Good Evidence: The Limits of Evidence-Based Medicine and the Sociology of Medicine

by

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Abstract

Evidence-based medicine (EBM) is, simply, the conscientious and judicious use of medical research ("evidence") in clinical practice (Sackett et al. 2000:1). EBM emerged as a solution to various identified uncertainties in clinical practice as a programme for intervention at the level of individual medical judgments. Drawing on textual methods of analysis, my dissertation investigates how uncertainty is dealt with in two specific cases: multiple sclerosis and breast cancer. First, I ask if the principles of evidence-based medicine have the potential to reduce uncertainty by producing practice guidelines for rule-guided, procedural medical judgments. Then, I ask if there are other social relations that influence the production or translation of research and medical knowledge into concrete practices. I argue that the effects produced by the strategies of EBM have the potential to be deresponsibilizing, and that evidence is created within a political economy. I conclude by considering the Grey Zone of clinical practice and the ethic of responsibility, and then highlight the political implications for evidence-based policymaking and the sociology of medicine.

Dedication

For my parents

Acknowledgements

My interest in the profession and practice of medicine began in my late teens and early twenties, when a number of health problems took me through a network of various practitioners and specialists. Each of their judgments about my symptoms was different, and each seemed to be based on contradictory justifications about the nature of disease. Some doctors told me that their judgments were based on evidence, while others said that, "sometimes we have to live with *not knowing*". My interest in this tension between evidence and not knowing was further cultivated during my Master's degree while working on "City Life and Well-Being: The Grey Zone of Health and Illness," a five-year interdisciplinary research project funded generously by the Canadian Institutes for Health Research. The workshops and mentorship throughout my time on that project have proved invaluable for thinking through my approach and the intellectual development of the questions of my dissertation project more generally. Here I mention Kieran Bonner, whose guidance and friendship is an ongoing presence, whose integrity to both theorizing and its limits continue to inspire me.

The particular questions and interests of this project began to crystallize in the summer of 2012. I had just completed six months of immersion reading in the areas of medicine, health policy, feminist critiques of science, sociology of medicine, bioethics, and post-structuralist and hermeneutic philosophy. I knew that I was incredibly interested in writing about the "evidenced-based" phenomenon, specifically in medicine (given my earlier interests and training), but I had not yet formulated a "way in" – a way of synthesizing my thoughts and honing in on a clearly delineated research question and project. I read an article written by Eric Mykhalovskiy and Lorna Weir (from York University in Canada) published in the journal *Social Science and Medicine* in 2004 titled "The Problem of Evidence-Based Medicine: Directions for social science." My dissertation was written in response to this article, which may be evident by my starting point in Chapter Two.

My dissertation project owes a great debt to many teachers and colleagues at the University of Alberta. The earliest iterations of this project were shaped and developed through an apprenticeship working with Ronjon Paul Datta, whose commitments to creativity, consistency, and Theorizing (with a capital "T") remain present in the manuscript in many ways. I owe immense gratitude to Zohreh BayatRizi, whose careful readings, untold time, generous encouragement, and poignant criticisms helped to form the final object that is presented here. Offering a sound voice of reason to many of my (what seemed to be at the time) immediate dilemmas, Professor BayatRizi offered me help when I needed it, and allowed me the space to sort things out on my own when I didn't, and for that I am immensely grateful. I am most grateful to Tara Milbrandt who has kept me honest to my tradition and my questions throughout my degree, resisted my temptations for instrumentality, and disrupted my imagined security in the things "I thought I knew" with grace and tact. Robyn Braun offered helpful advice and support. I thank her for her expert direction during times of stagnancy, for offering formulations of similar problems, and for

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For my sister, Kiara, who lived with us while many of these ideas took shape, I thank her for providing a distraction from the problems that overwhelmed me and for the strength to return to the struggle. Many thanks go to my brother, Kevin, who laid the soundtrack to my studies, and to Kathy and Jim, supportive and generous extended family. Thanks to Berenice Hanemaayer, Carlyle MacMillan, as well as the rest of my family, who all helped to refresh my spirits through their love and support at various times throughout my program.

Finally, I must thank my parents, Glenda and John. I am deeply grateful for their unconditional love, encouragement, and multidimensional support. From an early age their parenting invited questioning as a worthwhile way to live, and for that reason I dedicate my dissertation to them.

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Chapter 1

Evidence-Based Medicine: Uncertainty and Medical Judgments

ABSTRACT: The first chapter introduces the "problem" of medical judgments by detailing the foundational assumptions of evidence-based medicine. By articulating these assumptions, I will open up a question for investigation: how these assumptions play out in various case studies where medical judgments are made? I argue that the production of evidence in evidence-based medicine, the dominant discourse of western medical training and practice, is a solution to the problem of uncertainty in medical practice. I spell out how evidence-based medicine is a programme[1] that seeks to provide an epistemological basis upon which judgments can be made in order to facilitate intervention into the practical dimensions of medical care and to control uncertainty. At the end of this chapter, readers will understand how evidence-based medicine aims to eliminate uncertainties of clinical decision-making by formulating guidelines for medical practice that recommend and prescribe the use and evaluation of evidence in a procedural, systematic way.

Evidence-based medicine (EBM) is, simply, the conscientious and judicious use of medical research ("evidence") in clinical practice (Sackett et al. 1996). EBM is considered a new name for modern western medicine. While EBM proclaimed to have ushered in a "new

[1] I use different spellings to differentiate between a *program*, a concrete set of practices that are institutionalized through various interventions, e.g., medical training program, and *programme*, the theoretical basis or rationale for such an intervention, e.g., the curriculum for that medical training program.

paradigm" of medical training and practice (Guyatt et al. 1992), physicians largely consider that their judgments were based on some form of evidence prior to the appearance of the term in the literature. This is my exact question: what is considered evidence? And, subsequently, what is considered "good" evidence? What I argue here is that EBM changed medical epistemology through its problematization of medical practice. According to EBM, the "gold standard" of medical knowledge, and subsequently good evidence, is the use of scientific reasoning to assess the validity of evidence through statistical measures of randomized controlled trials (RCTs). It was on this basis that medical practice began to be reformulated and restructured. But how?

In this chapter I consider what EBM is as well as a number of its successes. Following, I situate the argument and questions of this dissertation in the context of the sociology of medicine, its approach and concepts. Finally, I take a look at the movements of this dissertation at a glance.

