

EBM NOTEBOOK

Transferring evidence from research into practice: 1. The role of clinical care research evidence in clinical decisions*

There is within medicine, somewhere beneath the pessimism and discouragement resulting from the disarray of the health care system and its stupendous cost, an undercurrent of almost outrageous optimism about what may lie ahead for the treatment of human disease if only we can keep learning.

—Lewis Thomas (1)

If Lewis Thomas was concerned about the disarray and cost of the health care system when he made this statement in 1979, he would be truly dismayed today. If he felt outrageous optimism then about the value of continuing learning, surely his optimism would have been dampened with each passing year by the increasing volume of new knowledge and the push for doctors to do more administrative tasks and to see more patients in less time than ever before. Yet, spurred on by 5 decades of unprecedented public and private investment, biomedical research has never been more productive of clinically important evidence than it is now. How tragic it would be if we lost our optimism for learning and applying new knowledge to clinical care just when we most need that knowledge to offset the adverse effects of resource slashes that are being made to control the stupendous cost of health care.

Evidence-based health care is a movement initiated by a broad coalition of clinicians, researchers, educators, policy makers, and many others to accelerate and improve the application of evidence from sound clinical care research to clinical practice (2). (Evidence-based medicine is a subset of evidence-based health care.) Evidence-based health care is new enough to be misunderstood (by practitioners who worry that it might be “cookbook” medicine or, conversely, that they have

been doing it all along [3]) and potent enough to be abused (by administrators and corporate executives who value the balance sheet above patients and practitioners). In this series, we will portray a model for evidence-based medical care that depicts each of the necessary steps, from evidence to practice, and describes the resources that are available to assist with each step. These steps include getting the research evidence straight; developing clinical policies that seek the best match between research evidence and the clinical circumstances in which we must practice; and then applying the research evidence to individual patients in the right way, place, and time (4). We begin the series with a definition of evidence-based medicine and a simple model for evidence-based decision-making.

Definition

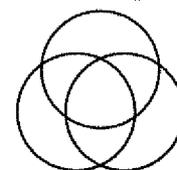
Evidence-based medicine is the conscientious and judicious use of current best evidence from clinical care research in the management of individual patients (5).

This definition is evolving and will continue to be refined (nitpickers, please note!). The key terms *conscientious*, *judicious use*, and *current best evidence from clinical care research* call for high standards for practitioners of evidence-based medicine. *Conscientious* means that evidence is applied consistently to each patient for whom it is relevant. *Judicious use* calls for the incorporation of clinical expertise that balances the risks and benefits of diagnostic tests and alternative treatments for each patient and takes into account his or her unique clinical circumstances, including baseline risk and comorbid conditions, and preferences (see below). Those who decry evidence-based

medicine as cookbook medicine ignore this part of the definition of the term. Finally, *current best evidence from clinical care research* means that practitioners must be able to discern current best evidence from the full spectrum of studies of the care of patients (“critical appraisal”) and to provide themselves with very quick access to dependable, up-to-date sources of information in which the link with research evidence is explicit and honest.

An important symbiosis exists between evidence from clinical care research and evidence from research into the basic nature of health disorders. Studies in the laboratory and preliminary investigations in humans form the foundation of our knowledge about clinical problems and provide the groundwork for most diagnostic procedures and clinical interventions. To determine whether these inventions and insights do more good than harm, however, systematic studies of their application in clinical settings are needed. Evidence-based medicine focuses on these systematic studies simply because they represent the most advanced stages of testing to ascertain whether the innovations of basic science work, how well they work, and for whom they work when applied in the clinical setting. Thus, evidence-based medicine is not in com-

Clinical Expertise



Research Evidence Patient Preferences

Figure. A model for evidence-based clinical decisions.

petition with basic science; rather it depends on it and builds on it.

The figure shows a simple model for clinical decisions with 3 components that might bear on the management of the patient's problems: *clinical expertise*, *patient preferences* for alternative forms of care, and *clinical research evidence*. We note from the outset that potentially more powerful decision-making models exist (6) but must report that these models currently lack practical application for most clinical decisions. It is important to note that clinical expertise and patient preferences may override the other components of the model for a given decision. For example, clinical expertise must prevail if the clinician decides that the patient is too frail to have a surgical procedure that is otherwise best for his condition, and the patient's preference will dominate when she declines a treatment that clinical circumstances and research evidence indicate is best for her condition.

