Eighteen years later:
Is Evidence-based Practice really adult?

Professor Paul Glasziou
University of Oxford
Who are we?

- I have been to a previous Sicily meeting
- I teach EBHC
- I use EBHC in clinical practice
- I am from
  - Asia
  - Africa
  - Europe
  - North America
  - South America
Some milestones in the history of EBM

**Al-Rhazi**
For I once saved one group by it, while I intentionally neglected another group. By doing that, I wished to reach a conclusion.

**James Lind**
Publishes review & clinical trial in *Treatise on Scurvy*

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

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

**Alvan Feinstein**
Publishes his book *Clinical Judgement*

<table>
<thead>
<tr>
<th>900 AD</th>
<th>1780</th>
<th>1840</th>
<th>1937/48</th>
<th>1967</th>
<th>1970’s</th>
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</table>
Coping with the growth in trials?

MEDLINE 2006/day
1,600 articles
95 trials
4 reviews*

*CDSR per day
1 new
1 update

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 randomised controlled trials.

Bastian, Glasziou, Chalmers, (accepted for PLoS 2009)
“EBM” - birth of a term

Update of CMAJ series on how to read a paper

JAMA User guides 1991

authors seek a new term

Clinical epidemiology?

Scientific medicine?

Evidence-based medicine!
1993: Sackett moves to Oxford

An EBM Approach to Education

- Evidence cart on ward rounds - 1995
- Looked up 2-3 questions per patient
- Took 15-90 seconds to find
- Change about 1/3 decisions
- Rounds took longer!

Dave Sackett
This page provides the following specialized PubMed Clinical Queries:
- Search by Clinical Study Category
- Find Systematic Reviews
- Medical Genetics Searches

PEDro (Physiotherapy Evidence Database)

Structured Abstracts
CONSORT statement
What should be the EBM curriculum?

Skills for each of the 4 steps*

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

* Sicily statement on evidence-based practice.


EBM teaching in UK Medical Schools (based on 20 replies from 32 schools)

- Searching of research databases
- Appraisal of therapy articles
- Confidence intervals and p-values
- Calculation of effective statistics (RR and NNT)
- Appraisal of systematic reviews
- Appraisal of prognostic articles
- Appraisal of diagnostic studies
- Communication of risks
- Appraisal of qualitative studies
- Calculation of post-test probabilities

Meats et al, Medical Teacher, 2009
EBM has spread...


2nd Pan-Arab EBM conference

JISCmail
National Academic Mailing List Service
Subscriber's Corner  Email Lists

EVIDENCE-BASED-HEALTH List
1,500 members
… but EBM is (comparatively) small
Evolution and persistence pays

1672

1931
EBM rocks!
Past & future: EBM is evolving

- More evidence; better tools
- Better search methods
- Better appraisal techniques
- Better application methods
Step 2. Searching: finding good answers?
### Impact of searching on correctness of answers to clinical questions

<table>
<thead>
<tr>
<th></th>
<th>Right to Right</th>
<th>Wrong to Right</th>
<th>Right to Wrong</th>
<th>Wrong to Wrong</th>
</tr>
</thead>
<tbody>
<tr>
<td>McKibbon (GP or IM)</td>
<td>28%</td>
<td>13%</td>
<td>11%</td>
<td>48%</td>
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Impact of searching on correctness of answers to clinical questions

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<td>28%</td>
<td>13%</td>
<td>11%</td>
<td>48%</td>
</tr>
<tr>
<td>Quick Clinical (GPs)</td>
<td>21%</td>
<td>32%</td>
<td>7%</td>
<td>40%</td>
</tr>
<tr>
<td>Hersh (Med students)</td>
<td>20%</td>
<td>31%</td>
<td>12%</td>
<td>36%</td>
</tr>
<tr>
<td>Hersh (Nursing)</td>
<td>18%</td>
<td>17%</td>
<td>14%</td>
<td>52%</td>
</tr>
</tbody>
</table>
Searching: possible solutions

- Better searching training
- Better search engines (QuickClinical, TRIP, etc)
- Question-Answering service (clinical librarian)
This page provides the following specialized PubMed searches for clinicians:

- Search by Clinical Study Category
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After running one of these searches, you may further refine your results using PubMed's Limits feature.

