

UC Irvine

Western Journal of Emergency Medicine: Integrating Emergency Care with Population Health

Title

Pro: Should Evidence-Based Medicine Be Used More in Clinical Practice?

Permalink

<https://escholarship.org/uc/item/7t4138sx>

Journal

Western Journal of Emergency Medicine: Integrating Emergency Care with Population Health, 7(1)

ISSN

1936-900X

Author

Fee, Chris

Publication Date

2006

Copyright Information

Copyright 2006 by the author(s). All rights reserved unless otherwise indicated. Contact the author(s) for any necessary permissions. Learn more at <https://escholarship.org/terms>

Peer reviewed

PRO/CON

Pro: Should Evidence-Based Medicine Be Used More in Clinical Practice?

Chris Fee, MD

*Department of Emergency Medicine
University of California, San Francisco
San Francisco, California*

When first asked to write the pro side of this debate, I found myself enthusiastically accepting. After all, what possible argument could be found against implementing a more evidence-based approach to one's clinical practice? Perhaps because of my fervent support of doing so, I found myself having trouble approaching this article. How can one write the pro side to a debate topic when the con side is so hard to envision?

Perhaps we should begin with a seemingly simple question: what is evidence-based medicine (EBM)? The term "evidence-based medicine" originated at McMaster University in Canada and was first used in the medical literature in 1992.¹ The most commonly used definition is that put forth by the Centre for Evidence-Based Medicine at the University of Oxford. They state that EBM "is the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients."²

Is this not what physicians have been doing for centuries? Does this imply that before the advent of

EBM medicine was unscientific? No. The primary impetus behind the creation of EBM as we now know it was to encourage physicians to improve the scientific basis of their clinical practice through teaching them to interpret the scientific literature in a critical and meaningful manner. Proponents of EBM state that "all medical action of diagnosis, prognosis, and therapy should rely on solid quantitative evidence-based on the best of clinical epidemiological research" and that "we should be cautious about actions that are only based on experience or extrapolation from basic science."¹ This includes not only understanding how to interpret a particular study, but also understanding the hierarchy of the evidence, which is based on the methods used to collect it (with the randomized controlled trial (RCT) taking form as the penultimate study format for many clinical questions, and case reports and case series or other experiences based on small n constituting a research hypothesis, but not comprising definitive evidence in support of a hypothesis). It is worth noting here the emphasis on relying on the current "best" evidence. There are simply too many clinical questions and too many variables to control to realistically expect a RCT to be available to answer every clinically relevant issue. Many specialty societies have addressed this issue by grading recommendations and evidence within consensus statement guidelines (see table).³

Detractors of the EBM movement often point out that everyone is already practicing this way or conversely that it is impossible to implement into practice. There is ample data to support the concept that a large portion of the medical profession fails to practice EBM. The high prevalence of practitioners continuing to prescribe antibiotics to patients presenting with upper respiratory infections is a case in point. Not only has this practice been shown to be ineffective, but there is growing concern that doing so plays a major role in the growing antibiotic resistance debacle we now face. Other examples include the poor adherence of physicians

Table. Grading system.³

Grading of recommendations

- A: Supported by at least two level I investigations
- B: Supported by one level I investigation
- C: Supported by level II investigations only
- D: Supported by at least one level III investigation
- E: Supported by level IV or V evidence

Grading of evidence

- I: Large, randomized trials with clear-cut results; low risk of false-positive (alpha) error or false-negative (beta) error
- II: Small, randomized trials with uncertain results; moderate-to-high risk of false-positive (alpha) and/or false-negative (beta) error
- III: Nonrandomized, contemporaneous controls
- IV: Nonrandomized, historical controls and expert opinion
- V: Case series, uncontrolled studies, and expert opinion

for prescribing controller medications to patients with chronic persistent asthma or lipid lowering medications and beta-blockers to patients with recent myocardial infarctions. The deluge of data that a practitioner must sort through on a life-long continuous process is mind-numbing and certainly plays into the idea that EBM is impossible for a practitioner to keep up with on his or her own. There is a multitude of ways that a practitioner can keep up with the literature. These include actively reading journals relevant to one's own specialty (easier said than done), attending CME conferences and journal clubs, subscribing to services that provide summations of articles pertinent to one's specialty, subscribing to online services that do the same, utilizing databases stored on personal digital assistants (PDAs), or reading consensus articles.