EVIDENCE-BASED MEDICINE IS AWESOME

The contributions of scientific evidence are heralded as revolutionary in medical practice today. By using data from large populations about the effectiveness of specific therapies, practitioners can make informed judgments about their individual patients. In the past, according to Guyatt and colleagues (1992), medical practice relied heavily on the physician's "intuition" or what was considered conventional knowledge in the field. EBM, however, claims to have changed the traditional way of practicing medicine by adding rigorous

scientific tests of validity to the results produced by RCTs. These results can then be put into recommendations for actual clinical practice in the form of clinical practice guidelines, which are a set of implemented strategies for managing disease through therapy and/or treatment programs. The emergence of EBM has been a "movement" that has radically restructured western medicine in less than two decades.

There is a lot of praise for EBM and its contribution to medicine: "EBM has been of major value to medical practice, especially with regard to screening methodologies and therapeutics" (Schechter & Pearlman 2009:161). The production and collection of vast amounts of data (i.e., evidence) about new and emerging technologies and therapies has shortened the lag time between medical research and innovation and clinical practice. EBM has the power and potential to keep physicians abreast of the newest and latest, tried and proven tests, techniques, and therapies for every known disease or condition. Vast numbers of journals now focus on translating the results of medical studies into recommendations for clinical practice. EBM journals have improved the uptake of knowledge from laboratory research to the patient's bedside:

> Clearly there was an internationally perceived need for this development, and in the last 15 years EBM has taken off and rapidly expanded, with innumerable articles, monographs, textbooks, and now journals devoted to it. Numerous private, quasi-governmental, and governmental organizations—such as the Cochrane Collective, the U.S. Preventive Services Task Force, and various ad hoc "working groups"—have appeared in order to develop and implement these ideas. These groups, in various countries and some on an international scale, have developed tools such as "guidelines" for medical care, sometimes accompanied by strong organizational or even governmental mandates for their implementation. (Schechter & Pearlman 2009:162)

EBM is often described as the following:

> Evidence based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research. (Sackett et al. 1996:71)

EBM requires that physicians consult and integrate medical (i.e., scientific) knowledge into their decisions. EBM takes place at the level of the individual's judgment. Evidence is considered any research about the use and effectiveness of therapies and medical interventions. This research is then subject to tests of statistical validity through the use of RCTs, which are systematically executed double-blind trials of the latest therapies or meta-analyses of these literatures.

Shortly after the first publication of EBM, a study that assessed in-patient care in a hospital setting is released concluding that, "82% of patients (90/ 109) were judged on our criteria to have received evidence-based interventions" (Ellis et al. 1995:408). The authors stated,

> The overwhelming majority of patients were offered (and accepted) evidence-based interventions. More than half received interventions previously shown to do *more good than harm* in one or more randomised controlled trials, and another one-third received interventions judged to be self-evidently effective to the extent that the team members considered it unethical to conduct a trial in which the intervention would be withheld. These results support the view that learning how to practise *evidence-based medicine is not just an academic exercise but can influence clinical decisions*. (Ellis et al. 1995:409; *my emphasis*)

The goals of EBM were not "new" in terms of doctors prescribing what they thought to be the most effective therapies to their patients. What was "new," I argue, were the changing landscapes of medical programming and training as well as health policy. First, I consider an

example of the significance and success that EBM has had on the profession, institution, and practice of medicine.

A Success Story

EBM is largely considered a success story in modern medicine. It has revolutionized the instruments and procedures of medical training and practice. In the literature, EBM is often cited as having real and important effects on discrediting or improving what were current or conventional medical prescriptions. By testing conventional medical knowledge and subjecting the results to the hierarchies of good evidence and statistical relevance and rigor[2], outdated therapies could be discarded and new therapies could be introduced. Doing so, EBM argued (e.g., Sackett et al 1996), would improve health services, but most importantly patient health.

One example of a procedure that EBM has made obsolete is the administration of an enema during labour. According to the *British Medical Journal* Group publication "Best Health,"

> Fifty years ago, women were often given an enema while they were in labour. This is uncomfortable and unpleasant. But doctors thought that enemas would reduce the risk of infection for the woman and her baby. Some hospitals gave soapy enemas, which were painful for women. When doctors studied the results from the research, they found there was no evidence that enemas prevented infections. Two studies showed that enemas made more of a mess, and women felt embarrassed by the enema. Women no longer have enemas while they're in labour. (British Medical Journal Publishing Group 2013)

[2] There is further discussion of how evidence is ranked and considered "good" or "valid" evidence in the second and third chapters.

The above summary was based on the following review of RCT data about enemas during labour, which concluded the following:

> Giving women enemas during labour has been routine practice in delivery wards of many countries and settings. Occasionally women leak from their back passage whilst giving birth and it was thought an enema in early labour would reduce this soiling and the consequent embarrassment for women. It was also thought that emptying the back passage would give more room for the baby to be born, would reduce the length of labour and would reduce the chance of infection for both the mother and the baby. It was also suggested it would reduce bowel movements after birth which often cause women concern. The disadvantages suggested were that it is a very unpleasant procedure and causes increased pain for women during labour and because enemas could produce a watery faecal soiling whilst giving birth, they could potentially increase the risk of infections. The review identified four studies involving 1917 women. These studies found no significant differences in any of the outcomes assessed either for the woman or the baby. However, none of the trials assessed pain for the woman during labour and there were insufficient data to assess rare adverse outcomes. Thus *the evidence speaks against the routine use of enemas during labour*. (Reveiz, Gaitán & Cuervo 2000:2; *my emphasis*)

EBM uses scientific methods to produce knowledge about medical practices. Systematic reviews, a common tool for measurement in EBM, offered scientific evidence about medical practices and treatment strategies, and disproved a previously common sense misconception. The reviewers formulated the criteria for their evaluation, and their conclusions assessed the effectiveness of a therapy. In this case, the evidence demonstrated that the practice of administering enemas was doing more harm than good, rather than preventing infection. This review of RCT data dispelled a previous practice that was based upon conventional knowledge. Scientific evidence is helpful for eliminating what might now be considered an antiquated and irrelevant (and even sexist!) common medical procedure. EBM is understood to be improving medical practice by eliminating these kinds of

unnecessary or harmful treatments. As I will explain later on, however, even evidence-based recommendations and practices can have harmful effects.

In addition to eliminating harmful practices and unnecessary procedures through the evaluation of medical research, many medical practitioners consider EBM to be largely beneficial in a number of other ways. For example, EBM is designed to save physicians time and energy (O'Reilly 1997:1457). Evidence-based medical journals translate the results of clinical trials and systematic reviews of the literature into plain-language practice guidelines or recommendations. Doing so allows physicians to adapt the "take away" from each study into their clinical practice, rather than being burdened with the arduous task of trying to keep up with every study that is published that may be relevant to the patients in their practice or specialized field. Time constraints are a large problem in medical practice, and this is discussed further in Chapter Two.

