

RE-EVALUATING THE EMANCIPATORY PROMISE OF EVIDENCE-BASED MEDICINE

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ABSTRACT: *With the potential to alleviate disease and ameliorate illness, and thereby to promote the conditions for human flourishing, few human endeavors have the emancipatory potential of medicine. And yet, despite being in the age of evidence-based practice, medicine has come increasingly under criticism as a territorializing force exerting a kind of dehumanizing, colonizing pressure on patients and practitioners alike. Overwhelmingly, these attacks lean on the work of philosophers like Heidegger, Foucault, and Deleuze and Guattari. This line of criticism fails on two fronts. First, it represents a form of reductive ideological dogmatism that ignores facts on the ground – a rather ironic fact, since that charge is one of the primary allegations made by this camp against evidence-based medicine (EBM). Second, this line of attack hinges to a great extent on a consistent failure to recognize and appreciate the distinction between EBM and biomedicine. Disentangling EBM from biomedicine is an important and urgent task, therefore. When properly disentangled, it becomes clear that charges of an inherent, pernicious reductivism leveled against EBM in fact are aimed at pernicious features of biomedicine’s model of health. Evidence-based medicine is best understood as a method, not a doctrine. As method, EBM is not intrinsically reductive. Yet, like any method, it can be applied improperly, yielding reductive practices. Far less well appreciated is that healthcare professionals’ interpretive frameworks influence their practices, and, moreover, that the biomedical model represents the current prevailing model of health. This is perhaps the most important reason why EBM and biomedicine must be disentangled; in order for EBM to recover its emancipatory potential, it must liberate itself from the biomedical model, and, further, it must develop an alternate model of health consistent not only with its methodology, but with its values. In this endeavor pragmatism offers particularly rich resources.*

Introduction

In 1747, the year that Scottish physician, James Lind, conducted his well known experimental study while at sea aboard a ship of the British Navy, scurvy killed more sailors than military action (Tröhler 3). Lind’s experiment took twelve sailors “as similar as I could have them,” and assigned two each to one of six treatments, all having

the support of medical authority, or commonsense experience. The pair of sailors who took two oranges and a lemon daily showed far more dramatic improvement than the remaining ten sailors. In 1753 Lind published a *Treatise on the Scurvy* in which he not only detailed his methodology, the results of the experiment, and his rigorously kept records, but also provided a “critical and chronological view” of what had been published on scurvy to that point (Tröhler 3). Yet, it would not be until 1795 – the year after Lind’s death, and more than forty years after publication of his *Treatise* – that the British Navy would finally introduce fruit juice into the regular diet of its sailors (Tröhler 3). Less than twenty years later “the scourge of scurvy” was relatively under control (Tröhler 4).

That Lind’s research failed during his lifetime to redirect the treatment of scurvy is perhaps unsurprising, even if from our vantage point it appears scandalous. Lind and other early pioneers of what we now call an evidence-based approach to the evaluation of medical treatments (like Lind, also overwhelmingly Edinburgh trained men) ran afoul of the prevailing therapeutic dogma of their day. In that context, their perceived insubordination was sufficient grounds for dismissing their research independent of what should have been acknowledged as its clear merits. Although Lind is perhaps most commonly recognized for advocating the use of fruit juice to fight scurvy, his publication is a landmark for other, arguably more important reasons. Not least among these are that it represented a prospectively controlled clinical experiment to test the efficacy of competing alternative therapies, and that it also represented perhaps the first systematic review to be published in medicine, insofar as it critically analyzed the extant literature on scurvy and its treatment as an integral feature of making the case for the superiority of fruit juice as a therapeutic. It is not unreasonable, therefore, to suggest, as historian of medicine Ulrich Tröhler has done (2000), that Lind is the father of evidence-based medicine (EBM).

It took nearly two hundred-fifty years to get from Lind's *Treatise* to the publication of the seminal 1992 article by the Evidence-Based Medicine Working Group that would effectively launch EBM as a formal movement. A great deal changed in that time. As Howick observes, in the century prior to EBM's emergence, from 1885-1985, the rabies vaccine was discovered, as were penicillin and streptomycin; most childhood cancers were able to be cured; open heart surgery, hip replacements, and kidney transplants held out the promise that failing body parts could be replaced; and *in vitro* fertilization offered recourse to infertile couples (Howick 11). Despite these therapeutic advances, institutionally, things remained very much the same, and, not surprisingly, EBM advocates encountered (and continue to encounter) the same forms of resistance and ridicule faced by Lind and his companions over two centuries ago, leading Tröhler to note, "The history of church and law come to mind immediately when dogma is mentioned; but medical history too has abounded with dogma since antiquity – and still does," (Tröhler 2).

As the example of the eradication of scurvy suggests, few human endeavors offer such emancipatory promise as medicine. By preserving, promoting, and recovering health, medicine is not only a liberating enterprise in its own right, it simultaneously safeguards and advances many of the basic conditions for human flourishing and broader projects of social, political, educational, and other emancipation. Insofar as EBM seeks to liberate medicine from its historical bondage to the dogmatism of institutional medical authority, the arbitrariness of individual physician bias, and the unsystematic vagaries of clinical judgment, it may be understood as challenging medicine to meet its emancipatory calling. In so doing, EBM ostensibly promotes a remarkably far-reaching emancipatory agenda with significant implications for society at large. And yet, like Lind, EBM has found itself under attack regularly, and often aggressively. Critiques have taken a wide range of forms, including challenges to EBM's external validity, most notably by Cartwright

(2011; 2007); attacking the inescapable reliance on background knowledge in establishing proper controls for trials, which requires use of professional judgment – one of the very things from which EBM aims emancipate medicine (Worrall); and deploying post-positivist accounts of scientific knowledge as "situated knowledges" to challenge EBM's alleged objectivity and value-neutrality (Goldenberg 2006). In more recent years critiques have not only come from antagonists, but also from those seeking to clarify and strengthen EBM's position (Howick 2011; Gupta 2003; Parker 2005).

