

The problem of evidence-based medicine: directions for social science

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Abstract

Evidence-based medicine (EBM) is arguably the most important contemporary initiative committed to reshaping biomedical reason and practice. The move to establish scientific research as a fundamental ground of medical decision making has met with an enthusiastic reception within academic medicine, but has also generated considerable controversy. EBM and the broader forms of evidence-based decision making it has occasioned raise provocative questions about the relation of scientific knowledge to social action across a variety of domains. Social science inquiry about EBM has not yet reached the scale one might expect, given the breadth and significance of the phenomenon. This paper contributes reflections, critique and analysis aimed at helping to build a more robust social science investigation of EBM. The paper begins with a “diagnostics” of the existing social science literature on EBM, emphasizing the possibilities and limitations of its two central organizing analytic perspectives: political economy and humanism. We further explore emerging trends in the literature including a turn to original empirical investigation and the embrace of “newer” theoretical resources such as postmodern critique. We argue for the need to move the social inquiry of EBM beyond concerns about rationalization and the potential erasure of the patient and, to this end, suggest new avenues of exploration. The latter include analysis of clinical epidemiology and clinical reason as the discursive preconditions of EBM, the role of the patient as a site for the production of evidence, and the textually mediated character of EBM.

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Introduction

Evidence-based medicine (EBM), the project of reshaping biomedical practice by creating an organizing presence for clinical research within medical decision making, has taken the health care world by storm. The storm gathered quickly. The term evidence-based medicine was coined less than 15 years ago by a group of clinical epidemiologists working out of McMaster University in Hamilton, Canada. With characteristic rhetorical enthusiasm, the members of the McMaster

group announced EBM as a new “paradigm for medical practice” (*Evidence-based Medicine Working Group, 1992, p. 2420*). They criticized clinical decision making based on individual experience as hopelessly out of date. The way forward, the McMaster group heralded, was EBM—an approach to clinical activity based on careful review and application of the best and most current clinical research literature. Subsequent statements by members of the group incorporated clinical experience into the EBM mix, but without fundamentally altering its defining features (see *Sackett & Haynes, 1995; Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996; Sackett, Straus, Richardson, Rosenberg, & Haynes, 2000*).

From these not so humble beginnings, EBM has grown into one of the most important and successful

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initiatives to recompose contemporary biomedical reasoning and practice. The evidence-based movement, as some have described it (Pope, 2003), has been met with remarkable enthusiasm on the part of the elites in academic medicine. EBM has been formally incorporated into editorial policies, has spawned new journals and approaches to reporting biomedical research, and is now routinely taught throughout medical schools in North America, the UK and parts of Western Europe. Even more impressively, EBM has extended its reach well beyond the domain of medicine proper. Nursing, the allied health professions, health administrators and policy makers are all fast at work rearticulating their areas of practice as evidence-based domains. Research and policy institutes committed to EBM have been established across the globe, and evidence-based decision making has emerged as a recurring organizing theme of health-care policy conferences. Recently, a colleague, remarking on the enthusiasm for evidence within health care, noted that we live in a time of “evidence-based everything.”

Social scientists have been slow to respond to the rapid rise of EBM and the issues it presents. We lag behind our counterparts in medicine who have developed a lively critical discussion that ranges from a broad philosophical criticism of EBM to more specific concerns about its implications for the integrity of individual clinical judgement (e.g. Charlton & Miles, 1998; Feinstein, 1994; Schattner & Fletcher, 2003; Straus & McAlister, 2000; Tonelli, 1998; Upshur, 2002).

It is not that social scientists have been caught unaware. Work has been done on the relationship of EBM to various forms of rationalization (Berg, 1997a,b). Empirical studies have been conducted on such topics as the social construction of evidence in accident prevention (Green, 2000), practitioners' interpretations of evidence in pediatrics (Timmermans & Angell, 2001) and the play of evidence in physicians' prescribing practices (Armstrong, 2002). Social scientists have explored EBM's implications for health-care policy (Clark & McEldowney, 2000; Harrison, 1998; Niessen, Grijseels, & Rutten, 2000). A number of critical commentaries have also been written focused on such issues as evidence-based medicine's reliance on faulty notions of medical consensus (Walker & Jacobs, 2002), its viability as a strategy for sustaining collective autonomy of the medical profession (Denny, 1999), its relation to new forms of standardization in medicine (Timmermans & Berg, 2003) and its rapid dispersal across the health professions (Trinder & Reynolds, 2000).