EBM is also considered useful for assessing the effectiveness of continuing medical education programs (e.g., Davis 1992:1116). Many medical colleges worldwide require that physicians take medical education credits throughout their career as part of their licensing. The credits are meant to keep practitioners up to date with the latest therapies, diagnostic tools and technologies, and procedures and techniques. By teaching physicians about the procedures that are proven to be effective according to the best evidence (i.e., RCTs), practitioners are not only updating their skills, but also increasing their knowledge on the basis of scientific relevancy: "The practice of evidence based medicine seems to be able to

halt the progressive deterioration in clinical performance that is otherwise routine and which continuing medical education cannot stop" (Davidoff et al., 1995:1085).

Finally, EBM is useful for improving health outcomes and reducing the number of procedures carried out on patients (e.g., Schoenbaum 1993). If fewer patients are undergoing unnecessary therapies, then there is better health care and less unnecessary harm. Further, if there are fewer medical interventions, then there is better cost effectiveness. While the proponents of EBM deny that EBM is a tool for reducing costs or allocating resources (e.g., Sackett 1996), the logic follows that medical resources will only be used for those procedures that are necessary and effective, thus reducing money spent on those that are unnecessary or ineffective. In a socially funded medical insurance program like here in Canada, EBM could potentially decrease the cost of health care. The same may also be said for health care in the United States. Private insurance companies and health maintenance organizations (HMOs) would have a greater incentive to avoid "wasting" their money on unnecessary or ineffective treatments.

As a preliminary illustration, the success of EBM has depended on multiple endorsements from medical associations in the western world. The *Journal of the American Medical Association* (*JAMA*), following the original publication of the first EBM paper in 1992, began a series titled "Users' Guides to the Medical Literature" in 1993 (Guyatt, Sackett, & Cook 1993:2598-2601). The authors, members of the Evidence-Based Medicine Working Group who coined the term, stated the rationale for the series as follows: "Our clinical journals are abound with reports documenting inexcusable delays and inexplicable

variations in the incorporation of evidence into traditional medical practice, sometimes even in the same institutions in which the primary evidence was generated" (Sackett 1995:840). Further, the Canadian Medical Association (CMA) gave its official endorsement of the EBM programme when, in 1994, the theme for the annual March Leaders Conference was titled, "evidence-based medicine and ways to bring research and practice together" (Rafuse 1994:250). More than 400 delegates from all areas of medicine, including physicians, hospital administrators, and researchers, among others, were in attendance. The major focus at the meeting was what effect EBM would have on health care in Canada (Rafuse 1994:251). Later, in 1995, a new journal for physicians appropriately titled *Evidence-Based Medicine* also appears. Then, a 1997 survey of one quarter of all working general practitioners in the United Kingdom was published in the *British Journal of Medicine* (*BMJ*); it stated that physicians "welcomed evidence based medicine and agreed that its practice improves patient care" (McColl et al., 1998:361).

Today, EBM continues to be the term at the heart of Canadian initiatives to improve patient care. In a document about the importance of national strategies for practice guidelines, the Canadian Medical Association (CMA) notes "the significance of the process by which knowledge, more specifically evidence-based research, is incorporated into routine practice" (CMA 2007:2). In fact, EBM is the dominant rationale for developing practice guidelines and creating national databases, accessible to all physicians. These databases contain the latest up-to-date information about medical treatments and procedures and recommendations about which treatment options are the most effective. The measurements of

validity for evidence-based practice and decision-making, as stated by the EBM programme, have been linked up to policymaking as well. EBM, and data from RCTs specifically, have quickly become what the medical profession refers to as the "gold standard" for policy think-tanks (Davies 2013). The implications of the epistemological commitments[3] of EBM remain to be seen for policy formation, which I will discuss later on in Chapters Three, Four, and Six.

Hesitations and Reservations: A Tension with Uncertainty

Despite the claim made by EBM about its contribution to improving health care, there are also some hesitations about the EBM agenda. For example, social scientists and analysts have asked questions about the effectiveness of EBM in practice, or if physicians actually employ the step by step procedure for reviewing and bringing the knowledge from medical research into their individual practices: "Two decades into EBM, practice variation has not diminished and patients continue to be over- or undertreated based on physician idiosyncratic preferences" (Timmermans 2010:320). There are uncertainties about physician compliance with the EBM recommendations: do practitioners actually perform a critical review of the literature for each judgment and assessment? These uncertainties about compliance are part of the impetus for the translation of evidence into national strategies and policy formation.

In addition to questions about whether physicians actually use EBM, there are criticisms about its epistemology, the assumptions about scientific validity upon which all

[3] I return to a discussion of my approach shortly. First, I situate the successes of EBM in relation to broader questions from both within medicine and from social science scholars in the following subsection.

truth claims about the evidence rest. The following was written by medical researchers in molecular medicine:

> The evidence base of EBM still suffers from a variety of biases, ranging from individual conflicts of interest to unwarranted corporate intrusion into the design and publication of the results of clinical trials; these biases need to be eliminated to the extent possible, and recognized if they cannot be eliminated. Although RCTs are an invaluable source of clinical information, they may not provide the most appropriate information for many situations. (Schechter & Pearlman 2009:162)

Uncertainties about the logic of EBM also arise from the fact that it marginalizes data sources that do not fit into the rigid hierarchies of evidence. What about other forms of knowledge? One social scientists asks,

> Many previous observers have suggested that EBM, through its privileging of the evidence derived from RCTs, risks devaluing the knowledge gained through individual clinical encounters. But the problem is not that EBM places too much emphasis on RCT evidence, to the neglect of anecdotal evidence or self-reports from patients. It is that advocates of EBM privilege the very data that may be the most compromised by political and economic factors, often with the mistaken assumption that these data are the most "evidence based." (McGoey 2009:215)

My dissertation examines these ongoing tensions in the EBM programme. I explore these uncertainties by beginning with the questions "what is evidence?" in EBM, and to what is EBM a solution (I discuss this question specifically in Chapter Two)? After I explain what discursive and historical conditions made it possible for EBM to emerge and later come to dominate western medicine, I theorize the potential effects of the problematization of uncertainty as the deresponsibilization of medical judgments. Next, I consider the political economy that contributes to the creation of CPGs (Clinical Practice Guidelines) and the profit relations that structure the field of medicine and the production of evidence. Once I dispel the objectivity of medicine and highlight the antithetical outcomes of its

implementation, I conclude by retheorizing the ethical limitations of medicine and the implications of the evidence-based paradigm in other areas of policy development. Now, I discuss the theoretical conversations from which this project departs.

