From 10 essential papers for the practice of EBM to 10(?) on teaching EBM

EBHC Conference 2019, Taormina, Sicily

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Disclosure statement

[Other than cognitive biases towards my own work]

I have no actual or potential conflict of interest in relation to this presentation.
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Douglas Badenoch
Lucy Abel
Adrian Stokes
Sarah Pannell
Edmund Jack
Mark Perry
One day Intro to EBM

March - Practicing EBHC - Oxford

Introduction to EBM (ppt - 7.8MB) Paul Glasziou
SHAMELESS PLUGGING
Practice of Evidence-Based Health Care

Teaching Evidence-Based Practice

Postgraduate Certificate in Teaching Evidence-Based Health Care

Tutor
Dr David Nunan

Module Coordinator
David Nunan is a Departmental Lecturer and Senior Research Fellow in Evidence-based Medicine.
Ten essential papers for the practice of evidence-based medicine

David Nunan,1,2 Jack O Sullivan,1,2 Carl Heneghan,1,2 Annette Pluddemann,1,2 Jeffrey Aronson,2 Kamal Mahtani1,2

Abstract
In this article we signpost readers to 10 papers we consider essential reading for anyone starting out on an evidence-based medicine journey. We have considered papers consisting a mix of old and new, seminal and cutting-edge that offer insight into what evidence-based medicine is, where it came from, why it matters and what it has achieved. This is balanced against some of the common criticisms of evidence-based medicine and efforts to tackle them. We have also highlighted papers acknowledging the importance of teaching and learning of the principles of evidence-based medicine and how health professionals can better use evidence in clinical decisions with patients.

Introduction
As an introduction to evidence-based practice, we as a group of evidence-based researchers, clinicians and editors have collated the top 10 papers we consider most helpful when starting on the journey of evidence-based medicine (EBM). We have based our selection on our experience of teaching a wide range of individuals and describe why we consider each paper to be important.

EBM: what it is and what it is not
In 1996, the BMJ published an editorial by Sackett and others, in which they defined EBM as ‘the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients’.1 By emphasising the essential components of EBM, they made it clear that evidence, values and expertise play similar roles in clinical decision making.

EBM: a new approach to teaching the practice of medicine
Although the 1996 paper by Sackett et al clarified what EBM is and what it is not, the term and concept had already been introduced in a 1992 paper by the flawed through the use of inappropriate designs, unrepresentative samples, small samples, incorrect methods of analysis and faulty interpretation.

Echoing the realisation by Sackett and colleagues that much of medical practice lacked evidence of effectiveness and that much research was inadequate, Altman concluded: ‘We need less research, better research, and research done for the right reasons.’ Now, 22 years later, the call to arms has been repeated in the EBM Manifesto for Better Healthcare.5

Assessing the quality of research
A cornerstone of evidence-based practice is the ability to assess the quality of the evidence and the research that underpins it—often easier said than done. Glasziou and colleagues published an editorial in the BMJ, aimed at helping clinicians and researchers to assess research.3 They suggested five general principles:

1. Different types of research are needed to answer different types of clinical questions.
2. Irrespective of the type of research, systematic reviews are necessary.
3. Adequate grading of the quality of evidence goes beyond the categorisation of research design.
4. Assessment of the benefit to harm balance should draw on a variety of types of research.
5. Clinicians need efficient search strategies for identifying reliable clinical research.

Empirical evidence of bias. Dimensions of methodological quality associated with estimates of treatment effects in controlled trials
The relevance of the methods used in clinical trials to the results that emerge was highlighted in this seminal paper by Schulz and colleagues.4 They found that knowledge of treatment allocation inflated the effect of an intervention by an average of 41%. Failure to blind group allocation could overestimate the intervention effect by 10%.
Road to nowhere

Not so THE PROMISED LAND

Land of the Damned DIAMOND REXX
EBM: what it is and what it is not

What is the evidence that postgraduate teaching in EBM changes anything? A systematic review

EBM: a new approach to teaching the practice of medicine

EBM manifesto for better healthcare

The scandal of poor medical research

EBM: a commentary on common criticisms

Assessing the quality of research

Evidence-based guidelines or collectively constructed ‘mindlines?’ Ethnographic study of knowledge management in primary care

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General practitioners’ perceptions of the route to EBM: a questionnaire survey
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- EBM: what it is and what it is not
- EBM: a new approach to teaching the practice of medicine

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- Assessing the quality of research
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Evidence-Based Medicine

A New Approach to Teaching the Practice of Medicine

Evidence-Based Medicine Working Group

A NEW paradigm for medical practice is emerging. Evidence-based medicine de-emphasizes intuition, unsystematic clinical experience, and pathophysiologic rationale as sufficient grounds for clinical decision making and stresses the examination of evidence from clinical research. Evidence-based medicine requires new skills of the physician, including efficient literature searching and the application of formal rules of evidence evaluating the clinical literature.

