

EDITORIAL INTRODUCTION AND COMMENTARY

Medicine and evidence: knowledge and action in clinical practiceAndrew Miles MSc MPhil PhD,¹ Michael Loughlin PhD² and Andreas Polychronis MB PhD MRCP³

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Introduction

This issue of the *Journal of Evaluation in Clinical Practice* is the 10th Thematic Edition charting the evolution and development of the evidence-based healthcare debate [1–10]. Through it, we contribute a further and substantial set of scholarly articles to the international medical literature, with the aim of improving clinical and scientific understanding of the nature of evidence for clinical practice and how such evidence, properly defined, gathered and understood, can be directly employed as part of the working knowledge necessary for the making of sound clinical decisions by the 'good doctor', acting with and for his individual patient.

The *Journal* has gained a pre-eminent international reputation for ensuring that the concepts and precepts of the EBM movement, given their extraordinary nature and profound implications for the exercise of effective clinical practice, remain subject to intensive intellectual and clinical inquiry. In having taken this approach over some 13 academic volumes of publication, the JECP has not only contributed substantially to the EBM debate, but has also actively shaped it, having had a major effect on its claims and direction. The journal's work in this context will move forward with increasing vigour through 2008 and beyond, with the aim of leading the international debate towards an intellectual resolution of the many illogicalities and inconsistencies of EBM which continue to remain clearly in evidence.

In the editorial introduction to the previous thematic edition [10] we remarked upon the one-sided nature of the EBM 'debate'

in mainstream medical literature, the predominance of 'pro-EBM' viewpoints and the increasingly marginalised nature of any criticism of EBM. We invited anyone who believed this debate to have now been 'settled' to write to us explaining the precise time and manner of its intellectual resolution. As yet we have received no reply, yet the ever-expanding EBM literature remains awash with references to the undoubted superiority of the EBM 'approach', 'paradigm', 'methodology', 'philosophy', 'system' and 'process' (all of these terms were used to characterise the nature or 'essence' of EBM in *the same paper* [109] by an EBM protagonist), with bald assertions to the effect that it is 'unquestionably the right approach to follow in medicine, wherever and whenever possible', 'the only way to view medicine in the near future' [109], the 'only game in town' and 'here to stay' [107], and assertions that 'anyone in medicine today who does not believe it is in the wrong business' [110]. Such claims are sometimes accompanied by those of a moral nature; for example, that it is 'blameworthy not to bend one's knee' at the 'altar' of EBM, because 'science and morality are linked' [111] and there are even references to 'evidence-based ethics', where moral principles are enunciated on the absolute requirement to use 'best evidence' as understood by exponents of EBM [112].

Where, we ask, outside of the pages of this journal, is the serious and penetrating interrogation of such claims? Where is the debate? Why do authors who attempt to articulate fundamental criticisms of EBM find it difficult to publish in mainstream medical media [78]? Amongst the rhetorical barrage, the perpetual references to the latest 'advances' in EBM thinking and practice,

we find little or no attempt on the part of EBM enthusiasts to justify, or even to explain in any detail, its underlying assumptions: about the nature of science, rationality and evidence itself and how these key concepts may be put to work in the formulation of any defensible view about proper medical practice [10]. EBM has become the dominant *ideology* of medical discourse [10,108]. Its defenders, treating their own basic assumptions as far too obvious to require any clear explanation or defence, have come to regard any form of disagreement as evidence that the dissenter has not understood – hence their magisterial disdain of criticism and their typical refusal to engage in formal intellectual exchange, a posture which we have previously described as both unscientific and anti-scientific [10]. When the failure to agree is automatically treated as symptomatic of both intellectual and moral corruption, the ground is prepared for dogmatism and intolerance, for the sort of ‘education’ that might reasonably be confused with indoctrination [108].

This has acted as a trigger for the development of more ‘EBM training’, more practice guidelines and the tools with which to measure ‘compliance’ with them, and still more applications to governments for the funding of activities, rather than to independent medical and scientific funding councils – an observation and its implications to which we will return later in this article. Yet despite the energy and enthusiasm of EBM advocates and the support of their work by politicians and their advisers, EBM has achieved nothing like the degree of automatic acceptance by practising clinicians that it set out to achieve. It is usually reported that most clinicians will confirm their interest in and acceptance of some of its principles if specifically asked for their opinion, though in an environment where it is tacitly understood what a ‘reasonable’ practitioner should say, the significance of this observation requires some interpretation. Indeed, real measures of ‘commitment’ to EBM, such as a working knowledge of EBM terminology, the use of practice guidelines and frequent consultations of the Cochrane database, illustrate a very different picture of clinicians’ judgements and practices.

While some researchers (including authors whose contributions we are happy to include in this journal [43,49,50,54–60]) might be inclined to see the work of research as identifying and (in some cases) considering ways to solve this ‘problem’ for the implementation of EBM, it is surely appropriate, in the interests of open debate about a matter of profound import for the future of medical practice, to raise also the more fundamental, philosophical question of how we characterise ‘the problem’ here. It is at least possible to argue that the real problem is the attempted imposition of a set of dogmas and practices upon a working population, in the absence of any demonstration of its benefits, the truth of its key claims nor even a detailed and consistent exposition of their meaning.

Medical epistemology – the systematic study of medical knowledge to discover its nature, basis and the conditions, possibilities and limitations of its application in practice – is hardly a new area of enquiry. (Consider ancient ruminations on the extent to which medicine is a science and an art – questions that are still the topic of journal papers today.) Nor can its central questions plausibly be claimed to have been given a decisive answer. For EBM to be meaningfully described as a ‘paradigm’ (let alone the ‘dominant’ paradigm in medicine) it would need to have developed a detailed theoretical structure with explanatory power and substantial empirical corroboration. This is elementary philosophy of science,

and while it could be supported with reference to Kuhn [95], it strikes us as barely requiring a reference, any more than the claim that humans have hearts requires an established medical source.

Some fifteen years after its inception, EBM remains a practice bereft of a clear theoretical foundation, in a state of constant flux with regard to its definitions of itself and not infrequently revising old methodologies in favour of new ones. Its adherents freely and frequently admit that it is unable to provide any proof, in accordance with its own evidentiary systems, that EBM produces superior clinical outcomes over what is typically and disparagingly described by the EBM community as ‘traditional’ Medicine [25,107,109,111]. It continues to insist that it cannot be used to contain healthcare costs and limit the care of individuals, even as governments and healthcare systems are increasingly convinced of (indeed, *impressed by*) its ability to do so. Its advocates now admit that EBM does have limitations, but they have refrained from a proper listing of them, let alone a systematic addressing of the same.

Fifteen years is not a long time in intellectual history. It is easy for researchers to become so engulfed by whatever is ‘current’ in their field that they lose a sense of their place in history and the contingency of academic fashions, which are as often dictated by economic and social factors as by experiment, analysis and sound rational argument [108]. Far from having been settled, we contend that the most pressing, intellectually demanding and practically challenging questions of medical epistemology remain open. This is why we welcome not only contributions from within the EBM camp [43,49,50,60], but also from those whose concern is not to see how well EBM is being *implemented* but to question, in a variety of different and sometimes incompatible ways, *whether it can and should be implemented at all*. If this position seems radical or eccentric to some then they need to examine their own expectations about the nature and scope of proper academic debate: for how can it be eccentric to promote open and rigorous debate of unresolved and fundamental questions that promise to shape our conceptions of medical knowledge and practice in future? Is this not the *raison d’être* of any serious academic journal?

In the pages to follow we therefore present a sustained examination and discussion of alternative positions in medical epistemology [24,41,48] and the philosophy of medicine [30–35] that question the fundamental assumptions of EBM, as well as discussions of critical thinking and its relationship both to EBM and to good practice in general [45,46]. The debate must continue. It must be wide-ranging and not delimited by commercial interests, political constraints or ideology [10]. The *Journal of Evaluation in Clinical Practice* is gratified to assist its progress by contributing in the current Thematic Issue, some 36 papers on the subject of EBM for international study, assimilation and use.

Advancing a casuistic model of clinical decision making

The 9th Thematic Edition featured an important piece by Tonelli outlining a thesis on methods, alternative to EBM, for the integration of evidence into clinical practice [11], upon which the *Journal* commissioned twelve commentaries from a wide variety of intellectual sources [12–23]. In direct response to his commentators Tonelli contributes the first article of this edition, which sets out to

develop his earlier casuistic model of clinical decision making by advancing a refinement of his argument with reference to the content of those substantive analyses [24]. While Tonelli finds himself in agreement with much of what his commentators advance, he is unable to cede certain core precepts which he continues to regard as fundamental to his casuistic model. He acknowledges the point made by Geanellos and Wilson, that the complexity and inherent inequity in the relationship between patients and clinicians means that it is impossible neatly to categorize into goals and values all of the important factors and characteristics of a particular patient seeking care [22]. Tonelli nevertheless remains convinced that his casuistic model is able to embrace the complexity of individuals and of human relationships with much greater ease than EBM approaches, which attempt to convert these features into quantifiable patient ‘utilities’ [25]. We agree with Tonelli that a careful examination of his model does in fact illustrate its basic capacity to ‘unpack and expand’ the elements which relate to patient values and preferences, to allow for these and other complexities of the individual patient to be properly considered. As he points out, the protagonists of EBM have developed no such tool to date which has, or purports to, replace the skills of the compassionate and inquisitive clinician in best understanding the needs and personal context of the individual patient. Such ‘personal context’ must of its nature encompass the social setting in which the clinical encounter takes place. Responding to Malterud’s observations [20], Tonelli is clear that in his view the casuistic model can and does accommodate this central factor – and far more so than current EBM-inspired models. He goes on to provide an explanation, in overview, of precisely how this can be achieved.

Beyond ‘evidence’ – the appeal to non-evidentiary warrants

The most consistent and recurring criticism within the set of twelve commentaries [12–23] related not to the completeness of the topics, but rather to whether potential warrants under each topic constituted ‘evidence’ or not. The contention here was expressed in both epistemic and pragmatic terms. It derived from Tonelli’s demarcation between, on the one hand, the empirical results from clinical research and systematic formulation of clinical experience (which he describes as ‘evidence’) and on the other hand warrants relating to principles of physiology, patient goals and values – or the system in which clinical care is provided (which he describes as ‘non-evidentiary’). In acknowledging the immediately controversial nature of this ‘division’, Tonelli explains the basis of his distinction as having been made specifically in order to ‘draw a bright line between EBM and its alternatives, highlighting the self-referential focus on a narrowly defined understanding of evidence within the EBM community’. It is as part of this same strategy that Tonelli asserts as ‘non-evidentiary’ the status of other (and legitimate) forms of medical knowledge such as pathophysiological principles – as an attempt to counter their incorporation into the EBM model, where they would immediately be subjugated to the ‘tyranny of data’.

A similar concern leads Tonelli to caution against the suggestion put forward by Tanenbaum [16], that evidence can be generated from within any of the five topics by conducting relevant empirical research: for example, on patients’ goals and prefer-

ences in order to synthesize knowledge with a degree of generalizability sufficient to allow it to be considered for clinical decisions. This, Tonelli fears, may re-inforce, rather than counter, the erroneous notions of the EBM model which continue to insist on the fundamental primacy of empirical evidence. Indeed, notwithstanding such an approach, there would still remain the other ‘non-evidentiary’ factors: *the goals and values of the given particular, individual patient*, and the unsystematic experience of the particular, individual clinician. By allowing EBM to claim that some empirical evidence available to aid clinical decision making is derived from each of the topic areas, one risks a further devaluation of the remaining and much more personal aspects of the potential warrants. Tonelli has related concerns in assimilating Gupta’s thinking [21] and, with all of the commentaries having been considered, his firm view is that there are real risks in abandoning a defence of the ‘non-evidentiary’. As Tonelli points out, defining all potential warrants for clinical decision making in the casuistic model as ‘evidence’ allows not only the continued rejection of the authentically personal and individual, but it also strengthens ongoing efforts to structure hierarchies of evidence that demote and devalue evidence derived from anything other than rigorously conducted, journal-published, clinical research. It seems certain that within such hierarchical structures, evidence from sources other than such studies is acknowledged as of value or use only when evidence given higher standing remains unavailable.

Tonelli recognises that while advancing a claim to a broader view of evidence has the advantage of gaining the casuistic and other such models of clinical decision making an ‘acceptability’ and ‘prominence’ now (both in terms of medical education and also health policy), a sacrifice of the ‘non-evidentiary’, though possibly representing a pragmatic concession, would be intellectually unwise. Tonelli is equally concerned to clarify that the casuistic model does not necessarily conflate evidence with decision making, a concern that Djulbegovic had expressed [12]. Rather, he makes clear that the casuistic model (variously applied in different specialties) explicitly recognises that evidence, even when understood in its broader sense, is never determinative [26]. Thus, the casuistic understanding of clinical decision making necessarily recognises that just as the process of arriving at the assessment of the truth of an inference is fraught with uncertainty [27], every casuistic decision can only probabilistically represent the ‘right’ course of action.

A way forward?

We agree with Tonelli that there is an *essential* relationship (though clearly a difference) between advancing a thesis on the philosophical basis of medicine and the making of a clinical decision and in taking the approach to the EBM debate that he has done. Tonelli has contributed much to illustrate the inherent weaknesses of EBM and to illuminate ways forward. Tonelli’s particular focus on epistemic underpinnings and decision making at the bedside should not therefore be viewed as reductionist in itself but, in our view, represents necessary concentration on those areas of intellectual inquiry and clinical understanding that have typically and woefully been absent from EBM debates [10]. Our own sense is that while Tonelli’s article has stimulated vigorous and highly valuable debate [11–24,26,28,29], the debate on what exactly con-

stitutes evidence for clinical decision making remains far from intellectual resolution and that a great deal more academic and clinical exchange will be necessary before any meaningful consensus can be synthesized to act as a platform on which a deeper understanding of 'sound' clinical decision making can proceed. The casuistic model advanced by Tonelli should in our own view be actively built upon with the aim of stimulating further philosophical and clinical inquiry. Tonelli himself notes, as will the astute reader, that there is now a pressing need to 'unpack' the topics and to develop a more detailed understanding of the relationship between knowledge, warrants and decisions. Suggestions of how this work might commence have already been advanced in thoughtful commentaries by Upshur [18] and Buetow [23]. For his part, the Editor has already consulted on Tonelli's current work [24] with each of his previous commentators, two of whom contribute further suggestions in the present issue [28,29].

For our part, we wholeheartedly agree with Tonelli that the 'importance and use of argument and analogy in clinical decision making requires further examination and defence'. While this is most certainly a demanding task under the repressive, anti-intellectual conditions for debate that the protagonists of EBM have created [10], it is not only worthwhile, but as Tonelli recognises, essential in working towards the optimal practice of clinical medicine.

Intellectual integrity under the regime of 'evidence' and 'best practices': EBM, bad faith and 'microfascism'

We now move to the next major article in the current Thematic Edition [30] and its associated commissioned commentaries [31–34]. Like Tonelli's article, the piece by Murray and his colleagues [30] has been synthesized in response to major commentary on an earlier publication [35].

The authors had constructed that article by drawing in part on the philosophical writings of Deleuze, Guattari and Foucault to illustrate that the evidence-based movement in the health sciences is 'outrageously exclusionary and dangerously normative with regards to scientific knowledge'. From this position, they were able to assert that the evidence-based movement in health sciences constituted a 'good example of microfascism at play in the contemporary scientific arena' and identified the Cochrane Collaboration as having created a hierarchy of evidence and thought, now endorsed by a plethora of academic organisations, which actively excludes certain forms of research from scientific and clinical inquiry. Labelling the evidence-based healthcare movement vividly as a 'regime of truth', Holmes and his colleagues [35] insisted that scholars have not only a scientific duty, but also an ethical obligation, to deconstruct such regimes of power.