This emerging literature unsettles the characteristic service relation of social science to medicine, opening up a space for treating EBM as an object of critical inquiry, rather than as something to which social science must necessarily contribute. But it is very much in the early

stages of development. Critical and independent social science discussion of EBM is still sporadic, with individual contributions not well articulated with one another. The extent of social science analysis of EBM has not yet reached a scale one might expect given the breadth and significance of the phenomenon, nor has the full range of potential inquiry of EBM been exploited.

This article encourages a broader scope for social scientific inquiry of evidence-based medicine. We begin by exploring and commenting on the analytic character of contemporary social science work on EBM. We do not claim to treat that work in an exhaustive fashion, nor do we offer a traditional topical review of the literature. Instead, we identify and discuss the central forms of analysis that have been deployed in social science inquiry around EBM. We want to explore and reflect on how social science thought on EBM has been articulated and structured in relation to key analytic approaches. We examine the possibilities and limits of these approaches and suggest new theoretical resources and research problematics that have been under-exploited in the literature.

The paper begins with a discussion of two central and, at times, overlapping forms of social science analysis of EBM: political economy and humanism. We then turn to work drawing on “newer” theoretical resources and discuss recent examples of empirical research that deal with EBM and clinical reasoning. The paper closes by outlining the possibilities for new avenues of investigation, namely analysis of clinical epidemiology and clinical reason as the discursive preconditions of EBM, the role of the patient as a site for the production of evidence, and the text-mediated character of EBM. Overall, our hope is to contribute thoughts and reflections that will help to build a more robust social science inquiry of EBM.

Political economy

Social scientists have been quite eager to understand EBM as a political phenomenon, generally relying on the analytic resources of the political economy tradition to do so. This is not surprising. Political economy, by which we mean those forms of neo-Marxist analysis that explore the relation of the social, political and cultural to the organization of capitalist economies (Armstrong, Armstrong, & Coburn, 2001), is arguably the most popular form of scholarly critique of contemporary macro-relations of health care in English language social science. In North America, the UK and elsewhere, political economy perspectives have been foundational to forms of analysis that treat new developments in the health-care field as effects of structural changes in state/capital/professional relations (Armstrong & Armstrong, 2002; Leys, 2001; Light, 2001; Navarro, 1993, 2002).

Political economy produces a characteristic style of analysis of evidence-based medicine. The EBM movement is typically framed by political economy adherents as a constituent of institutional transformations in health care and of contests for power associated with the neoliberal restructuring of the welfare state. Discussions tend to be rather grand, organized as abstract critique of EBM rather than as empirical research of particular cases of its development or use.

Ideology critique represents one important strand of the political economy treatment of EBM. Denny (1999), for example, argues that EBM should be seen as an ideological resource that the medical profession uses to buttress its authority, primarily by reinforcing the scientific character of medical practice. EBM also gets analyzed as a movement that serves the interests of capital by focusing on the fate of the individual patient to the exclusion of the social and environmental factors that place individuals at the risk of disease (Willis & White, 2001). While we oversimplify somewhat, these framings of EBM rely on an established analysis of power within political economy research, whereby EBM is positioned as a kind of ideological tool used by established corporate actors in pursuit of their interests.

Even more common than the critique of EBM as ideology is a thread of political economy-based argument that views EBM as part of the rationalization of health services. This way of making sense of EBM is informed by a longstanding concern about the growing penetration of health care by market relations. It also relies on the established conceptual resources of political economy research on health care, most notably, medical dominance, a state-centered conception of power, and the analytic triumvirate of state/capital/professions. What results are arguments that enter EBM into politics as an instrument of rationalization that destabilizes medical authority.

For example, writing from the context of Ontario, Canada, Rappolt (1997) and Coburn, Rappolt, and Bourgeault (1997) argue that the promotion of evidence-based practice guidelines should be interpreted as a part of state efforts to restrict both the economic and clinical autonomy of the medical profession. These authors locate EBM and practice guidelines, in particular, within a trajectory of state policies that draw on population-based knowledges to reduce the utilization of medical services. From this perspective, evidence-based guidelines are considered a form of external control over the content of medical work that ties physicians' decision-making practices to fiscal imperatives. In a related fashion, Rodwin (2001) positions EBM within forms of numerically based aggregate knowledge that corrode individual medical judgement and render it vulnerable to administrative control. Given his concern with managed care in the US context, Rodwin does not link EBM so much with state control as with the private rationaliza-

tion of medical services. As the argument goes, given the market organization of managed care, the promotion of a scientific practice of medicine founded on population-based research is easily transformed into the development of a business knowledge of pathways and protocols that restricts physician judgement and transfers power from physicians to a new class of medical managers.