THE QUESTION OF EBM: THE QUESTION OF THIS STUDY

> Medicine—even evidence-based medicine—is theory-based. Theory gives data their status as facts, guides the search for new facts, and lends findings their meaning and implications. Medicine relies on theory to develop interventions, test them, generalize findings to new situations, and apply research findings to individual cases. Theories about "what causes what" rest on more fundamental theories about how things "must work," and what the "things" themselves must be. (Giacomini 2009:246)

My dissertation begins by considering some theoretical questions about EBM. As noted above, EBM changed the notions of validity in medical practice. But how did this happen? Are there any consequences that follow from these assumptions? In this section I consider the "things" that EBM makes statements about, on what basis medicine can pose questions about the nature of disease and treatment, and, subsequently, on what basis my own intervention will begin.

EBM refers to a field of practices. These practices include, assessing the evidence and making medical judgments based on those recommendations. Medicine, however, is a field with various contested voices. While there are many treatments that are conventional, in the sense that there is good evidence to support their use but little evidence to the contrary of their effectiveness, doctors are not always sure about what they should do. For example, among medical professionals, there are questions about which treatment is best for diabetics who also have heart disease (e.g., Sobel & Schneider 2013). What about the ageing

population, where many medications pose difficult problems for physicians who must coordinate between a whole host of risks and side-effects for multiple therapies (e.g., Health Council of Canada 2012)? The medical literature is wrought with questions about what doctors should do in their practice, and these statements do not always agree.

My approach to the study of the theoretical basis of evidence-based medical judgments relies on three dimensions: ontological, epistemological, and normative. Ontological commitments concern statements about "what kinds of things there are in the world" (Benton & Craib 2010:3). EBM and its recommendations rely on fundamental understandings of what the "things" of medicine are, such as the body and disease. Next, epistemology concerns theories of knowledge. In EBM, there are specific measures of validity and theories about causation. There are assumptions about "what causes what". Finally, EBM relies heavily on its normative commitments. Normative statements concern questions of morality and ethics, asking how things *ought to be* in the world. EBM, as a programme that generates recommendations for what physicians should do, is concerned with normative assumptions about how medicine should be practiced. The normative dimensions are evident in the practice guidelines and recommendations about what doctors should do. The links between these assumptions in medical practice have been taken up previously in the work of Michel Foucault. I now turn to a brief discussion of *The Birth of the Clinic* in order to demonstrate how my dissertation both begins and departs from previous work.

Seeing and Saying: Studies of Medicine after The Birth of the Clinic

My dissertation analyzes medical literature and policy statements in the field of medicine in order to demonstrate the theoretical and practical limits of the EBM programme. Medical and policy statements represent a discursive field, which contains both thought and action. In his archaeological work, *The Birth of the Clinic*, Foucault retraces the events that led to modern medical discourse. In this section I briefly explicate Foucault's arguments, as well as relate his position to his broader theoretical apparatus. Doing so allows me to theorize the relationship between the principles of a discourse as well as the practices that reproduce its relations. This discussion shows both the relationship between his work and my own intellectual developments. I will also clarify some of the working distinctions from which I theorize my analysis.

Foucault's work has changed the way that medicine and its object are conceptualized for study in various social science and humanities disciplines. For Foucault, medicine is a discursive terrain, a formation of various relations that structure and make possible what people do and say in a given practice. The medical terrain is defined as follows:

> This whole group of relations forms a principle of determination that permits or excludes, within a given discourse, a certain number of statements: these are conceptual systematizations, enunciative series, groups and organizations of objects that might have been possible (and of which nothing can justify the absence at the level of their own rules of formation), but which are excluded by a discursive constellation at a higher level and in a broader space. A discursive formation does not occupy therefore all the possible volume that is opened up to it of right by the systems of formation of its objects, its enunciations, and its concepts; it is essentially incomplete, owing to the system of formation of its strategic choices. (Foucault 1973:67)

The field of medicine is a discursive formation. The condition of possibility for a statement about the nature of a particular disease, for example, is subject to the epistemological rules for defining it on the body. The discursive formation of medicine determines what kinds of knowledge and statements are considered true, and what kinds of knowledge and statements are considered false. Foucault (1973:3) documented the emergence of a specific set of rules for seeing disease on the body: "The space of configuration of the disease and the space of localization of the illness in the body have been superimposed, in medical experience, for only a relatively short period of time". *The Birth of the Clinic* analyzed a number of events that changed the discursive field of medicine in the nineteenth century, and subsequently its object.

Foucault explained a number of practices and concrete events that relocated the medical gaze onto the human body – the space where disease could be seen: a "function that the discourse under study must carry out *in a field of non-discursive practices*" (Foucault 1973:68). The discourse generated by a discursive formation is not an idealistic phenomenon; it occurs in a material world, where actual practices, like examining patients and making diagnoses, form a part of the relations that make it possible. Discursive practices are "characterized by the demarcation of a field of objects, by the definition of a legitimate perspective for a subject of knowledge, by the setting of norms for elaborating concepts and theories. Hence, each of them presupposes a play of prescriptions that govern exclusions and selections" (Foucault 1994:11). EBM produces rules for doctors (subjects) to follow, such as

diagnosing illnesses (e.g., diagnostic criteria, reading test results) and recommending therapies (e.g., writing prescriptions).

Practices take shape in institutional contexts. The invention of the operating theatre provided a space to observe the body post-mortem. Discursive practices are not only modes of manufacture of discourse, "they take shape in technical ensembles, in institutions, in behavioural schemes, in types of transmission and dissemination, in pedagogical forms that both impose and maintain them" (Foucault 1994:12). The space of the hospital in the eighteenth century allowed individuals practicing medicine to observe patients in their beds, which "was to become the essential part of the new medicine" (Foucault 1973:69). The eighteenth century hospital setting provided the conditions of possibility to create a new way of understanding the body and disease. The concrete practice of "opening up a few corpses" allowed the medical profession to conceptualize how the body "looks" and how to "see" disease. Doing so provided the opportunity for medicine to make statements about (to "say") health and illness.

Foucault's project demonstrated how a field of thought, like medicine, could be located and analyzed by examining

> …how the formation of [medicine] as a science, the limitation of its field, and the definition of its object implicated a political structure and a moral practice: in a twofold sense that they were presupposed by the progressive organization of [medicine] as a science, and that they were changed by this development. (Foucault 1994:116)

The institutional structures, like hospitals, provided concrete places to see and learn about the disease process on the body of the patient. The "new" way of speaking about the body allowed statements about disease to be true in new ways: they corresponded to actual places

(e.g., organs) on a patient's body. The consequence of this practice of observing was the emergence of a new discursive formation, a new way of seeing and speaking about disease: it was located on and in the body. Statements about disease could only be true if they could be located in this space.