The authors designed their intervention as a 'productive misapplication' of sorts [35] and they achieved what many critics before them had failed to achieve, in provoking a swift response from the 'EBM community'. Indeed, their argument that a theoretical discussion on truth, power and political fascism had the potential to provide a valuable insight into the impact and influence of the evidence-based healthcare movement met with an extraordinary level of reaction within both the popular as well as the scientific press. Unfortunately, the greater part of this discourse was characterised more by vacuity than insight.

Following an invitation from the Editor of the JECP to develop their thinking in the light of such responses, Murray, Holmes, Perron and Rail [30] return in this Thematic Issue to the debate on inappropriate power structures in the health sciences. Have we arrived at an impasse in the health sciences? Has the regime of 'evidence' coupled with corporate models of accountability and best practices led to an inexorable decline in innovation, scholarship and actual health care? Would it be fair to speak of a methodological fundamentalism, a totalising ideology from which there is no escape? These are the pivotal questions with which the authors open the article *No exit? Intellectual integrity under the regime of 'evidence' and 'best-practices'* [30]. Their use of the question 'No exit?' alludes to Jean-Paul Sartre's play of this name and to his discussions of *mauvaise foi* or 'bad faith'.

Murray and colleagues argue that clinicians and researchers who adopt evidence-based practices in line with officially sanctioned dogma but in the striking absence of a persuasive intellectual rationale, act in 'bad faith', denying their status as autonomous thinkers and agents with the associated responsibility such a status entails. Autonomous thinking and practice require 'critique' – systematic reflection upon the conditions of knowledge and truth. By eschewing critique in this sense, the faithful devotee of EBM fails to think or act authentically and with intellectual integrity, forsaking scientific rigour and honest inquiry for the simple gratifications of ideology, greed, routinisation and efficiency. As such he acts on the basis of 'a peculiar type of evidence – non persuasive evidence'. Although at some level he knows the truth, he instead chooses to turn from it and to adopt a posture of defence, often from a moralistic vantage, remaining deliberately impervious to persuasive evidence in order to remain faithful to his worldview. The authors position themselves against those who have, by initial hubris and later stealth, achieved control of the terms by which the public understands 'integrity' and 'truth'.

For Loughlin [31], the first of four commentators invited to review Murray *et al.*'s article, the response of the EBM community to their work [30,35] proves their point more effectively than the arguments advanced in their papers (not that he is critical of the latter). Noting that all practice embodies theoretical assumptions of some sort, he argues that a refusal to engage in learned argument on the theoretical foundation of one's practice represents nothing more than the intellectually arbitrary stipulation that one's own assumptions are to be accepted without argument.

In considering the nature and scale of the responses to Murray *et al.*'s previous work [35], Loughlin is concerned not only with the 'shameless stupidity' of those responses but also with the sheer cynicism of those who generated them. Loughlin identifies Goldacre [36] as a particularly luminous example of a commentator who is able not only to combine audacity with outrage, but who in a very real way succeeds in manufacturing a sense of having been personally offended by the article in question. Such moralistic posturing acts as a defence mechanism to protect cherished assumptions from rational scrutiny and indeed to enable adherents to appropriate the 'moral high ground', as well as the language of 'reason' and 'science' as the exclusive property of their own favoured approaches. Loughlin brings out the Orwellian nature of this manoeuvre and identifies a significant implication.

If Goldacre and others really are engaged in posturing then their primary offence, at least according to the Sartrean perspective adopted by Murray *et al.* is not primarily intellectual, but rather it

is moral. Far from there being a moral requirement to 'bend a knee' at the EBM altar, to do so is to violate one's primary duty as an autonomous being. So we seem to have here the basis for an alternative to the emerging 'evidence-based ethics'. We might label this move the replacement of an *ethics of compliance* with an *ethics of authentic practice*. The difference between the two is that, at present, no-one has offered any valid arguments for the former, while there is a lengthy philosophical history to defences of the latter.

If Loughlin is correct in advancing such an hypothesis, then Goldacre does indeed function well as an example of what Murray and associates [30] discuss in terms of the Sartrean idea of 'bad faith'. Importantly, the nature of the exchange that has taken place provides a riposte to those who claim that the ideas of philosophers like Sartre provide us with no insight into 'real life' questions. For Loughlin, we cannot 'do without' the concept of 'bad faith' if we are to understand the EBM movement. Readers will see that Loughlin [31] has thrown down the gauntlet, issuing in these pages a challenge to Goldacre and other such EBM apologists. Here, he invites them carefully to study the arguments laid out by Murray and colleagues [30,35] and others [10] and to ruminate as to why these colleagues, who qualify for the label 'rational beings', can nevertheless fail to agree completely with EBM's assumptions about the meaning of 'evidence' in medicine and 'rationality' in scientific practice. Consider, Loughlin invites them, the *possibility* that someone could disagree with you without thereby qualifying as either stupid or insane. Do an old fashioned exercise in analysis, to try to identify the structure of the arguments that you reject, explain the premises, the conclusions and the relationship between them and then say *specifically* which part of the argument is wrong and why. This is, indeed, 'undergraduate stuff', but it has rarely characterized the nature of the response by the advocates of EBM to their critics; indeed, typically, there is no response at all.

What seems likely, however, is that Goldacre will fail to take up this challenge. Will this, then, come to count as 'evidence' in support of Murray and associates' thesis that Goldacre, and those who can be compared with him, are guilty of 'bad faith'? Will that prove that their approach to argument is indeed fascistic in precisely the sense explained in the paper by Holmes and colleagues [35]?

In the second commentary which follows, Couto [32], while agreeing that EBM has long been denounced as a 'set of crooked theories and principles', is unable to agree with Murray *et al.* [30] that a decline in healthcare innovation can be ascribed to EBM – yet. Couto agrees that EBM persuades on the basis of faith rather than on persuasive evidence and is thus able to conclude with Murray *et al.* that the proponents of EBM act in bad faith. As he has elegantly shown in the *Journal*, Couto is clear that while scientific paradigms in the Kuhnian sense are essential in the process of scientific development, they can also constrain and limit our vision of the World [37]. In order to push back the limits of our knowledge, it is incontrovertible that we must first possess a theoretical foundation. As Couto [32] points out, EBM, as a praxis that is disconnected from theory, cannot therefore provide such a foundation and he agrees with Foucault that 'theory does not express, translate or serve to apply practice: it is practice' [38,39]. It is this, then, which illustrates the defective basis of EBM: formulated as a practice first, it cannot now be translated into theory; it is therefore

transvestite because it is dressed up as something which it clearly is not, and a *non-theory* because its assumptions are absurd [37]. For reasons such as these, Couto believes that EBM has taken Medicine and the healthcare sciences in general, to a preparadigmatic phase. EBM indeed has the potential to impose upon us a state of intellectual minority and a system of tutelage and slavery from which an exit can be difficult to find. As to whether this potential 'dark grip of power' can be accurately described as fascist or microfascist he is not sure, but he is clear that it is a very authoritarian threat. EBM misrepresents evidence, disregards theory, and limits the development of knowledge. In concluding, Couto [32] re-iterates his view that EBM denies reality and reason and has replaced them with fantasy and emotionalism – a quixotic endeavour whose protagonists typically ignore rational argument in order to avoid any debates that would jeopardize their ideologies.

Writing in the third commentary on Murray *et al.*'s paper, Miettinen and Miettinen [33] express their concern that rather than deconstructing the conceptual basis of EBM, Murray and his colleagues may actually have strengthened it. These commentators are convinced that a defective argument against EBM has been synthesized which in turn has dealt a minor blow against the cause of scientific medicine. Miettinen and Miettinen [33] contend that Murray and colleagues [30], in arguing against authority in favour of the self-empowerment and self-direction of practitioners, 'undermine the necessary authority' of a knowledge-generating scientific community in informing medical practice, while lending comfort to EBM advocates in their mistaken view that medical practitioners 'should be direct consumers of scientific evidence, without authoritative intermediaries'. They believe that what is needed is a 'middle way', in the establishment of a suitable network of scientific authorities to develop, organise and present knowledge derived from evidence. They advance four distinct but related first-order theses as the basis on which Murray *et al.* might have constructed their arguments, with the suggestion that in so doing they would have better understood the issues underpinning the controversy surrounding 'evidence' and 'best practices', avoiding the criticism that their formula for practitioner action is one for intellectual narcissism, and not intellectual integrity. For Miettinen and Miettinen [33], Murray *et al.* have based their 'anti-EBM' stance on a more fundamental 'antiauthoritarian' stance, risking the criticism that they promote intellectual profligacy, as opposed to intellectual integrity. Within this context, these commentators point out that it is professional, not intellectual, integrity that is expected of practitioners and that this might be equally simply described as 'adherence to professional discipline' [40], the reverse of 'ad hocery driven by subjectivist intellection'.

We agree that the danger in anti-authoritarian critique of EBM in the absence of an adequately defined knowledge base is that the systematic review so beloved of the Cochrane Collaboration will continue to be advanced as the basis of professional knowledge for medical practice. Faced with this source of evidence, or a 'pseudo-professional anarchy', many may find the former preferable. We suspect that such a dichotomy would not be accepted uncritically by Holmes and colleagues, nor are they likely to accept the translation of their call for authenticity and integrity into a recipe for narcissism or 'pseudo-professional anarchy'. Such observations indicate the urgent need to work towards an intellectual and clinical resolution of what exactly constitutes knowledge for practice.

It is the stimulation of thinking and debate on this matter that has been, and remains, a principal preoccupation of the *Journal of Evaluation in Clinical Practice*. In concluding their commentary, Miettinen and Miettinen are confirmed in their view that we have not yet arrived via EBM at 'an impasse in the health sciences', although it appears perhaps equally clear that the doctrines of the EBM movement have led professional healthcare practice further away from, rather than closer to, an authentically knowledgeable medical practice.

For Buetow [34], the fourth and final commentator, Murray *et al.* [30] have certainly developed the EBM debate, creatively introducing novel concepts and questions worthy of serious discussion. However, he has concerns about the structure of their argument, in particular their reliance on Sartrean existentialism with its commitment to a version of ethical subjectivism or 'relativism'. His paper presents an extremely useful overview of the Sartrean philosophical scheme and makes it clear that he does not seek to devalue the thesis of Murray *et al.* [30]. Murray and co-workers are free to advocate an ethics of critique/integrity and to argue strongly why such honesty is important – which they do. But he is certain that what they cannot do, legitimately at least, is to draw upon Sartrean existentialism in support of their arguments.

We do not question Buetow's exposition of Sartre, even if he risks a disservice to the readers of the JECPC in presuming that only a select few will be familiar with Sartre's philosophical writings, novels and plays [34]. Nor do we think it is *necessary* to evoke Sartre to defend intellectual integrity. In fact, one of us has elsewhere appealed to the alternative Aristotelian scheme as a basis for an understanding of the role of integrity in professional life [108]. We doubt, however, that Murray *et al.* would wish to claim that theirs was the only possible basis for a fruitful critique of the lack of intellectual integrity that EBM displays, and we find their use of the concept of bad faith extremely illuminating in the context of the EBM debate. Buetow's response to these authors raises interesting questions about the extent to which, to use concepts derived from the work of any particular theorist in the analysis of a given phenomenon, one must accept the totality of that thinker's work, and the extent to which one may legitimately appropriate some elements of the overall picture while rejecting others. Certainly, some attempts to 'cherry pick' ideas from the work of philosophers and other figures in intellectual history represent abuses. (We have argued above that the appropriation of Kuhn's notion of a 'paradigm' in the writings of EBM apologists falls into this category.) Yet it is also incontrovertible that some of the most fruitful developments in intellectual history derive from thinkers combining ideas from alternative philosophical schemes (even some previously regarded as incompatible) in the construction of new, coherent and illuminating pictures of the world and our place within it. To present an adequate discussion of this topic would take us too far from the subject matter at hand, and would be impossible within the space allowed, though such considerations may be worthy of attention in future debates.

The process of evidence-based medicine and the search for meaning

In the paper which follows, Biswas and colleagues [41] are concerned to reflect on the methods through which the processes of EBM might be made more relevant and applicable to the individ-

ual patient. Looking back to the times that EBM meant nothing more than Expressed Breast Milk and where medical education and practice was governed by local experts, one's immediate seniors and the content of 'important books', the authors identify the rise in information technology as the primary driver of the 'evidence' revolution of latter years. They emphasise that while the present system of EBM places information gathered from the individual patient at the lowermost rung of the evidence ladder, the lowest step is a very relevant starting point that generates important clinical research questions. The authors note that unlike their predecessors, today's doctors are, for various sociological and related reasons, unlikely to possess the same degree of knowledge and insight into their patients' lives. Certainly, even though the wise doctor's anecdotal wisdom seems to count for very little now, it has traditionally been of immense value when employed within the local community of which the doctor was part and where he would hold a knowledge of the given patient that while 'nonmathematical', would nevertheless provide a grounded narrative and equally fair impression of what actions suited their individual needs.

Biswas and associates are clear that it is easy to see why many researchers have been drawn to EBM, given its promise of 'clean and rational' research which would control the influence of biological and related variables, the vagaries of the social environment and the local and complex political, economic and health systems that determine health [41]. This is, of course, when such research is confined to building a standard model of an ideal 'EBM patient' who 'behaves and responds to all proven scientific therapies and yields to most diagnostic tests' [41]. However, realities immediately begin to differ when confronting the real world individual. Biswas and co-workers note that while the whole question of the applicability of evidence to the individual patient has retained its capacity to bring researchers of very different backgrounds together, it is not long before an attempt at 'common ground' sees colleagues accusing each other of 'microfascism' or 'post positivism' or 'post modernism'. For the authors, this observation suggests a newer definition of fascism that describes a 'hatred of all things un-understandable often manifesting as violence, again an ubiquitous reflection of global inadequacies in handling mutual human un-understandabilities' [41]. As Biswas and colleagues point out, a postmodernist thrives in teasing out the obscurities and uncertainties which the modern researcher spends time in explaining and solving. Indeed, while at the present time postmodernists are generally to be found working within more qualitative fields of endeavour in healthcare, pluralism and relativism are nevertheless well represented in mathematical, philosophical, computational and scientific fields of study. They rightly note that qualitative or interpretive data, in which man makes sense of his environment, exist as stories and are difficult to share efficiently within the present system of data sharing. Thus, modern man has always surrounded himself with these narratives and while these stories keep changing with every so-called paradigm shift in the same way that individuals continue to evolve and adapt, their discourse on the nature of being human and the relationship of humans to their environment, appears unchanged [41]. It is within this context that Hodgkin talks of EBM as a reaction to the multiple, fragmented versions of 'the truth' which the postmodern World offers [42]. Thus, EBM seeks to standardize and control that which does not fall neatly within its 'World view' and it has

been classically irritated by deeper questioning about how ‘objectivity’, truth and validity are constructed, by whom, and for what purpose and by what underpinning assumptions is ‘reality’ arrived at. So irritated, in fact, that its strategy has been to ignore argument and stay silent [10].

Evidence-based medicine: too dependent on mathematical formulae and statistical analyses?