Analyses of evidence-based medicine written from a political economy perspective are helpful sources of discussion that explore how EBM is implicated in the broad organization of health care. They offer the important insight that during times of cost control EBM, particularly in association with outcomes research, can render medicine vulnerable to administrative scrutiny, either at the hands of state authorities or private enterprise. However, there are limits to the political economy approach. Much of the political economy research on EBM is empirically thin and pitched at high levels of abstraction. Arguments about the role evidence-based medicine plays in rationalization tend to be overstated and are expressed as claims about the external control of medicine writ large. The literature's rhetorical gestures involve broad characterizations of numerically based knowledge that have an almost "anti-numbers feel", and that tend to overstate the subsumption of EBM within a bluntly formulated economic or administrative squashing of medical judgement. One wonders, for example, in respect of Rappolt et al.'s arguments, how evidence-based practice guidelines can be taken to represent a serious restriction of clinical autonomy in Ontario. What the authors term the practice guidelines movement never quite gathered steam in the province, was not state-sourced, and produced voluntary guidelines that had no enforcement mechanism.

The problem with the analytic of political economy is its limited capacity to address questions about the relationship between the exercise of power and the organization of formal discourses of knowledge. EBM is about the mutual articulation of scientific knowledge and clinical and related action across a variety of sites. It conjoins science and decision making through the routines of a pedagogical practice. Political economy analysis that treats EBM as part of a justificatory regime or that focuses narrowly on the "protocol" (Berg, 1997b) through an imported Taylorist vocabulary does not well address EBM's specificity as a knowledge relation.

Political economy discussions of EBM and rationalization processes collapse EBM and outcomes/cost-effectiveness research within an overall project of rationalization directed by health-care management. Yet, EBM gives itself goals quite distinct from cost-effectiveness and the corporate or state management of health care. It is about attaching the evidence of

randomized clinical trials to decision-making in clinical practice through the skilled readings of independent physicians. The project it announces does not necessarily coincide with budgetary rationales.

Moreover, as Denny (1999) notes, EBM may bolster professional autonomy rather than subordinate it to managerial demands. To simply collapse its knowledge practices into managerialism or health services research misses this key point. The relation of EBM to health services research and health management is something to be investigated rather than read off the category of outcomes research. National and regional variations in the relation between evidence-based medicine and health services research, health policy and health management should be put to the test of empirical research. In the Canadian context, the absence of private health-maintenance organizations and the presence of publicly funded health care may, for instance, provide the basis for a greater autonomy of EBM from managerial imperatives than in the American case. Specific attention to the social organization of evidence-based decision making within differing systems of health care is needed (Tanenbaum, 1996). This is not an argument for apolitical naivety, but an invitation to recognize and study more carefully the play of forces among evidence-based medicine, health services research, and health-care management.

Some of political economy's conclusions about EBM might also be nuanced by a further turn to careful ethnographic research. A close examination of the local settings in which the texts and routines of EBM are produced and enacted might help to unsettle the "protocol equals restriction of medical autonomy" trope of political economy research. Recent studies by Berg, Horstman, Plass, and Van Heusden (2000), Timmermans and Angell (2001) and Mykhalovskiy (2001) move partly in this direction by suggesting the multiple forms of rationality inherent in guidelines, as well as a multiplicity of protocol forms that can intend different organizational and medical courses of action. These studies advance a different model of human action than is implied by political economy by detailing how the local enactment of guidelines relies not on a closure of judgement but on a capacity for flexibility and modification of their parameters.

Further studies of this sort are needed. Folding EBM into an established trajectory of analysis focused on the struggle for power amongst capital, the state and the medical profession relegates EBM to the analytic status of tool or resource. Other ways of thinking about power, particularly those that address how knowledge is implicated in the neoliberal governance of the professions (Castel, 1991; Osborne, 1993), might dovetail well with more careful empirical scrutiny of the full range of programmatic initiatives within EBM (e.g. critical appraisal, structured abstracts, systematic reviews).

The results will produce a more complex understanding of the knowledge mechanics of EBM and how they are implicated in contemporary relations of power in health care.

Humanism

A second important analytic perspective organizing social science inquiry into EBM is medical humanism. A particularly influential article written from this perspective is Frankford's (1994) "Scientism and Economism in the Regulation of Health Care." Frankford situates evidence-based medicine within a longer history of technologically influenced practice: "... the increased reliance of western medicine on technology tends to reduce patients to technological objects and physicians to technocratic managers" (Frankford, 1994, p. 776). In this reading, EBM strips patients of their stories and the meaning of their experience, reducing them to passive recipients of doctor-centered communications. This critique is performed in the name of holism and against the fragmentation and reification of the subject. The ideal physician is positioned as a listener and counsellor who, by recognizing that people have life contexts and are not "scientific objects" (Frankford, 1994, p. 785), is able to alleviate their suffering.