My project analyzes medicine as a field structured by discursive relations. EBM is a discourse that renders some statements true and others false, such as the example above about the use of enemas. The rules of evidence are used for ruling in and ruling out diagnoses and prescriptions. These rules give statements (and practices) their authoritative character, which I discuss further in Chapters Two and Three. Judgments are made based on the best available evidence, not doctor intuition or conventional knowledge. As I will show later on, EBM changed the institutional space of the hospital and the way that medicine is practiced. My research builds on the work of Foucault by showing how changes to medical epistemology occurred within an institutional context and field of discursive and nondiscursive practices.

The texts that I have read and engaged with to conduct my research[4] are understood to be products of both discursive and social relations; in additional to being subject to the rules of EBM, the texts are also "active constituents of social relations" (Smith 1990:122-123). My method relies on the following assumptions: "The investigation of texts as

[4] Texts range from a variety of sources, including, medical literature, policy documents, health promotional materials, podcasts, reports from private and public sectors, website, among others. A detailed discussion of my sources is found in the following section.

constituents of social relations offers access to the ontological ground of institutional processes which organize, govern, and regulate the kind of society in which we live, for these are to a significant degree forms of social action mediated by texts" (Smith 1990:121-122). The institution of medicine relies on certain assumptions that ground its practices, delineating its objectives and possible courses of action. The texts are representative of assumptions and questions that have stabilized and crystallized in particular documents.

Smith's conception of texts as constituents of social relations allows my research to move "beyond the localized setting of individual physician–patient interaction" (Mykhalovskiy & Weir 2004:1066). The production of evidence is subject to discursive conditions, and by drawing on the work of Smith I show how these textual relations may have implications for the social organization of local activity: "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" (Mykhalovskiy & Weir 2004:1066). What evidence-based practitioners ought to do is stipulated in medical texts. I argue that these texts are products of governance strategies within health care to regulate what practitioners do. Future research might also examine how individual users activate the relations found in these texts in local settings. I expand on these points in Chapters Three and Six respectively.

My work also builds on the materiality of Foucault's understanding of discursive practices. The texts that I analyze here provide insight into the authoritative character of medical documents: what doctors can see and say in their practice is structured by the

assumptions of EBM and its recommendations that govern medical practice. While medical research locates disease in the body, EBM is a formulation of the normative dimensions of medical practice: it stipulates what doctors can and cannot do. EBM has consequences for medical practice; medicine is a "political and moral practice." I return to this point later on in Chapter Five.

Responsibility and Health: The Politics of Life

Nikolas Rose has taken up Foucault's arguments in a contemporary twentieth-century context. Rose argued that the body remains the space for medical thought and action, but "medicine itself has also been transformed. It has become technomedicine, highly dependent on sophisticated diagnostic and therapeutic equipment" (Rose 2007a:11). The instruments of medical science have become the standard for seeing; they allow doctors to observe the body through technological lenses (e.g., a Magnetic Resonance Imaging test). The juridical structure of medicine, however, remains the same: the disease must be seen within the measured processes of the body. For example, an MRI provides a "look" into the brain (i.e., "seeing"), and provides the basis for diagnosing (i.e., "saying") an illness such as multiple sclerosis.

Medicine has become what Paul Veyne has called a "justification for power" (Veyne 2008:32). Medicine has therefore created a new space of responsibility and ethics, changing the way individuals understand themselves. Rose stated,

> I argue that we are seeing the emergence of a novel somatic ethics, imposing obligations yet imbued with hope, oriented to the future yet demanding action in the present. On the one hand, our vitality has been opened up as never before for economic exploitation and the extraction of biovalue, in a new bioeconomics that

> alter our very conception of ourselves in the same moment that it enables us to intervene upon ourselves in new ways. On the other hand, our somatic, corporeal neurochemical individuality has become opened up to choice, prudence, and responsibility, to experimentation, to contestation, and so to a politics of life itself. (Rose 2007a:8)

While doctors remain the only subjects able to deploy medical statements (i.e., make valid diagnoses, prescribe therapies), individual patients now become subjects of a number of theoretical choices about their health: "Judgments individuals make of their actual and potential choices, decisions, and actions as they negotiate their way through the practices of contemporary biomedicine" (Rose 2007a:8). The field of medicine deploys biomedical strategies (groupings of biomedical concepts) in various populations in order to interpellate[5] patients as somatic subjects who will correct themselves of abnormalities.

Rose explained that the emergence of these new "ethics of biocapitalization" (2007a:258) are closely tied to political and economic relations. There was a contingency of events that allowed the proliferation of somatic understandings of individual "health choices" to emerge. These understandings are closely tied to emerging markets and biopower (i.e., power over life). The use of these strategies to regulate and control the conduct of individuals through their lives can be observed, for example, in emerging markets in North American for correcting the conduct of children with attention deficit hyperactivity disorder through pharmaceutical products (e.g., Conrad 1975). Further, the ethical obligation lies with parents and children alike to regulate their behaviours through these means. The justification for

[5]Interpellation is defined as the constitution of concrete subjects by a discourse (c.f. Althusser 1970). "Somatic individuals" recognize themselves in relation to a particular form of medical knowledge, with subsequent obligations and practices (e.g., to be healthy individuals).

intervention lies in the medical discourse, showing a disease process in the body that can be modified and controlled through psychoactive therapy, and it is an ethical necessity to do so.

Site-ings: Medical Judgments

My dissertation further examines the normative dimensions (e.g., ethical obligations) related to the practice of medicine. My focus, however, is on an idealized subject of EBM, how does EBM presuppose the duties of an individual practitioner? What implications follow for thought and action? Building on the approach of Rose, I examine the discourse of medicine to determine what events led to the emergence of EBM. While there are implications for understanding how EBM creates ethical subjects, inducing individuals and populations to regulate their health and lives (see, for example, Dent 2006), I concentrate instead on the judgments that doctors must make on a regular basis as part of their professional medical practice. I show how good judgments that are based on evidence have ethical implications. Building on Rose's definition, medical judgments are choices, decisions, and actions that negotiate medical practices like diagnosis, intervention, treatment, and prognosis. It is my argument that the field of medicine, as reformulated by EBM, targets the individual judgments of the practitioners themselves for new strategies for control and regulation.