In a brief though informative communication, Soltani & Moayeri [43] address the criticism that EBM is too highly dependent on mathematical formulae and statistical analyses. For these investigators, the approach of an ‘evidence-based diagnostician’ toward the utilization of mathematically generated parameters is fundamentally different from the approach of a mathematician to mathematical formulas and rules in problem solving. Beginning with the assumption that the majority of clinicians are simply not interested or experienced in solving mathematical problems (and might therefore be averse, as it were, to the use of so-called evidence-based resources and materials), they continue with the hypothesis that other doctors, while equally unfamiliar with mathematical reasoning, may well be content to employ the principles of EBM and its ‘evidence-based’ knowledge as part of their clinical decision making. In order to illustrate their argument, the authors proceed to review what they describe as the differences in ‘mindset’ between these two groups of doctors by focusing on their approach to diagnosis with reference to ‘deductive-nomological’ and ‘probabilistic-statistical’ systems of reasoning. Soltani & Moayeri compartmentalize the characteristics which they believe broadly separate these two types of doctor into those clinicians who they observe as exhibiting a ‘deterministic attitude’ and those exhibiting an ‘evidence-based attitude’. For the authors, the aspiration of some doctors completely to rule in or completely to rule out a disease is, in their own words, a ‘plague’ which results from the ‘deterministic attitude’. They are convinced that doctors who hold this attitude are prone to various biases in the estimation of diagnostic thresholds and utility of diagnostic tests. By contrast, their view is that doctors who adhere to an ‘evidence-based diagnostic approach’ are able to appreciate ‘ground realities’, to appreciate the inability to avoid widespread uncertainty in clinical medicine and are able to convey this in terms of probabilistic reasoning [43,44].

A Physician’s Self-Paced Guide to Critical Thinking

We move next to two analyses by Upshur [45] and Loughlin [46] of Jenicek’s recent book *A Physician’s Self-Paced Guide to Critical Thinking* [47]. Upshur [45] poses the question: ‘Is medicine fundamentally a thinking-based discipline?’. He is able to remind the reader that it has been fairly well documented that, at least according to the criteria accepted by those concerned with the science of reasoning such as logicians and philosophers, doctors lack the capacity to reason well. This is not to say that it has been demonstrated that doctors lack the capacity to draw appropriate inferences either logically or factually from data and to detect incorrect or fallacious reasoning when present. However, it has been generally accepted for some time that there is a need to improve doctors’ reasoning skills as an important component of

medical training. The EBM movement has represented one response to this recognition, however misguided. Jenicek, alluding to the same, sets out to address this deficiency, attempting to illuminate a useful way forward.

While Upshur applauds Jenicek’s attempt to examine the relationship between reasoning skills *per se* and clinical reasoning, he does not feel able, in the final analysis, to advance a recommendation of Jenicek’s volume. Notwithstanding an ‘eccentric feel’, Upshur’s principal objection relates to the manner in which the book has been organised. While Jenicek suggests that his book can be seen as a set of PowerPoint slides, the boxes and vignettes he uses in slide format are difficult to link to skills and could, Upshur feels, be better explained with definitions more consistently employed. He notes that terms are defined multiple times with different definitions and that the definitions themselves are by no means unproblematic. Upshur identifies one vignette (Vignette 1.2.7) by way of example. Here, probability is defined as ‘degrees of belief in hypothesis or statement, often expressed on a scale from 0 to 1’. As he observes, while this definition would hold no small appeal for Bayesian statisticians or subjective probabilists, it is likely to be rejected by anyone from the frequentist or logical school of probability who would subscribe to the belief that probabilities are measures of events in a probability space or the long term frequency of occurrence of events in space and time. Related problems are identified for vignettes 1.2.8 and 1.2.9. Upshur is equally disappointed by Jenicek’s over-reliance on his own work and by the completely unexplained omission of the work of Doug Walton and John Woods and of Hamblin, all of whom are widely acknowledged to have produced seminal writings in the field of logic. Moreover, Upshur finds puzzling that in a book devoted to concepts of reasoning that include fuzzy logic as an integral part of modern informal logic, there is no discussion of abductive inference, as opposed to inductive or deductive inference, and neither is there discussion of newer research exploring defeasible reasoning schemes. Upshur finds much of value in Jenicek’s general insight that critical thinking is integral to modern medical practice. This may in fact be a means of displacing EBM as the dominant perspective, given its potential to integrate both scientific and philosophical or moral means of reasoning into one package. Nevertheless, his view is that Jenicek’s volume has unfortunately failed to achieve the goals that it set out to.

The second analysis of Jenicek’s volume has been undertaken by Loughlin [46] who is clear that the general idea of Jenicek’s book is wholly commendable. He is a strident defender of applied philosophy and critical thinking in precisely the sense that Jenicek himself purports to be [108]. But for Loughlin this book is an opportunity missed. It conveys nothing of the intellectual excitement that philosophy can offer; nothing of the illumination of the practical that critical thinking can achieve and (most shockingly for a book about *logic*) nothing of the habit of intellectual rigour that a training in philosophical methods of reasoning should develop. Instead, Jenicek preferentially supplies lists of technical terminology to be used as tags for insights previously considered too obvious and commonsensical to require labelling. His writing style consistently privileges intellectual pretension over clarity and as such the book is wholly unfit for its stated purpose. Loughlin notes [46] that there are still many (and learned) colleagues who dismiss logic and philosophy as abstract exercises that have nothing to do with ‘real life’. While he regards such dismissals as

covers and excuses for dogmatism and intellectual laziness, which impoverish practice and inhibit progress, Loughlin feels that such prejudices could only be confirmed by a reading of this text. Looking in detail at some of Jenicek's examples of 'critical thinking', Loughlin notes that the author confuses the structural validity of arguments with the truth of premises (which in a book on logic is the equivalent of writing a book on midwifery and being 'unclear on the issue of whether babies should come out head or feet first'), misrepresents the logic of conditional statements and even invents non-existent 'fallacies', to absurd and sometimes comic effect. Loughlin concludes a spectacularly negative review with a list of alternative texts on critical thinking, urging the reader to buy any one of them (or to write his or her own 'self-paced guide') before consulting Jenicek.

Science: a limited source of knowledge and authority in the care of patients

In their article within the present Thematic Edition, Murray and associates [30] speak of the benefits that a relative 'outsider' can bring to the progress of debate by specialists in a given field. As history teaches, the 'outsider' is not limited by the theoretico-practical terms that govern the 'insider's' regime of knowledge. Thus, the 'outsider' brings a different lexicon, novel explanatory terms and a fresh *modus operandi*. Murray *et al.* quote Deleuze's remark that 'the outsider sets to work to build something new, trespassing upon our familiar terrain and transgressing our traditional topologies' [30,38]. In a recently published and important book, Kathryn Montgomery describes herself essentially in these terms and it is to her volume *How Doctors Think – Clinical Judgement and the Practice of Medicine* that Miles devotes his Essay Review [48].

How do doctors think? Is Medicine a science or an art, or an uneasy inter-relationship between the two? What is this process we call clinical judgement and exactly how reliant upon it are we in making decisions in the context of the individual case? It is with these three salient questions that Montgomery opens her monograph, setting out in answer some twelve chapters organised into four distinctive parts. We make a great, even dangerous mistake about Medicine, Montgomery asserts, when we assume it is a science in the realist Newtonian sense, even as Lewis Thomas described it, as the youngest science. For her, although such words are noble and the aspirations praiseworthy, the assumption that Medicine is a science leads to the expectation that medical knowledge is invariant, objective and always replicable – which clearly it is not. So if Medicine is not a science, she asks, then what is it? Certainly, wherever it is cited that Medicine is a science it is also cited that Medicine is an art, and for Montgomery the affirmation of this duality is a reminder that Medicine remains poorly defined and poorly described even by those who nevertheless practice it quite well. For Montgomery 'art' and 'science' are both 'slippery' terms, if not shallow and ill-defined and which detract from the appreciation that good Medicine is neither an art nor a science, but rather a 'rational practice based on a scientific education and sound clinical experience', although some of the most interesting and increasingly relevant questions derive from an examination of the intersection of the so-called art-science duality. She is clear that, for her, medical practice is far more than just a body of scientific knowledge and a collection of well practised skills, it is

the conjunction of the two: the rational, clinically experienced and scientifically informed care of sick people. The core component, indeed description, of this activity can be considered as *clinical judgement*, a process of coming to a conclusion about the optimal management of an individual patient that has been much studied, both from within and also outside of Medicine. It is from this starting point, then, that Montgomery, as Miles describes, goes on to develop her volume as a whole, contributing a book of substantial importance to the medical literature.

Sources of knowledge for clinical practice

Identifying conceptual groups based on their relative importance

In this next section of the Thematic Issue, we move to two contributions from Nooraie and his colleagues [49,50] at the Tehran University of Medical Sciences. In the first of these, the authors report the results of their study which had set out to determine the most important knowledge sources that can influence clinical practice and to cluster these into conceptual groups, based on their relative importance [49]. The setting of this research was a large, tertiary care teaching hospital in Tehran, with 250 of 320 recruited hospital staff (comprising faculty members, fellows and residents), returning anonymous, self-administered questionnaires. In addition to demographic data, participants were asked to rate the importance of different resources in their daily clinical practice and their self-rated estimation of the percentage of their practice that was based on the 'best current evidence'. The authors report that the resources judged most important in clinicians' daily practice were journals in the English language, textbooks and searching skills (for faculty members); experience, textbooks, and journals in the English language (for fellows) and textbooks, experience and peers (for residents). Regional journals were judged the least important resources for all study groups. Interestingly, 62.7% of residents did not know the meaning of 'number needed to treat', 36.8% 'confidence interval', 54.9% 'confounding factor' and 44.6% 'meta-analysis'. The percentages for faculty members were 41.3%, 37%, 42.2% and 39.1%. Based on their findings, Nooraie *et al.* [49] conclude that the dominance of traditional information resources represents a major barrier to the practice of EBM in developing countries and they advocate the use of so-called 'evidence-based' clinical practice guidelines within this context as tools through which busy clinicians could make informed decisions.

In their companion paper, Nooraie *et al.* [50] report the results of their study aimed at identifying the views of international EBM experts on precisely what information should be included in EBM courses, in an attempt to achieve consensus on the relative importance of different topics. Of 105 EBM teachers invited to participate, 51 from 15 different countries agreed to take part in the study, with 40 of these continuing to participate in the second phase of the work. Nooraie *et al.* report consensus as having been achieved in terms of the agreed context for an 'Introductory' and 'Advanced' EBM course and set out their findings with admirable clarity.

Readers will recall a recently published article in *Medical Teacher* by Akl and co-workers [51] which drew a distinction between clinicians who exhibit interest in acquiring a basic level

of understanding of EBM theory and practice and those who indicate an interest in acquiring in-depth EBM knowledge and skills. The former, Akl *et al.* label 'evidence-based users' and the latter they label 'evidence-based practitioners', a distinction reminiscent of earlier descriptions of 'evidence-based' doctors actively making 'hot off the press' decisions and 'non-evidence based passive spectators of clinical practice' [1,44,52,53]. For Nooraie and colleagues, their 'Introductory' EBM course would prove suitable for those colleagues interested in becoming 'evidence-based users', the 'Advanced' EBM course being suitable for would-be 'evidence-based practitioners'. While the study contributes interesting findings to the EBM literature as it relates to teaching, it has nevertheless been conducted on the premise that this particular approach to medical education is superior to the approaches described by the authors as 'traditional'. They state explicitly that '... attention has shifted from whether to teach EBP at all, to how to teach EBP... (and it)... is important to give health care providers an effective knowledge of EBP as ineffective education is thought to be an important barrier to EBP'. Such statements imply that an intellectual resolution has been achieved on the subject of study when, in fact, no such consensus is present among the international clinical community at large. Teaching EBM concepts and methods to clinicians successfully through the long established EBM workshops such as those designed at Oxford UK and those that may follow from Nooraie *et al.*'s work is one thing. Whether such knowledge and its application will make such colleagues better doctors is quite another. To investigate such a question adequately, very particularly designed comparative studies will be necessary for which, at present, there appears to be little appetite, either within the EBM community or by practising clinicians more widely. We return to such issues later in this article.

Evidence-based medicine and primary care doctors

We now move to a focus on Medicine in primary care where Shuval and his colleagues [54,55] report the results of their evaluations of the impact of EBM concepts and methods in general medical practice. In the first study [54], the authors conducted a cross-sectional study to evaluate the EBM skills of primary care doctors and to determine the risk markers associated with these skills. Interestingly, although these doctors were reported to view EBM 'positively', and to have on-line EBM resources available at their clinics, it was nevertheless observed that the majority seldom searched the internet for medical information and that few were aware that they had easy access to the Cochrane Library. When questions were advanced as to why this should be the case, answers were principally expressed in terms of a lack of time and a conviction that a lack of 'sufficient EBM knowledge' hindered their application of this technique in the clinical setting.

In their subsequent study, Shuval and his associates [55] report the results of their evaluation of a multi-faceted EBM intervention at the largest Health Maintenance Organization (HMO) in Israel, aiming to test the ability of their method to facilitate a change in 'doctor's attitudes, knowledge and clinical behaviour'. Methodologically, the study evaluated the intervention programme through a controlled trial and a typical before-and-after study, with the aim of firstly examining the impact of the educational interven-

tion on primary care doctors' test ordering performance and drug utilization by their patients and secondly assessing the impact of their intervention on attitudes towards EBM concepts and practice. The results of their investigation suggest that while their intervention positively influenced doctors' attitudes and knowledge, it failed significantly to alter their test ordering performance and their patients' drug utilization.

Shuval *et al.* [54,55] based their investigations on study populations of medically qualified workers in primary care. Other groups of health professionals practising within that setting have less frequently been studied in similar terms and it is to these, in addition to doctors, that de Smedt and his colleagues [56] turn in a Research Letter to the Editor. In this particular study, the authors were concerned to assess the extent to which doctors, nurses and paramedics working within the primary care setting in Belgium were objectively and subjectively knowledgeable of EBM terminology. Using an electronic survey of 112 doctors, 158 nurses and 121 paramedics (the last interestingly drawn from medical emergency technicians, firemen and medical volunteers), they tested participants' knowledge of 13 methodological terms frequently used within EBM, also including a non-existent 'dummy term', inviting respondents to rate their understanding of the terms using a Likert scale. Analysis of the resulting data demonstrated that the majority of all three professional groups objectively lacked accurate knowledge of EBM terms and associated statistical terminology while subjectively a major overestimation of their actual knowledge was recorded. In agreement with Shuval *et al.*'s findings in the previous two papers published here [54,55], the study participants were nevertheless approbatory of EBM while having little knowledge of it – an interesting observation indeed!

Clinical practice guidelines – I: Doctors' views of CPGs and factors mediating their implementation

Having considered doctors' views on and knowledge of EBM concepts, methods and terminology, we move now to a set of four articles [57–60] examining doctors' views of clinical practice guidelines and the factors which mediate their implementation and use in routine clinical practice. In the first article, Harder and her co-workers [57] describe their qualitative study which mapped Saskatchewan doctors' views on the implementation of clinical practice guidelines. Their research demonstrated that the modified diffusion of innovation model encompasses the complexity of the decision to make a behavioural change, while maintaining a focus on the key factors that affect doctors' decisions about changes in clinical practice. They review the strengths of the modified diffusion of innovation model before proceeding to discuss the various influences which modulate doctors' adoption of practice guidelines. The authors' findings are largely in agreement with those of independent investigators [61–65] and directly support the use of the proposed diffusion of innovation model to guide clinical practice guideline implementation research.

In the study which follows, Graham and associates (2007) [58] examine the attitudes of Ontario doctors towards the use of clinical practice guidelines in Oncology. Methodologically, the authors employed a cross-sectional, self-administered postal survey of 1034 doctors, achieving a 57% response rate and demonstrating, overall, a positive attitude toward the use of practice guidelines.

Here, the survey indicated that the doctors' attitudes towards practice guidelines were correlated with their intention to use them. The authors argue that by understanding the relationship between doctors' perceptions of specific guidelines and their subsequent adherence to them, guideline developers will be better placed to produce guidelines that doctors will find acceptable and therefore be more predisposed to use. They announce their intention to develop this research further, in order to assess a range of factors and variables including the relative contribution of practitioners' general attitudes towards and beliefs about guidelines, their specific attitudes towards practice guidelines developed in Ontario, defining organizational and practice characteristics and practitioners' stated intentions to use recommendations. Such work will contribute importantly to the guidelines literature.

