quality research will continue indefinitely, requiring considerable investment by funding agencies all over the world. The process of summarising that evidence is daunting. Estimates based on current rates of publication of randomised trials and completion of systematic reviews indicate that it would take reviewers until 2015 to produce the 10 000 Cochrane reviews required to summarise existing evidence.[5] Clinicians will also need new reviews and updates for the many thousands of trials completed each year and for observational studies concerning diagnosis, clinical prediction, and harm.

Evidence based medicine's biggest future challenge is one of knowledge translation, ensuring that clinicians base their day to day decision making on the right principles and on current best evidence. All too often clinicians are unaware of the available evidence or fail to apply it. Because clinicians' values often differ from those of patients,[6] even those who are aware of the evidence risk making the wrong recommendations if they do not involve patients in the decision making process.

One solution is to replace traditional sources of medical information that are unsystematic or quickly outdated. In the past five years many new resources have been developed to facilitate rapid access to the best evidence on a wide array of clinical problems. For most medical decisions, these preprocessed sources of high quality evidence surpass databases such as Medline. Other approaches to encouraging evidence based practice include computer systems for decision support that can incorporate reminders, directives, and incentives, as well as audit and feedback.

Ensuring decisions are consistent with patient values is even more challenging. With which patients should clinicians discuss personal values, and for which should they present the likely outcomes of different courses of action so that patients' values will be manifest in their decisions?[7] How can clinicians quickly and accurately ascertain patients' values? And how should they convey efficiently complex information that includes appreciable uncertainty? Clinicians often barely have time to do the necessary history and physical examination.

Investigators have begun to address these dilemmas. One strategy is to offer graded recommendations that identify decisions in which the trade offs between benefits and risks are clear and for which virtually all patients who understood the evidence would make the same choice.[8] A guidelines panel for the American College of Chest Physicians has used such an approach in developing recommendations for antithrombotic therapy including, for instance, recommendations concerning prophylaxis against deep venous thrombosis.[9]

Many important decisions will, however, remain sensitive to patients' values and preferences. Decision aids that provide structured presentations of options and outcomes for conditions such as breast cancer, for modifying cardiovascular risk, and for preventing stroke offer one approach. Decision aids increase knowledge, increase the proportion of patients with realistic perceptions of the chances of benefits, and improve agreement between patients' values and choices.[10]

While this research and innovation represents an encouraging start, appropriate incorporation of evidence and values in all clinical decision making remains a distant goal. Evidence based medicine has come a long way, but the remaining challenges suggest that its second decade will be as exciting as the first.

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# The essence of EBM

*Practising what we teach remains a big challenge*

Two roads diverged in a yellow wood,
And sorry I could not travel both . . . .

Robert Frost

When Frost pondered these two roads, he did not call for a randomised controlled trial. Life is about chance, and that goes for medicine too. Clinicians know that sometimes the best we can do is make our decision, hope it will have made all the difference, and not pine away about the road not taken. Today, as medicine lurches down the road to an evidence based world view, do we know where we are going? Should we turn back?

Even well intentioned supporters ask what's the "E" for evidence based medicine (EBM)?[1] Its most basic assumptions are unproved, indeed largely untested. For example, we do not know whether "convincing information leads to optimal decision making."[2] Nor do we know whether most healthcare professionals "base their decisions on the best evidence." As Frost wrote about another wood, EBM has miles to go, and promises to keep.

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One problem is the lack of consensus and clarity about what EBM is. Experts have explained well what EBM is not.[3] It is not a clearing house for cookbooks. Nor is it something we have been doing all along, repackaged to look new. It is not a Trojan horse, built by cunning cost cutters to infiltrate and then kill the autonomy of doctors. Neither is it a power grab by academicians bent on questioning the "proficiency and judgment that individual clinicians acquire through clinical experience."[3] EBM is a conflation of three distinctive essences: an epochal scientific hypothesis; an ever evolving body of evidence; and an idealised professional process—a way of practising medicine. Whether we come to bury EBM or praise it, we must be clear about what we mean.

Few would disown the EBM hypothesis—providing evidence based clinical interventions will result in better outcomes for patients, on average, than providing non-evidence based interventions. This remains hypothetical only because, as a general proposition, it cannot be proved empirically. But anyone in medicine today who does not believe it is in the wrong business. Commitment to this idea is what some clinicians have in mind when they insist that they have been "doing" EBM for decades. Fair enough, in a limited sense. But these folks, deep into Frost's yellow wood, are missing the forest for the trees: clinical medicine, long considered more art than science, is becoming the opposite. This is a noteworthy change, and EBM enthusiasts deserve much of the credit for it.

Muir Gray captured the second essence of EBM when he proposed that it is about doing the right things right for the right people at the right time.[4] Critics ask—what are these "right things" and who decides? We should avoid getting bogged down in the complexity of all this because in medicine good science is not the sole determinant of the right things to do. Political, economic, and sociocultural considerations sometimes trump the scientific ones. In the United States, for example, patients' empowerment, corporate profiteering, immature information systems, and the growing gap between rich and poor complicate the translation of strong evidence into practice. In other countries, different factors may influence which care is right for which people and when.[2 5] In a very real sense, all health care is local—even evidence based health care—and this makes the right things more challenging to do.

But these challenges, and others highlighted by Guyatt et al (p 990) and Straus and Jones (p 987) in this issue, must not deter us. We should start with what we know. After all, in many areas of medicine, the evidence is in. Some systematic literature reviews describe evidence so compelling that the right thing to do is clear. For example, elderly people should receive influenza vaccination.[6] But we must also stand up for what we know. EBM supporters have been timid in their advocacy of such right things, overly cautious about shouting from the pulpit, "This (or that) should be done." No doubt some caution is warranted, given the inherent uncertainty of scientific evidence, the selective reporting of clinical trials,[7] and the potential harms of being wrong about what is right. But what passes today for the standards of clinical care—thousands of practice guidelines, often conflicting, sometimes disreputable, always a mixture of opinions and biases (and, sometimes, evidence)—is a mess. Purveyors of systematic reviews can begin to reverse this trend by promoting practice recommendations instead: a frequently updated compendium of all (and only) those clinical practices whose evidence of benefit is undisputed. Oversight of this new effort will be essential, including an imprimatur of objectivity (granted perhaps by bodies such as the National Institute for Clinical Excellence in the United Kingdom or, in the United States, the Institute of Medicine). If this is done well, many healthcare professionals, goaded by unimpeachable evidence, will try harder to translate it into practice. If so, lives will be saved, and we will know we are on the right road.

But it is the third essence of EBM—the process of practising it—that we understand least and spar about most. Many of us teach EBM (integrating best evidence with clinical expertise and patient values) knowing that it is nearly impossible to practise it in everyday clinical care.[8–10] This makes sense because someday practising EBM will be feasible—when technology for searching literature improves (soon) and when all of us are more EBM facile (not so soon). But we should not promote the practice of EBM until we know whether the process itself improves patients' care. Improves? Compared with what? In our laudable compulsion to translate more and better research faster into clinical practice, we should keep in mind that mortality rates for many diseases have dropped dramatically in the past few decades—for example, a 50% decline in cardiovascular deaths in the United States.[11] So someone must be doing something right. But who and how? The great irony about promoting the practice of EBM in the future is that we know so little about how clinicians practise medicine in the present.[10 12] We need to find this out, if only to establish credible comparison groups for the experiments that must be done. When this research is done, one thing seems certain: at least some of us will feel good about the road we have taken.

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