One form of critique that has enjoyed particular popularity among opponents since EBM's beginning is the charge that EBM is perniciously reductive. Medical professionals, philosophers, sociologists, and others have accused EBM of being a dehumanizing and colonizing force. A common suggestion within this particular line of criticism is that EBM's pernicious reductivism "erases" the selfhood both of patients and practitioners, treating them merely as instrumental cogs in a medical-industrial machine. In what follows I develop a measured defense of EBM against this particular line of critique. My objective is to show that the accusation that evidence-based medicine is perniciously reductive in dehumanizing and colonizing ways is wide of its mark, and that this form of critique is frequently tied to a certain mode of Continental philosophical engagement, the application of which tends to privilege theoretical commitments over facts on the ground in these contexts. One consequence is that these critics regularly fail to draw the distinction between evidence-based medicine and biomedicine, conflating the two as a result, and leveling attacks at EBM that are more aptly aimed at biomedicine. The reason for offering a measured defense, however, is that EBM nevertheless remains in a precarious state. For, while it is not perniciously reductive *per se*, it is not free from powerful, reductive influences from adjacent quarters, law and business in particular, but biomedicine as well. This means that EBM still has significant work to

do if it is to more fully live up to its emancipatory potential. Addressing the reductive influence of current legal structures and business-driven health management entities will require EBM advocates to engage matters of policy reform. Addressing the reductive influence of biomedicine, however, will require EBM advocates to articulate and defend an alternate interpretive framework for understanding health that avoids the pernicious reductivism of the biomedical model. In this connection, pragmatism proves to be a helpful ally.

Continental anti-foundationalist critiques of EBM

Evidence-based medicine advocates a shift away from the traditional emphasis on clinical expertise grounded in the mechanistic reasoning of pathophysiology, and toward clinical decision making grounded in evidence generated from randomized controlled trials (RCTs). On the basis of meta-analyses and systematic reviews of RCTs, EBM develops clinical guidelines designed to direct practice in conformity with the best available RCT evidence. Of course, this does not imply that RCTs are well suited to answering all our clinical questions. In addition, even with regard to those questions which RCTs are well suited to answer, it does not follow that the current best evidence for a given medical condition will be particularly decisive, and, moreover, when the current RCT evidence is strong, the problem of external validity remains – that is, the problem of understanding how evidence from “clean” trial populations screened for confounding factors applies to individual patients in routine practice, who typically present with a host of other health conditions, are already taking other treatments, and so on. Recognition of these challenges is in good part why EBM grounds its practice guidelines in what is called the evidence hierarchy. Systematic reviews and meta-analyses of RCTs represent the strongest form of evidence because they impartially assess and combine the findings of multiple, independent RCTs. A randomized controlled trial is stronger than either a prospective or retrospective cohort study, or a case study, because, unlike these

others, it controls for confounding factors. That is, by design, an RCT prospectively eliminates alternate plausible explanations for the effect under investigation. Clinical expertise, grounded in pathophysiologic rationale and physician experience, sits near the bottom of the evidence hierarchy for the reason that it is unsystematic and prone to misguided conclusions about *how* and *why* a therapy ought to work, based on what is taken to be established pathophysiologic knowledge.

Not only have the evidence hierarchy and practice guidelines not insulated EBM from attack, these features have become the primary targets of opponents who allege EBM is perniciously reductive. The most common charge against practice guidelines is that they result in so-called “cook book” medicine, in which physicians blindly apply a pre-given therapeutic “recipe” to patients according to their medical condition, with no concern for understanding or addressing any of the unique complexities of individual patients (Dopson, et al. 312). The evidence hierarchy, on the other hand, is alleged only to recognize as evidential those data that can be quantified, effectively reducing patients to mere statistics (Maier and Shibles 466). The attacks are pervasive enough that Mykhalovskiy & Weir have observed critics are “well versed at sounding the alarm bell at EBM’s potential erasure of the patient” (Mykhalovskiy & Weir 2003: 1067).

It is striking that these attacks come at a time when evidence-based medicine is perceived, as James Lind was centuries ago, to be challenging the prevailing tradition’s claims to authority, and calling instead for a new grounding in systematic, evenhanded, and unbiased clinical testing. So why is it that evidence-based medicine, arguably the most emancipated and potentially emancipating form of medicine yet to be practiced, has come under such heavy and sustained assault?

Critics who allege EBM is perniciously reductive in ways that erase the selfhood of patients can be seen as fitting into two camps – soft critics and strong critics (Thomas, forthcoming). Soft critics, who are more likely to be healthcare practitioners, tend to make more measured claims, grounded in empirical concerns about the concrete consequences of EBM implementation. By contrast, strong critics tend to make sweeping, aggressive claims with little concern for demonstrating any empirical support. Although soft critics lean on many of the same theoretical resources, my focus will be primarily on a subset of these strong critics, since they develop anti-foundationalist attacks explicitly indebted to Continental thinkers, like Heidegger, Foucault, Habermas, and Deleuze and Guattari, but also since they are overwhelmingly medically credentialed professionals. Their view, in short, is that EBM's evidence hierarchy and clinical guidelines, both of which are ultimately grounded in RCT research, represent a dehumanizing and colonizing force, territorializing the life-world of patients and practitioners alike.

The anti-foundationalist strategy typical of this particular form of critique involves first treating EBM as an extension of the modernist worldview, and then, on that basis, attacking EBM as an inherently domineering, efficiency driven, calculative-instrumental force colonizing the life-world, stripping patients (and clinicians) of their selfhood, and reducing them to gears in the medical-industrial machinery (Thomas, forthcoming). Laugharne is exemplary for the explicitness with which he presents this strategy. After asserting the traits of rationalism, materialism, and reductionism as modernism's defining characteristics, Laugharne contends these features entail modernism's denial of the individuality of people by "reducing them to their component parts (as in the emphasis on disease in medicine) or to a cog in an inhuman machine" (Laugharne, 1999: 641). On the basis of this assessment, Laugharne claims "[t]he movement to evidence-based medicine is clearly modernist" (Laugharne, 1999: 642).