The third article in this set reports the results of a qualitative investigation of the use of practice guidelines for the management of low back pain (LBP). Here, Dahan *et al.* [59] set out to identify the barriers and facilitators for the implementation of LBP guidelines in a sample of family physicians in Israel. In agreement with much of the current guidelines literature, the authors document a variety of obstacles to the implementation of guidelines, but their study broadens significantly the understanding of the intellectual and psychological challenges facing primary care doctors in the treatment of patients presenting with back pain. They are clear that successful intervention programmes for the implementation of low back pain practice guidelines should simultaneously address all levels of care: the physician, the patient, the environment and the guidelines themselves, and that lower back pain guideline implementation should enhance physicians' therapeutic ability to reach common ground with their patients, change public knowledge and attitudes towards lower back pain as well as consider health system factors such as physician time constraints.

In the final paper of this set, Cheng and his colleagues [60], similarly focussing on primary care medicine, examine possible changes in the attitude of family doctors to the use of practice guidelines that may have taken place in recent years in the USA. The authors report a significant increase over their 5-year period of study in the proportion of primary care doctors acknowledging at least a moderate effect of practice guidelines on their practise of medicine, with important gender differences being observed and a significant influence of date of graduation and of the complexity of the health care environment in which a doctor works. Cheng and co-workers believe that the trend they report will continue and will result in an increase in the number of primary care doctors who adopt the guidelines as doctors receive evidence-based medicine training. They recommend the design and use of systems that facilitate guideline implementation, such as focusing on organizational strategies that can contribute to enhanced 'compliance' with clinical practice guidelines.

Clinical practice guidelines – II: the selection and prioritization of topics for CPG development, CPG construction and its rigour, the use and measurement of deviation from CPGs and the effects of policy constraints

Evidence-based guidelines for clinical practice are increasingly developed by guideline programmes that review multiple condi-

tions and diseases, some limiting their activities to a small number of priority areas, while others are considerably more expansive. It is well recognised that the whole process of guideline development and updating is a significantly expensive one, and given this resource implication it remains important to work towards a clear process for selecting new guideline topics. Acknowledging the same, Ketola and her associates [66] present their study illustrating the design, development and validation of a guideline topic prioritization tool. The results of their study indicate the value of their developed PRIO-tool when selecting guideline topics, adding to the transparency of the decision making process and ensuring the optimal use of time and efforts of clinical experts.

In the paper which follows, Guo *et al.* [67] report the results of their review of existing guidelines in the clinical departments of a large teaching hospital in Sydney, Australia, describing their characteristics, development and implementation. Unsurprisingly, perhaps, the authors were able to observe a marked variation in the numbers of practice guidelines available within each of the departments studied (ranging from 2 to 368). They ascribe this dramatic variation, probably correctly, to the different specialties of the departments and as a function of their differing complexities and requirements. Interestingly, however, Guo and colleagues noted that the majority of the guidelines used in the departments were produced locally by the departments themselves and while such local development retains the well-documented advantage of tailoring care to local needs, it may nevertheless act to codify local 'tradition', especially where some observations, as in Guo *et al.*'s study, appear to indicate that local guideline developers and users may, in fact, have little or no knowledge of the existence of national and international guidelines for the same disease/condition. Within this context, the authors additionally observed a lack of formalized/standardized methods for guideline development and a narrow skills representation in the team developing the guidelines. The authors express their concern as to the effects of these factors on the 'quality' of the guidelines produced. They report that only 20.9% of the available guidelines provided references to their knowledge base, with no guideline providing information relating to literature review processes and very few being accompanied by the concomitant development of application methodologies. Moreover, little attention appeared to have been given to dissemination strategies or even simple methods for raising awareness of local guideline availability.

The availability of guidelines, whether local, national or international, is one issue, adherence to such guidelines, in total or in part is quite another. It is to the subject of guideline use, and the measurement thereof, that Mercier and her co-workers [68] turn in their description of a novel method designed to measure discrepancy between prescribing practices and guideline recommendations. In this particular study, and in order to provide a quantitative measurement of clinician adherence to guideline recommendations, the authors identify three principal steps in assessing discrepancies: (i) the setting of reference prescriptions; (ii) the collection of data on prescribing practices; and (iii) the measurement of deviation between medical practices and these references. They observe that in many studies conducted since the 1980s there appear to have been three methodological weaknesses: (i) a lack of a precise definition of non-conformity, discrepancy or deviation; (ii) an inappropriate conception of guideline recommendations; and (iii) the lack of an adequate and standardized

tool to measure deviation. It is on this basis that Mercier *et al.* [68] argue for the need for a measurement tool to identify and quantify deviation from guideline recommendations at the population level, with the availability of such a tool being a prerequisite for scientific study of deviation and appropriateness in medical care. The authors aimed to develop such a tool by identifying relevant dimensions of deviation, summarizing deviation between prescribing practices and guideline recommendations, using two approaches to quantify the total deviation on the basis of its elementary dimensions and by exploring and comparing the performances of the resulting indices of deviation through simulation of the prescribers' behaviour facing a sample of diseases for which evidence-based reference treatments exist and where they do not exist.

In reporting their results, the authors advance the utility of two indices – an additive index (of greatest use in analyzing deviation in observational studies) and a multiplicative index (of best use in comparative studies that include training interventions directed towards a group of prescribers). Both the additive index and also the multiplicative index demonstrated similar properties in that they result in deviations that fit a binomial distribution. Mercier *et al.* [68] are convinced that the development of such techniques represent the starting point for new surveys or trials dealing with medical practice at three principal levels: (i) at an ethical level, where any prescription that does not conform to EBM is judged as a loss of chance for the patient; (ii) at a quality of healthcare level, where the aim is to provide patients with the best possible care at the lowest cost; and (iii) at the level of 'social concern' to integrate the concerns and imperatives of patients, doctors and policy makers.

In a related paper, McWhirter *et al.* [69] examine the impact of educational interventions on adherence to published guidelines on baseline radiological staging in primary breast cancer. The rationale for baseline radiological staging in newly diagnosed carcinoma of the breast is to exclude the presence of overt metastatic disease. In previously comparing the use of radiological staging at their institution with the recommendations of the Cancer Care Ontario Practice Guidelines Initiative, the authors were able, over a three year period, to demonstrate that a high proportion of patient studied underwent investigations that were judged as unnecessary. They developed, implemented and assessed an educational intervention to encourage the utilization of staging guidelines in a study population of early breast cancer patients. Methodologically, multidisciplinary educational rounds were organized in order to raise awareness of guideline availability and content and in order to report the results of subsequent audits and investigations of staging investigations. Interestingly, for patients with stage I breast cancer, the intervention appeared to result in a significant decrease in each type of investigation: a twofold decrease in chest x-rays, a 2.5 fold decrease in bone scans and a fourfold decrease in the number of abdominal ultrasounds. In contrast, for patients with stage II disease, there was no significant change in the proportion of patients undergoing radiological investigations and for patients with stage III disease a (non-significant) trend was observed towards the appropriate use of all three investigations. The authors' study appears to demonstrate therefore that their educational strategy significantly enhanced the exercise of local clinical practice in stage I breast cancer patients in accordance with published clinical practice guidelines.

It is to the implementation of national consensus guidelines and the measurement of their impact in a primary care setting that Touzet and co-workers [70] turn. In this particular study, the authors set out to measure the extent to which French national guidelines on the management of bronchiolitis derived from a consensus development conference were being followed. Using a non-randomized intervention study, with a first survey one year before the consensus development conference and a second survey one year later, Touzet *et al.* [70] were able to observe that, one year following the consensus conference, a slight improvement was apparent in the adherence of doctors' practice patterns to the guidelines, more evident for some clinical actions than others. The authors are nevertheless clear, and wisely in our view, that non-adherence to guidelines does not necessarily imply inappropriate medical decisions. Indeed they are aware that primary care doctors rightly view practice guidelines as corresponding to the 'ideal patient', rather than the patients typically seen in clinical consultations and measurements of deviations from guidelines must therefore always be assessed in terms of the concerns of the practitioner as to their applicability to the given individual case, although if other factors are suspected then they should clearly be described.

A different approach to the study of clinical practice guidelines have been taken by Hurdowar and colleagues [71] in a further Canadian study of the characteristics of currently available guidelines for the care of patients following stroke. The authors set out to evaluate the quality of published guidelines and to examine the reliability and validity of the appraisal of guidelines research and evaluation (AGREE) instrument. Methodologically, the authors searched multiple databases and Internet sources for stroke care guidelines published in English or French from 1998 to 2003 and developed by a group process. Four appraisers conducted an evaluation of each practice guideline identified using the AGREE instrument, representing the first systematic evaluation of the quality of published guidelines which make clinical recommendations on stroke management using this particular tool. Their observation that the stroke guidelines they identified scored highly across all of the domains assessed by the AGREE instrument is noteworthy, given that the rigour of practice guideline development is widely held by experts and clinicians to be one of the most important domains in any practice guideline evaluation. Nevertheless, it remains to be noted, in so far as the AGREE instrument is concerned, that this instrument essentially assesses (and thoroughly) the characteristics of the guideline development process only and by its nature can therefore say nothing about the clinical content and knowledge base of the guideline recommendations themselves. In that sense it provides an important, but nonetheless partial, insight into the real clinical utility of practice guidelines which remain, by their essential nature, sources of reference than of automatically appropriate decisions.

A further perspective on the use of evidence-based practice guidelines is provided by Bostrom and co-workers [72] in their investigation of the determinants of research use in elderly care in Sweden. As these authors point out, research for enhancing evidence-based knowledge and its dissemination and implementation has been conducted in academic nursing for some thirty years now. With, originally, a specific focus on the individual practitioner, six categories of potential, individual determinants of research utilization have been identified: beliefs and attitudes towards research,

involvement in research activities, information seeking, education, professional characteristics, and 'other' socio-economic factors [79]. With the research focus having now been developed to recognise a range of organisational and contextual factors such as leadership, culture, access to research-related resources, time and professional autonomy [80,81] and a substantial literature now available to draw upon, Bostrom and associates [72] set out to identify the determinants of research use in the highly specific setting of elderly care in a large municipality in the Stockholm region. Their study demonstrated the importance of both individual as well as organisational factors in research use. Individual determinants, for example, included 'positive attitudes towards research' and 'seeking research that is related to clinical practice'. Organisational determinants included 'access to research findings at work' and 'support from management'. A definitive finding was the concern of staff to seek research directly related to clinical practice, indicating staff awareness of ongoing development in their fields of practice and the need to keep up to date with relevant, current knowledge. On the basis of their data they recommend implementation strategies that embrace both individual and organizational considerations, but with additional research aimed at elucidating, not least, the constraints on research identification and use exercised by organizational culture and time requirements.

We return to the subject of prescribing practices and their relationship to guideline availability and use in the article by van Driel and co-workers [73], which describes the evaluation of national prescribing data for proton pump inhibitors over a nine year period, prior to and following, the promulgation of national reimbursement guidance aimed at encouraging the more 'rational' use of gastric acid suppressants and as mechanisms for cost-containment. As part of their research, the authors explored the impact of several potential drivers of prescribing, including the availability of the practice recommendations, the introduction of new products to the market and the national reimbursement policy recommendations. The results of their investigation demonstrate a real effect of the various policy regulations in place during the period of study, but with results that were quite unexpected. They go on to discuss the various factors in operation that acted to frustrate the intrinsic aims of the regulatory policies and suggest possible ways forward for the implementation of guidelines and policies. Certainly, reimbursement policies are a strong driver of prescribing, but their effect can be unintended and undesired, as the authors' study [73] shows. Similarly, publishing recommendations for clinical practice without due consideration of the policy context and of relevant incentives and disincentives is unlikely to lead to alterations in clinical behaviour and effects on the quality of care. For the authors, policy regulations should ideally be designed according to an 'evidence-based' methodology and be able to guide, stimulate and facilitate the implementation of guidelines and they hypothesize that the integration of medical with policy evidence may well represent a more effective and efficient way to achieve improvements in the quality of care and the public health.

Systematic reviews of medical evidence

Having considered current thinking on the development and implementation of clinical practice guidelines, we move at this point in the 10th Thematic Edition to three articles which discuss

the systematic review of the medical literature as a source of knowledge for practice.

In this first paper, Ann Scott and colleagues [74] report their development of a research translation strategy for the management of chronic pain that they advance as having significant potential to improve the usefulness of systematic reviews in clinical practice. Methodologically, their strategy employed interactive case based workshops that summarized current evidence on treatments for chronic pain. As part of their approach, the authors enlisted the assistance of health technology assessment researchers and clinicians collaborated to translate data from systematic reviews into education aids, although they are clear that this process proved far from a straightforward one. Indeed, they report that the sourcing and selection of systematic review evidence required the maintenance of a credible balance between the diametric concepts of comprehensiveness and efficiency and those of relevance and validity. Moreover, on examination of the collated evidence base, additional challenges were encountered in addressing the lack of consistency among systematic reviews in the quality of execution, the scales used to rate the quality of the evidence and the conclusions on common topic areas, and the authors proceed to discuss methods for resolving these particular difficulties. For Ann Scott *et al.* the key elements for synthesizing clinically relevant knowledge from systematic reviews are: a flexible consistent and transparent methodology; credible research; involvement of renowned clinical experts to translate the evidence into clinically meaningful guidance; and an open, trusting relationship among all of the contributors to the overall process. In concluding, they acknowledge that while they believe their results to be encouraging, they also serve as a reminder that 'all research is not equal, even among systematic reviews' and that successful knowledge translation requires far more than credible research alone.

In the article which follows, El Dib and associates [75] have been concerned to evaluate the conclusions from Cochrane reviews in terms of their precise recommendations for clinical practice. Methodologically, they employed a cross-sectional study of systematic reviews published in the Cochrane Library, randomly selecting and analyzing reviews published across all 50 Cochrane Collaborative Review Groups. 1016 completed systematic reviews were examined, of which 44% concluded that the interventions studied were likely to be beneficial and where 1% recommended no further research and 43% recommended additional research. Seven per cent of the reviews concluded that the interventions were likely to be harmful, of which 2% did not recommend further studies and 5% recommended additional research. In total, the authors observed, essentially half of all of the reviews reported that the evidence did not support either benefit or harm, of which 1% did not recommend further studies and 48% recommended additional studies. Strikingly, 96% of the reviews studied recommended further research. Given that the stated aim of the Cochrane Collaboration is to enhance the use of research in healthcare and minimize uncertainty, it is startling indeed that El Dib's paper has proved able to demonstrate that 47% of the 1016 reviews studied failed to provide sufficient evidence for clinical decision making. To stimulate further discussion on such a profound limitation, the JECPC commissioned a short commentary on El Dib *et al.*'s findings and the *Journal* is grateful to Professor Eyal Shahar [76] for his accompanying arguments.

EBM and research *versus* clinical ethics

In the penultimate paper of the Thematic Edition, Kottow [77] poses the question ‘should research ethics triumph over clinical ethics?’ This author notes that EBM and its fundamental tool, the randomized controlled trial (RCT), have had less impact on day-to-day medical practice than might have been expected and he proceeds to explore some of the possible reasons as to why this should be the case, with discussion focussed on the nature of research protocols, clinical ethics and the respective cultures and dialogue of scientists and practitioners. As he points out, defenders of the predominance of research ethics are predisposed to emphasize the need for scientific validity and it is of course correct that the more vigorous a trial design, the more precisely it is likely to be able to answer the working hypothesis. It is, however, these very gains in internal validity that frequently act to reduce external validity precisely because, as Kottow emphasizes, the research strategy so adopted will create artificially controlled situations that do not apply in real life. Under these circumstances, doctors will, as he says, be reasonably tempted to deviate from the results and recommendations of such studies and willingly commit what have been described as ‘desirable errors’ [82]. This gap in thinking and approach between scientists and practitioners is already wide and may widen further if sensible dialogue and joint working between health services researchers and clinical practitioners is not secured relatively soon, as Miles and colleagues [2] noted and called for many years ago now. Indeed, it is Kottow’s view that such a gap might even become insuperable.