In a fashion similar to the political economy critique, the medical humanist opposition to EBM frequently makes no clear distinction between health services research and EBM (Belkin, 1997; Frankford, 1994; Tanenbaum, 1994), framing both within the regime of managed health care. EBM and health services research are treated as 'outcomes research' based on quantitative, probabilistic analysis of large populations. Managed health care is viewed as removing decision making in clinical practice from the discretionary power of individual physicians, thereby undermining professional freedom. Thus, from a humanist position, EBM is also perceived as implicated in a current rationalization of health care that is done in the name of cost-cutting and efficiency. Humanists further argue that managed health care attempts to give technical solutions to what should properly be political debates over the direction of the health system, making these questions into a matter of expertise to resolve through population-based research. Situated in this way, EBM is construed as subverting the integrity of clinical reasoning and doctor-patient communication, subordinating these to health-system goals that have not been decided upon through due democratic process.

Medical humanists are above all concerned with doctor-patient communication. They are troubled that evidence-based medicine does not take sufficient account of patient values, nor has it a concept of alternative patient choices that might influence treatment decisions.

The design of randomized clinical trials, it is felt, makes their outcomes difficult to generalize over a diverse and heterogeneous patient population. Doctor-centered rather than patient-centered, EBM stands accused of failing to provide for human experience.

In brief, medical humanism interprets evidence-based medicine as erasing and ignoring the patient. A similar critique focused on EBM's impoverished model of doctor–patient communication has been articulated within medicine itself (Jacobson, Edwards, Granier, & Butler, 1997; Kassirer, 1994; Rogers, 2002). These critiques fail to recognize that EBM, rather than erasing the patient, puts new demands on her/him. Through EBM, patients enter into new relations with physicians, relations mediated by scientific evidence. An example of new evidence-mediated communication is the patient decision aid. While varied in form and content, decision aids typically provide patients with probabilistic information about risk factors and treatment outcomes for chronic or life-threatening diseases such as cancer (O'Connor, 1999). They are designed to bridge the world of patient values and scientific evidence, helping patients to weigh the risks and benefits of having a surgical procedure such as a mastectomy or of choosing one treatment option over another. In this way, decision aids enter the regime of evidence into patients' own deliberations about their health. They construct patients as a locus of decisions to be made on the basis of evidence presented or refereed by physicians. Evidence is not monopolized by physicians. Within contemporary biomedicine, patients are actively recruited into its circulation. Models of patient erasure fail to recognize this activity and are thus unable to diagnose what dangers these new evidentiary practices—based on the notion of patients as rational choice actors—might present.

At a more general level, medical humanists view EBM through the lens of “technological oppression” (Frankford, 1994). This is what historians of the present, working from a Foucauldian analytic perspective, would term a negative theory of power, by which is meant a way of understanding power as operating through negation, shutting down, and deduction (Foucault, 1980, pp. 81–91). The selective enabling of the patient that evidence-based medicine effects is occluded from this theoretical location. A positive theory of power is more apt. Modern forms of power are productive, seeking empirical knowledge of that which they act on so as to optimize them. Power operates through the cultivation of desire rather than its destruction. The positive model of power sees it as constituting subjects, for instance, evidentiary subjects, both physicians and patients, rather than destroying them, though destruction of many kinds is found within regimes of positive power. EBM is not the power of no; it operates through incitement rather than oppression. Positive

power has its own cruelties, but access to their analysis is barred rather than enabled through the concept of oppression.

The model of proper human exchange in doctor–patient communication offered by medical humanism is itself based on a hermeneutic model of the subject derived from psychology and older confessional practices. It is not a universally desired form of human communication, but a culturally specific model of interaction that assumes that patients want deep disclosure. The specific power effects of authority figures demanding extensive self-disclosure from patients is left unexamined, concealed under the cosy cloak of the ‘human.’ Medical humanism calls for a practice that constitutes subjects presupposed as desiring self-revelation; doctor and patient interpret patient self-revelation as therapeutic. This too is a practice constituting subjects that meets its limit in working class distrust of psy discourse, cultures that place positive value on being inexplicit, and physicians who restrict their questioning out of concern for patient privacy. Humanism provides no time out from power.