Other critics claim that EBM maintains an "essentially Newtonian, mechanistic world view" that takes reality to be objective, or "absolutely independent of the human observer, and of the observer's intentions and observations" (Holmes, et al. 2006: 182) and accuse EBM of a "determination to reduce medicine to the physical and material" (Little 2002: 181).

These charges seem to stem in large part from a misunderstanding of EBM's basic commitment to prioritize RCT evidence over clinical expertise and patient narrative self-report (Parker 2005; Dopson et al. 2003; Cronje & Fullan 2003). The claim is that EBM recognizes as rational and "objective" only evidence gathered through RCTs, which, it is argued, is unduly narrow (Cartwright 2011; 2007). RCTs trade in population-level probabilities as the basis for superior clinical care, rather than personal knowledge of individual patients (Horwitz 320), and, because EBM's clinical guidelines are developed on the basis of the best available RCT evidence, a governing role is granted to "quantified 'scientific' evidence in the decision making process" of medical professionals (Cronje & Fullan 354). The influence of this reduction to quantified evidence is alleged to be so domineering that it leads inexorably to an "erasure" of the selfhood of both patients and practitioners in the clinical encounter.

According to Ståle Fredriksen (2003), EBM's prioritization of RCT evidence has led directly to an ever-expanding instrumental colonization of the lifeworld. Adapting Habermas's notion of systems colonization of the lifeworld, Fredriksen contends "the main colonising mechanism of modern medicine is situated in technological and instrumental bypass of communication," resulting in "a one-sided focus on purposive-rational problem solving" (Fredriksen 290). Instrumentation, in the form of RCTs, systematic reviews, and meta-analyses, has replaced communication because physicians' clinical expertise and patients' self-reports are considered by EBM to be less reliable sources of objective knowledge than RCTs.

Although Fredriksen does not make the argument that RCTs, systematic reviews, and meta-analyses have made physician-patient conversation entirely obsolete, this fear seems to be his concern. Moreover, EBM's instrumental technology allegedly "uncouples disease from the lifeworld;" according to Fredriksen, "[d]iseases gain a life of their own when they are viewed through a . . . Randomised Controlled Trial. They are uncoupled from the life of both patients and professionals and come into view only as objective facts, as . . . p-values" (Fredriksen 291). The effect is that "the evidence, however trifle, transforms us into instrumental slaves capable of doing nothing more than passively adapt to indisputable but unimportant facts" (Fredriksen 294).

Using a Foucauldian frame, Wall analyzes the specific power relations exerted by EBM on nursing in terms of systems of differentiation, degrees of rationalization, and forms of institutionalization (Wall 48). She contends that nursing is profoundly undercut by increasing pressure to adopt evidence-based protocols. The basic tension, as she sees it, is that EBM fails to support the primary goal of nursing – to provide clinical care – by failing to acknowledge the specific modes of knowing Wall contends are distinctive of nursing, and by grounding practice guidelines in quantified, population-based research, both of which serve to differentiate and devalue nurses and the role of nursing.

The care distinctive of nursing, according to Wall, involves an interpersonal and relational process leading to what she calls "personal knowing," which enables the nurse to "encounter the individual as a person, as a self" (Wall 45). Evidence-based practice discourse marginalizes this "personal knowing," rendering it invisible, in favor of "knowledge that supports the completion of technical (support) tasks by nurses" (Wall 47). Dopson supports this view at a more general level by suggesting "EBM is not simply about getting specific pieces of research evidence into practice. It is about creating a culture where practitioners automatically think in an evidence-based way every time they see a

new case" (Dopson, et al. 316; 318). The problem is not simply that evidence-based culture appears to abandon clinical *phronesis*, but that it does so through the insistence upon adherence to protocols "that treat all patients as essentially interchangeable" (Timmermans and Mauck 2005: 21; cf. Callahan 1999, Fredriksen 2007, and Walsh and Bowyer 2013). For Wall, this exertion of institutional power represents a clear form of Foucauldian "surveillance" in the nursing context, by which compliance with EBM principles is policed.

Whereas Wall suggests that compromising the caring endeavor of nursing jeopardizes patients, other critics influenced by Deleuze and Guattari, like Nick Fox, and Holmes et al., think patients are under attack independently of whatever indirect negative impact they might suffer through the surveillance of medical caregivers. Fox charges EBM with being guilty of the "territorialization of the subject." Following Deleuze and Guattari, he depicts "[t]erritorialization [as] an active process, whose agent may be human, animate, inanimate, or abstracted (society, God, 'they'), as may [be] the object of territorialization" (Fox 1999: 130). In this case the purported territorializing agent is evidence-based medicine, and the active process involves subjection to a system in which patients' lived bodily states are intrinsically meaningless, only gaining the possibility of significance in light of the subject's territorialization, that is, only once they signify in relation to the clinical organism, as opposed to the lived self (Fox 128). Meanwhile, Holmes and colleagues contend EBM is "dangerously reductive insofar as it negates the personal and interpersonal meaning of a world that is first and foremost a relational world, and not a fixed set of objects" (Holmes, et al. 181). Adapting Deleuze and Guattari's notion of "fascism," they assert that EBM represents a form of "microfascism" that "fetishises the object at the expense of the human subject, for whom this world has a vital significance and meaning" (Holmes, et al. 183).

So, for example, under this microfascistic process of territorialization, “it is not the self which experiences pain or attributes meaning to it, the self *is* the pain, the self is an effect of the meaning” designated by the territorializing system (Fox 128). This echoes the kind of uncoupling from the lifeworld alleged by Fredriksen. Here, however, the reduction of the meaning of disease and illness to evidence-based signifiers supposedly entails an evacuation of the very possibility of patients’ individual meaning-making with regard to their lived illness experiences. Moreover, to the extent that EBM is a dominant ideology, it allegedly excludes alternate forms of knowledge, thereby acting “as a fascist structure” (Holmes, et al. 181).

In a similarly strident tone, Maier and Shibles contend that EBM’s quantitative emphasis requires abstracting out all qualitative dimensions from the individual patient (Maier and Shibles 461), and that, as a result, “the EBM method dehumanizes the individual and patient,” rendering her as “just a number or statistic to be manipulated mathematically.” Thus, not only is the relationship between physician and patient allegedly “eliminated,” the evidence-based clinician “does not actually try to treat the patient, but the ailment” (Maier and Shibles 466-7).

