If not evidence, then what? Or does medicine really need a base?

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Abstract
This essay analyses the concept of ‘base’ in relation to its use in evidence-based medicine (EBM). It evaluates the extent to which evidence provides a sufficient base for health care to rest and discusses whether medicine needs a base, and, if so, what are the other possible candidates. This paper will argue that EBM is linked epistemologically to the theory of foundationalism and shows how important criticisms of EBM emerge from anti-foundationalist epistemologies and interpretive frameworks. Drawing from recent writings in the philosophy of science, it is argued that there is a need to see multiple perspectives relevant to the practice and understanding of medicine.

Introduction
Evidence-based medicine (EBM) is defined as ‘the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients’ (Sackett et al. 1996). Despite the success of the dissemination of the concept of ‘evidence-based health care’ there are several aspects of the movement that remain problematic. Critics have argued that evidence-based approaches represent a narrow reductionism that ignores clinical judgement and experience and that evidence-based approaches foster an inappropriate reliance on epidemiology and statistical methodology, particularly a dogmatic adherence to the randomized control trial (RCT) (Miles et al. 1997, 1998, 1999, 2000, 2001; Charlton 1997; Tonelli 1998). Others argue that evidence-based approaches neglect the true underlying issue that relates to what and how physicians and health care workers know (Tanenbaum 1993; Malterud 1995). That empirical studies have not shown conclusively the superiority of evidence-based approaches is regarded as an important and telling fault for a theory based on the primacy of research evidence (Norman 1999).

These perceptions may stem from a legitimate concern over what counts as evidence in the first place. (Feinstein & Horwitz 1997, Miettinen 1998) The priority given to the application of research-based evidence over clinical knowledge in practice, and the limitation of what constitutes evidence in the current evidence-based paradigm to what can be expressed as a probability are two additional problems (Miller & Safer 1993, Upshur 1999). Furthermore, in early conceptions of evidence-based medicine, values are conceived either in opposition to evidence or are relegated to footnote considerations.

However, it is clear that at each level of decision-making, values are regarded as crucial components of appropriate health care. The existence of large grey zones in clinical practice underscores the importance of eliciting and respecting patient values and openly acknowledging uncertainty. (Naylor 1995) As Pelligrino has noted, evidence enters any discourse in health care as a means of testing assertions and providing support for arguments. As there is a dimension of persuasion inherent in the use of evidence, it has an inescapable moral dimension. Therefore, Pelligrino recognizes the need to develop a theory of evidence that inquires into the existence, nature and kinds of evidence that exist (Pelligrino 1999).

The tension between values and evidence points out a neglected aspect of the EBM debate. The
concept of a ‘base’ has remained relatively unanalysed. Therefore, it can be asked: To what extent can evidence serve as a base for the practice of medicine or health care? This essay will analyse the concept of a base, and evaluate the extent to which evidence provides a sufficient base for health care to rest on, and discuss whether medicine needs a base, and if so, what are other possible candidates. This paper will argue that EBM is linked epistemologically to the theory of foundationalism and show how important criticisms of EBM emerge from anti-foundationalist epistemologies. The implications of a rapprochement between these two perspectives will be outlined in the conclusion.

What is a ‘base’?
Our inquiry will begin by considering the etymology and meaning of the term ‘base’. The *Oxford English Dictionary* provides the following distinct senses to the term:

- the lowest or supporting part, e.g. fundamental principle, foundation, groundwork, ground of action, attitude;
- the main or most important ingredient, looked upon as its most important part;
- that from which a commencement of action or reckoning is made, regarded as a fundamental starting point;
- figurative senses: low-borne, etc.

Clearly, the first three senses are germane to how EBM was originally self-conceived. The major thrust behind the call for a move towards EBM is an argument that intuition, experience, pathophysiology and authority are insufficient grounds for basing clinical decisions. Rather, the point of departure should be the use of clinically relevant research that has been critically appraised via the application of formal rules of evidence. Hence, evidence would be the starting point, the fundamental principle and foundation for action.

There has been a vigorous debate in the philosophy of science and epistemology concerning the foundations of knowledge. From the perspective of epistemology, EBM can be regarded as a species of foundationalism. Foundationalism is a general term for theories of knowledge that support the belief in the pursuit of incorrigible, secure or infallible knowledge. Originating in its modern form in Cartesian rationalism or in empiricism, the goal of science is the creation and justification of this secure knowledge. Such secure knowledge forms the basis for adequate belief and action. For EBM advocates, evidence, in the form of well-designed clinical studies, provides sufficient reason to support belief and action. It is in this sense, I believe, that the term ‘base’ is intended to operate in the name ‘evidence-based medicine’.