EBM and editorial practices

The final article by Shahar [78] which closes the Thematic Edition looks back, like the opening article by Tonelli [11], to the previous Thematic Edition of 2006. Here, the author is concerned to meditate upon the editorial practices of learned medical journals and on the whole process of peer review. The stimulus for Shahar’s paper has been the raising of questions by the *Journal of Evaluation in Clinical Practice*, within the context of the EBM debate on the ‘conduct of business’ of the *British Medical Journal* [10,83,84], but he goes on to develop his thinking in an article which makes many very interesting observations and which raises many important questions. If Shahar’s article resonates with any colleague who has submitted an article to a clinical or health policy periodical raising intellectual and clinical questions concerning EBM only to see it swiftly rejected without adequate or convincing explanation, then they are cordially invited to submit the same article to the JECP for formal and unbiased consideration.

Discussion

EBM: a practice without a theory

It is now some 16 years since the coining of the neologism ‘evidence-based medicine’ [85–87] and a full 15 years since its substantive codification within the *Journal of the American Medical Association* [88]. Since that time, Medline citation of the keyword ‘evidence-based medicine’ grew from the original 1 to some 13 000 in 2004 to approximately 25 000 at the time of writing [89]. Such quantitations provide insight into the scale of the initial

excitement generated by the ‘unveiling’ of that new concept and were propelled upwards in no small measure by the emotive characteristics of the neologism itself [10]. But such quantitations, though celebrated by the EBM community, of themselves provide little or no understanding of how successful EBM has been in convincing experienced doctors of its potential for the development of clinical medicine. Indeed, careful study of the publications that constitute the current citation figure to date quickly demonstrates that the EBM literature consists essentially of the initial rhetoric of the EBM advocates and the reactions to it by the international medical profession, articles describing methods for ‘doing’ EBM, papers describing EBM training courses and workshops, studies examining doctors’ attitudes to EBM over time, descriptions of EBM resources including meta-analyses, systematic reviews and practice guidelines (together with various books and publications, journals and on-line materials), discussions of the scale and content of EBM inputs suggested as necessary for introduction into undergraduate and postgraduate medical education curricula and debates within the specialities and professions as to the relevance of ‘EBM thinking’ for their routine clinical practice. A further characteristic of the literature is that it has been built essentially from contributions by academic medicine, with a disproportionately much smaller contribution from service clinicians – a noteworthy observation in itself. Most noteworthy, however, is the absence from this substantial corpus of writing, of studies which, conforming to the usual scientific standards of proof, show any superiority or overall benefits of EBM approaches over non-EBM approaches in clinical practice. It is shocking that with this observation now and inevitably conceded by the protagonists of EBM [25], coupled with a recent recognition by them that ‘EBM has limitations and further innovation is required to resolve *some* of these . . .’ (italicisation ours) [90], discussion on how further to implement EBM continues to press ahead in the absence of a settled intellectual basis on which to proceed.

We are gratified to see further explicit recognitions by the protagonists of EBM of the limitations of their concept and method, such as its inability to integrate patient values and preferences with ‘the evidence’ [90] – other limitations already having been conceded and resulting in altered methodological approaches to the identification of evidence by practitioners [91,92]. We are simultaneously disappointed that they remain preferentially given to listing what they consider to be the strengths of EBM, rather than systematically listing what they now concede to be the existence of (and noting the plural) *limitations* of EBM [25,90,93] and addressing them accordingly. Perhaps the advocates of EBM are unsure as to quite where to start? On the premise that this might well be the case, the lack of any formal publication on the limitations of EBM from them suggesting that it may be, the *Journal* would like to offer them some assistance with the suggestion that they begin urgently with *theory*.

It is increasingly well recognised, not least by the protagonists of EBM themselves [94], that their early description of EBM as a revolutionary new paradigm that had emerged in clinical practice [85], based on Thomas Kuhn’s definition of paradigms [95], was at once absurd and indeed it was conclusively demonstrated to be so almost immediately following its promulgation [37,96–98]. It remains clear, as Haynes has admitted [94], that the originators of EBM paid little attention to the philosophy of science and continue to devote essentially no attention to constructing a philosophical

basis for their activities [98]. As noted in a previous editorial of this journal, there are startling parallels between the history and development of EBM and that of the 'management science' that has provided the rationale for curtailing professional autonomy in medicine, academia and elsewhere [10]. EBM, like management science, is an 'approach' that was 'operationalised' before being fully 'conceptualised' [108]. It really should not be necessary to point out that there is nothing 'scientific' about putting an approach into practice, let alone one which proposes to 'revolutionise' an entire field of productive and vital professional activity, without working out in very much detail what precisely that approach is, or what advantages it is supposed to have over existing alternatives, basing one's confidence of its success on the marvellous rhetorical properties of its defining terminology [108].

There has appeared in recent times an altogether modern tendency not only to distinguish but to set up an opposition between 'theory' and 'practice'. We now seem predisposed to dislocate 'thinking' from 'doing' [108], what Murray and colleagues [30] have referred to as the *vita contemplativa* and *vita activa*. These authors ascribe this seemingly rigid separation to a form of anti-intellectualism, the result of which is the celebration of practice, but the denigration of theory. Indeed, for Murray *et al.* [30], the pro-EBM stance capitalizes on the current climate of anti-intellectualism, equating evidence with practice and truth while dismissing theory as irrelevant – if not downright troublesome – because it 'meddles with a job well done'.

We wholly agree that the theory-practice separation is a false dichotomy which both distorts theory and impoverishes practice. It is this bizarre form of wilful academic thoughtlessness, this corrupted, intellectually vacuous version of 'pragmatism' [108] that has brought us to the epistemological and philosophical impasse that Murray *et al.* lament [30,35], an intellectual culture in which professional integrity is reduced to the following of 'guidelines' determined by factors far removed from the context of professional life, an environment where 'compliance' (as opposed to rational self-determination) is definitive of the 'responsible practitioner'. Though no doubt conceived in part for its provocative potential, is the comparison with the psychology of fascism really as wildly inappropriate as mainstream commentators would like to believe? The lack of an adequate theoretical base has led directly to the spectre of EBM's driving of a 'routinised, quantifiable practice driven by utility, "best practices" and reductive performance indicators where (it) functions as an ideologically driven practice that ignores the context of experience' [30]. Given this, Murray and colleagues find themselves in easy agreement with Denzin and associates [99] that the result of this scenario is the turning of subjects into numbers and social inquiry into the handmaiden of a technocratic globalizing managerialism. Practices become systematic and ideological, endorsed and circulated by a powerful cadre of 'experts' whose vested interests are frequently hidden from sight [30].

It is here, as Murray and co-workers [30] point out, that theoretical intervention shows its value by interrupting such processes and by revealing and undermining power where it is most invisible and insidious. Theory-free observation is impossible [96]: observation takes place within a theoretical context which gives it significance, such that there can be no *meaningful* observations in the absence of an intellectual agenda as human beings attempt to understand the world that confronts them. Of course, observations

can challenge theories and redirect the agenda of inquiry, just as such theoretical modifications can in turn enable more specific, more detailed and more useful observations to be made. This is hardly controversial, as the merest acquaintance with philosophical and scientific thought over the last 120 years confirms [96]. But, as Cohen and colleagues [100] have pointed out, EBM typically ignores this essential interplay between theory and observation, promoting the belief that observation, rather than theory and understanding, can be an adequate basis for medical knowledge. As Miles and colleagues [5] and Charlton and Miles [101] point out, to characterise medical knowledge in this way is to remove it from its proper scientific underpinnings, which is why these authors have consistently referred to EBM as both unscientific and antiscientific.

EBM: adolescence, maturity or premature senility?

Given the wide ranging philosophical and epistemological deficiencies inherent in EBM, it is little wonder that the term 'evidence-based medicine' itself and also the lengthier definitions of 'what it is and what it isn't' have been subject to so much change. Even its protagonists now recognise explicitly that 'the very name has been an impediment to getting across its main objective' [94], recommending that a better name would be 'Certain Types of High Quality and Clinically Relevant Evidence from Health Care Research in Support of Health Care Decision Making Based Medicine' [94] or, we assume, CTHQCREHCRSHCDM – based medicine (!). While Haynes [94] advances that such a nomenclature would be more 'accurate' than 'EBM', he recognizes such an appellation to be 'mind numbing'. On this score, it would depend on whose mind we are talking about.

Indeed, the critical thinker will not simply wish, but will automatically demand, an explanation of what precisely is meant by 'certain types' of evidence, how these types when identified can be selected and why [108]. He will seek to understand how 'quality' is defined in this context and how 'high quality' may be distinguished from 'low quality'. Similarly, he will search for a definition of 'evidence' in this context and information on how assessments of whether it is 'clinically relevant' or not, can be made. If such 'evidence' is aimed at the 'support' of healthcare decision making, then this implies that there are other 'supports', and so our critical thinker will need to understand how precisely they work in conjunction with the 'evidence'. Are such supports 'evidence' or not, and if not, why not and how do we understand them? He will take the choice of words 'health care decision making' to be different from 'medical decision making', implying non-medical inputs to this process. What are these, and how do they interact with the medical processes? So far from making our understanding of EBM more 'accurate', Haynes' redefinition makes it more ambiguous. Its problem is not, of course, that it is 'mind-numbing' but rather that it is evasive. Haynes simply rebuts criticisms of EBM by introducing a number of new and unexplained terms which would require extensive interpretation. Perhaps the reason why so many clinicians do not know what EBM terminology means or how to apply it in real contexts is because its inventors do not know this either.

Of course, if Haynes were prepared to provide the hypothesised critical thinker with an answer to these questions this would be a

different matter. That would be a genuine theoretical exercise which could, in principle, provide the outline of a position in medical epistemology. Unfortunately, such questions are likely to be dismissed rather than answered by the protagonists of EBM, who seem to feel that if they can only solve the problem, first, of how to get people to implement EBM, then an answer to the question of what precisely it is will somehow emerge. Without such answers or the design of studies to bring us nearer to the production of them, EBM will continue to exist as a practice without a theory – a philosophically bankrupt position, indeed, an ‘impossible’ one [102].

So much for Haynes’ revised definition of EBM [94], which while recognising the deficiencies of the original definition, complicates them further, albeit in a manner which services usefully to illustrate the theory-free nature of EBM. Enter Jenicek, a leading protagonist of EBM [103–106] who asks ‘Do we have a clear answer to what EBM is today?’ [107] The answer, of course, is ‘no’, though Jenicek does supply us with many different and unclear answers as a substitute. He suggests that ‘most EBM definitions’ are ‘motivational’ but not ‘operational’ [107], which would seem to mean that they sound good but provide no basis for practice. Since Jenicek praises EBM for its ‘catchy name’ and muses that ‘it is precisely due to its loose meaning that a good number of adherents and followers have become comfortable, enthusiastic and often empowered in this domain’ [107] it would seem that this is what he means.

Should this be a cause for concern? Not at all: the fact that its advocates cannot explain what it is does not constitute a crisis for EBM but a ‘challenge’ to its adherents, providing the opportunity for further research papers on the ‘further evolution’ of EBM. For Jenicek it simply shows that EBM ‘has reached its adolescence and should be wished all the best in its further development. As in our own lives, a ‘new look’ is often desirable at this age. Even though we are on the right track with EBM, it is clear that we still have some work to do.’ [107] So the response to fundamental questions about the meaning of the ‘doctrine’ (his word) being proposed is to call for a ‘new look’.

We contend that the fact that such a paper can be written by so senior a figure in the EBM movement, and published in a serious academic journal, indicates that EBM has moved beyond adolescence and (to develop Jenicek’s metaphor) bypassed maturity altogether, moving directly to a state of premature senility. We enthusiastically recommend that the paper be read in full by anyone requiring clear proof of the intellectual impasse to which EBM has brought us. Jenicek provides no argument or evidence for his view that ‘we are on the right track with EBM’; his only response to detailed criticisms of his earlier work articulated in this journal is a block reference, in brackets, to ‘[his] critics in their current uproar’ [107]; he states (of EBM adherents) that ‘we do have a point, but it needs to be improved’ without explaining what the point is or how it could be improved and he persistently uses the terms ‘hence’ and ‘therefore’ to suggest some sort of inference has taken place, when what he appears to be presenting is (at best) a number of unsupported claims. So, we move from the assertion that ‘medicine has always been evidence-based, only evidence has now taken on a new meaning’, via references to ‘personal experience’ being replaced by ‘well organised randomly controlled trials’ plus ‘systematic review and meta-analysis’ to the assertion: ‘Hence, we are facing a *new paradigm of best evidence only*.’ [107]:

his emphasis] The appearance of logical connections between these claims seems wholly illusory: why should the rejection of personal experience in favour of RCTs (&etc.) mean we face a ‘new paradigm’? Referring to Kuhn, Jenicek asks whether EBM is really a ‘paradigm’ and answers, obscurely, ‘If it is, it is increasingly being tested, but this is not enough.’ [107] Such obscurantism, accompanied by frequent appeal to odd constructions and mixed metaphors (‘Despite its well-deserved strengths, EBM’s shell still remains half-full. Its strong points are clouded in persisting philosophical gaps’) plus its frequent references to the mythological ‘Golem’ and the decision to structure the paper around the title of a well known Clint Eastwood movie (spanning the eons of popular mythology and culture in a single subheading) all combine to generate a distressing sense of advanced intellectual incontinence.

Jenicek states: ‘The main problem of EBM today is perhaps that it is ideologically strong, while remaining philosophically weak. Consequently, it is subject to several potential reconsiderations. There is nothing wrong with good doctrine, ideology, belief, or rhetoric as the art of influencing the thought and conduct of the reader or the listener. This does not exclude us, however, from further improvements.’ [107] Is this the statement of someone engaged in a serious intellectual process, aimed at improving real-world practices, or of someone in the grip of ideological bias and rampant intellectual dishonesty? While effectively admitting that there is no coherent and substantial position underlying the barrage of celebratory rhetoric, Jenicek apparently treats this as a minor problem and moves immediately to discussing the possibility for ‘further improvements’ to EBM. Jenicek has consistently maintained that while neither he nor any other expert on EBM actually knows what it is, this is no obstacle to its continued development and progress, because one thing we do know about it is that it is unquestionably right. Jenicek’s work is so bizarre that it functions well to illustrate some of the very particular characteristics of EBM that must surely be given urgent attention.

So what *should* we be ‘doing’, if not EBM?

Have we, then, moved closer since the publication of the last thematic edition to an agreed definition of what exactly constitutes knowledge for practice? We think not. Reflecting on the reason why, we believe that this can best be explained in terms of two independent but related factors. Firstly, we see the continued insistence by the advocates of EBM on the primacy of the randomised controlled trial and meta-analyses of these study designs as remaining highly problematic for any such definitional resolution. Secondly, we see the continuing discordance between the orientation of current programmes of health services research and the research programmes that are preferentially necessary to address the more urgent concerns of practising clinicians, as equally problematic to any such resolution. Bearing on both these issues is also, we think, a cultural divide between the EBM-HSR community and service clinicians. Let us turn first, however, to the scientific factors that we have identified.

