CEBM. They are provided free, and you are free to use and modify these, but we ask you to please acknowledge the original author in your presentations.



##### 2008

Systematic Reviews (1.2MB) **Paul Glasziou**

Evidence in Practice Projects (3.5MB) **Carl Heneghan**

The Role of Questions when Teaching EBP (6.1MB) **Amanda Burls**

Team-Based Learning (0.1MB) **Dan Mayer**

EBHC Community of Practice (1.1MB) **Andrew Booth**, Reader in Evidence Based Information Practice (*Acknowledgements*: Sara Mallinson, HealthNoW)

Best BETs from the BestBETs Group (1.1MB) **Kevin Mackway-Jones** (see also <http://www.bestbets.org/home/people.php>)

Best Evidence Medical Education in Geriatric Medicine (6.2MB) **Suzan Abou-Raya**, MDFaculty of Medicine, University of AlexandriaFellow, Harvard Medical School, Boston, MA

Beyond Kirkpatrick Bradford and Airedale NHS (0.5MB) **Paul Stevenson**

Clinically Integrated E-curriculum for Teaching EBM (1.3MB) **Shakila Thangaratinam**, Clinical lecturer in Obstetrics and Gynaecology and Clinical Epidemiology University of Birmingham. Part of the Training the Trainers Project

Diagnostic Reasoning (2.8MB) **Carl Heneghan**

Reaching for Knowledge in Unison Using Communities of Practice to Support Practice Change (2.6MB) **Melanie Barwickk**, Ph.D., C.Psych. Community Health Systems Resource Group The Hospital for Sick Children University of Toronto

World Cafe Process (0.5MB) **World Cafe Day 1** (see also <http://www.theworldcafe.com/> and <http://www.theworldcafe.com/what.htm>)

##### 2007 Diagnostics

# Common mistakes in teaching EBM



- Teaching EBM fails:
  - When learning how to do research is emphasised over how to use it
  - When learning how to do statistics is emphasised over how to interpret them
  - When teaching EBM is limited to finding flaws in published research

# Common mistakes in teaching EBM



- Teaching EBM fails:
  - When it humiliates learners for not already knowing the ‘right’ fact or answer
  - When it bullies learners to decide to act based on fear of others’ authority or power, rather than on authoritative evidence and rational argument
  - When the amount of teaching exceeds the available time or the learner’s attention

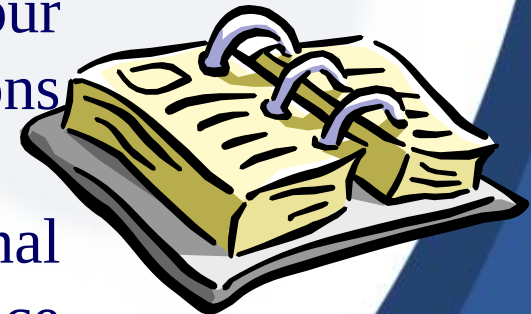
# Coping with the overload: three *possible* things you might try



A. Read guidelines & evidence-based  
abstraction journal  
(and cancel other journals)



B. Keep a logbook of your  
own clinical questions



C. Run a case-discussion journal  
club with your practice



# Take home messages

- EBM should be the language of medicine
- EBM should be taught in medical schools and hospitals
- EMB should be taught to patients!
- Look for the answerable questions in secondary sources first (UK RCOG, NICE, ACOG, SOGC, RCOG for AUS and NZ)
- Challenge colleagues by asking for evidence
- Explain to patients the evidences for treatments and investigations



Thank You