A number of authors inside and outside medical humanism have called for a combination of its approach with that of evidence-based medicine. Bensing (2000), who does not identify as a medical humanist, notes an absence of concern with evidence in patient-centered approaches, and a reciprocal absence of concern with patients in EBM. The historian Fox (1994) emphasizes that medical humanism and evidence-based medicine responded to the problematizing of health in terms of equity during the 1960s and thus have much in common. Voices of reconciliation seeking to harmonize the two positions are present.

New analytic voices: postmodernist approaches and the turn to empirically based research

Medical humanism and political economy do not exhaust the analytic scope of current social science inquiry of evidence-based medicine. A postmodernist critique of EBM has begun to appear, for example. Drawing on deconstruction, the critique of scientific meta-narratives, discourse analysis and related analytic strategies, commentators such as Traynor (2000) and Wood, Ferlie, and Fitzgerald (1998) have redirected the medical humanist critique of the unexamined objectivism and scientism within EBM. Rather than preserving or rehabilitating the subject, their work aims to destabilize the authority of EBM's knowledge claims.

Traynor (2000) examines two strategies of persuasion that he argues are found in EBM: a rhetoric of purity that promotes self-identity and status claims to ‘holiness,’ and ‘conversion’ narratives of doctors who found the light and now practice EBM. In this satirical article,

Traynor reads the heavy scientific rationalism of evidence-based medicine as saturated with religious discourse, a move intended to undermine its strategies of disqualifying other forms of medicine as unscientific. While Traynor acknowledges that evidence-based medicine has been increasingly concerned with the place of the patient in evidence-based practice, he does not address the systematic moves made within EBM to govern patients in their freedom by configuring the patient as a choice-maker.

Wood, Ferlie and Fitzgerald (1998), on the other hand, perform a double critique informed by actor-network theory and deconstruction against what they take to be an internal binary in evidence-based medicine, namely, the split between objective facts rendered by randomized clinical trials and the unsystematized knowledge of clinical practice. From the perspective of actor-network theory, they note the insufficiency of EBM's 'knowledge transfer' models, preferring the concept of 'translation' as a practice that forms and concert the interests of disparate collective actors. Secondly, in common with the work of Timmermans and Berg (1997), they argue that clinical practice is not an activity that simply attaches research to a local worksite. Practice is not empty; it is a meaning-making activity that adapts research to local uses. However, the empirical cases used by Wood, Ferlie and Fitzgerald fit their arguments poorly, as they do not illustrate evidence-based knowledge-transfer activities. EBM and health services research have developed a series of techniques for 'knowledge transfer', including the cultivation of local 'opinion leaders,' academic detailing, and the production of new texts for quick reading by clinical practitioners, all deserving social science analysis (Haines & Donald, 1998; Sheldon, Guyatt, & Haines, 1998).

A further development of interest in the literature is the sign of an emerging discussion of how EBM is implicated in practices of reasoning in clinical judgement. A formative contribution to this discussion is Gordon's (1988) important article "Clinical Science and Clinical Expertise: Changing Boundaries between Art and Science in Medicine." Gordon's article appeared prior to the time when the term 'evidence-based medicine' was coined, but was specifically interested in the rise of clinical epidemiology and associated attempts to intervene in clinical judgement so as to make it "more rational, explicit, quantitative and formal" (1988, p. 258). Contrary to this model of reasoning, Gordon argues that expert reasoning becomes highly intuitive after an initial stage of explicit learning.

The later studies of Tanenbaum (1994), Timmermans and Angell (2001) and Armstrong (2002) are unusual in the social science literature on evidence-based medicine in being based on primary empirical research. Tanenbaum's (1994) ethnographic and interview research

examines the interaction of probabilistic, evidence-based reasoning with deterministic, cause-and-effect reasoning in clinical practice. Timmermans and Angell's (2001) wide-ranging interview study of pediatric residents explores the relationship between EBM and medical uncertainty in clinical work. Armstrong's (2002) interview study explores the tensions between EBM and patient-centered medicine at the point of family physicians' prescribing practices.

Timmermans and Angell isolate two subgroups of residents differing in their uses of evidence, 'librarians' and 'researchers.' Librarians scan a variety of sources to solve problems at hand, but do not engage in critical appraisal of the literature; they conform to prior reading practices within medicine. The researchers engage in critical appraisal, disregard studies not meeting its design protocols, and use the resulting studies to create new distinctions in clinical decision-making. Systematic use of research-based evidence was less apparent in Armstrong's study of how family physicians introduce new anti-depressants into their prescribing repertoires. Armstrong's respondents described a gradual process of becoming familiar with new drugs that involved only "vague recollections of reports in medical journals" (2002, p. 1772).