Why evidence cannot be a base
In a previous paper I argued that medical evidence has certain distinct properties. (Upshur 2000). It is important to distinguish evidence from truth. Evidence may, in fact, be true, but it is not necessarily so. Evidence in medicine is provisional and capable of being overturned, modified, refuted or superceded by better evidence. It is finite in its application and utility. Indeed, there is a very important sense in which evidence exists to become obsolete. Therefore, if it is the evidence itself, that is, the results of the clinically based, critically appraised studies, that is to be the foundation of medicine, then it is an ephemeral and transitory base at best. It is a foundation set in shifting sands.

Furthermore, there are difficulties in the timely provision of appropriately rigorous evidence for clinical decision making. As Saver and Kalafut (2001) recently demonstrated, evidence of the optimal combination of agents to treat Alzheimer’s disease would require 127 randomized trials, 63 500 patients and 286 years, and ischaemic stroke 31 trials, enrolling 186 000 patients and lasting 155 years. They argue that there are marked limitations in the ability of clinical trials to interrogate varied treatment combinations to determine the most effective treatment strategy and that the extent of this problem is vastly underestimated. In this sense, research evidence may ultimately be provided to answer the particular clinical question at hand, but there is no guarantee or necessity that such studies are available at the time a clinical decision must be made.

Clearly, then, the process of EBM must be separated from the product or results of clinical research. If it is not the results of clinical research studies that are to supply the foundation of medicine, then it
must be the process of practising EBM (defining the problem; constructing and conducting an efficient search to locate the best evidence; critically appraising the evidence; and applying it in the context of clinical care) that defines its status as a base. Empirical evidence, and the sentiments of EBM practitioners themselves, indicate that the process of EBM is not likely to be foundational in the sense originally intended.

Empirical studies, particularly in the context of primary care, have consistently pointed out that EBM is problematic. Some studies indicate a belief that evidence-based practice is impracticable given the restraints and constraints of actual practice (McColl et al. 1998, Cranney et al. 2001). Empirical studies show that clinicians fear that reliance on evidence alone will endanger the physician–patient relationship (Butler et al. 1998) or mistrust the authority of those proposing evidence-based solutions (Beaulieu et al. 1999). More profoundly, some have suggested that the assumptions on which evidence-based health care is based are not consistent with the manner in which clinicians behave or think (Tomlin et al. 1999). From the perspective of nursing, concern with effectiveness obscures the underlying mission of the profession (Mitchell 1999). From the perspective of policy making, it is recognized that many other inputs besides evidence are required for decision making and the fit between evidence and the needs of policy makers may be poor (Willison & MacLeod 1999).

There are also statements by proponents of EBM indicating that the general applicability of the process of EBM may be limited. As Guyatt et al. (2000a) write:

Because of the amount of time required to make ‘from scratch’ evidence-based decisions, evidence-based practitioners will often not succeed in reviewing the original literature that bears on a clinical dilemma they face. Thus, two reasons exist why training evidence-based practitioners will not, alone, achieve evidence-based practice. Firstly, many clinicians will not be interested in gaining a high level of sophistication in using the original literature, and, secondly, those who do will often be short of time in applying these skills. (p. 955)

It is hard to imagine a similar argument being advanced for history taking or physical examination skills, that practitioners would be uninterested in gaining high-level proficiency or would lack the time to apply them. Surely something foundational requires proficiency. If general proficiency is not a requirement for practitioners, then it is difficult to imagine how the process of EBM can provide a base for medicine. Furthermore, if the process of EBM, as it seems to be evolving, becomes more oriented to directing practitioners to use pre-appraised and secondary evidence resources, and distinguishing ‘evidence users’ from ‘evidence-based practitioners’, then authority has once more supplanted critical rationality as the base for medicine.

It must be recognized that there is already an admission from advocates of EBM that ‘evidence is never enough’. The last instalment of the Users’ Guides to the Medical Literature (Guyatt et al. 2000b, p. 1292) recognized the importance of context, patient preferences and values in making clinical decisions, conceding that eliciting and incorporating them ‘constitutes an enormously challenging frontier for EBM’. The limitations of evidence-based approaches in elucidating values and reasoning with values at the clinical and resource allocation level have led to arguments suggesting that evidence is an insufficient basis for this essential dimension of decision-making. (Singer 1997; Norheim 1999) There are few decisions in medicine and health care that are value or preference neutral. Furthermore, it is stated that clinical experience and expertise are required for evidence to be applicable in practice.