EBM articulates a specific problem of medical practice, the individual physician's "intuition". In its first statements, EBM asserted that it remedies various uncertainties:

> Evidence-based medicine de-emphasizes intuition, unsystematic clinical experience, and pathophysiologic rationale as sufficient grounds for clinical decision making and stresses the examination of evidence from clinical research. Evidence-based medicine requires new skills of the physician, including efficient literature searching and the application of formal rules of evidence evaluating the clinical literature. (Guyatt et al. 1992:2420)

EBM aims to reformulate the grounds for clinical decision making by focusing on the importance of "evidence from clinical research" in clinical practice. The physician is the one who must make judgments about their patients on the basis of actual research, not their hunches or intuition. The judgments of individual practitioners are the target of these strategies for intervention in clinical practice, as the judgments themselves are not enough for sound medical decision-making: there must be a scientific basis that determines the best course of action. In EBM and policy statements, the physician is the target of new programs for skills training, such as searching the literature and assessing its relevance for the application to particular patients. The judgments of individual medical practitioners are the site at which the intervention of EBM can be observed.

FOUR MOVEMENTS

I begin in Chapter Two by examining the conditions of emergence for this particular formulation of the question of EBM. I show how EBM localizes the problems of clinical practice on individual medical judgments and offers a solution to various clinical uncertainties. Research was carried out in the Archives of Ontario (AO), National Archives in the United Kingdom (NA), and at the McMaster University Faculty of Medicine Archives (McMaster Archives). These archives were chosen for different reasons. The Archives of Ontario house policy documents pertaining to the creation of new medical education programs in Ontario. I wanted to explore how the MacMaster University medical school was created, and what political influences shaped the program initiatives. I examined documents

at the National Archives in the United Kingdom in order to understand how the Centre for Evidence-based Medicine was created in 1995. I asked what funding initiatives and broader interests supported its creation. The Faculty of Medicine Archives at McMaster University contained numerous documents about the history of the creation of the clinical epidemiology program in addition to the medical school. I was interested in examining both the rationale for the creation of each program as well as the political relationships between medical practitioners, university administrators, and government officials in historical documents. Building on these materials, Chapter Two demonstrates how the questions of EBM stabilized in various training programs targeted directly at the education of clinical practitioners. I explain where EBM came from in order to better understand the conditions under which this particular question about clinical practice emerged.

Chapter Three builds on the arguments made in Chapter Two by demonstrating the effects of the particular formulation of uncertainty in clinical practice. To do this I engage with a case study of the multiple sclerosis literature and guideline documents to show the potential limits of the EBM programme and the development of CPGs. I explain these limitations in order to understand the discursive nature and consequences of the problem that EBM is trying to solve. My case study will demonstrate that EBM has potentially produced the opposite effect of its governance strategies: deresponsibilization.

In Chapter Four, I examine the conditions under which evidence is produced. EBM requires that practitioners rely on evidence in order to make judgments about individual patients. But how is this evidence produced? I engage with another case study to show the

political economy of CPGs. Using the case of breast cancer, I argue that pharmaceutical companies are "interested stakeholders" in medical practice, influencing the production of evidence about specific therapies that are then taken up through implementation strategies such as CPGs. CPGs are both produced by economic interests and are the conditions for further accumulation of profit. Both the genetic testing industry and the production of adjuvant therapy demonstrate this trend.

In the Fifth Chapter I discuss the ethical implications of EBM, deresponsibilization, and the political economy of evidence. After I explain the effects of EBM and the political economy that influences the "evidence" upon which judgments ought to rely, I return to the importance of ethics for medical practice. Ethics are intertwined with medical intervention. Not only are there many Codes of Ethics that regulate medical conduct, but the normative dimension of medical practice is to do more good than harm and to diminish suffering. Because EBM is the solution to the problem of uncertainty, this chapter re-engages with that principle in order to retheorize the ethic of responsibility in medical practice in light of the "Grey Zone." I propose an alternative basis for medical judgments.

Finally, I conclude by considering some of the broader implications of the EBM programme. I show the significance of my arguments for considering trends such as the rise of "evidence-based" policy. I offer my final comments about directions for future research about evidence-based programme from the sociology of medicine.

Chapter 2

The Emergence and Dominance of Evidence-Based Medicine

ABSTRACT: Building on the introduction of the problem of medical judgments in the First Chapter, this chapter develops and explains the history and emergence of evidence-based medicine (EBM). In particular I examine how EBM became "historically possible and to what it was a solution" (Mykhalovskiy & Weir 2004:1065). I detail the epistemological and scientific tensions that led to the first statements of EBM in 1992, as well as further explore its rise to prominence and dominance in modern western medicine. Among the questions that this chapter considers are the roles of the institution of medicine and various funding agencies as well as professional and economic pressures that contributed to the first articulations and later acceptance of the EBM approach. At the end of this chapter readers will understand what led to the emergence of EBM and the tensions and contradictions that continue to circulate in its discourse.

This chapter begins by asking the following questions: what is evidence in EBM? What were the dominant themes in the ongoing conversations concerning the practice of medicine and medical judgments prior to the emergence of EBM? And, subsequently, what tensions and contradictions (historical and epistemological) led to the first statements of EBM? EBM emerged as an answer to growing concerns and questions about the role of laboratory medicine and its applicability to (or incompatibility with) bedside practices. After a few decades of debate over this relationship, the first statements of EBM appeared in 1992. In a

few short years, the number of times the words "evidence-based" appeared within published medical journal articles rose from 1 in 1992 (the first statement put forth by the Evidence-Based Medicine Working Group) to more than 1000 by 1998 (Sackett et al. 2000:4). The exponential increase in evidence-based medicine as a key- or buzz-word within the medical field indicates the importance of those problems that were being dealt with before it was first uttered.

Mykhalovskiy and Weir (2004) argue that social science research has not given enough attention to the question of EBM, specifically its impact upon the medical profession and transformation of biomedical reasoning and practices. They highlight and suggest that social scientists examine the "discursive preconditions" of EBM, and ask what questions led to the emergence of clinical epidemiology: "How the apparent oxymoron, clinical epidemiology, became historically possible and to what it was a solution is a topic in need of a genealogy" (Mykhalovskiy & Weir 2004:1065). This is where this chapter begins, by considering the concerns to which clinical epidemiology (and later EBM) was a solution.

PROBLEMATIZING CLINICAL PRACTICE

To make my argument, I draw on the sociological formulation of problematization offered by Thomas Osborne and Nikolas Rose and relate their concept to EBM. Over the past few decades, medicine has become specifically concerned with questions surrounding the nature of clinical practice. These questions represent "styles of articulation": "a way of giving voice to a certain set of problems and aspirations" (Osborne & Rose 1997:88). The problem of

medical judgments, as I have formulated it in the first chapter, has to do with the relationship between uncertainty and the grounds or basis upon which judgments can be made in the medical field. EBM proposes solutions to the problem of uncertainty in medical practice. It provides the justification for medical judgments in an attempt to reduce uncertainty in a world where the ambiguity of any medical judgment is an ontological condition of its practice[6]. EBM emerged in relation to a history, to rising concerns over the scientific basis upon which clinical decision-making rested. EBM reflects efforts to systematize and scientifically classify and explain clinical judgments, and, later, the problem of the application of scientific research to clinical practice.