In describing how the formal rationality of EBM connects with clinical reasoning, both studies move towards a more complex understanding of EBM's relationship to clinical practice than is currently available within the EBM corpus or its humanist and political economy critique. Armstrong describes how population-based information assumes a background relevance within a process of mini-experimentation, as new drugs are entered into physicians' existing prescribing repertoires through a process of modification to address individual patient circumstances. Timmermans and Angell advance the term "evidence-based clinical judgement" to suggest a combination of evidence and clinical experience requiring epidemiological knowledge and interpersonal skills in dealings with patients and other practitioners, a way of "managing uncertainties during residency training" (2001, p. 355).

Timmermans and Angell's account further situates evidence-based reading practices in institutional chains of authority and shows the local creativity in the practice of evidence-based medicine, as the understanding of evidence permits modifications of protocols and guidelines. Armstrong's account emphasizes the tensions between patient-centered medicine and clinical trials-based evidence, posing questions about the capacity of a codified and rule-based rationality to overcome the indeterminacy of clinical practice. Both studies break with the stereotypes of evidence-based medicine as a heartless application of scientific knowledge to the verdancy of patient experience, stereotypes that tend to abstract critique of an object little known.

New avenues of inquiry

Evidence-based medicine is a phenomenon open to multiple possibilities of analysis. Existing social science research has been framed largely as uncomplicated normative criticism of EBM. New analytic spaces and empirical foci have begun to emerge. With a view to further diversifying social science treatment of EBM, we reflect on possibilities for further research that emerge out of our reading of the literature.

In making suggestions for future research, our intention is to encourage the use of analytic perspectives better suited to exploring the social character of formal discourses of knowledge and their relationship to contemporary forms of governance than political economy and humanist perspectives make possible. Our suggestions express analytic approaches that we work with: Foucauldian genealogy and studies in the social organization of knowledge. There are, of course, other possibilities.

We also highlight foci for inquiry that extend beyond the literature's characteristic topical focus on clinical freedom, the rationalization of health care and essential patient needs. Our suggestions call for work that is animated by a concern to investigate the specificity, discursive character and effects of EBM as a practice of knowledge. They privilege questions about the discursive preconditions of EBM, the relationship of EBM to clinical reasoning, the place of patients in EBM, and the textual mechanics through which EBM operates across time and place.

The discursive preconditions of EBM: clinical epidemiology and clinical reason

In an important article on EBM, Berkwits (1998) argues that physicians engaged in critical appraisal should be encouraged to evaluate the social foundations of standards of evidence more generally. Berkwits' call for physicians to be more conscious of the historical and social relations that have enabled EBM would also serve social scientists. Careful social science work on the discursive preconditions of EBM would help to clarify the emergence of EBM as a form of reasoning and encourage investigation of its relationship to other ways of knowing.

Social scientists have been much interested in one aspect of epidemiology—risk—and remarkably little in other forms of epidemiological thinking such as clinical trials, population health or genetic epidemiology (although, see the historians Eyler, 1979; Marks, 1997; Matthews, 1995). The overvaluation of risk is perhaps one of the reasons for the understudy of EBM, for the evidence upon which it is based is the product of clinical epidemiology. The concept of clinical epidemiology breaches an earlier series of distinctions dating from

the late 18th century that positioned public health against curative medicine, epidemiological against clinical knowledge and population against patient. How the apparent oxymoron, clinical epidemiology, became historically possible and to what it was a solution is a topic in need of a genealogy. The initial phase of clinical epidemiology marked an application of quantitative methods to the evaluation of diagnostic testing and therapeutics. As mentioned earlier, it was only in the early 1990s that evidence-based medicine was named as such and a programme for intervention in clinical care developed. This marks a move from a clinical epidemiology located in research to an attempt to intervene in clinical practice.

The specific social and textual mode of intervention in clinical reason that has been constituted for evidence-based medicine—its model of physician education, its genres and modes of affiliation (e.g. the encouragement of small groups rather than solo practitioners for critical appraisal of research studies)—has yet to be empirically investigated and thus social scientific knowledge of it tends to be abstract. The intervention of EBM in clinical reason is an attempt to take the probabilistic rationality resulting from clinical trials and attach it to previously existing forms of clinical knowledge that bound together pathophysiology with a social and cultural knowledge of the individual patient (Foucault, 1994).