In their article, “An Heideggerian Critique of Evidence-Based Medicine,” Walsh and Bowyer contend EBM is underpinned by calculative thinking that “expresses the same efficiency driven, reductive, and controlling agenda as all instrumental thinking in its efforts to regulate human life” (Walsh & Bowyer 39). Through this calculative-instrumental “bracketing off,” EBM reduces the patient to a physiological entity composed of discrete constituent parts interrelated by causal functions that can then be efficiently managed, effectively making the patient generic and interchangeable, “just another case to be managed” (Walsh and Bowyer 39). In other words, the patient as complex self enmeshed in her life-world context is thus “erased” in order to frame her problem in abstraction

and detachment from the matrix of habits, interpersonal relationships, and worldly involvements that make her the complex and unique self she is, and that constitute the contextual conditions for the meaning of her pain, suffering, and fear in her experience of illness. Thus, EBM loses sight of “the Being of the unique, suffering individual,” and it is “the disease that then becomes the focus of treatment, whilst the person herself vanishes” (Walsh & Bowyer 39). James Marcum echoes this last sentiment when he suggests that by “reducing the body to a collection of parts . . . the patient as a person vanishes before the physician’s gaze” (Marcum 313).

A measured defense of EBM

The prevalence of these critiques suggests that they have a certain appeal, at least to those operating from within Continental anti-foundationalist theoretical frameworks. Despite their appeal, however, they do not stand up to careful philosophical scrutiny. Thomas Reid wisely advised that “theory ought to stoop to fact, and not fact to theory” (Reid 138). Yet one consistent problem with these critiques is that they uncritically grant a privileged position to the theoretical framework being applied. Rather than treating theory as an operational tool in service of detecting and transforming problematic existential facts in meliorative directions, these critiques instead treat the theory as the relevant fact. Consider, for instance, what was noted at the outset, namely, that most of the critics addressed here are credentialed healthcare professionals.¹ In light of this fact, it is more than a little surprising that these opponents offer no empirical backing for their claims (Thomas, forthcoming). Instead, they are uniformly content to let their sweeping anti-foundational theoretical claims swing free of concrete, empirical support. This is deeply problematic. For at the end of the day, the charges made are empirical in nature: either it is

¹ Of the critics mentioned above, Laugharne, Horwitz, Welsby, Little, Fredriksen, Holmes and colleague Perron, Marcum, Maier, Wall and Walsh all have medical affiliations.

or is not the case that EBM “territorializes” subjects, or “erases” and “dehumanizes” patients in the manner alleged. Given the robust, unqualified nature of the allegations being made, one would expect no shortage of concrete examples from these critics’ own clinical experience illustrating just how, despite knowing and desiring better, and despite their very best efforts to resist, these critics were nevertheless powerless to avoid “erasing” the selfhood of those entrusted to their clinical care, or dehumanizing them by reducing them to mere statistical abstractions. Yet, not one such example is offered by a single one of these critics.² This is particularly ironic, given that the general nature of these critiques alleges that EBM is perniciously reductive. In their zeal to indict, these critics have themselves relied on an unduly reductive picture of EBM.

Wall is the one possible exception here. In part, this may be because Wall is better understood as a soft critic. But if we bracket the issue of how best to classify her critique, there are still concerns about the scope of her claims. Wall argues that EBM discourse and methodologies are at cross-purposes with the caring endeavor of the nursing profession. Yet, surely it is the case that the ability to determine with relative confidence which therapies are likely to be most effective for one’s patient contributes meaningfully to a nurse’s ability to fully care for that patient in the manner Wall describes as characteristic of nursing. Wall is on firmer ground when she argues that the influence exerted by evidence-based practice guidelines tends to reduce the role of nursing to “the completion of technical support tasks.” Here we have a highly plausible

claim, but it remains uncoupled from any concrete evidence that would warrant its scope beyond Wall’s own clinical experience. It is strange that Wall should decline to offer an example from firsthand experience that might strengthen the claim’s empirical basis even in that more limited, anecdotal context. One possible reason for this omission is that it turns out to be difficult to peg to EBM methodology and discourse a concrete instance of being “reduced to support task-work.”

This points to another difficulty facing Wall’s position, namely, that there are compelling plausible alternate explanations that give us reason to be skeptical of her assertions. For example, Wall fails to address the very strong economic forces known to drive the largely for-profit medical system, which demand quick clinical turn-over at the expense of meaningful interaction with patients. When business-driven health management entities are known not only to be prevalent but also to be increasingly influential in establishing parameters for the delivery of clinical care, why should we accept the theoretical claim that EBM discourse is the pernicious force at work here, short of compelling concrete evidence to that effect? Thus, it is not at all clear that Wall has met the burden of demonstrating that EBM methodology and discourse is incompatible with the nursing profession.

A second problem with this group of critiques is that they misidentify their target, conflating EBM with biomedicine. Dopson, et al., for example, claim “EBM is entirely consonant with – and a product of – the biomedical model and therefore holds a powerful attraction to doctors trained in that model,” and this is because of “EBM’s appeal to a biomedical scientific agenda” (Dopson, et al. 320-21; 319). Similarly, Fredriksen characterizes EBM as “the biomedical core” (Fredriksen 293). It is clear from this that critics have failed to understand the distinction between EBM and biomedicine.

² To be clear, I am not suggesting that these critics should provide empirical evidence in the form of *statistical data* showing that, indeed, implementation of EBM erases the selfhood of their patients (or of themselves as clinicians) in order to validate their claims. But if their claims are to amount to more than mere rhetorical-theoretical exercises, surely these practitioners should be able to provide supporting anecdotal evidence or case studies from their own clinical practices.