If it were to be accepted that the RCT and meta-analysis invariably produces the most reliable ‘evidence’ to inform treatment decisions, then it would make perfect sense to accord these methods a primacy and to assess the potency of other methods for generating ‘evidence’ relative to them, creating a hierarchy as part

of this process. This, of course, is precisely what EBM has done. But, as we have argued at length in the JECPC and elsewhere, such an approach has no validity whatsoever as a principle of scientific method [1–10,101]. The current ‘hierarchy of evidence’, while it may be accepted and indeed utilised by some colleagues, has by no means achieved universal acceptance within the scientific and clinical community at large. Our view is that as a system it will eventually collapse through a process of increasing marginalization as the power of other research designs to provide the answers practising clinicians need for the care of the individual becomes more widely accepted. The current ‘hierarchy of evidence’ is, after all, not remotely a clinical conception deriving from the observations and needs of medical practice, but is rather a product of ‘biostatistical thinking’ deriving from the principles of clinical epidemiology [1–10,101]. An initial ‘sense of order, logic and neatness’ conveyed by the ‘hierarchy of evidence’ on its publication has since given way to a growing rejection of its usefulness in addressing the problems of modern clinical practice, based on the twin concerns of *methodology in medical research* and *philosophy in clinical practice*. From a methodological perspective, the limitations of the RCT are becoming increasingly recognized as a function of accumulating research into its power, this now acting to temper the initial enthusiasm for the RCT which followed its original description. Here, concerns have increasingly focussed on a failure to demonstrate that RCTs and meta-analyses are invariably superior to other research designs for determining clinical effectiveness and on the replicability of the results of RCTs themselves. For example, independently conducted, similarly designed RCTs which ask the same question frequently disagree with each other and well conducted cohort studies often generate results in agreement with those from RCTs which ask the same question, this latter observation thus questioning the uniqueness of the RCT as a method. Meta-analyses of RCTs, aimed at pooling the results of similarly conducted RCTs with the aim of generating an average treatment effect size, have themselves been the subject of intensive criticism. While many of the early methodological weaknesses of this endeavour have been addressed and minimized, others have not and appear to be (as with the RCT itself), intrinsic and intractable, representing inherent and permanent limitations of these particular study designs. This is to say nothing of the inability of RCTs and meta-analyses to address questions of considerable clinical significance such as quality of life, patient satisfaction, patient values, patient expectations of care, rare side-effects of a treatment, long-term treatment toxicity, causes of illnesses, evaluation of diagnostic tests and prognostic research [114–118].

Many of these indices, especially those involving subjective assessment and non-qualitative analyses, are of enormous significance to ‘what it is to be a good doctor’ and it is unsurprising, perhaps, that while academics have become preferentially concerned (indeed obsessed) with the objective and quantifiable rather than the subjective and qualitative, the practising clinician is overwhelmingly concerned with both. Given this, it is surely the case that researchers should seek first to understand the priorities of practising clinicians as they relate to information urgently needed for clinical practice and then to design studies to answer these questions, with the particular study designs themselves being selected with reference to their likelihood to be able to answer the questions in mind. Far too often the reverse is the case, with the

research agenda of the EBM-HSR community being identified as a function of its ability to be tested by an RCT. This is to do nothing more than subordinate hypothesis to method and thus to make the servant the Queen. This insistence on the primacy of the RCT, given all that has been written above, is highly disappointing, especially in light of earlier papers by leading EBM advocates which suggested that the ‘hierarchy of evidence’ was being actively reconsidered [113].

The EBM-HSR community and practising clinicians – a cultural divide

We believe that there is a cultural divide between the EBM-HSR community and the medical community at large. Evidence of this divide was initially seen in the unsound judgement of the former to allow hyperbole and triumphalism to accompany the promulgation of EBM some fifteen years ago, with explicit descriptions of ‘active, evidence-based practitioners’ and ‘non-evidence based spectators of clinical practice’ [52]. Indeed, for further examples of a continuing cultural divide, the reader has to look no further than this current thematic issue with some authors talking of ‘evidence-based practitioners’ and ‘evidence-based users’, where former premises [52] remain intact, but where only the variables of tone and presentation appear altered. It is Nooraie and colleagues’ judgement, for example, that: ‘unfortunately, some of the information in doctors’ heads is out of date and may be wrong, new information may not have penetrated and the information may not be there to deal with patients with uncommon problems’ [49]. Similarly, de Smedt and associates [56] state openly ‘maybe some (doctors) are still in denial of the importance of this concept’. These approaches are hardly likely to engender a spirit of mutual appreciation and cooperation between doctors and health service researchers and are indicative of a cultural divide. Many more such examples could be cited if space allowed.

Perhaps doctors do not wish to: (i) be ‘practitioners’ or ‘users’ of the type of information EBM produces; (ii) fill their ‘heads’ with EBM information and allow it to ‘penetrate’; and (iii) accept EBM information as a sufficient basis for clinical practice and therefore are, yes, ‘in denial’, in the sense that they deny the relevance of EBM to their routine clinical practice and refuse to affirm its value in the absolute manner which the EBM-HSR community would like to see. We are not sociologists and it would therefore be absurd for us to develop this argument any further here. Suffice it is to say that we are convinced that there is clear evidence of a cultural difference between the EBM-HSR community and service clinicians which deserves further study and which requires rationalization if partnerships between these communities are to be successfully forged in the interests of health services development and patient care. We commented on this lack of impact of much of EBM-HSR activity almost 8 years ago in the JECPC [2], arguing that it could not be explained simply in terms of ‘recalcitrant’ doctors whose lack of cooperation in changing practice constituted the principal barrier to health services development. We argued then that HSR does not always address the problems that cause clinicians most difficulty within their daily practice and only infrequently presents proposals for research and the results of studies in a manner which clinicians can understand, trust and use. Many doctors continue to see much of the result of HSR available to them as not directly relevant to their practice and

a principal reason for this may be that insufficient collaboration occurs between HSR scientists and practising clinicians in the research planning stage. We argue now, again, that it is essential for the future that such collaboration takes place at all stages of the research cycle so that the difference priorities and value systems within which each group operates can be understood and reconciled. Such observations surely emphasize the imperative for shared priority setting in all future health services research [119,120].

EBM and the Cochrane Collaboration

There is little doubt that the methodological primacy ascribed to the RCT at the time of the promulgation of EBM [88,91] has been written into stone and held as infallible dogma, as it were, by the international Cochrane Collaboration. Conceived in 1992/1993 and operationalized soon afterwards [121,122], its mission has been to provide access to the 'best available evidence' for the making of clinical decisions. Notwithstanding the Collaboration's lack of scientific and clinical authority to distinguish the usefulness of one form of evidence over another in order to be able to privilege one type as 'best', the Collaboration has represented one of the most significant threats to good medical practice in the history of Medicine. How is it that we are able to make such a seemingly extraordinary claim? The authoritarianism of the Collaboration, which authoritarianism, in tolerating only research based on RCTs as able to contribute 'best evidence', dismisses 98% of the clinical and HSR literature as a whole as scientifically imperfect. In doing so, it attempts to direct an ideological shift in the understanding of what is acceptable science with the aim of changing settled understandings of scientific method and inquiry in clinical research away from philosophically tenable understandings towards the conclusion that only RCT-derived evidence 'counts'. As Holmes and colleagues [35] have said, this phenomenon is actively resulting in the elimination of many ways of knowing in Medicine. By virtue of this process, context in Medicine and the need to utilize evidence gathered from multiple and diverse sources to be able to practise effectively, are being increasingly eroded. Thus, context-specific and patient-centred medicine which we define unashamedly as 'traditional' and 'good' medicine, is gradually being replaced by impersonal, standardized medicine, that is to say, 'public health' – based medicine. Thus, in the name of 'efficiency, effectiveness and convenience', the Cochrane Collaboration simplistically supplants all heterogenous thinking with a singular and totalizing ideology, with the all embracing economy of such an ideology lending the Collaboration a profound sense of entitlement, a universal right, to control the scientific agenda [35]. Its monarchical claims of a 'right to be consulted' from primary care physicians' complexes and from hospital consultants' clinics and the expectation of the incorporation of its reviews into the construction of clinical practice guidelines advocated as the basis for routine clinical practice, raises many very serious and urgent concerns for the progress and development of clinical medicine. Indeed, if medical practice were to become firmly aligned with what the view of the Cochrane Collaboration believes it should be, then humanitarian medicine would be mutilated. It is precisely because clinical practice guidelines have the potential to codify the beliefs and approaches of the

EBM community and Cochrane Collaboration that we highlight them again as causes for particular concern.

EBM and clinical practice guidelines: ongoing concerns

The definition of what a clinical practice guideline is, is well known and we will therefore not repeat it here. For us, and for an increasing number of colleagues worldwide, there are principal concerns which demand considerable attention and study. Firstly, there is the whole question of how suggested treatment pathways based on general research evidence can be judged applicable to the individual patient in the context of the consultation, a field of research that remains in its infancy. Secondly, there is the question of the nature and types of evidence on which the guideline is based and how rigorously the process of guideline development has been followed. Thirdly, there is the question of the intellectual laziness that guidelines have the capacity to foster, particularly in newly qualified and inexperienced clinicians. Fourthly, there is the question of how guidelines can come to be used by the managerial classes in controlling the nature and delivery of clinical care to patients, a scenario that would have profound implications for medical professionalism. Fifthly, there is the medico-legal status of guidelines and how this will change over time.

Each one of these five major concerns warrants a series of papers in its own right and it is therefore clearly impossible for us to discuss our own thinking and to review that of others in detail under these headings within the confines of the current article. We will, however, confirm our belief that there are policies evolving which will seek to establish practice guidelines as the basis of care delivery in both primary and secondary care settings and where compliance with guidelines will be assessed through audit tools and divergences measured. If it is the local policy that divergences must not occur, except in situations where they are judged necessary for legal reasons by agencies external to the doctor–patient consultation, then coupling a doctor's employment contract or revalidation process to such a system is likely to increase compliance with it under current political and economic circumstances. The reduction of a doctor's options for treatment selection and use to those allowed by the guideline and none other, as a function of local cost containment or commissioner reimbursement agreements, against what international evidence and clinical judgement indicates is optimal for that patient, not only makes a mockery of some of the so-called founding principles of EBM, but more importantly it limits the quality of patient care and devastates Hippocratic notions of medical integrity and professionalism.

We can put our case no better or more succinctly than as has been outlined recently in an informal publication of the New England Research Institutes entitled 'Clinical guidelines: boon or threat?':

'We all know that things sometimes don't turn out as expected. This notion of 'unintended consequences' has a stellar pedigree in the social sciences – beginning students are taught to distinguish between the stated purpose or intent of social action, and their generally unrecognized but objective functional consequence. Max Weber's theory concerning the protestant ethic and the spirit of capitalism is but one classic example – that prevailing Calvinist doctrines had the unintended consequence of creating a climate conducive to the

accumulation of capital as a duty or end unto itself. To our knowledge, the theory has never been applied to a popular movement in modern health care – the development of clinical guidelines. NERI's Senior Vice President and Director John McKinlay suggests that 'while introduced with the best of intentions, clinical guidelines are reducing the complex art of doctoring to prescribed, formulaic, task-based activities'. One of the unintended consequences of such guidelines is the creation of conditions conducive to the replacement of primary care physicians. The greatest threat from clinical guidelines, however, comes from their reduction of primary care to a set of prescribed clinical tasks – a formula for the management of any particular case. Guidelines tend to simplify the complex 'art of doctoring' (a physician's sometimes metaphysical understanding of a patient's whole being and underlying psychosocial phenomena) and reduce the medical encounter to completion of preset tasks for an objectified case. Any sufficiently detailed guideline for managing disease X (a list of what ought to be done) opens the door for any appropriately trained health worker, or even a computer, to deliver the recommended procedures. As long as what is done fulfils the requirements of the formula, then quality medical care is deemed to have been delivered, irrespective of whether an individual, or even a computer, delivers it. As is so often the case, those intimately involved in the implementation of new programs are sometimes oblivious to their long-term unintended consequences. How paradoxical is it that primary care providers, who act with the very best intentions (improving the quality of care and reducing health care variations) are dramatically altering the nature of doctoring and creating, through guidelines, the seeds of their own demise as an independent profession? Sometimes things just don't turn out as expected'.

Typical funding sources for EBM initiatives: characteristics and implications

The advocates of EBM have proved able to continue with their programme of implementation via EBM workshops, medical teaching and practice guideline production through grants of major funding derived from governments. No independent scientific funding body or medical research council would countenance the award of grants in support of a practice which not only lacks a theoretical basis, but where even preliminary data showing a beneficial effect on clinical outcomes cannot be shown – and where reported reflections on the shortcomings of the technique by its advocates see them discussing its limitations not in terms of absence of theory or proof of benefit, but rather in terms of obstacles to its further operational implementation into health services.

Since attempts to win the hearts and minds of practising clinicians freely following the promulgation of EBM met initially with widespread revolt and with subsequent disinterest, a second attempt at implementation would necessarily involve coercion. This has been achieved incrementally and by stealth through increased collaborations with governments, a Faustian pact that has seen the protagonists of EBM become and remain the darlings of the managerial class. Government departments, staffed as they are by clinically unqualified politicians, political advisers, epidemiologists, economists and managers (as well as by doctors who

have become transmogrified from clinicians into managers, having lost or suspended their vocation to care as evidenced by their choice of career path) have an interest in a tool which has the very real potential to standardise clinical practice, limit its scope and contain or reduce its costs. Despite protestations that argue that EBM often increases costs, it can do so only in situations where national and local policy levers are unapplied and where the treatments concerned are shown by its own calculations to be cost-effective as well as clinically effective. When EBM tools, such as clinical practice guidelines, are developed with reference to specific limitations (allowing use of some medications, for example, but mandating the preclusion of others), when these guidelines are ordered for implementation and where divergences from them are linked to disciplinary measures (such as contract renewals and financial disincentives) the case will be very different indeed. We find it difficult to understand how self-respecting clinicians and scientists can achieve professional satisfaction through the leadership of, or involvement in, this linear process which is destined in our view to cause grave damage to the historic mission of Medicine, with a cost that is likely to lead to impoverished standards of care and the gradual conversion of thinking clinicians into healthcare operatives.

The evidentiary basis of EBM: no 'E' for EBM

A fundamental assumption of EBM, as Haynes [94] admits, is that doctors who practise it provide superior clinical care compared to those who do not. He equally admits that 'so far no convincing direct evidence exists that shows that this assumption is correct' [94]. Jenicek [108] agrees and he calls as have we ourselves many times previously, for a formal evaluation of EBM's impact in healthcare. It is noteworthy that the advocates of EBM have consistently avoided the organisation of, or involvement in, this most fundamental of scientific processes – the testing of an hypothesis. Instead, they have talked of the difficulties of doing so only very occasionally (showing no motivation to rise to the various methodological challenges in identifying RCT and non-RCT study designs for this purpose) and they remain content to point to proxy and surrogate markers of EBM's effects, such as the successful teaching of EBM, observations of clinicians' use of the EBM process, adherence to guidelines, consultations of the Cochrane database and other EBM resources, using a spurious form of probabilistic reasoning to argue for real and beneficial effects and even, on one occasion, extraordinarily citing the journalistic description of EBM as 'one of the most influential ideas of 2001', as an outcome measure (!) [94].

It is axiomatic that none of these measurement indices has any validity whatsoever as a clinical outcome indicator. EBM is, unequivocally, an intervention and an intervention that typically consumes substantial resources. It should therefore wish to, and certainly be expected to, justify its use of resources within healthcare resource scarce environments. It does not, and has not. It is staggering that in talking, in recent times only, of the limitations of EBM, its advocates do not cite this one, single fundamental and serious deficiency – the complete lack of an evidentiary basis of EBM. They instead see the limitations of EBM as the obstacles to its implementation, such as the lack of time of interested clinicians to conduct it, and the lack of interest of other clinicians to learn it.