Clinical expertise

Clinical expertise is needed to assess the patient's problem: what is wrong, how severe it is, what comorbid conditions exist, and so on. In professional training and beyond, we learn the basic mechanisms of disease and pathophysiology and acquire skills in history taking, physical examination, diagnostic testing, and prescribing treatment. We then hone these skills by accumulating clinical expertise through observing the correlates and consequences of our actions in dealing with many patients. Although some clinical decisions are so simple that they can be done at least as well by machines (7, 8), many elements of clinical assessment and management require both the advanced knowledge that medical education provides and the expertise that comes with experience and cannot be replicated even by very sophisticated computer programs

(9). Evidence from research can help to perfect that expertise (10) but cannot do the examination, let alone sort through the welter of information, both quantitative and qualitative, that practitioners collect, even in the first few moments of the clinical encounter. Clinical expertise is the crucial element that separates evidence-based medicine from cookbook medicine and the mindless application of rules and guidelines.

Patient preferences

Patients have always exercised their preferences for care by seeking second opinions, choosing alternative therapies, preparing advance directives, and adhering or not adhering to prescribed treatments (11). (Clinicians should not be surprised at this self-reliance: We often direct our own care when we become ill, with both good and bad consequences!) Moreover, today's patients have greater access to clinical information than ever before, and some become more knowledgeable about their conditions than their practitioners. Although the patient's role in clinical decisions is usually not formalized and is sometimes overridden or ignored by practitioners, it is nevertheless an important component in most decisions, particularly with self-administered treatments. The importance of patient preferences is recognized in the emerging discipline of evidence-based patient choice, an approach to decision-making that deserves its own discussion (12).

Evidence from clinical care research

Advances in clinical care in the past 30 years have been astonishing: A host of lethal or limiting acute and chronic conditions are now becoming avoidable or at least much more manageable, including many types of cancer and the complications of premature

birth, hypertension, diabetes mellitus, myocardial infarction, congestive heart failure, and peptic ulcer. No credible commentators deny that sound evidence from research must be an integral part of clinical decision-making. But how well is sound evidence from research incorporated into clinical decisions in practice? Not nearly as well as might be hoped. It took more than a decade after the appearance of unassailable evidence on the life-sparing value of thrombolytic therapy in acute myocardial infarction for it to be broadly accepted (13), and many institutions are still struggling with implementation. Studies show that the treatments that patients receive often reflect what the practitioner remembers from formal training rather than on current best treatment (14, 15), a fact that lends testimony to the ready admission of practitioners that they feel overwhelmed by the clinical literature (16). The critical question surrounding evidence-based medicine is not whether research evidence should play a role in clinical decisions—of course it should. Rather, the question is how to establish this role effectively and efficiently. The challenge of integrating individual clinical expertise with current best evidence from systematic research is complex and goes far beyond overcoming the difficulties of keeping up to date. The subsequent essays in this series will describe how evidence-based medicine addresses the 3 challenges of getting the evidence straight, of developing clinical policies that fairly balance research evidence with the realities of clinical practice, and of applying these policies in the right way.

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Journals Reviewed for This Issue

Core Journals

Am J Med	Arch Gen Psychiatry	Circulation	J Intern Med
Am J Obstet Gynecol	Arch Intern Med	Clin Pediatr	J Neurol Neurosurg Psychiatry
Am J Psychiatry	Arch Pediatr Adolesc Med	Cochrane DB Sys Rev	J Pediatr
Am J Surg	Arch Surg	Diabetes Care	J Vasc Surg
Anaesthesia	Arthritis Rheum	Hypertension	Lancet
Anaesth Analg	BMJ	JAMA	N Engl J Med
Anesthesiology	Br J Gen Pract	J Am Board Fam Pract	Obstet Gynecol
Ann Intern Med	Br J Obstet Gynaecol	J Am Coll Surg	Pediatrics
Ann Surg	Br J Surg	J Gen Intern Med	Surgery

Journals for Continuing Review

Acta Obstet Gynecol Scand	Arch Neurol	Eff Health Care	J Fam Pract
Age Ageing	Br J Dermatol	Fertil Steril	J Infect Dis
Am J Cardiol	Br J Psychiatry	Gastroenterology	J Reprod Med
Am J Gastroenterol	Br J Rheumatol	Gut	Med Care
Am J Public Health	Can Fam Phys	Heart (formerly Br Heart J)	Med J Aust
Am J Respir Crit Care Med	Can Med Assoc J	J Am Acad Dermatol	Neurology
Ann Emerg Med	Chest	J Am Coll Cardiol	Spine
Ann Med	Clin Invest Med	J Am Geriatr Soc	Stroke
Arch Fam Med	Crit Care Med	J Clin Epidemiol	Thorax