

EBM Library

Ten essential papers for the practice of evidence-based medicine

The EBM library signposts some essential readings for the practice of Evidence-Based Medicine. Here we highlight some essential papers for anyone starting out on the journey to evidence-based medicine.

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As an introduction to evidence-based practice we, as a group of evidence-based researchers, clinicians and editors have collated the top ten papers we consider most helpful when starting on the journey to evidence-based medicine. 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.

1. Evidence-based medicine: what it is and what it isn't

In 1996, the BMJ published an editorial by Dave 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 stressing the essential components of EBM, they made it clear that evidence, values, and expertise play similar roles in clinical decision making.

2. Evidence-based medicine: A new approach to teaching the practice of medicine

Although the 1996 paper by Sackett et al. clarified what EBM is and what it isn't, the term and concept had already been introduced in a 1992 paper by the Evidence-Based Medicine Working Group.[2] A paradigm shift in medical practice was proposed, where the examination of evidence from clinical research is given equal place in clinical decision making as that of biological reasoning, clinical experience, and intuition. As a result, physicians needed to develop new skills, including efficient literature searching and the application of formal rules of evidence to evaluate the clinical literature. Thus, evidence-based medicine was born.

3. The scandal of poor medical research

Over 20 years ago Doug Altman published his now seminal paper in the BMJ, telling us in his view how most medical research wasn't very good and was probably wrong.[3] Altman wrote that much research was "seriously flawed through the use of inappropriate designs, unrepresentative samples, small samples, incorrect methods of analysis, and faulty interpretation."

Echoing the realization by Sackett and colleagues that much of medical practice lacked evidence of effectiveness and that much research was poor, 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 Evidence-Based Medicine Manifesto for Better Healthcare [6].

4. 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. Paul Glasziou and colleagues published an editorial in the BMJ, aimed at helping clinicians and researchers to assess research.[4] 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.

5. 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 Kenneth Schulz and colleagues.[5] 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 17%. This paper was influential in defining the effects of systematic bias on research outcomes and in showing why critical appraisal matters.

6. What is the evidence that postgraduate teaching in evidence based medicine changes anything? A systematic review

With growing acceptance of the importance of evidence-based practice, it soon followed that doctors need skills to appraise, interpret, and apply research findings to their clinical practice. Most medical schools worldwide now include some element of EBM teaching. But what is the evidence that teaching EBM affects anything?

This systematic review of 23 studies showed that stand-alone teaching improved knowledge, but not skills, attitudes, or behaviour.[6] Clinically integrated teaching improved all four. The authors proposed a hierarchy of evidence-based healthcare teaching and learning activities:

Level 1—interactive and clinically integrated activities.

Level 2(a)—interactive but classroom-based activities.

Level 2(b)—didactic but clinically integrated activities.

Level 3—didactic, classroom or standalone teaching.

Clarke and colleagues have since published an overview of systematic reviews, which supports these findings and highlights the need to implement effective teaching strategies.

7. Evidence-based medicine manifesto for better healthcare

The manifesto was a response to systematic bias, wastage, error and fraud in research underpinning patient care. Jointly published in the BMJ [7] and BMJ EBM, the manifesto is an invitation to contribute to and join a movement towards better evidence by creating a list of priorities and sharing the lessons from achievements already made. The manifesto steps required to develop trustworthy evidence were refined through consultation and require the evidence-based community to focus attention on strategies that could most improve the quality of healthcare.

8. Evidence based medicine: a commentary on common criticisms

This was the first systematic appraisal of some common criticisms of EBM.[8] Following a systematic database search and feedback from seminars (delivered by David Sackett), Straus and McAlister identified three limitations unique to EBM, including limited time and resources, the need to develop new skills, and a paucity of evidence that EBM is effective.

They said that many of what they called 'pseudolimitations' and criticisms of EBM often stem from misperceptions or misrepresentations, for example, that EBM is an ivory tower concept and that only randomised trials or systematic reviews constitute evidence. They cited evidence from frontline clinicians that refuted the first claim and showed that the question determines the best type of evidence to answer it, thus refuting the second criticism.