Each of these developments and questions, as I show below, is a result of the changing problematizations of medical practice, which are the conditions for the emergence of new theories (Osborne & Rose 1997:88). In other words, EBM is a product of social and historical circumstances that articulate a set of problems in the field of medicine for medical practice (specifically, in my case, medical judgments). Further, the ways that these problems (uncertainty and the scientific basis of clinical/medical practice) were developed, transformed, and changed, demonstrate the social history of EBM, arising from practical problems originally articulated in the research literature.

[6] The field of medicine understands the nature of medical practice to be ambiguous due to the impossible nature of knowing the outcome of any medical decision or intervention in advance (see for example Nuland 2008). The ambiguous nature of medical judgments is discussed at length in Chapter Five.

Clinical epidemiology introduced a justification and rationale for medical practice during a time when medical authority and reason had been called into question by events in the western world and in the field of medicine, such as the changing landscape of health care and research on medical effectiveness. Subsequently, EBM addressed the problem of implementing the scientific basis for judgments into medical training, practice, research, and guidelines. The field of medicine has long been interested in responding to the current happenings of the social world, and its practical problems have impacted the organization of society and its practice:

> Aside from such [sociological] theorists, there were also practical people like doctors for whom social thinking was a matter of the difficult, piecemeal midwifery of novel ways of construing the practical problems that they sought to understand and ameliorate in terms of a space of action and determination that exceeded the individual. (Osborne & Rose 1997:89)

Osborne and Rose (1997) argued that the changes in the Poor Law in England led to a study by Arnott, Kay, and Southwood Smith that discussed a new *space* for disease, "social disease," arguing that the causes of disease were not always tied to the space of the body. These doctors understood that the organization of the social world also affected human health: disease is thus a product of social and environmental conditions. Poor housing conditions would lead to the spread of illness; social remedies were needed for collective spaces (Osborne & Rose 1997:90). The field of medicine encountered practical problems which led to the articulation of those problems in the medical literature and recommendations for change. Similarly, the emergence of EBM was also a result of the practical problems that clinicians were encountering in their medical practices. The problems identified in the medical literature concerned the scientific basis that gives medical judgments their authority.

These questions led to a problematization of medical judgments that sought to intervene in the practical arena where judgments are made by providing recommendations (e.g., guidelines) for systematizing the implementation of scientific knowledge.

We can thus understand problematization in the field of medicine:

> [Problematization] show[s] that at each moment a precise set of problems were the target of thought and action, within certain specific practices, and that a given problematization was first of all an answer given by definite individuals in specific texts, although it may later come to be so general as to become anonymous. (Osborne & Rose 1997:94; cf. Foucault 1988:17)

In this chapter I build on this definition of the process of problematization to explain that the problems identified by EBM were first articulated by a few key players, Feinstein, Fletcher and Fletcher, and the McMaster Medical School. I show how these questions moved from individuals in specific contexts, encountering real problems for the practice of medicine, and were later taken up as a general line of inquiry: "To analyze problematizations is to investigate why certain things (behaviour, phenomena, processes) become articulated *as* problems, how they are linked up with or divided off from other phenomena, and the various ways (conditions and procedures) in which this actually happens"(Osborne & Rose 1997:97).

I examine how medical judgments became articulated as problems in relation to medical practice, and how, these individuals specifically, and later groups of individuals, began "articulating experience as a series of problems" (Osborne & Rose 1997:97). These problems are not just derivative of the medical field, but they are also "creative events" (Osborne & Rose 1997:97). The practices and procedures that rendered the problematization of medical judgments visible (e.g., the necessity to produce scientifically grounded evidence

for clinical practice) also created the conditions for the problem to be taken up in various ways within the field and for new problematizations to emerge (Rose 1997:98).

I analyze the emergence of the problematization of medical judgments "from a modest empirical engagement with specific problematic zones [in my case, medicine], linked to explicit attempts to conceptualise problems in order to make them amenable to intervention" (Osborne et al. 2008:521). According to Osborne, Rose, and Savage, the strength of sociology is to engage in "debates which simultaneously raise both political and social questions" (2008:521)[7]. The approach of my research examines the "work of framing a particular problem in relation to that area of study, of relating that particular problem to previous forms of problematization...[is] not so much the history of discoveries in relation to this or that topic but the succession of different fields of questioning"(Osborne et al. 2008:526; c.f. Osborne 2003).

This chapter outlines the ways that medical judgments became a problem in the field of medicine through emerging concerns about the scientific nature of clinical practice. The subsequent articulations of this problematization initiated the need for more and better evidence in the EBM programme. EBM translates and renders these concerns "amenable to intervention;" it is the dominant (political) movement for the revision of medical training and practice in the western world.

[7] The political questions and dimensions of the EBM debates are further developed in Chapter Three when I examine the problematization of medical judgments as a result of various governmental strategies that *deresponsibilize* individual practitioner conduct.

CONVERSATIONS IN MEDICINE: EMERGING CONCERNS

In this section, I discuss three basic concerns that led to the first statements about and development of EBM. The narrative begins with questions surrounding the laboratory and medical research, and also the clinic and the health of patients. A justification for studying clinical judgments through the instruments of science emerged from concerns about the applicability of research to doctors' individual practices. The questions that problematize the uncertainties of clinical practice led to new methods for systematizing and measuring the outcomes of care.

The Laboratory and the Clinic: The Rise of Clinical Epidemiology

After World War II, what is now referred to as "biomedicine" became the dominant science of medicine and medical education. During the 1950s, the doctrine of specific aetiology predominantly provided the basis for medical research. According to this doctrine, every disease has specific symptoms, a specific cause, and a specific cure that can be located and treated directly by looking at and examining the body as a system of interrelated parts (Mishler 1981). These are the epistemological foundations of the biomedical model, where medicine is targeting, testing, and treating biological processes on and in the body. During that decade (the 1950s)

> ...The laboratory became the focus for research, and the laboratory moved into the hospital next to patients. Increasingly the laboratory became the principle source of information for purposes of diagnosis and the main source of understanding the nature of disease. The population outside the hospital gradually was shifted aside, and the observational methods went into disrepute. Now, after World War II, with the laboratories having produced

> sulphonamides and penicillin, this seemed the most promising way to go. (Daly 2005:42)

During a time of rapid change, increasing innovations, and technological developments, questions began to arise concerning the effectiveness of health care: does all this new information and technology actually improve health in the clinical setting? The 1960s opened with this question about health care and its relation to laboratory medicine and the biomedical sciences. White, Williams, and Greenberg (1961:885) referred to this approach as the "ecology of medical care," an approach that conflicted with what would later be called community medicine[8]. These questions about the relevance of medical research to the clinical situation were motivated by interests in reducing the disjuncture between the technological improvements and research advances in the laboratory with a "measurable improvement in the health of a society's member" (White, Williams, and Greenberg 1961:891). In other words, there were concerns over whether the improvements in medicine could be measured in terms of the improving health of individual patients. If improvements could not be measured, the authors wondered, on what basis would it be possible to reform the whole institution of medicine and medical research?