As Guyatt et al. (2000b) write:

... Knowing the tools of evidence-based practice is necessary, but not sufficient for delivering the highest quality patient care. In addition to clinical expertise, the clinician requires compassion, sensitive listening skills, and broad perspectives from the humanities and social sciences. These attributes allow understanding of patients’ illnesses in the context of their experience, personalities and culture. (p. 1293)

From the above arguments it can be seen that there is no sense in which evidence, either as an object or as a process, can serve as a base or foundation for medicine and health care. McAllister and Strauss (2000), in their defence of EBM, fail to address these issues and challenges substantially and argue that EBM is a model of care with limitations.
This concession, though, leaves unanswered how evidence can be a base for health care. That being said, the question remains as to whether medicine needs a base and if so, what form should it take.

**If not evidence, then what?**

In response to the emergence of EBM, several commentators have argued for the importance of including qualitative dimensions of clinical practice as constitutive of the base for medical practice. Examples of these include narrative-based medicine (Greenhalgh 1999), context-sensitive medicine (Greenhalgh & Worrall 1997), interpretive grammar (Horton 1998), clinical jazz (Shaughnessy et al. 1998) and tacit knowing (Malterud 2001). A common theme among these approaches is the need to overcome the dualism between facts and values and appreciate the complex interplay of values, perceptions and beliefs that frame how medicine is practiced. The focus on interpretation, subjectivity, natural language and qualitative methods highlights dimensions of practice that escape the methods of EBM.

Interpretive approaches, though, include a diverse spectrum of methods drawing from the humanities and social sciences. The call for the integration of interpretive approaches is likely to lead to a move from the metaphor of a uniform base for medicine as the consideration of the qualitative domain acknowledges multiplicity of perspectives and meanings.

Greenhalgh’s (1999) comments typify the interpretive approach. She writes:

> . . . It is only within such an interpretive paradigm that a clinician can meaningfully draw on all aspects of evidence, his or her own case based experience, the patient’s individual and cultural perspectives, and the results of rigorous clinical research trials and observational studies to reach an integrated clinical judgement. (p. 325)

What form should that interpretive paradigm take? Horton’s vision of interpretive medicine is rooted in a concern for close attention to the process of reasoning. Drawing on the work of the British philosopher Stephen Toulmin, Horton argues that physicians lack the reasoning skills necessary to interrogate arguments in a critical manner. Furthermore, he makes the claim that the argument is the fundamental unit of medical thought. The focus on argumentation, then, places the concept of interpretive medicine into the tradition of logical analysis. This roots the foundation of medical reasoning in cognitive, explicit and rationally justified forms of discourse.

Horton’s focus on the logic of argumentation, though, is in marked contrast to phenomenological approaches to medical knowing advocated by Malterud and Shaugnessy. Malterud argues that quantitative and qualitative approaches should be regarded as complimentary approaches in health care research. Following the philosopher Michael Polanyi, Malterud argues for the importance of the tacit dimension of human knowing, part of which cannot always be made explicit. Similarly, Shaugnessy et al. (1998) argue that the knowledge gained from experience is more intuitive, informal and less amenable to explicit analysis. They call for a model of clinical reasoning based on the metaphor of jazz, tolerating uncertainty and improvisation and sensitive to the chaos of the clinical context.

Interpretive approaches, then, are neither uniform, nor united. They move the concept and image of medicine to the post-modern and post-normal. In epistemological terms, Horton to the contrary notwithstanding, they are manifestations of anti-foundationalism. Anti-foundationalism rejects the existence of objective, eternal, certain knowledge. This is made apparent in the concepts of medicine associated with post-modernism, post-normal theory and complexity theory.

Post-modern medicine, as argued by Gray (1999), is characterized by relativism, contingency and plurality of meaning. It is suspicious of science and the interests that lurk beneath research. A post-modern health orientation is concerned with values as much as evidence, risk rather than benefit and empowerment of the consumer. Kernick and Sweeney (2001) find the concept of post-modern medicine to be too restrictive and call for the consideration of post-normal medicine. Post-normal medicine, in their view, ‘is holistic, reflecting diversity, rich interactions and complex dynamics: a meta view of which the nihilism of post-modernity is seen merely as a limited gaze’ (Kernick and Sweeney 2001, p. 357) Plsek and Greenhalgh (2001) argue that clinical practice, organization, information management, research,
education and professional development are interdependent and built around multiple self-adjusting and interacting systems. In these complex systems, unpredictability and paradox are inherent to the process, and some things will remain unknowable. They believe that new conceptual frameworks that incorporate a dynamic, emergent, creative and intuitive view of the world must replace traditional ‘reduce and resolve’ approaches to clinical care and service organization.

Clearly these varieties of anti-foundationalism will not permit a reductionist strategy to prevail. Anti-foundationalism pushes medicine away from simplistic conceptions of science and its relationship to human values and systems. The question arises as to whether this move to anti-foundationalism in some way diminishes the scientific integrity of medicine, or in some way stands in opposition to the aims of medicine.

Conclusion: does medicine need a base?