An important goal of our medical residency program is to educate physicians in the practice of evidence-based medicine. Strategies include a weekly, formal academic half-day for residents, devotion to teaching the necessary skills; recruitment into teaching roles of physicians who practice evidence-based medicine; sharing among faculty of approaches to teaching evidence-based medicine; and providing faculty with feedback on their performance as role models and teachers of evidence-based medicine. The influence of evidence-based medicine on clinical practice and medical education is increasing.

CLINICAL SCENARIO

A junior medical resident working in a teaching hospital admits a 43-year-old previously well man who experienced a witnessed grand mal seizure. He had never had a seizure before and had not had any recent head trauma. He drank alcohol once or twice a week and had not had alcohol on the day of the seizure. Findings on physical examination are normal. The patient is given a loading dose of phenytoin intravenously and the drug is continued orally. A computed tomographic head scan is completely normal, and an electroencephalogram shows only nonspecific findings. The patient is very concerned about his risk of seizure recurrence. How might the resident proceed?

The Way of the Past

Faced with this situation as a clinical clerk, the resident was told by his senior resident (who was supported in his view by the attending physician) that the risk of seizure recurrence is high (though he could not put an exact number on it) and that was the information that should be conveyed to the patient. She now follows this path, emphasizing to the patient not to drive, to continue his medication, and to see his family physician in follow-up. The patient leaves in a state of vague trepidation about his risk of subsequent seizure.

The Way of the Future

The resident asks herself whether she knows the prognosis of a first seizure and realizes she does not. She proceeds to the library and, using the Grateful Med program, conducts a computerized literature search. She enters the Med Subject Headings term epilepsy, prognosis, and recurrence, and the program retrieves 25 relevant articles. Surveying the titles, one appears directly relevant. She reviews the paper, finds that it meets criteria she has previously learned for a valid investigation of prognosis, and determines that the results are applicable to her patient. The search costs the resident $2.58, and the entire process (including the trip to the library and the time to make a photocopy of the article) took half an hour.

The results of the relevant study show that the patient risk of recurrence at 1 year is between 43% and 51%, and at 3 years the risk is between 51% and 60%. After a seizure-free period of 18 months his risk of recurrence would likely be less than 20%. She conveys this information to the patient, along with a recommendation that he take his medication, see his family doctor regularly, and have a review of his need for medication if he remains seizure-free for 18 months. The patient leaves with a clear idea of his likely prognosis.

A PARADIGM SHIFT

Thomas Kuhn has described scientific paradigms as ways of looking at the world that define both the problems that can legitimately be addressed and the range of admissible evidence that may bear on their solution.1 When defects in an existing paradigm accumulate to the extent that the paradigm is no longer tenable, the paradigm is challenged and replaced by a new way of looking at the world. Medical practice is changing, and the change, which involves using the medical literature more effectively in guiding medical practice, is profound enough that it can appropriately be called a paradigm shift.

The foundations of the paradigm shift lie in developments in clinical research over the last 30 years. In 1960, the randomized clinical trial was an oddity. It is now accepted that virtually no drug can enter clinical practice without a demonstration of its efficacy in clinical trials. Moreover, the same randomized trial method increasingly is being applied to surgical therapies3 and diagnostic tests.4 Meta-analysis is gaining increasing acceptance as a method of summarizing the results of a number of randomized trials, and ultimately may have as profound an effect on setting treatment policy as have randomized trials themselves.7 While less dramatic, crucial methodological ad-
EBM: a new approach to teaching the practice of medicine

Teaching the Practice of Medicine

dose of phenytoin intravenously and the drug is continued orally. A computed tomographic head scan is completely normal, and an electroencephalogram shows only nonspecific findings. The patient is very concerned about his risk of seizure recurrence. How might the resident year is between 43% and 50% in the first year, and it is less than 20% after a seizure-free period. He asks his risk of recurrence. After a seizure-free period, his risk of recurrence is less than 20%. She recommendation that he...
“EBM requires **new skills** of the physician, including efficient literature searching and the application of formal rules of evidence evaluating the clinical literature.”
“Evidence based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients.”
External clinical evidence can inform, but can never replace, individual clinical expertise, ....decides whether the external evidence applies to the individual patient at all and, if so, how it should be integrated into a clinical decision.
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"We need less research, better research, and research done for the right reasons"
“The development of the **EQUATOR Network** to improve reports of research and the 2014 Lancet series of papers on ways of increasing value and reducing waste in research are just two examples of testimony to the enduring influence of Doug’s 1994 call for....”