In my view, EBM is best understood as a method for generating evidence of an intervention's effectiveness and efficiency through clinical trials (whenever possible) that carefully control for confounders, identifying the best available evidence relevant to a particular case, and integrating it with practitioners' clinical expertise and patients' values and circumstances (Strauss et al., 2005, cited by Howick, 2011).³ A central feature of good evidence is that it rules out alternate plausible explanations for the effect under investigation; all other things being equal, if a rival explanation remains highly plausible even in the face of your own evidence, it is irrational to accept your evidence as support for the experimental hypothesis (Howick, 33). Well conducted RCTs exhibiting rigorous randomization, blinding, and concealment are currently the best means at our disposal for ruling out confounding explanations for a great number of clinical questions. An important, though often overlooked, upshot of EBM's methodological stance is that it effectively treats the question of the mechanism of causality as a "black box" (Howick, 125; see also Goldenberg 2009). To put this point differently, EBM does not concern itself with making inferences from purported knowledge of physiological mechanisms to claims that an intervention will produce a patient-relevant outcome; it forfeits answering the question of *how* an intervention works in favor of establishing *that* it

works (or does not work, as the case may be).⁴ Of course, our background knowledge, including our best pathophysiologic understanding, remains not only relevant, but also important in guiding the formation of our research questions. Properly understood, then, EBM's commitment to RCTs, and systematic reviews and meta-analyses of RCTs, is not crudely reductive. Although these methods deploy quantitative strategies, as I shall argue in more detail below, it does not follow from this that EBM reduces patients to "just a number or statistic to be manipulated mathematically." Instead, they reveal evidence of whether or not an intervention is effective, and under what conditions, leaving to the side questions about causal mechanisms.

By contrast, biomedicine is an approach to medicine that applies principles of biology and other natural sciences, particularly physiology, to clinical practice. The result is that biomedicine treats the human body as a complex machine comprised of interlocking systems of mechanisms. Gross bodily function is explained in terms of the function of more basic, lower level parts or systems, and, in recent years, increasingly in terms of the most basic known parts, our genes. Diagnoses of maladies and therapeutic prognoses alike are made on the basis of putative facts about the pathological and physiological mechanisms of disease and health (Howick 16). The now famous Cardiac Arrhythmia Suppression Trial (CAST) revealed the dangers of this over-reliance on mechanistic reasoning as evidence for which therapies will work (CAST Investigators 1989). Myocardial infarction often leaves the heart vulnerable to arrhythmias by damaging the muscle and electrical system, frequently resulting in a type of arrhythmia known as ventricular extra beats (VEBs). Epidemiological studies suggested a strong correlation between sudden cardiac deaths and arrhythmias, and so, on the basis of what was taken to be understood about the underlying

³ Upshur (2006) has accurately observed, "There are no shortage of those arguing for their preferred view of what EBM is, or is not" (p. 420). For example, it has been characterized variously as a new paradigm (EBM Working Group 1992), a social movement (Pope 2003), an epistemological framework (Tonelli 1998), and, as I advocate, a method (Howick 2011; Goldenberg 2009). Moreover, the textbook definition offered by EBM's founders has undergone multiple revisions. Despite this diversity of opinion being well recognized, the role it plays in fuelling the debate between EBM protagonists and antagonists has been largely unappreciated. In an unpublished paper, Sarah Wieten (2014) found that neither EBM proponents nor critics were particularly consistent in citing a clear definition of EBM. Resolving that issue, while urgent, lies well outside the purview of this paper.

⁴ For a careful and lucid discussion of mechanistic reasoning and EBM's position with respect to it, see Howick (2011) Chapter 10.

mechanisms involved, several drugs, developed and found to be successful in treating VEBs, began being prescribed in the belief that they would successfully reduce mortality rates among patients who had suffered myocardial infarction. In 1987, the CAST was initiated to test the efficacy of these drugs in reducing mortality among patients who had suffered myocardial infarction. The results upended all expectations supported by mechanistic reasoning, showing that the drugs increased, rather than reduced mortality, and that they had in fact killed more people every year than died in action during the whole Vietnam War (Howick 5). The results were so decisive the trial was discontinued by 1989.

The mechanistic reasoning central to biomedicine exhibits the kind of pernicious reductivism critics of EBM target insofar as it divides the human body, reducing it to its constituent parts, and simultaneously separating it from its socio-cultural context and from the lived self. It is committed to the “principle of separation,” which is “the notion that things are better understood in categories outside their context, divorced from related objects or persons,” according to Gaines and Davis-Floyd, who add that

[b]iomedical thinking is generally ratiocinative, that is, it progresses logically from phenomenon to phenomenon, presupposing their separateness. Biomedicine separates mind from body, the individual from component parts, the disease into constituent elements, the treatment into measurable segments, and patients from their social relationships and culture. (Gaines and Davis-Floyd 98)

Under the biomedical gaze, the organic, contextual, lived body is reduced to an abstract, ahistorical, and asocial assemblage of parts, processes, and systems.

This “atomistic trend” is reflected in biomedicine’s grounding philosophical framework, the biostatistical theory of health (BST). The BST is built around a fundamental distinction between theoretical health and practical health. This distinction holds that theoretical

health is the absence of disease, while practical health is the absence of treatable illness (Boorse 1977, 542; 1997, 11). Disease is defined as deviation from the species-typical biological design (Boorse 1975, 61; 1977, 543), characterized as “the typical hierarchy of interlocking functional systems” (Boorse 1977, 557; cf. 1997, 7), with goal-directedness at every level (except, importantly, the level of the unified organism as a whole), representing “contributions to the apical goals of survival and reproduction,” (Boorse 1975, 57-58).⁵ “Species-typicality” refers to functioning at or within the range of normal variation of the statistical mean for a particular function and age-sex reference class (Boorse 1977, 546). In short, according to the biostatistical theory, “health is normal functioning, where the normality is statistical and the functions biological” (Boorse 1977, 542).