This paper has argued that evidence cannot be a base for medicine and that advocates of EBM have conceded as such. It has been further shown, from an anti-foundationalist standpoint, that medicine and health care are not in need of a single solid foundation, but can operate well in a dynamic emergent framework. The sharp division between the foundationalists and anti-foundationalists is a long-standing one, part of a series of categorical distinctions like science and art, fact and value, that seem to polarize intellectual debate. Wulff (1999) has written that these distinctions represent two cultures in medicine, with the former taking as its point of departure the physical sciences and the latter arising from the humanities with its focus on meaning. These cultures need not necessarily stand in opposition, but can be integrated. (Upshur et al. 2001, Upshur 1999).

The argument that medicine does not need a base may strike some as overly relativistic, nihilistic and antiscientific. However, this is far from the case. The call for a secure foundation for knowledge is a laudable one that has exercised a profound hold on Western intellectual life. The idea that any one discipline or practice is more fundamental in medicine, and that time and energy should be devoted to discovering and articulating this, is probably misplaced.

Recent writers in the philosophy of science have articulated promising directions for understanding science that have implications, as yet unexplored, for the philosophy of medicine and the EBM debate. Philip Kitcher, in a recent book, Science, Truth and Democracy, argues that there is no sharp conflict between facts and values. There is a legitimate sense in which the views of society can direct the goals of science as there is an important and ineradicable sense in which culture, societal norms, historical limitations and human interests shape the agenda and conduct of science (Kitcher 2001). Yet Kitcher is not a relativist. Arguing from a perspective of ‘modest realism’, Kitcher argues that there should be consideration of value in the creation of science. The goal of a democracy is to permit the inclusion of the preferences of citizens in setting the agenda of the scientific enterprise. This is evidently so for health care as health is as much human aspiration as scientific fact.

Peter Galison, in his book Image and Logic, sets out a conceptual framework for interdisciplinary understanding in a complex scientific culture. Examining the history of particle physics in the 20th century, he argues that physics has advanced due to the interactions of heterogeneous disciplines, including theorists, experimenters, engineers, mathematicians, statisticians, architects and colleagues, all making contributions at various times to the vision and practice of science. The title reflects the disunity of method between those striving to visualize physical properties of subatomic matter through instrumentation and experiment and those wishing to explain subatomic matter through ideal models expressed through mathematics. Galison describes the various contributors as subcultures and drawing from linguistics and anthropology shows how through the metaphor of a ‘trading zone’, a common ground and language develops among the subcultures and local agreed-upon knowledge is established.

How does this relate to the evidence-based debate? Galison’s analysis is a profound one in that it recognizes diversity of disciplines, the contexts in which they operate and interact, and the manner in which knowledge and research change and evolve. As he writes:

My question is not how different scientific communities pass like ships in the night. It is rather how, given the extraordinary diversity of the par-
Participants in physics-cryogenic engineers, radio chemists, algebraic topologists, prototype tinkerers, computer wizards, quantum field theorists – they speak to each other at all. And the picture (to the extent one simplifies and flattens it) is one of different areas changing over time with complex border zones that sometimes vanish, coalesce and even burgeon into quasi autonomous regions in their own right. (Galison 1997, p. 63)

Health care similarly has a breathtaking diversity of participants and an even wider ambit of disciplines. The introduction of evidence-based approaches can be seen as the attempt to introduce a new language or approach in health care. In the ensuing debates, a trading zone has emerged in which the concepts of EBM have been vigorously contested and, as noted above, transformed in the interplay of disciplinary discourse. EBM will likely continue to be influential and popular but on analysis it is but one voice in a larger chorus. Neither evidence nor values alone provide a sufficient base for health care, and it is perhaps appropriate that we do not seek one.

Galison, in his concluding comments, cites the image of a cable as the metaphor for the emergence of a scientific enterprise. Gallison quotes C.S. Peirce, who regarded the progress of science as trusting the multitude of arguments (and methods) rather than a single method, so that:

Its reasoning should not form a chain which is no stronger than its weakest link, but a cable whose fibres may be ever so slender, provided they are sufficiently numerous and intimately connected. With its intertwined strands, the cable gains its strength, not by having a single golden thread that winds its way through the whole. No one golden strand defines the whole.

(Galison 1997, pp. 843–844)

Evidence, then, is no golden thread. The task of understanding knowledge in health care is to understand and appreciate how the intertwining disciplinary threads relate to and give strength to the modern enterprise of medicine. In this vision, the contexts of practice, experiences and narratives of practitioners and patients, the basic and clinical sciences, values and societal perspectives are not banished to subsidiary places beneath the throne of evidence, but conceived as integral elements of a larger process.

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References


Guyatt G.H., Haynes R.B., Jaeschke R.Z. et al. (2000b)