EBM and public relations: the tables are turning

The protagonists of EBM have had, from the beginning, a desire to bring their concept to the attention of the masses, pushing the idea as a whole out of the medical and scientific arena, so that it traverses into the public and political domain. For our part, we applaud the efforts of doctors and scientists to secure the interest of the general public on matters which are of immediate and substantial importance to them, especially in an age which has seen the dominance of the Internet as a source of medical and health information and the creation of chairs in the public understanding of science in our leading universities. But there is a very great difference in educating the public (in the 'pros' and 'cons', as it were, of the EBM movement) and indoctrinating them (through the deliberate use of emotion and sensationalism). A thorough discussion of the history of the attempts of the EBM advocates to enlist the lay public in the support of their movement is far beyond the scope of this Editorial Introduction and Commentary, as fascinating as such an excursion would be. Suffice it is, however, to remind the reader of one of the earliest attempts at sensationalism [123] and to point him to more recent excitement within the EBM Community at the appearance of an article on EBM published in the *New York Times Magazine* [124] and the publication of an explanation in the British newspaper *The Times* of the epidemiological concept of the Number Needed to Treat (NNT) [125], a calculation that can no doubt be expected to lead the public into orgasmic delight with cries for more of the same.

It is certainly true, we feel, that the advocates of EBM have quietly but assiduously attempted to control the very terms by which the public faithfully understands 'integrity' and 'truth' in Medicine [30]. Indeed, the word 'evidence' has become a politically loaded term, carrying as much, if not more, moral and emotional than intellectual weight [11,24,28,126]. That the concept and practice of EBM has generated one of the longest and most heated debates in the history of Medicine is a fact that is not at all as public as it should be. We believe, however, that signs are appearing which indicate that it is at last becoming so. As more and more doctors engage with the popular press in the writing of medical articles on a scale not hitherto seen, so it will be that concepts such as EBM will be more fully understood in terms of their underlying limitations as well as in terms of their advertized strengths. As Dr Bernadine Healy, former Director of the USA National Institute of Health has said, evidence-based medicine has the ring of scientific authority, but it is not as self-evident as it sounds, having its own ideological and political agenda separate from its clinical purpose [127]. If patients were not now beginning to understand the limitations of EBM, they would have been 'none the wiser' about its potentially deleterious influences on the standards of their care and their degree of access to medical services. But, indeed, patients *are* now far more educated, aware and understanding of the real issues. Indeed, they are increasingly aware that EBM systems, by virtue of their ignoring, discarding or devaluing of clinical judgement and more than 90% of the medical literature through selective use of very particular study designs, force individual patients, one at a time, into a 'one-size-fits-all straightjacket', ironically when both human genomics and informed patients are demanding more tailored and personal prescription for care [48,128,129]. Healy's call for EBM, given its limitations, to be integrated into Medicine and not to be at odds with it, will surely

resonate with most informed patients. Needless to say, Healy's intellectually honest article met with an entirely standard refutation from the EBM camp, under the title 'misunderstandings, misperceptions and mistakes' [90], confirming that while the concept of EBM has been forced to change, the personality of the 'EBMer' has most certainly not [87].

In discussing the now exponentially growing interest of the public in the nature and circumstances of their care and how an increasing number of formal publications are being directed to the public and its 'expert patients' in this context, we are reminded of a very recent volume sent to the JECF for formal consideration of learned book/essay review. The volume, by Jerome Groopman, is already receiving considerable interest from patients, being aimed primarily at them rather than a medical audience and having been made first available via an *initial* print run of 250 000 copies. Groopman's volume [129], which, like Montgomery's text [128] has been [48], will be the subject of a forthcoming detailed analysis in the JECF, is clear on the subject of EBM. Given that this volume is being digested by a very large number of patients, carers and health journalists as we write, we quote Groopman here *verbatim* and at length:

'Clinical algorithms can be useful for run-of-the-mill diagnosis and treatment – distinguishing strep throat from viral pharyngitis, for example. But they quickly fall apart when a doctor needs to think outside their boxes, when symptoms are vague, or multiple and confusing, or when tests results are inexact. In such cases – the kinds of cases where we most need a discerning doctor – algorithms discourage physicians from thinking independently and creatively. Instead of expanding a doctor's thinking, they can constrain it ... Similarly, a movement is afoot to base all treatment decisions strictly on statistically proven data. This so-called evidence-based medicine is rapidly becoming the canon in many hospitals. Treatments outside the statistically proven are considered taboo until a sufficient body of data can be generated from clinical trials. Of course, every doctor should consider research studies in choosing a therapy. But today's rigid reliance on evidence-based medicine risks having the doctor choose care passively, solely by the numbers. Statistics cannot substitute for the human being before you; statistics embody averages, not individuals. Numbers can only complement a physician's personal experience with a drug or a procedure, as well as his knowledge of whether a 'best' therapy from clinical trial fits a patient's particular needs and values. Each morning as rounds began, I watched the students and residents eye their algorithms and then invoke statistics from recent studies. I concluded that the next generation of doctors was being conditioned to function like a well-programmed computer that operates within a strict binary framework. After several weeks of unease about the students' and residents' reliance on algorithms and evidence-based therapies alone, and my equally unsettling sense that I didn't know how to broaden their perspective and show them otherwise, I ask myself a simple question: How should a doctor think?'

Does Groopman have some sort of axe to grind against the EBM community? Or could it be, quite simply, that his sheer wealth of medical knowledge and contextual clinical experience has led him to a purely honest and commonsense position which he now wishes to communicate to patients in terms that they have come to understand? Well, we shall have to wait to see what patients think

in our new age of greater public understanding of medical and scientific issues. As for us, we feel confident that patients will now come to see through the obscurantist rhetoric of EBM, that they will reject the 'fool's gold of EBM', and that they will increasingly demand highly personalized medical services, litigating if they do not. Will such developments see the 'screaming baby of EBM consigned to the formaldehyde of medical history' [53]? Again, we shall surely have to wait to see, but if through such a process the JECP will have precipitated a 'fall' of EBM into its place as a potential tool, rather than a dominant ethos within Medicine, then we will indeed have cause, in the interests of medical and scientific progress, for no small celebration.

Conclusion

Is it any wonder then, that when observing all of the above, and in being perfectly aware of the intrinsic deficiencies of the study designs favoured as sources of information by EBM, that the majority of practising clinicians continue, 15 years later, to show little appetite for this now hardly new concept as shown by their 'contented ignorance' of much of classic EBM terminology? We think not. Is it surprising, then, that there is so little uptake of, and 'compliance' with, practice guidelines when doctors are more than aware of their limitations and frequent inapplicability to the individual case within the context of the consultation? We think not. It is extraordinary, then, that clinicians should wish to utilize sources of evidence wider than those uniquely privileged by EBM and to combine them with patient preferences, values, intuition, empathy and compassion as part of the exercise of clinical judgement in making sound clinical decisions with and for their individual patient? Again, we think not. When EBM begins to understand and address these matters, and all of the accumulated philosophy, science, art and humanity that underpins them, it may then, in parallel, begin to become of limited use, adding value to the historic mission of Medicine, rather than continually opposing it.

References

- Miles, A., Bentley, P., Polychronis, A. & Grey, J. E. (1997) The limits of evidence-based medicine. *Journal of Evaluation in Clinical Practice*, 3, 83–86.
- Miles, A., Bentley, P., Polychronis, A., Grey, J. E. & Price, N. (1998) Recent progress in health services research: on the need for evidence-based debate. *Journal of Evaluation in Clinical Practice*, 4, 257–265.
- Miles, A., Bentley, P., Polychronis, A., Grey, J. E. & Price, N. (1999) Advancing the evidence-based healthcare debate. *Journal of Evaluation in Clinical Practice*, 5, 97–101.
- Miles, A., Charlton, B. G., Bentley, P., Polychronis, A., Grey, J. E. & Price, N. (2000) New perspectives in the evidence-based healthcare debate. *Journal of Evaluation in Clinical Practice*, 6, 77–84.
- Miles, A., Bentley, P., Polychronis, A., Grey, J. E. & Melchiorri, C. (2001) Recent developments in the evidence-based healthcare debate. *Journal of Evaluation in Clinical Practice*, 7, 85–89.
- Miles, A., Grey, J. E., Polychronis, A. & Melchiorri, C. (2002) Critical advances in the evaluation and development of clinical care. *Journal of Evaluation in Clinical Practice*, 8, 87–102.
- Miles, A., Grey, J. E., Polychronis, A., Price, N. & Melchiorri, C. (2003) Current thinking in the evidence-based health-care debate. *Journal of Evaluation in Clinical Practice*, 9, 95–109.
- Miles, A., Grey, J. E., Polychronis, A., Price, N. & Melchiorri, C. (2004) Developments in the evidence-based health-care debate – 2004. *Journal of Evaluation in Clinical Practice*, 10, 129–142.
- Miles, A., Polychronis, A., Grey, J. E. & Melchiorri, C. (2006) The evidence-based health care debate – 2006, Where are we now? *Journal of Evaluation in Clinical Practice*, 12, 239–247.
- Miles, A. & Loughlin, M. (2006) The progress and price of EBM. *Journal of Evaluation in Clinical Practice*, 12, 385–398.
- Tonelli, M. (2006) Integrating evidence into clinical practice: an alternative to evidence-based approaches. *Journal of Evaluation in Clinical Practice*, 12, 248–256.
- Djulbegovic, B. (2006) Evidence and decision making. *Journal of Evaluation in Clinical Practice*, 12, 257–259.
- Miettinen, O. S. (2006) Evidence-based medicine, case-based medicine; scientific medicine, quasi-scientific medicine. *Journal of Evaluation in Clinical Practice*, 12, 260–264.
- Porta, M. (2006) Five warrants for medical decision making: some considerations and a proposal to better integrate evidence-based medicine into everyday practice. *Journal of Evaluation in Clinical Practice*, 12, 265–268.
- Lipman, T. (2006) Evidence and casuistry. *Journal of Evaluation in Clinical Practice*, 12, 269–272.
- Tanenbaum, S. J. (2006) Evidence by any other name. *Journal of Evaluation in Clinical Practice*, 12, 273–276.
- Sa Couto, J. (2006) Can we forget how to treat patients? *Journal of Evaluation in Clinical Practice*, 12, 277–280.
- Upshur, E. G. (2006) The complex, the exhausted and the personal: reflections on the relationship between evidence-based medicine and casuistry. *Journal of Evaluation in Clinical Practice*, 12, 281–288.
- Loughlin, M. (2006) The future for medical epistemology? *Journal of Evaluation in Clinical Practice*, 12, 289–291.
- Malterud, K. (2006) The social construction of general knowledge – the context of culture and discourse. *Journal of Evaluation in Clinical Practice*, 12, 292–295.
- Gupta, M. (2006) Beyond 'evidence'. *Journal of Evaluation in Clinical Practice*, 12, 296–298.
- Geanellos, R. & Wilson, C. (2006) Building bridges: knowledge production, publication and use. *Journal of Evaluation in Clinical Practice*, 12, 299–305.
- Buetow, S. (2006) Opportunities to elaborate on casuistry in clinical decision making. *Journal of Evaluation in Clinical Practice*, 12, 427–432.
- Tonelli, M. R. (2007) Advancing a casuistic model of clinical decision making: a response to commentators. *Journal of Evaluation in Clinical Practice*, 13, 504–507.
- Straus, S. E., Richardson, W. S., Glasziou, P. & Haynes, B. R. (2005) Evidence-Based Medicine: How to Practice and Teach EBM. Edinburgh: Elsevier.
- Tonelli, M. R. (1998) The philosophical limits of evidence-based medicine. *Academic Medicine*, 73, 234–240.
- Djulbegovic, B., Morris, L. & Lyman, G. H. (2000) Evidentiary challenges to evidence-based medicine. *Journal of Evaluation in Clinical Practice*, 6, 99–109.
- Gupta, M. (2007) What's in a name? A commentary on Tonelli (2007) 'Advancing a casuistic model of clinical decision-making: a response to commentators'. *Journal of Evaluation in Clinical Practice*, 13, 508–509.
- Miettinen, O. S. (2007) Rationality in medicine. A commentary on Tonelli (2007) 'Advancing a casuistic model of clinical decision making: a response to commentators'. *Journal of Evaluation in Clinical Practice*, 13, 510–511.
- Murray, S. J., Holmes, D., Perron, A. & Rail, G. (2007) No exit? Intellectual integrity under the regime of 'evidence' and 'best-practices'. *Journal of Evaluation in Clinical Practice*, 13, 512–516.