They concluded clinicians should have better access to evidence in their day-to-day practice and that the way evidence was described and shared with patients needed to be improved. They also pointed out the lack of evidence of the impact of evidence-based medicine on healthcare and patient outcomes that needs addressing.

9. General practitioners' perceptions of the route to evidence-based medicine: a questionnaire survey

This paper demonstrated rapid adoption of the ethos and philosophy of evidence-based medicine by primary care doctors but also identified some of the early barriers to its implementation.[10] These included awareness of the available resources and lack of time. Access to available technologies was also a major problem; for example, only around 20% of general practitioners at that time had access to the Internet and key bibliographic databases such as Medline.

Most of those surveyed had some understanding of the technical terms used in evidence-based medicine, however, under a third felt able to explain the meaning of these terms. Respondents thought that the best way to move from opinion-based practice towards evidence-based medicine was by using evidence-based guidelines or protocols developed by colleagues.

10. Evidence-based guidelines or collectively constructed “mindlines?” Ethnographic study of knowledge management in primary care.

This important paper was one of the first empirical assessments of how general practitioners use findings from scientific research in their daily practice and decision making.[10] Using a mixed methods approach, Gabbay and le May found that few practitioners went through the steps associated with the traditional model of evidence-based healthcare (e.g. the 5 A's), including accessing newly published knowledge.

They observed that practitioners preferred shortcuts and relied on “mindlines” (“collectively reinforced, internalised guidelines”). These mindlines were developed over time not through reading of literature, but predominantly by their experiences and interactions with colleagues, opinion leaders, pharmaceutical representatives, patients, and other sources of knowledge.

However, they stressed that practitioners were professionally responsible for ensuring that mindlines are underpinned by research evidence, and that “knowledge of key opinion leaders, from medical or nursing school onwards, is based on research and experiential evidence and wherever appropriate follow the evidence-based healthcare model.”

Conclusion: our list is not designed to be exhaustive; you may disagree with our top ten, as we certainly did. We, however, found it useful to discuss the papers that we think matter and are essential to developing, understanding and improving the use of evidence to improve healthcare. We hope that this list will evolve and would welcome suggestions to enhance it in the future.

Disclaimer: The views expressed in this commentary represent the views of the authors and not necessarily those of their host institution, the NHS, the NIHR, or the Department of Health.

Conflicts of interest:

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CH has received expenses and fees for his media work. He holds grant funding from the NIHR, the NIHR School of Primary Care Research, The Wellcome Trust and the WHO. On occasion, he receives expenses for teaching EBM and is also paid for his GP work in NHS out of hours.

References

- 1 Sackett DL, Rosenberg WM, Gray JA, et al. Evidence-based medicine: what it is and what it isn't. *BMJ* 1996;**312**:71–2.
- 2 Evidence-Based Medicine Working Group. Evidence-based medicine. A new approach to teaching the practice of medicine. *JAMA* 1992;**268**:2420–5.
- 3 Altman DG. The scandal of poor medical research. *BMJ* 1994;**308**:283–4.
- 4 Glasziou P, Vandenbroucke JP, Chalmers I. Assessing the quality of research. *BMJ* 2004;**328**:39–41.
- 5 Schulz KF, Chalmers I, Hayes RJ, Altman DG. Empirical evidence of bias. Dimensions of methodological quality associated with estimates of treatment effects in controlled trials. *JAMA* 1995;**273**:408–12.
- 6 Coomarasamy A, Khan KS. What is the evidence that postgraduate teaching in evidence based medicine changes anything? A systematic review. *BMJ* 2004;**329**:1017.
- 7 Heneghan C, Mahtani KR, Goldacre B, et al. Evidence-based medicine manifesto for better healthcare. *BMJ* 2017;**357**:j2973.
- 8 Straus SE, McAlister FA. Evidence-based medicine: a commentary on common criticisms. *CMAJ* 2000;**163**:837–41.
- 9 McColl A, Smith H, White P, et al. General practitioner's perceptions of the route to evidence-based medicine: a questionnaire survey. *BMJ* 1998;**316**:361–5.
- 10 Gabbay J. Evidence based guidelines or collectively constructed 'mindlines?' An ethnographic study of knowledge management in primary care. *BMJ* 2004;**329**:1013–1010.