Results of searches on these pages are limited to specific clinical research areas. For comprehensive searches, use PubMed directly.

### Clinical Queries using Research Methodology Filters

<table>
<thead>
<tr>
<th>Category</th>
<th>Optimized For</th>
<th>Sensitive/Specific</th>
<th>PubMed Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>specific/narrow</td>
<td>93%/97%</td>
<td>(randomized controlled trial[Publication Type] OR randomized[Title/Abstract] AND controlled[Title/Abstract] AND trial[Title/Abstract])</td>
</tr>
<tr>
<td></td>
<td>specific/narrow</td>
<td>64%/98%</td>
<td>(specificity[Title/Abstract] )</td>
</tr>
<tr>
<td></td>
<td>specific/narrow</td>
<td>51%/9%</td>
<td>(relative[Title/Abstract] OR relative*[Test Word] OR etiology[Test Word] OR cohort studies[MeSHtemp] OR controls[Title/Abstract] AND study[Title/Abstract])</td>
</tr>
<tr>
<td></td>
<td>specific/narrow</td>
<td>52%/94%</td>
<td>(prognosis*[Title/Abstract] OR (first[Title/Abstract] AND episode[Title/Abstract]) OR cohort[Title/Abstract] )</td>
</tr>
<tr>
<td>clinical prediction guides</td>
<td>sensitive/broad</td>
<td>91%/79%</td>
<td>(predict* [task] OR predictive value of test[task] OR score*[task] OR outcome*[task] OR observer variation*[task] )</td>
</tr>
<tr>
<td></td>
<td>specific/narrow</td>
<td>54%/99%</td>
<td>(validation*[task] OR validate*[task] )</td>
</tr>
</tbody>
</table>
Step 3. Critical Appraisal

It’s peer-reviewed, therefore it must be OK?
Clinicians cannot tell good from poor quality research

BMJ study of 607 reviewers

- 14 deliberate errors inserted

Detection rates

- On average <3 of 9 major errors detected
- Poor Randomisation (by name or day) - 47%
- Not intention-to-treat analysis - 22%
- Poor response rate - 41%

Modestly improved by 1-day training

Appraisal: possible solutions

- Better appraisal training
- Better appraisal pre-publication
- Appraisal service (evidologists)
Unified Critical Appraisal

**EBM notebook**

The GATE frame: critical appraisal with pictures

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**Figure 6** Study validity (RAAMbo).

Rod Jackson
Are RCTs always needed for treatment questions?

- Some immediate & dramatic effects don’t need RCTs*

- Example:
  - Child with nasal foreign body
    - Dislodged with Parent Kiss method
    - Case series of success 15/19
      - Botma J Laryngol Otol 2000

* Glasziou, Chalmers, Rawlins, McCulloch BMJ 2007
Step 4: Applying to individuals

- What do the results mean on average?
- What do they mean for this individual?
- How do I use in practice
Team-based EBM: digesting the evidence

Fortnightly GP “Journal Club”

**Step 1 – 10 minutes (TOPICS?)**
- Discuss new problems and topics (questions, EBM journal, guidelines)

**Step 2 – 40 minutes (THE EVIDENCE)**
- Read and appraise research paper for last week’s problem

**Step 3 – 10 minutes (NEXT ACTIONS)**
- Agree conclusions and “next actions”
- Organise changes in practice and follow up – who, what, when?
Summary: optimist & pessimist

- Rapid growth in research & trials
  
  *But much is poor, unsynthesised, or unusable*

- Search engines improving
  
  *but clinicians may find bad information*

- Skills in EBM increasing
  
  *but many medical schools still ignore*
International Society for Evidence-Based Practice?

EBM Centres in

- Oxford, McMaster, Riyadh, Tabriz, Taipei, Philippines, Kuala-Lumpur, Jakarta, Australia, NZ, ...