31. Loughlin, M. (2007) Style, substance, Newspeak 'and all that': a commentary on Murray *et al.* (2007) and an open challenge to Goldacre and other 'offended' apologists for EBM. *Journal of Evaluation in Clinical Practice*, 13, 517–521.
32. Couto, J. (2007) Where is Sancho? A commentary on Murray *et al.* (2007) 'No exit? Intellectual integrity under the regime of "evidence" and "best practices"'. *Journal of Evaluation in Clinical Practice*, 13, 522–523.
33. Miettinen, O. S. & Miettinen, K. S. (2007) A commentary on Murray *et al.* (2007) 'No exit? Intellectual integrity under the regime of "evidence" and "best practices"'. *Journal of Evaluation in Clinical Practice*, 13, 524–525.
34. Buetow, S. (2007) Yes, to intellectual integrity, but without the Sartrean existentialist attitude: a commentary on Murray *et al.* (2007) 'No exit? Intellectual integrity under the regime of "evidence" and "best practices"'. *Journal of Evaluation in Clinical Practice*, 13, 526–528.
35. Holmes, D., Murray, S. J., Perron, A. & Rail, G. (2006) Deconstructing the evidence based discourse in health sciences: truth, power and facism. *International Journal of Evidence Based Healthcare*, 4, 180–186.
36. Goldacre, B. (2006) Objectionable 'objectives'. *The Guardian*. 19 August 2006.
37. Couto, J. (1998) Evidence-based medicine: a Kuhnian perspective of a transvestite non-theory. *Journal of Evaluation in Clinical Practice*, 4, 267–275.
38. Foucault, M. (1977) Intellectuals and power: a conversation between Michel Foucault and Gilles Deleuze. In: *Language, Counter-Memory, Practice: Selected Essays and Interviews* (ed. D. F. Bouchard), pp. 205–217. Ithica, NY: Cornell University Press.
39. Foucault, M. (1997) *The Politics of Truth*. New York: Semiotext.
40. Miettinen, O. S. & Flegel, K. M. (2003) Professionalism in medicine. *Journal of Evaluation in Clinical Practice*, 9, 353–356.
41. Biswas, R., Umakanth, S., Strumberg, J., Martin, C. M., Hande, M. & Nagra, J. S. (2007) The process of evidence-based medicine and the search for meaning. *Journal of Evaluation in Clinical Practice*, 13, 529–532.
42. Hodgkin, P. (1996) Medicine, postmodernism, and the end of certainty. *British Medical Journal*, 313, 1561–1568.
43. Soltani, A. & Moayeri, A. (2007) Deterministic versus evidence-based attitude towards clinical diagnosis. *Journal of Evaluation in Clinical Practice*, 13, 533–537.
44. Davidoff, F., Case, K. & Fried, P. W. (1995) Evidence-based medicine: why all the fuss? *Annals of International Medicine*, 122, 727.
45. Upshur, R. (2007) A Physician's Self-Paced Guide to Critical Thinking. *Journal of Evaluation in Clinical Practice*, 13, 538–539.
46. Loughlin, M. (2007) A Physician's Self-Paced Guide to Critical Thinking. *Journal of Evaluation in Clinical Practice*, 13, 540–544.
47. Jenicek, M. (2006) *A Physician's Self-Paced Guide to Critical Thinking*. Chicago, IL: American Medical Association Press.
48. Miles, A. (2007) Science: a limited source of knowledge and authority in the care of patients. *Journal of Evaluation in Clinical Practice*, 13, 545–563.
49. Nooraie, R. Y., Shakiba, B., Hejri, S. M. & Soroush, A. R. (2007) Sources of knowledge in clinical practice in postgraduate medical students and faculty members: a conceptual map. *Journal of Evaluation in Clinical Practice*, 13, 564–568.
50. Nooraie, R. Y., Rashidian, A., Keating, J. L. & Schonstein, E. (2007) Teaching evidence-based practice: the teachers consider the content. *Journal of Evaluation in Clinical Practice*, 13, 569–575.
51. Akl, E., Maroun, N., Neagoe, G., Guyatt, G. & Schunemann, H. (2006) EBM user and practitioner models for graduate medical education: what do residents prefer? *Medical Teacher*, 28, 192–194.
52. Rosenberg, W. M. C. & Donald, A. (1995) Evidence-based medicine: an approach to clinical problem solving. *British Medical Journal*, 310, 1122–1126.
53. Miles, A., Bentley, P., Polychronis, A. & Grey, J. E. (1997) Evidence-based medicine: why all the fuss? This is why. *Journal of Evaluation in Clinical Practice*, 3, 83–86.
54. Shuval, K., Shachak, A., Linn, S., Brezis, M. & Reis, S. (2007) Evaluating primary care doctors' evidence-based medicine skills in a busy clinical setting. *Journal of Evaluation in Clinical Practice*, 13, 576–580.
55. Shuval, K., Berkovits, E., Netzer, D., Hekselman, I., Linn, S., Brezis, M. & Reis, S. (2007) Evaluating the impact of an evidence-based medicine educational intervention on primary care doctors' attitudes, knowledge and clinical behaviour: a controlled trial and before and after study. *Journal of Evaluation in Clinical Practice*, 13, 581–598.
56. de Smedt, A., Buyl, R. & Nyssen, M. (2007) Knowledge on evidence-based practice: self-assessment by primary care workers. *Journal of Evaluation in Clinical Practice*, 13, 599–600.
57. Hader, J. M., White, R., Lewis, S., Foreman, J. L. B., McDonald, P. W. & Thompson, L. G. (2007) Doctors' views of clinical practice guidelines: a qualitative exploration using innovative theory. *Journal of Evaluation in Clinical Practice*, 13, 601–606.
58. Graham, I. D., Brouwers, M., Davies, C. & Tetroe, J. (2007) Ontario doctors' attitudes toward and use of clinical practice guidelines in oncology. *Journal of Evaluation in Clinical Practice*, 13, 607–615.
59. Dahan, R., Borkan, J., Brown, J., Reis, S., Hermoni, D. & Harris, S. (2007) The challenge of using the low back pain guidelines: a qualitative research. *Journal of Evaluation in Clinical Practice*, 13, 616–620.
60. Cheng, L., Nieman, L. Z. & Becton, J. L. (2007) Changes in perceived effect of practice guidelines among primary care doctors. *Journal of Evaluation in Clinical Practice*, 13, 621–626.
61. Grol, R., Dalhuijsen, J., Thomas, S., Veld, C., Rutten, G. & Mokkink, M. (1998) Attributes of clinical guidelines that influence use of guidelines in general practice: observational study. *British Medical Journal*, 317, 858–861.
62. Cabana, M. D., Rand, C. S., Powe, N. R., Wu, A. W., Wilson, M. H., Abboud, P. C. & Rubin, H. R. (1999) Why don't physicians follow clinical practice guidelines? A framework for improvement. *Journal of the American Medical Association*, 282, 1458–1465.
63. Solberg, L. I., Brekke, M. L., Fazio, C. J., Fowles, J., Jacobsen, D. N., Kottke, T. E., Mosser, G., O'Connor, P. I., Ohnsorg, K. A. & Rolnick, S. J. (2000) Lessons from experienced guideline implementors: attend to many factors and use multiple strategies. *Journal of Quality Improvement*, 26, 171–188.
64. Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P. & Kyriakidou, O. (2004) Diffusion of innovations in service organisations: systematic review and recommendations. *Milbank Quarterly*, 82, 581–629.
65. Sheldon, T. A., Cullum, N., Dawson, D., Lankshear, A., Lowson, K., Watt, I., West, P., Wright, D. & Wright, J. (2004) What's the evidence that NICE guidance has been implemented? Results from a national evaluation using time series analysis, audit of patients' notes and interviews. *British Medical Journal*, 329, 999.
66. Ketola, E., Toropainen, E., Kaila, M., Luoto, R. & Makela, M. (2007) Prioritizing guideline topics: development and evaluation of a practical tool. *Journal of Evaluation in Clinical Practice*, 13, 627–631.
67. Guo, Y., Adelstein, B. & Rubin, G. (2007) Availability and development of guidelines in a tertiary teaching hospital. *Journal of Evaluation in Clinical Practice*, 13, 632–638.
68. Mercier, C., Boissel, J. P., Esteve, J., Iwaz, J. & Nony, P. (2007) New tools to measure discrepancy between prescribing practices and guideline recommendations. *Journal of Evaluation in Clinical Practice*, 13, 639–646.
69. McWhirter, E., Yogendran, G., Wright, F., Dranitsaris, M. & Clemons, M. (2007) Baseline radiological staging in primary

- breast cancer: impact of educational interventions on adherence to published guidelines. *Journal of Evaluation in Clinical Practice*, 13, 647–650.
70. Touzet, S., Refabert, L., Letrilliart, L., Ortolan, B. & Colin, C. (2007) Impact of consensus development conference guidelines on primary care of bronchiolitis: are national guidelines being followed? *Journal of Evaluation in Clinical Practice*, 13, 651–656.
 71. Hurdowar, A., Graham, I. D., Bayley, M., Harrison, M., Wood-Dauphinee, S. & Bhogal, S. (2007) Quality of stroke rehabilitation clinical practice guidelines. *Journal of Evaluation in Clinical Practice*, 13, 657–664.
 72. Bostrom, A., Wallin, L. & Nordstrom, G. (2007) Evidence-based practice and determinants of research use in elderly care in Sweden. *Journal of Evaluation in Clinical Practice*, 13, 665–673.
 73. van Driel, M. L., Stichele, V. R., DeMaeseneer, J., De Sutter, A. & Christiaens, T. (2007) Medical evidence and health policy: a marriage of convenience? The case of proton pump inhibitors. *Journal of Evaluation in Clinical Practice*, 13, 674–680.
 74. Ann Scott, N., Moga, C., Barton, P., Rashid, S., Schopflocher, D., Taenzer, P. & Harstall, C. (2007) Creating clinically relevant knowledge from systematic reviews: the challenges of knowledge translation. *Journal of Evaluation in Clinical Practice*, 13, 681–688.
 75. El-Dib, R. I., Atallah, A. N. & Andriolo, R. B. (2007) Mapping the Cochrane evidence for decision making in health care. *Journal of Evaluation in Clinical Practice*, 13, 689–692.
 76. Shahar, E. (2007) Commentary: interpreting the interpretation. *Journal of Evaluation in Clinical Practice*, 13, 693–694.
 77. Kottow, M. H. (2007) Should research ethics triumph over clinical ethics? *Journal of Evaluation in Clinical Practice*, 13, 695–698.
 78. Shahar, E. (2007) On editorial practice and peer review. *Journal of Evaluation in Clinical Practice*, 13, 699–701.
 79. Estabrooks, C. A., Floyd, J. A., Scott-Findlay, S., O'Leary, K. A. & Gushta, M. (2003) Individual determinants of research utilization: a systematic review. *Journal of Advanced Nursing*, 43, 506–520.
 80. Estabrooks, C. A. (2003) Translating research into practice: implications for organizations and administrators. *Canadian Journal of Nursing Research*, 35, 53–68.
 81. Gerrish, K. & Clayton, J. (2004) Promoting evidence-based practice: an organizational approach. *Journal of Nursing Management*, 12, 114–123.
 82. Buetow, S. (2004) Why the need to reduce medical errors is not obvious. *Journal of Evaluation in Clinical Practice*, 11, 53–57.
 83. Buetow, S., Upshur, R., Miles, A. & Loughlin, M. (2006) Taking stock of evidence-based medicine: opportunities for its continuing evolution. *Journal of Evaluation in Clinical Practice*, 12, 399–404.
 84. Upshur, R., Buetow, S., Loughlin, M. & Miles, A. (2006) Can academic and clinical journals be in financial conflict of interest situations? *Journal of Evaluation in Clinical Practice*, 12, 405–409.
 85. Guyatt, G. H. (1991) Evidence-based medicine. *Annals of Internal Medicine*, 114 (Suppl), A–16.
 86. Polychronis, A., Bentley, D. P. & Miles, A. (1996) Evidence-based medicine: Reference? Dogma? Neologism? New orthodoxy? *Journal of Evaluation in Clinical Practice*, 2, 1–3.
 87. Polychronis, A., Bentley, D. P. & Miles, A. (1996) The protagonists of EBM: arrogant, seductive and controversial. *Journal of Evaluation in Clinical Practice*, 12, 9–12.
 88. Evidence-Based Medicine Working Group (1992) Evidence-based medicine: a new approach to teaching the practice of medicine. *Journal of the American Medical Association*, 268, 2420–2425.
 89. Straus, S. E. (2004) What's the E for EBM? *British Medical Journal*, 328, 535–536.
 90. Straus, S., Haynes, B., Glasziou, P., Dickersin, K. & Guyatt, G. (2007) Misunderstandings, misperceptions and mistakes. *Evidence-Based Medicine*, 12, 2–3.
 91. Sackett, D. L., Richardson, W. S., Rosenberg, W. & Haynes, R. B. (1997) Evidence-Based Medicine: How to Practise and Teach EBM. New York: Churchill Livingstone.
 92. Guyatt, G. H., Meade, M. O., Jaeschke, R. Z., Cook, D. J. & Haynes, R. B. (2000) Practitioners of evidence-based care. Not all clinicians need to appraise evidence from scratch but all need some skills. *British Medical Journal*, 320, 954–955.
 93. Straus, S. E. & McAlister, F. A. (2000) Evidence-based medicine: a commentary on common criticisms. *Canadian Medical Association Journal*, 163, 837–841.
 94. Haynes, R. B. (2002) What kind of evidence is it that Evidence-Based Medicine advocates want health care providers and consumers to pay attention to? *BMC Health Services Research*, 2, 3.
 95. Kuhn, T. S. (1970) *The Structure of Scientific Revolutions*, 2nd Edn. Chicago, IL: University of Chicago Press.
 96. Harari, E. (2001) Whose evidence? Lessons from the philosophy of science and the epistemology of medicine. *Australian and New Zealand Journal of Psychiatry*, 35, 724–730.
 97. Sehor, S. R. & Stanley, D. E. (2003) A philosophical analysis of the evidence-based medicine debate. *BMC Health Services Research*, 3, 14.
 98. Chalmers, A. J. (1999) *What Is This Thing Called Science?*. Indianapolis, IN: Hackett Publishing.
 99. Denzin, N. K., Lincoln, Y. S. & Giardina, M. D. (2006) Disciplining qualitative research. *International Journal of Qualitative Studies in Education*, 19, 769–782.
 100. Cohen, A. M., Stavri, P. A. & Hersh, W. R. (2004) A categorization and analysis of the criticisms of evidence-based medicine. *International Journal of Medical Informatics*, 73, 35–43.
 101. Charlton, B. G. & Miles, A. (1998) The rise and fall of EBM. *Quarterly Journal of Medicine*, 91, 371–374.
 102. Goldenberg, M. J. (2006) On evidence and evidence-based medicine: lessons from the philosophy of science. *Social Science and Medicine*, 62, 2621–2632.
 103. Jenicek, M. (1995) *Epidemiology. The Logic of Modern Medicine*. Montreal: EPIMED International.
 104. Jenicek, M. (2001) *Clinical Case Reporting in Evidence-Based Medicine*, 2nd Edn. London and New York: Arnold and Oxford University Press.
 105. Jenicek, M. (2003) *Foundations of Evidence-Based Medicine*. Boca Raton, FL: The Parthenon Publishing Group/CRC Press.
 106. Jenicek, M. & Hitchcock, D. (2005) *Evidence-Based Practice. Logic and Clinical Thinking in Medicine*. Chicago, IL: American Medical Association Press.
 107. Jenicek, M. (2006) Evidence-based medicine: fifteen years later. Golem the good, the bad and the ugly in need of a review? *Medical Science Monitor*, 12, RA241–RA251.
 108. Loughlin, M. (2002) *Ethics, Management and Mythology. Rational Decision Making for Health Service Professionals*. Oxford: Radcliffe Medical Press.
 109. Jenicek, M. (2006) The hard art of soft science. *Journal of Evaluation in Clinical Practice*, 12, 410–419.
 110. Reilly, B. M. (2004) The essence of EBM. *British Medical Journal*, 329, 911–912.
 111. Goodman, K. (2003) *Ethics and Evidence-Based Medicine. Fallibility and Responsibility in Clinical Science*. Cambridge: Cambridge University Press.
 112. Borry, P., Schotsmans, P. & Dierickx, K. (2006) Evidence-based medicine and its role in ethical decision making. *Journal of Evaluation in Clinical Practice*, 12, 312–318.
 113. Sackett, D. L. & Wennberg, J. E. (1999) Choosing the best research design for each question. *British Medical Journal*, 315, 2027.
 114. Worrall, J. (2002) What evidence in evidence-based medicine? *Philosophy of Science*, 69, S316–S330.

115. Cartwright, N. (2007) Are RCTs the gold standard? *Biosocieties*, 2, 11–20.
116. Concato, J., Shah, N. & Horwitz, R. (2000) Randomised controlled trials, observational studies and the hierarchy of research designs. *New England Journal of Medicine*, 342, 1887–1892.
117. Benson, K. & Hartz, A. J. (2000) A comparison of observational studies and randomised controlled trials. *New England Journal of Medicine*, 342, 1878–1886.
118. Pocock, S. J. & Elbourne, D. R. (2000) Randomised trials or observational tribulations? *New England Journal of Medicine*, 342, 1907–1909.
119. Donaldson, M. S. (1988). Institute of Medicine. Statement on Quality of Care. National Roundtable on Health Care Quality. Washington, DC: National Academy of Sciences.
120. Craig, J. C., Irving, L. M. & Stockler, M. R. (2001) Evidence-based medicine: useful tools for decision making. *Medical Journal of Australia*, 174, 248–253.
121. Chalmers, I., Dickersin, K. & Chalmers, T. C. (1992) Getting to grips with Archie Cochrane's agenda. *British Medical Journal*, 305, 786–788.
122. Chalmers, I. (1993) The Cochrane Collaboration: preparing, maintaining and disseminating systematic reviews of the effects of health care. *Annals of the New York Academy of Sciences*, 703, 156–163.
123. House of Lords (1995) Minutes of Evidence Taken Before the Select Committee on Science and Technology. Subcommittee 1: medical research and the NHS reforms, session 1994–1995, 31 January 1995. London: HMSO.
124. Hitt, J. (2001) Evidence-based medicine. *New York Times Magazine*. 9 December 2001.
125. Hopcroft, K. (2003) Why the drugs don't work. *The Times*, 13 December 2003.
126. Rodwin, M. A. (2001) The politics of evidence-based medicine. *Journal of Health Politics, Policy and Law*, 26, 439–446.
127. Healy, B. (2006) *Who say's what's best*. United States News and World Report. Available at: <http://www.usnews.com/usnews/health/articles/060903/11healy.htm> (accessed 3 September 2006). Printed version September 11, 2006.
128. Montgomery, K. (2006) *How Doctors Think. Clinical Judgement and The Practice of Medicine*. Oxford: Oxford University Press.
129. Groopman, J. (2007) *How Doctors Think*. New York: Houghton Mifflin Company.