Others envision an EBM-induced culture of cookbook medicine that detracts from the physician-patient relationship by limiting the patient's choices. Opponents argue that the usefulness of applying EBM to individual patients is of limited value because individual patients' circumstances (severity of disease, co-morbidities, and coexisting therapies) and values vary tremendously in ways not accounted for by the studies. On the contrary, EBM allows a provider to make recommendations backed by empiric data to a patient who, together with their loved ones and medical providers, can then make an educated decision about what interventions they choose.

It is important to remember that any given study can only answer a single specific question at a time. For example, a study cannot answer the question "what is the best way to treat patients with severe sepsis or septic shock?" but can come to a conclusion when asked "does early goal-directed therapy improve mortality in patients with septic shock?" The former requires a summation of several studies (i.e., early goal-directed therapy, early broad-spectrum antibiotic coverage, activated protein C, corticosteroid administration, tight glycemic control, and low tidal volume ventilation in the setting of severe sepsis or septic shock). The answer to this type of open-ended question is perhaps best found in treatment guidelines put together by a panel of specialists, with rankings

assigned to the type of evidence supporting each statement (as noted above).³

Part of the EBM movement is learning to interpret studies correctly. Clinicians need to know how to judge if a study has internal validity and whether the study results are generalizable to their patient population. One must also keep in mind that EBM (and medicine as a whole) is a dynamic field. As we gain more information with each subsequent investigation, best available evidence evolves (new treatments are proven more effective and safe, old treatments are proven ineffective or dangerous). As Sir William Osler noted, "one should treat as many patients as possible with a new drug while it still has the power to heal."

Finally, some have argued that EBM has failed to scientifically prove its own effectiveness. A recent systematic review of empiric studies evaluating the relationship between clinical experience and performance (as measured by adherence to national treatment guidelines) found that physicians with more years of practice and older physicians had less factual knowledge, were less likely to adhere to appropriate standards of care, and that their patients may have poorer outcomes.⁴ This is contrary to the popular belief that experience adds knowledge and skill that translates into improved care. There are several potential explanations for these results but one of the more intriguing possibilities is that older physicians are less likely to have been provided the tools during their training to adopt EBM into their practice.

EBM is a dynamic tool that should be used to improve the quality of care that one provides, but by no means should it be used in isolation. Even in the age of EBM, medicine remains as much an art as a science. It is one thing to be familiar with the best available evidence. It is another to be able to present that data in a compassionate and understandable format to a potentially scared, overwhelmed patient and their family. A human touch, an understanding of cultural differences, and the ability to navigate the complex web of co-morbidities, medications and their interactions, and individual patient values remain critically important. Not even the staunchest opponents

of EBM would argue that high quality evidence obtained through clinical epidemiologic methods should be ignored in the context of patient care. Nor would anyone argue that the current best evidence should be conscientiously, explicitly, and judiciously utilized when caring for an individual patient.

REFERENCES

1. Evidence-Based Medicine Working Group. Evidence-based medicine: a new approach to teaching the practice of medicine. *JAMA* 1992;268:2420-5.
2. Sackett DL, Rosenberg WMC, Gray JAM, Haynes RB, and Richardson WS. Evidence-based medicine: what it is and what it isn't. It's about integrating individual clinical expertise and the best external evidence. *BMJ* 1996;312:71-2.
3. Dellinger RP et al. Surviving Sepsis Campaign guidelines for management of severe sepsis and septic shock. *Crit Care Med* 2004;32(3):858-873.
4. Choudhry NK, Fletcher RH, and Soumerai SB. Systematic review: the relationship between clinical experience and quality of health care. *Ann Intern Med* 2005;142:260-273.

Rebuttal of Pro

Preston Maxim, MD

Popular, scientific, and medical culture in the United States favor the rhetoric of a dichotomous “all or nothing” response to a subject. Proponents of Evidence-Based Medicine (EBM) have taken this approach and have pushed for the abandonment of “authority-based” medicine in favor of EBM. Unfortunately, rhetoric rarely reflects reality and nowhere is this truer than in clinical practice in the Emergency Department (ED). While Dr. Fee and I agree in theory that EBM should be incorporated more into clinical practice, we disagree about the current overall effectiveness of EBM within the ED.