This philosophical conception of health depicts the body as a fragmented conglomeration of independent mechanistic parts and processes. Christopher Boorse, the founder of the biostatistical theory, and still its most ardent philosophical defender, goes so far as to assert that isolated body parts are “independent centers of teleology,” comparing (in good Cartesian fashion) properly functioning human physiology to the “mechanical condition of an artifact,” such as the perfect mechanical condition of a 1965 Volkswagen (Boorse 1976, 80; 1975, 59). Organisms, rather than possessing a unifying integrity of their own, “are vast assemblages of systems and subsystems which, in most members of a species, work together harmoniously in such a way as to achieve a hierarchy of goals” (Boorse 1975, 57). Ranges of normal variation are determined through statistical analysis of quantitative measurements of a given physiological part, process, or system, taken from a

⁵ Peter Schwartz has rightly observed that the survival and reproduction requirement ought to have been offered in the disjunctive, rather than the conjunctive, since, to borrow his own example, the heart of a 70-year-old man contributes to his survival, but being beyond the age of reproduction does not any longer formally contribute to that goal (Schwartz 372).

supposedly representative sample of the human population.⁶ According to the biostatistical theory of health, in construing physiological functions in this way, scientists are “simply describing the organization of a species as they [find] it” (Boorse 1976, 74). Effectively, the BST ontologizes statistical ranges, and as a result, “proper functioning” turns out to have little to do with the integrity of the whole organism – since incapacitation may exist despite there being no statistical abnormalities at the level of independent parts – and it also has nothing directly to do with the functional ability of contextual, lived selves that is the object of such concern to the opponents of EBM addressed above.

An example of the gap between EBM and biomedicine is helpful at this juncture. Consider the German Acupuncture, or GERAC, trials. These evidence-based controlled trials demonstrated that sham acupuncture far outperformed the conventional therapeutic regimen of exercise, physiotherapy, and non-steroidal anti-inflammatory drugs (NSAIDs) for persistent lower back pain, and that actual acupuncture outperformed sham acupuncture (Haake, et al.). Trial participants receiving sham acupuncture experienced a 17% improvement in response rate over conventional therapy, while those receiving actual acupuncture experienced a full 20% improvement in response rate over conventional therapy. The idea of a biomedical investigation into the therapeutic benefits of acupuncture is virtually unimaginable. Acupuncture involves the belief that a patient’s condition is related in some way to her *qi*, and that her *qi* may be manipulated through proper needling techniques by which her ailment may be improved. From

the biomedical perspective, belief in *qi*, belief that *qi* is influential in health states, and belief that *qi* can be manipulated through the insertion of needles is nonsensical, since it is flatly incommensurable with biomedicine’s modernist, objectivist, and mechanistic commitments. By contrast, from the perspective of EBM, the interesting question is whether acupuncture is demonstrably effective for certain kinds of ailments, not whether or not *qi* exists and may be manipulated to good effect.

It appears, then, that biomedicine, not EBM, exhibits the reductive features these critics target as pernicious and “self-erasing” in their attacks on EBM. Biomedicine, not EBM, represents modernist Cartesian metaphysics of mechanism and objectivism; and biomedicine, not EBM, is quantitatively reductive insofar as it reifies abstract statistical ranges as objective.

Biomedical realism and its pragmatist anti-foundationalist critique

In light of the foregoing analysis, it may be tempting to simply transfer these critiques from EBM to biomedicine. It is not obvious, however, that this strategy fares any better. Not only is it unclear that they would fit cleanly, it is also unclear that the Continental anti-foundationalist strategies deployed in these critiques are well suited for purposes of reconstruction that might conduce to EBM’s emancipation. An alternate, and, I believe, preferable anti-foundationalist strategy is available in a Deweyan operational critique.

According to the Deweyan strategy, theories are operational, not ontological. That is, the value of a theory like the BST lies not in its being a mirror of nature accurately depicting some facet of the universe. That interpretation represents the “hypostatization of a method, an instrumentality, of inquiry . . . into something ontological” (Dewey 1938, 215). Rather a theory’s value lies in its facilitating the performance of operations on existential material by which problematic situations can be transformed into satisfactorily resolved situations.

⁶ In fact, these data used to establish the ranges of normal functioning are gathered overwhelming from the populations of developed nations. This means that the biomedical body is largely a reflection of the social and cultural conditions of Western, and westernized, peoples. The belief that ranges of statistically normal functioning defining the biomedical body are universal is an assumption that has not been satisfactorily investigated, much less adequately defended.

The Deweyan critique of biomedicine can be developed on two fronts. The first involves Dewey's view of propositions, concepts, and theories as instrumental and operational (or intermediary) rather than as reified entities; in other words, they are best understood as instrumental *means* for solving problems, not as representations of ontological *finalities*. The second involves his account of the proper relationship between qualitatively experienced problems and scientific inquiry which seeks to resolve them through quantitative methods. These two strands of Dewey's philosophy are, in fact, closely entwined.

In his 1938 *Logic*, Dewey claims "[t]he ontological hypostatization of a method, an instrumentality, of inquiry used to effect objective consequences, into something ontological, is the source of the mechanistic metaphysics of 'reality'" (Dewey 1938, 215). Somers calls this mistake "theoretical realism," explaining that it "attributes ontological truth to the theoretical phenomenon (e.g., the theory of electrons or the theory of market equilibrium)" (Somers 745). This very problem is characteristic of current biomedicine in general, and of the BST in particular; I refer to it as *biomedical realism*. We see this clearly in the BST's central distinction between theoretical and practical health, in which theoretical health is ontologically primary; only those lived incapacities grounded in abnormal statistical deviations are recognized as legitimate or "real."

Dewey's focus on the hypostatization of "methods" or "instrumentalities of inquiry" is significant here. On this view, quantitative methods are not intrinsically pernicious. Indeed, Dewey evenhandedly admonishes both those who "deplore the reduction by the scientist of all materials to numerical terms on the ground that it seems to them to destroy all value which is qualitative," and those who "insist that every subject matter must be reduced to numerical terms" of being guilty of the same logical error of taking propositions as "ultimate and complete, when, in fact, they are intermediate and instrumental" (Dewey 1938, 205-6). One clear value of a

quantitative approach is that it "renders things qualitatively unlike ... comparable with one another, in such ways that controlled interchanges are capable of being brought about" (Dewey 1938, 215).