*Iain Chalmers, health services researcher and a founder of the Cochrane Collaboration*
## Reporting guidelines for main study types

<table>
<thead>
<tr>
<th>Study Type</th>
<th>Guidelines</th>
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<tbody>
<tr>
<td>Randomised trials</td>
<td>CONSORT</td>
</tr>
<tr>
<td>Observational studies</td>
<td>STROBE</td>
</tr>
<tr>
<td>Systematic reviews</td>
<td>PRISMA</td>
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<tr>
<td>Case reports</td>
<td>CARE</td>
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<tr>
<td>Qualitative research</td>
<td>SRQR</td>
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<tr>
<td>Diagnostic / prognostic studies</td>
<td>STARD</td>
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<tr>
<td>Quality improvement studies</td>
<td>SQUIRE</td>
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<tr>
<td>Economic evaluations</td>
<td>CHEERS</td>
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<tr>
<td>Animal pre-clinical studies</td>
<td>ARRIVE</td>
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<tr>
<td>Study protocols</td>
<td>SPIRIT</td>
</tr>
<tr>
<td>Clinical practice guidelines</td>
<td>AGREE</td>
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</tbody>
</table>

See all 401 reporting guidelines

Funders: reporting guidelines key for research reproducibility and reliability.
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### ABSTRACT

#### Table 1: Ratio of Odds Ratios (95% Confidence Interval)

<table>
<thead>
<tr>
<th>Level of Allocation Concealment</th>
<th>Ratio of Odds Ratios (95% Confidence Interval)</th>
<th>( \chi^2 ) (df)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate</td>
<td>1.00 (referent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unclear</td>
<td>0.67 (0.60-0.75)</td>
<td>57.9 (2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Inadequate</td>
<td>0.59 (0.48-0.73)</td>
<td></td>
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</tbody>
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Welcome to the Catalogue of Bias
A collaborative project mapping all the biases that affect health evidence

Confounding by indication

A Word About Evidence: 5. Bias—previous definitions

Confounding

A Word About Evidence: 4. Bias—etymology and usage

Centre for Evidence-based Medicine

Evidence Live

Most viewed biases
- Detection bias
- Ascertainment bias
- Perception bias
- Recall bias
- Attrition bias
- Confounding by indication
- Selection bias
- Wrong sample size bias
- Allocation bias
- Prevalence-incidence (Neyman) bias
Allocation bias

Systematic difference in how participants are assigned to comparison groups in a clinical trial.

Background

Allocation bias may result if investigators know or predict which intervention the next eligible participant is supposed to receive. This knowledge may influence the way investigators approach potentially eligible participants and how they are assigned to the different groups, thereby selecting participants with good prognoses (i.e. anticipated good outcomes and treatment responses) into one group more than another.

In a trial of different blood pressure medications the use of sealed envelopes to conceal the allocation schedule resulted in imbalances in baseline blood pressure between the treatment and control groups. In turned out that participants in the control group already had lower blood pressures compared to participants in the treatment group at the outset. The observed imbalance could have arisen if the investigator opened the envelopes before allocating participants to groups.
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“Both standalone courses and integrated teaching improve knowledge”

“Improvements in skills, attitudes, and behaviour, however, come about when teaching is integrated into clinical practice; standalone courses bring about no change”
How to Roll Your Shirt Sleeves: Your 60-Second Guide

The Basic Roll
Best for: Performing physical labor
Benefits: Simple and intuitive

Unbutton cuff and any gauntlet buttons further up sleeve.
Flip cuff back and inside out.
Fold back, using the cuff to set the width, until band of rolled cloth is just below elbow—higher when engaging in physical labor.

The Casual Forearm Roll
Best for: Casual dress, thin arms, layers
Benefits: Involves the least folding, easiest to unroll without wrinkles

Unbutton cuff. Undo gauntlet buttons according to preference. Flip cuff back and inside out.
Fold over once, hiding cuff behind a band of sleeve fabric.
Stop there and tuck corners of cuff in neatly.

The Master/Italian Roll
Best for: Rolling sleeves with style, showing off cuffs with inner contrasting color
Benefits: Easy to adjust and unfold

Unbutton cuff. Undo gauntlet buttons according to preference. Flip cuff back and inside out.
Pull flipped cuff all the way to just below elbow without folding, turning sleeve inside out as it goes.
Take bottom of inside-out portion and fold it up until it traps bottom of cuff. Show as much of the inside-out cuff as you desire.

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Groups 4-5

1st round - Initial list of papers [15 mins]

2nd round - Top 3 papers [10 mins]

3rd round - Top paper [5 mins] and discussion [10 mins]

Max 150 words on top paper [10 mins]
LiveSlides web content

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Start the presentation.
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Max 150 words on top paper [10 mins]
What next?
Ten essential papers for the teaching of evidence-based medicine

OPEN ACCESS

Abstract
What next for education in evidence-based health care? A call for submissions

David Nunan, Rod Jackson, Carl Heneghan

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MARCH 20th 2020

Full collection launch at EBM Live 2020
Thank you