The scope and depth of research underlying EBM is unable to generate “pure” evidence-based clinical guidelines on even the most well studied clinical questions. Most of us would agree with Dr. Fee when he quotes the Evidence-Based Medicine Working Group, “all medical action of diagnosis, prognosis, and therapy should rely on solid quantitative evidence based on the best of clinical epidemiological research.” Certainly, clinical guidelines, which grade the level of evidence supporting recommendations, allow the integration of the results of multiple randomized studies. It is important, however, to realize two things about these guidelines. First, many of these clinical guidelines contain recommendations that are based on expert consensus opinion, not evidence, as in the class 1C (C stands for consensus) recommendation from the AHA on treating acute coronary syndromes with

nitrites and morphine.^{1,2} While I agree with Dr. Fee's statement, “there are simply too many questions and too many variables to control to realistically expect a RCT to be available to answer every clinically relevant issue,” let's not call this “pure” EBM.

Secondly, the majority of clinical decisions made in the ED don't even approach this level of evidence. At best, most of our decisions would only be supported by 3D recommendations (Dr. Fee's table) or AHA class 2A/B evidence. EBM, as it currently stands, is unable to consistently and appropriately evaluate and integrate evidence from studies other than randomized clinical trials; however, these studies underpin the majority of clinical decisions within the ED.

Furthermore, since the complete set of relevant variables for any clinical condition is unknown, the evidence underlying EBM continues to evolve and change over time. For example, prior to 1997 the majority of trials investigating myocardial ischemia were done on middle-aged white men and suggested that “crushing substernal chest pain” was the primary presenting symptom; however, Goldberg et al. and subsequent investigators have shown that the presenting symptoms for angina in women are substantially different.^{3,4} In fact, in some studies only 43% of women report having chest pain and in most studies the predominant presenting symptom is dyspnea.⁴ While cardiac disease is very well studied,

EBM not only failed to appreciate all of the significant variables which are important in evaluating patients in the ED, but also may have inappropriately excluded patients from randomized controlled trials on myocardial ischemia prior to 1997. Clinician preconceptions will always be part of EBM, just as they are part of “authority-based” medicine, and as a result the evidence (and best evidence-based practice) will continue to evolve.

In fact the number of variables not examined due to perceived patient compliance, drug cost, funding sources, etc., is so extensive as to make EBM difficult to currently translate into actual clinical practice. So while it is clear that antibiotics are not required in housed compliant patients with a low grade fever and bronchitis, it is not clear that the evidence demonstrates they are not required in the same patient who is a homeless alcoholic. Similarly, is single dose azithromycin or 7 days of levofloxacin to treat community-acquired pneumonia superior to 7 days of doxycycline? There is no randomized controlled trial comparing either expensive drug with the relatively cheap doxycycline, because there is no monetary incentive to fund such a study. Yet somehow there are a plethora of “evidence-based” clinical guidelines on the treatment of community-acquired pneumonia using all three of these agents. In the end, competent clinicians need to meld relevant EBM with their clinical experience and common sense to form an appropriate care plan for the individual patient.

I suspect that the areas of agreement for Dr. Fee and I are greater than our disagreements; however, we do have some areas of significant philosophical disagreement. Clearly EBM is a powerful tool to improve clinical care and outcomes within the

Emergency Department; however, I believe the problems currently inherent within EBM demand a continued integration of pathophysiology, anatomy, common sense and clinical experience. Randomized controlled trials can provide elegant answers to narrow clinical questions within narrow subsets of the population, but the answers are difficult to translate to more heterogeneous populations or complex problems. In fact, when specialty societies attempt to answer more general questions with treatment guidelines and ranked evidence, they are often forced to rely on consensus or “authority-based” recommendations. There is nothing wrong with integrating EBM and older “authority-based” teachings and then molding the treatment to fit the individual patient. That is in fact “good clinical practice,” but it is not EBM and shouldn’t be called that.

REFERENCES

1. Gibler WB, CP Cannon, AL Blomkains et al. Practical implementation of the guidelines for unstable angina/non-ST-Segment elevation myocardial infarction in the emergency department. *Annals of Emergency Medicine* 2005;46:185-197.
2. Fesmire FM, Jagoda A. Are we putting the cart ahead of the horse: who determines the standard of care for the management of patients in the emergency department? (Editorial). *Annals of Emergency Medicine* 2005;46:198-200.
3. Goldberg RJ, O’Donnell C, Yarzebski J, Bigelow C, Savageau J and Gore JM. “Clinical investigations: acute ischemic heart disease. *American Heart Journal* 1998;136:189-195.
4. McSweeney JC, Cody M, O’Sullivan P, Elbertson K, Moser DK and Garvin BJ. Women’s early warning symptoms of acute myocardial infarction. *Circulation* 2003;108:2619-2623.