GIMBE
Gruppo Italiano per la Medicina Basata sulle Evidenze

CASP
INTERNATIONAL NETWORK

INCLEN

International Clinical Epidemiology Network

1843 members 34 countries

89 Clinical Epidemiology Units

SMDM
Society for Medical Decision Making
Step 4: Ways to individualise treatment

1. Chronic disease
   - Single patient “trials”
   - Monitoring & adjustment

2. Acute disease
   - Predicting recovery

3. Prevention
   - Predicting future risk
Collaboration between practices

**Quality:MK (Milton Keynes) partners**

- Health:MK – 26 of 27 general practices
- NHS Milton Keynes – the payer
- Patient and Public Involvement Forum
- University of Oxford
  - Centre for Evidence Based Medicine
Team EBM within & between practices

Evidence-based discussion groups
“Share and spread”

- EBM skills training & toolkit
- Librarian support
- Pharmacist support

IMPACTE groups
Improving Medical Practice by Assessing Current Evidence
Practice Activity 2007-2009

- Central
- Whaddon House
- Stony Stratford
- Parkside
- NPMC
- CMK

[Bar chart showing actions and discussed percentages for each location]
The Current Projects

- Carpal Tunnel Syndrome
- Delayed antibiotics
- Smoking Cessation
- Diabetes
- Mild to Moderate Depression
- Dyspepsia

- Patient Empowerment
- Alcohol reduction
- Weight Management
- Prescribing Projects
- Map of Medicine
A. Regulations & Organisations

1830  First edition of Index Medicus
1880  Library of Army Surgeon General
1950  FDA regulations require proof of drug effectiveness
1960  National Library of Medicine
1970  US founds Office of Technology Assessment
1980  Cochrane Collaboration founded
1990  US Congress mandates trial registration
2000  UK government establishes NICE
2010  WHO established International Trials Registry

B. Publications

1935  Codification of trial methods UNESCO conference Vienna
1950  Metá-analyse en médecine. (Jenicek)
1970  Cochrane’s Effectiveness & Efficiency
1980  Early systematic reviews (see James Lind Library)
1990  Cochrane Database of Systematic Reviews
2000  Oxford Database of Perinatal Trials
2010  Spain mandates trial registration
Evidence-Based Medicine – where are we?

- Exponential growth in research & trials
- EBM has, and will, evolve
- Better understanding of barriers & work-based learning
Finding Validity articles

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

Number Needed to Read to find 1 valid is 20+
Number Needed to Read to find 1 valid & relevant is 200+

What is the treatment?

- The paper’s description of sodium reduction
  - "Individual and weekly group counseling sessions were offered initially, with less intensive counseling and support thereafter, specific to sodium reduction."
What is sodium reduction?

- The paper’s description
  "Individual and weekly group counseling sessions were offered initially, with less intensive counseling and support thereafter, specific to sodium reduction."

- Previous reference
  (i) an individual session followed by 10 weekly group 90 minute sessions with a nutritionist, followed by a transitional stage of some additional sessions
  (ii) Topics in the weekly sessions included Getting Started, sodium basics, the morning meal, midday sources of sodium, the main meal, planning ahead, creative cooking, eating out, food cues, and social support,
  (iii) the sessions included sampling of foods, discussion of articles on sodium reduction, and problem-solving,
  (iv) patients kept diaries at least 6 days per week, and urine sodiums were measured.
EDITORIALS

Promoting evidence-based non-drug interventions: time for a non-pharmacopoeia?

Paul P Glasziou

A compilation of effective non-drug treatments could help increase their uptake in clinical practice

Avoidable waste in the production and reporting of research evidence

Iain Chalmers, Paul Glasziou

Lancet, 2009

Questions relevant to clinicians and patients?
- Low priority questions addressed
- Important outcomes not assessed
- Clinicians and patients not involved in setting research agendas

Appropriate design and methods?
- Over 50% of studies designed without reference to systematic reviews of existing evidence
- Over 50% of studies fail to take adequate steps to reduce biases—e.g., unaccounted treatment allocation

Accessible full publication?
- Over 50% of studies never published in full
- Biased under-reporting of studies with disappointing results

Unbiased and usable report?
- Over 30% of trial interventions not sufficiently described
- Over 50% of planned study outcomes not reported
- Most new research not interpreted in the context of systematic assessment of other relevant evidence

Research waste