Evidence based medicine: increasing, not dictating, choice

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The systematic synthesis of evidence is the foundation of all medical discoveries and of good clinical practice.

Evidence based medicine is healthcare practice that is based on integrating knowledge gained from the best available research evidence, clinical expertise, and patients' values and circumstances. It is curious, even shocking, that the adjective "evidence based" is needed. The public must wonder on what basis medical decisions are made otherwise. Is it intuition? Magic? The public must also wonder what happens to the research evidence in which they have invested—either directly through taxes or indirectly through buying drugs and other medical products—if it is not guiding clinical practice.

How could something so intuitively obvious to lay people not be similarly viewed by clinicians? And how could this medical milestone be so misunderstood by some? Critics of evidence based medicine worry that it dictates a single "right" way to practise, despite differences among patients; that some self appointed group of "experts" will declare only one type of study to be useful; or that healthcare decisions will be made solely on the basis of costs and cost savings. Giving a name to evidence based medicine and, now, awarding it milestone status could help everyone to realise that it is about making decisions that are based on the best available evidence, not dictating what clinicians do.

Establishing a modern milestone

The term "evidence based medicine" was coined in 1991 by a group at McMaster University, Ontario. It arose from a confluence of events and changes in our culture. These included a growing recognition that:

- The systematic synthesis of all reliable information on a topic has greater value than traditional reviews
- Bias can explain results in many individual studies, and randomised clinical trials are now recognised as the study design that is best suited to avoiding bias in questions of intervention effectiveness, although other types of study may be better for other types of questions
- Tragedy can result from paying attention to poor quality evidence instead of good quality evidence
- Clinicians need information, and they don't get enough from the sources they typically use
The medical literature is growing exponentially, and there is not enough time in the day to read even the good stuff, and

Undesirable gaps and variation in practice exist.

Imagine a world without evidence based medicine. Most women with early breast cancer would still be undergoing mastectomy instead of lumpectomy and radiation. Now they can choose. Many babies born prematurely would still be dying from respiratory distress syndrome, not having the advantage of a mother who took corticosteroids or of being given surfactant themselves. Pregnant women in Boston might still be taking diethylstilbestrol to prevent miscarriage, on the enthusiastic recommendation of well respected local experts, with the result that many of their children would be developing reproductive abnormalities and cancer. A boy with asthma might have his treatment changed every six weeks as new drug samples are dropped off at his doctor's surgery. The choice of drug to help prevent a second fracture in an elderly woman might be made on the basis of television advertisements. Finally, without evidence based medicine, precious health resources might have been spent unnecessarily. In the United States, research into preventing and treating AIDS has cost $30bn (£16bn; €23bn) since 1981. Had the research results not been applied to practice, more than 50% of hospital beds in the US would be filled with AIDS patients, at a cost of $1.4 trillion. Similarly, without the application of cardiovascular research from 1982 to the present, the cost of treating these patients would be 35% higher.

Making the evidence accessible

What is the future for evidence based medicine? The biggest challenge will be getting all clinicians, consumers, policy makers, and other stakeholders on board. We need to help the naysayers to understand what evidence based medicine is and what it isn't. It seems obvious to say that we also need to seek evidence that it is useful. The results of evidence based medicine often clash with the agenda of special interest groups. The challenges created by rich and powerful manufacturers of drugs and devices cannot be overemphasised. Not to be left behind, the industry is developing its own systematic reviews and making them public. We need to alert clinicians and patients to studies showing that reviews sponsored by the industry almost always favour the sponsor's product, whereas those that aren't sponsored by such companies do not. We also need to provide patients and the general public with the tools to enable them to understand and evaluate systematic reviews. Finally, it is not enough to create high quality, evidence based resources: we need to ensure global access to them.

The question has moved beyond "Why is evidence based medicine important?" to "Why is it not already a reality?" and "How can we all work together to make it a reality, quickly?" Evidence based medicine is one of our most important medical milestones because, without it, the other 14 of the BMJ's milestones would not have been implemented.

| Landmark publication that shaped our thinking on evidence based medicine |
|---------------------------|-----------------------------------------------------|
| **1959:** Robert Ledley and Lee Lusted's article in *Science* (1959;130:9-21), |
"Reasoning foundations of medical diagnosis," applied decision theory to medical judgment

1970: *Our Bodies, Ourselves* by the Boston Women's Collective used an evidence based approach to women's health that included the views of consumers. The most recent edition appeared in 2005 (www.ourbodiesourselves.org)

1972: *Effectiveness and Efficiency: Random Reflections on Health Services* by Archie Cochrane promoted the use of scientific evidence to evaluate health services

1977: *Costs, Risks, and Benefits of Surgery*, edited by J Bunker, B Barnes and F Mosteller (Oxford University Press), was a collection of articles that asked how we can get the most from the resources that we allocate to health care. It drew particular attention to the lack of evidence for surgical procedures

1979: The Canadian Task Force on the Periodic Health Examination published its first clinical practice guidelines on prevention. The Canadian Ministries of Health initiated the task force in 1976 to review evidence for the prevention of various conditions, with the guiding principle that evidence takes precedence over consensus (www.ctfphc.org). This first set of guidelines covered 78 conditions and recommended that annual check-ups be replaced with age specific "health protection packages"

1981: *CMAJ*, the journal of the Canadian Medical Association, published a series of articles by clinical epidemiologists at McMaster University on how to critically read the medical literature

1987: Cynthia Mulrow reported on the poor quality of traditional literature reviews in "The medical review article: state of the science" (*Annals of Internal Medicine* 1987;106:485-8). The study led to calls for a scientific approach similar to that used for reports of primary research

1990: Patricia Crowley and colleagues published a systematic review showing the beneficial effect on babies of giving corticosteroids to mothers who were about to deliver preterm (*British Journal of Obstetrics and Gynaecology* 1990;97:11-25)

1989 and 1992: *Effective Care in Pregnancy and Childbirth* (by I Chalmers, M Enkin, and M Keirse) and then *Effective Newborn Care* (by J Sinclair and M Bracken), which were based on systematic reviews of the evidence, were published by Oxford University Press. Details of the most recent editions are at www.childbirthconnection.org

1992: Deborah Cook and colleagues produce one of the first articles describing critical care practitioners' use of evidence based medicine (*Journal of Intensive Care Medicine* 1992;7:275-82)


Competing interests: KD is director of the US Cochrane Center. LAB is co-director of the San Francisco branch of the US Cochrane Center.