How these forms of clinical reasoning that are so different in analytic form align, interact and conflict in clinical practice presents itself as an important direction of inquiry that has already begun in the work of Armstrong (2002) and Timmermans and Angell (2001). In exploring the clinical enactment of EBM, social science need not be tethered to questions about the putative application of evidence. There is more to do than ask whether physicians actually use evidence in clinical activity or search for factors that can be seen to facilitate or disable the application of evidence (e.g. Putnam, Twohig, Burge, Jackson, & Cox, 2002). The distinct questions EBM poses about the textual modes and clinical activities that bring divergent forms of clinical knowledge into relation with one another await exploration. The general approach should be one of treating what appears to be a unity, clinical reason, as a compound of multiple forces that may conflict (Berg & Mol, 1998).

The patient as site for the production of evidence

What of the patient in a programme of social science research on evidence-based medicine? As noted above, critiques of EBM from within both the social sciences and medicine have been done in the name of the patient as individual, cautioning against the standardization of clinical judgement and clinical care. The patient, it is feared, becomes the site for the application of

epidemiological knowledge of populations. While this trajectory of critique is important, there are other questions that may be asked of the patient's place in evidence-based medicine and other ways of entering its study.

The patient is not only the point of application of evidence in the clinic, but also the site for the production of evidence in research (Epstein, 1996). The systemic dependence of EBM on clinical trials is often noted in the social science and medical literatures, with glancing reference to the "gold standard" of evidence. Locating the patient in evidence-based medicine must proceed along two courses: clinical and research practice. Stating the obvious may be helpful: evidence is derived from the bodies of patients. One and only one form of evidence is privileged by evidence-based medicine, namely, the results of clinical trials. Other types of study such as cohort studies, which are far less ethically problematic than randomized clinical trials, are inferiorized and marginalized as statistically less reliable by EBM. Evidence-based medicine creates a demand for clinical trials and thus the recruitment of patients into these trials. What are the effects of the evidence-based market in clinical trials on patients, on physicians and on health care?

Studying the effects of the demand structure of EBM for clinical trials should not be collapsed into the frame of the medical ethics literature's discussions of informed consent in recruitment and the treatment of research subjects during the course of trials. The effects of trials are much broader and occur at the level of markets: the treatment of patients as a research pool for the sake of health care. The patient becomes a site of evidence tied into the research reputation and career trajectories of clinician-researchers. The place of research in prestige-ranking among physicians is one motivation to constitute patients as sites of evidence. Another important set of motivations is directly economic. Individual physicians and research institutions are paid enormous sums of money to recruit, randomize and retain patients. The training of physicians in EBM may result in the perception that it is their right to demand their patients enter research studies, a demand physicians justify by the need to properly evaluate diagnostic technologies and treatments. Anecdotal reports from patients would initially indicate little understanding among specialists about why people would refuse to participate in a trial; it is clear that refusals are sometimes met with surprise, disapproval and withdrawal of care.

The concerns raised here point to the potential for an authoritarianism of evidence corrosive of the status of medicine as a liberal profession governing patients through their freedom, a potential at variance with the democratic ethos of evidence-based medicine. The dangers here are many for the patient and may operate outside the research setting, even in the presence of

rigorous applications of high standards of ethical protocols to individual trials. Studies of physician attitudes regarding their prerogatives as researchers are indicated, together with surveys of the experience of patients who have declined entering clinical trials. Ultimately, the dangers in the constitution of patients as the site of evidence become a larger issue of health protection and citizenship rights in health care.

Evidence-based medicine as text-mediated relations

The critique of evidence-based medicine needs to be respatialized to address problematics that extend beyond the localized setting of individual physician-patient interaction. The work of Smith (1987, 1999) in institutional ethnography may prove helpful in this respect. Smith's work introduces and develops the social investigation of textually mediated social organization, that is, social relations having written texts as constituents. These relations are of sociological interest because they enable trans-local coordination and concerting of local activities, over which they have a relation of authority. Expertise, whether of the state, capital or professions, operates through relations formed around fixed, standardized and mobile texts; it is a necessary characteristic of governance in our present.

A fuller reckoning of the textuality of EBM by, for example, treating its texts as points of entry into analysis of the apparatus of evidence, creates opportunities to cast a social science gaze onto the multiple relations of evidence in health care (Mykhalovskiy, 2003). The production and circulation of printed texts is a requirement of the practice of evidence-based medicine. Gathering evidence, reading evidence and applying evidence are all work practices; evidence might be explored as an organization of work, broadly conceived. The "work" of evidence along the course of its production, circulation and consumption requires exploration. This need not focus only on physicians and their economies of time and training, but also on evidence at the point of its production in clinical trials, and its circulation across the health professions, health policy contexts and beyond. For example, one might ask about the gendering of evidence production in clinical trials from nurses and research clerks to data managers to principal investigators. Alternatively, one might pose questions about the popularization of evidence. How are we to understand the forms of production, transformation and consumption of scientific knowledge and the chains of association that occur as evidence moves from point of publication to other sites of recomposition including the sales machinery of pharmaceutical firms, the public relations work of hospitals and research institutes and the sites of constitution of "health news" in the mass media, where new genres of health information are emerging?