What Dewey means by "intermediate" and "instrumental" in this context is that propositions are significant only insofar as they serve as means to the resolution of some otherwise indeterminate, troubling situation; their contents "are determined with reference to an intended future issue" rather than being self-determined or self-sufficient (Dewey 1938, 164). In other words, quantitative propositions are not transcripts of nature; they are, instead, tools enabling "controlled interchanges" between qualitatively disparate things. Quantitative reductions are a way of treating qualitatively dissimilar objects in terms "that are *logical*, rather than directly *ontological*" (Dewey 1938, 482; 206, emphasis added).⁷ Thus, the significance of quantitative objects derives not from those objects being final objects of inquiry, settled ontological realities, or by being somehow intrinsically "objective," but rather from their intermediary capacity to support ongoing controlled operations eventuating in satisfactorily resolved existential situations.

Remarkably, the example Dewey chooses to help make this general point about the intermediary and operational nature of propositions and theories is the proposition, *I am seriously ill*.

In the context indicated, the proposition is without point if taken to be final and complete. Its logical force consists in its potential connection with a future situation. . . . It formulates the possible operation which, if formed, will aid in existential production of a future situation different *in quality and significance* from that which will exist if the

⁷ "Constructive development of science has taken place through treating the material of the perceived world in terms of properties that accrue to natural objects on the ground of their function in promoted and controlled processes of systematic inquiry; that is, in terms of properties that are *logical*, rather than directly *ontological*" (1938: 482; emphasis mine).

indicated action is not taken. The same considerations will be found to apply to declarative propositions made by the attending physician about the facts which locate and disclose the illness on the one hand, and the course of action he prescribes for dealing with the illness on the other. (Dewey 1938, 164)

The point here is that a diagnosis of statistically abnormal deviation in, let us say, blood glucose level is valuable not because it discloses the presence of a malicious ontological entity, call it “diabetes,” but instead because it serves the intermediary function of suggesting operations to be performed to alleviate both the potential and actual lived ills that threaten the individual in question, and to prevent the consequences for diminished personal quality and significance of living that are associated with high blood glucose levels. Translation of existential data into quantitative expressions proves helpful in effecting the transformation of the existential situation, but even quantitative expressions representing the satisfactorily transformed situation cannot be taken as the content of the desired outcome, for that, too, is existential-qualitative in nature. Apart from guiding us toward a desirable qualitative-significant experience, the quantitative data are empty; their significance is not carried on their face. To frame the point differently, quantitative data, treated pragmatically, operate as principles. The same holds for our working body of background knowledge. This means that, like principles, quantitative data function as experimental hypotheses guiding our inquiries (Dewey 1922, 164-166).

At this juncture it is worth noting that EBM, too, is subject to this operational critique; indeed, applying it is vital to the project of emancipating EBM from perniciously reductive influences. Goldenberg has defended EBM against charges of wholesale “objectivism,” arguing that, although the evidence hierarchy exhibits objectivist tendencies, EBM nevertheless also demonstrates important pragmatist “allegiances,” particularly in its emphasis on RCT methodology. According to Goldenberg’s view, “problem

solving is a leitmotif for pragmatism, and concrete problem solving and the advancement of knowledge is strongly held to be best advanced through a reflexive process where our basic commitments can be scrutinized and revised in light of new findings” (Goledneberg 2009, 173). Understood in this light, EBM’s emphasis on RCTs embodies pragmatic commitments to methods of inquiry that prioritize ongoing experimental investigation over codified thinking from the past. Moreover, the randomized controlled trial appears better than its rivals at promoting “the open inquiry and democratism of empirical science” as well as exhibiting a welcome openness to revision of “even well-established views about treatment efficacy” (Goldenberg 2009, 172). On the other side, Goldenberg contends that the evidence hierarchy reflects a contrary commitment to an uncritically dogmatic “objectivism.” While RCTs reflect the bottom-up, open-ended, and ad-hoc nature of pragmatic inquiry, by contrast, the evidence hierarchy is inflexible, rule-based, and reflects objectivist ontology. However, because RCTs feature prominently in the evidence hierarchy, it turns out that they have a kind of dual-citizenship: as a method of experimental inquiry, they embody pragmatist values; as a feature of the evidence hierarchy, they represent a component of objectivist ontology. This analysis has a lot going for it, but I fail to see why pragmatists should be content to leave the matter where Goldenberg does when the hierarchy itself can, and *should*, be interpreted pragmatically. Even if EBM’s advocates (and, for that matter, its opponents) take the hierarchy to be rigid and “objective,” pragmatists need not accept this bit of dogma. If EBM is to be emancipated from objectivist elements, the view which construes the evidence hierarchy as a set of inflexible rules must be abandoned, and instead, the “hierarchy” must be treated pragmatically – that is, operationally – as a set of tested and contextually reliable, but nevertheless fallible, guiding hypotheses, the merits of which must continually answer to the demands of lived experience.

This brings us to the second prong of the Deweyan critique of biomedicine. Statistical ranges of normality are not ontological finalities, but rather operational intermediaries of inquiry into a given problematic existential situation. Properly understood, then, all such instruments of inquiry, be they propositions, concepts, or theories, are “controlled by the problem set by some qualitative situation, as one limit, and the objective consequence of a resolved situation as the other limit” (Dewey 1938, 210). Because biomedicine grants ontological primacy to statistical ranges of normality, it is possible under that framework for one to be seriously “diseased” (i.e., to have highly abnormal statistical deviations) yet experience no qualitative-existential disruption; it is also possible for one to experience severe qualitative-existential disruption without having any statistical abnormalities, and therefore without being either “diseased” or “ill.” The latter scenario is the more troubling of the two. Biomedicine demands ontological grounding in some physiologically relevant statistical abnormality before it can recognize an actual lived incapacitation as a valid medical fact. Thus, the biomedical practitioner confronted with just such a scenario may view her patient’s report with skepticism. Of course nothing about such a situation forecloses the possibility of a compassionate clinical interaction. Nevertheless, if the practitioner’s interpretive framework prioritizes ontologized statistical values rather than the patient’s existential situation, we can expect that theoretical commitment to be reflected in the kinds of clinical hypotheses that strike the practitioner as live, and therefore as worth pursuing.

Statistical ranges of normality, like all other quantitative values, gain their meaning only as they are first made relevant by some experienced qualitative-existential problem, and insofar as they aid in bringing about the transformation of a new, ameliorated qualitative situation by suggesting operations to perform. The framing and solving of a problem that interferes with living healthily, potentially obstructs one’s future, and is

therefore the basis of the proposition, “I am seriously ill,” is not reducible to abnormal statistical deviations, though those abstractions may be extremely useful intermediaries in the process of ameliorating the situation. It requires a much fuller understanding of individuals’ systems of meaningfulness and ongoing narrative self-developments in relation to their social and somatic environmental engagements, future aspirations, life purposes, and so on.

This suggests that there is a need for an alternate theoretical framework for conceiving health. If we deploy ranges of statistically normal functioning as operational intermediaries instead of treating them as the content of our conception of health, how then is health to be conceived, in light of the persistent worries about the potential erasure of selfhood and the ontologization of statistical ranges? I shall address this concern briefly in conclusion.

Conclusion:

Why EBM needs an alternate interpretive framework

My defense of EBM against its Continental anti-foundational critics has been a measured one; I’ve made the case that EBM is not *inherently* perniciously reductive, and that critics making this allegation have misidentified their true target: biomedicine. In doing so, I have been careful to avoid claiming that EBM is not guilty of pernicious reductivism *at all*. I have contended that EBM is a method. Like any method, it is subject to better and worse applications, as well as the pressure of external forces that may drive evidence-based practice toward reductive expressions. Two external sources that exert a reductive influence on evidence-based practice are business-driven health management bodies, and law. I have already noted how the first of these exerts a reductive influence in clinical practice. The profit motive of these management entities requires medical professionals to see patients at a brisk pace; more patients results in more billable expenses and an enhanced bottom line for executives and shareholders. As for the reductive influence of the law, some evidence-

based practitioners may fear becoming the target of legal action if, in trying to strike a balance between strict adherence to evidence-based guidelines and the integration of patient values and circumstances, they stray from the former in deference to the latter, only to have undesirable outcomes result (Barratt 410).

More fundamental, arguably, than the reductive influence of either business or law is the influence exerted by the biomedical conception of health. Given its pervasiveness and the current lack of a viable alternate interpretive framework for conceiving health, it is not clear what choice EBM practitioners have except to fall back on the prevailing biomedical conception. To the extent that this is the case, it is likely that the biomedical conception of health exerts a reductive influence on evidence-based clinical interactions. This is an important question for future research.

It seems, therefore, that if EBM is to recover its emancipatory calling, it would do well to develop an interpretive framework for health consistent with its more expansive, emancipatory enterprise. What is needed is an interpretive framework capable of redeploying quantitative strategies as the operational tools they are, rather than reifying them as fixed ontological entities or inflexible rules of practice, while at the same time widening the scope of health beyond mere physiological mechanisms to the embodied, social self. Otherwise, EBM effectively surrenders the interpretive field to the biomedical model, leaving itself open to that model's reductive influence and to allegations of pernicious reductivism. In the endeavor to recover EBM's emancipatory power, pragmatism – particularly the work of Mead and Dewey – offers rich and promising resources. Articulating that case fully cannot be accomplished here. Nonetheless, it is worth offering a suggestive sketch.

A profitable place to begin is by reframing health as a Deweyan ideal of *living healthily* that takes as its proper object the embodied social self (Dewey 1920, 167). For

Dewey, ideals are generalized ends-in-view, that is, intelligent, imaginative projections of the best possibilities of the present as we currently find it (Dewey 1934, 44; 49-50). This means ideals are dynamic, not static; they are rooted in the real, or “something which exists;” and yet, while rooted in existing things, they are not identical to those things, but rather are projections or hypotheses of the tendency and movement of the real (Thomas 2014, 154). In other words, Dewey treats ideals operationally; their value lies in their guiding function. For him, there is an “active relation between ideal and actual,” such that ideals fruitfully guide experience, but experience serves as a check and balance on the ideal (Dewey 1934, 51). Because experience is so central here, an “active” ideal of living healthily requires replacing the abstract, reduced, fragmented, ahistorical, and asocial biomedical body with the organic, dynamic, embodied social self. Mead's theory of selfhood offers potentially rich resources in this connection, since his construal of selfhood has the dual advantages of remaining sufficiently general, and of being grounded in, but not reducible to, biology. Moreover, insofar as his view explains selfhood as fundamentally social, Mead's theory holds out the additional promise of possessing explanatory power with regard to the relation between social conditions and individual's abilities to live healthily.

If successful, such a reconstruction of the ideal of health would at least reorient our understanding of biomedical data operationally, while simultaneously offering EBM a valuable and needed interpretive framework consistent both with its nonreductive research agenda (and its results), and its broader emancipatory calling. Of course it would leave untouched the reductive pressure of external forces, like business and law, but those concerns are matters that will need to be addressed through intelligent policy, and in any case, their pernicious influence is not rightly laid at EBM's door. Other criticisms will also still need to be addressed. There remains a lingering worry that EBM has not

removed the uncritical reliance on authority characteristic of medical history, but has only shifted it to the sources of evidence appraisal, such as Cochrane reviews. It is another fair criticism of EBM to suggest that EBM has not yet adequately developed apt methods for integrating patient values and circumstances. But it does not follow even from this that EBM “territorializes” patients’ subjectivity, or “erases” their selfhood; to the contrary, it suggests that EBM takes selfhood seriously. EBM has an impressive record of research suggesting, in a multitude of ways, that selfhood exerts an important influence on living healthily (Thomas, forthcoming). It is difficult to reconcile the contention that EBM represents a self-erasing attack on patients with this expanding body of research. EBM has done more concretely than most disciplines to point toward the need for an expansive, rather than a reductive conception of health. Biomedicine, by contrast, has shown no genuine interest in such questions, precisely because its theoretical commitments foreclose the possibility that selfhood *could* be influential on human health (and perhaps even that selfhood exists at all).

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