The market in textual evidence is transnational, electronic and shared across medicine and the allied health professions. The textbook *Evidence-Based Medicine: How to Practice and Teach EBM* (Sackett et al., 2000) instructs readers to beware of textbooks on the grounds they are obsolete immediately after printing; its own readers are directed to consult its accompanying website for regular updates (<http://www.library.utoronto.ca/medicine/ebm>). This empire of evidence has a global ambition visible, for example, in the gathering and dissemination activities of the Cochrane Collaboration, which should be tracked. The relations of a global evidence-based medicine constitute a research programme of their own. Obvious questions include the implications of the forms of standardization of knowledge required for such a globalizing project, the effect of electronically delivered evidence on indigenous systems of medicine, patient access to evidence, and the work of social movements in making claims related to health and illness. Evidence-based medicine in its electronic form is a textual practice to which many quite differing actors can attach to any number of ends, although presumably both access and use are socially stratified.

Conclusion

Evidence-based medicine is an important phenomenon whose social import has not yet fully registered in social science. While sourced in health care, where its emergence has provoked internal debates centered largely on the fate of individual clinical judgement, EBM is an expansive knowledge relation.

The mobility of evidence is multi-dimensional. Evidence-based decision making is not a fixed relation but a portable mechanics that is remade as it traverses work forms and intersects with differing professional cultures. The perambulations of evidence have given us evidence-based nursing, evidence-based social work, evidence-based education, evidence-based veterinary medicine, even evidence-based music therapy.

These sites of professional work do not contain or monopolize evidence. The proponents of EBM and its derivatives are democratizers, eager to invite their addressees—patients, clients, students and others—into the cultures and regimes of evidence-based decision making. New genres and textual forms of evidence, new subject forms, new reconfigurations of action around science and its traces, new exclusions and new dangers result. There is no shortage of material here for social science. Increasingly, evidence-based medicine has a global reach in terms of both dissemination and production. The World Wide Web and other electronically mediated forms of communication are important conduits of evidence that help to realize its spirit of timeliness. The dramatic popularity of EBM, tied with

the growing predominance of the pharmaceutical industry, fuels a transnational incorporation of human bodies into regimes of clinical trials research, with a host of potential unintended consequences for clinical relations.

The diverse social character and relations of EBM pose exciting questions for social science at the empirical nexus of scientific knowledge and social action across a variety of domains. That this rich terrain of inquiry has yet to be fully developed may simply represent a particular lag, a problem that will diminish as social scientists catch up with a development that has outpaced us. However, it may be symptomatic of EBM's success in other ways. The research agendas associated with EBM are heavily resourced and framed as win-win opportunities for social scientists. Who can argue with better evidence? Who would take issue with more effective and better quality health care? In EBM, the historic relationship of social science to biomedicine finds new grounds. The pressures and opportunities for social science to join in promoting evidence in health care can limit independent social inquiry of EBM.

In response to this potential closure, we have wanted to record, critique and promote the emerging space for social science exploration of EBM. New social research being done on EBM is at an exciting moment of development. Important lines of inquiry have developed around the problematic of EBM and clinical standardization and the relationship of formal, scientific rationality to clinical reasoning. The theoretical landscape is opening up, with new contributions coming from postmodernist critique, actor network theory, and science studies, amongst other sources. To these exciting developments, we have added our own suggestions for further inquiry.

Our suggestions have been framed by a diagnostics of the literature emphasizing how it has been organized in relation to the analytic perspectives of political economy and humanism. Social scientists have become good at suggesting how EBM can be technologized and overcome by administrative forms of reasoning committed to cost-effectiveness. We have become well versed at sounding the alarm bell at EBM's potential erasure of the patient. Cultivating a vigorous social science inquiry of EBM will require moving beyond these problem spaces, both of which bear traces of derivation from earlier concerns posed within the medical literature.

Our own predilections should be obvious. In this paper, we have argued against abstract critique and in favour of empirically-based research that attends to the specificity of EBM as a knowledge relation in its local and translocal dimensions. Our hope is for new possibilities of independent scholarly analysis of EBM framed by internal relevances, informed by new theoretical perspectives, and opening up new concerns and issues. The research terrain is open.

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