Alongside these questions about the relationship between the effectiveness of medicine and population health appeared the field of clinical epidemiology. During the

[8] The ecology of medical care examined the health of individual patients and then extrapolated to the health of populations more generally. It would later be marginalized by the dominant approach to clinical epidemiology where statistical analysis of health and populations would provide the basis for individual interventions (see also Paul 1966).

1960s, questions arose about the authority of medical knowledge: if health care is not necessarily improved by medical research and knowledge, then how much authority do the judgments of the doctor have? Alvan Feinstein (1967) described the emergence of this problem in relation to his own individual experience as a doctor participating in a broad epidemiological study of population health and rheumatic fever[9].As part of a medical study, Feinstein listened to the heart of the participating patients to determine whether there was a murmur or not (a murmur might indicate the condition). While listening to a patient's heart, he heard a faint murmur that had not been recorded in the patient's medical history. He realized that, had he not heard it, it would affect the patient's health in the future and, further, he wondered if he had made similar mistakes in the past with other patients. Feinstein set out to define this problem of clinical judgments in order to eliminate the variations between the interpretations of symptoms on patient's bodies. In *Clinical Judgment*, Feinstein (1967) described how to use scientific taxonomy, devised by his reasoning, to minimize discrepancies in diagnosis and variation in health care. He aimed to improve the practice of clinical judgments and medical practice:

[9] Rheumatic fever is a condition that may develop in the heart after a Streptococcus A bacterial infection, affecting the heart, joints, skin, or brain. While laboratory tests can determine whether the bacteria is present in the body or not, the diagnosis of rheumatic fever, at the time of his writing (1960s), had no set objective procedure; it relied on a series of clinical criteria (much like my case study of MS for the present project, as discussed in the proceeding chapter). Feinstein (1967) considered these criteria to be "subjective" as they relied on the clinician's interpretation of what s/he observes.

> What choices would doctors really be confident about? Honest, dedicated clinicians today disagree on the treatment for almost every disease from the common cold to the metastatic cancer. Our experiments in treatment were acceptable by the standards of the community, but were not reproducible by the standards of science. (Feinstein 1967:14)

Feinstein proposed a scientific method for applying scientific criteria to clinical judgments in clinical situations. One example of his method is the development of taxonomy for devising what murmurs "sound like" so that clinicians could have a consistent scientific basis to compare what they heard when listening to the heart. The book developed categories of clinical variation within the spectrum of a single disease: iatric detection, clinical stage and clusters, sequence, duration, and co-morbidity (Feinstein 1967:154). These were the building blocks, Feinstein argued, of a scientific basis for clinical judgments, eliminating variation in health care delivery through objective and reproducible categories (i.e., the principles of science: predictability, reproducibility, objectivity).

Feinstein (1967) argued that patients needed to be classified in relation to a larger population because it is difficult to diagnose an illness in an individual patient due to the ranges of variance in the categories of his classification list (above). Classification, he reasoned, would provide accurate comparison between populations and a scientific basis for applying therapeutic interventions to similar populations (Feinstein 1967:227). Once patients were classified in relation to their disease behaviour, they could be plotted on a distribution of population variance in order to render some plausible scientific knowledge about care interventions. The way to implement this change, Feinstein claimed, was for physicians to study their own practice, to "observe it accurately, classify it, and use it to determine prognosis and guide treatment" (Daly 2005:31).

Feinstein anticipated what would become the prevalent anxiety of the medical field in the following decade. He suggested that the pace of technological and therapeutic advances in medicine had overtaken the current methods of clinical judgments:

> The intellectual technology of clinical judgment – the methods of acquiring evidence and organizing clinical thought – has not received the same attention that contemporary clinical scientists have given to chemical, mechanical, electronic, and other new inanimate methods for observing and assessing tangible materials. Yet clinical judgment has a distinctive methodology for dealing with the tangible data of human illness; and clinical judgment now – uniquely in medical history – has both the obligation and the opportunity to be accomplished with scientific taste, discretion, and quality. Never before have clinicians had to make decisions about therapeutic agents capable of such spectacular benefits and such devastating harm. Never before have clinicians had available the intellectual assistance of new mathematical and computational systems to help manage the complex data assessed in the therapeutic decisions. (Feinstein 1967:28)

These scientific advancements in medicine led to concerns over their benefit for the health of the population overall and, more particularly, over the physician's authority. There were two dimensions to the uncertainty to which Feinstein's work responded: the scientific basis of care and the authority of the field of medicine over its object and practice. The authority of medicine concerns the legitimacy of the judgments made by individual practitioners. I build upon this point in the following sections.

The changing world of medicine led to practical problems for medical practitioners who were beginning to wonder about the relationship between research and practice, biomedical science and bedside care. The old guard saw "therapeutic decisions...as scientifically unapproachable because they depend on clinical and personal data obtained and analyzed by one human being observing other human beings" (Feinstein 1967:29). The basis for the clinician's assessment of medical "data" or evidence was under scrutiny, and the field

of medicine, as demonstrated by Feinstein's work, called for a scientific basis for their everyday practice: "identifying consistent criteria for the diagnosis of disease was the first step toward increased certainty in diagnosis. It was also the first step in the development of a taxonomic, classificatory science of clinical care" (Daly 2005:28).

At the time that Feinstein's *Clinical Judgment* was published in 1967, David Sackett, who would later become known as part of the EBM Working Group, was leading the first department of clinical epidemiology at McMaster University. Shortly after *Clinical Judgment* was published, Sackett published an article in the *American Journal of Epidemiology* arguing for the importance of the emerging field of clinical epidemiology. He defined the clinical epidemiologist as "an individual with extensive training and experience in clinical medicine who, after receiving appropriate training in epidemiology and biostatistics, *continues to provide direct patient care* in his subsequent career" (Sackett 1969:125). He justified the need for such a field by citing the overspecialization of statisticians in biometric modeling who were also lacking proficiency in the problems encountered by practicing clinicians (Sackett 1969:125). The reform of medical education and training were among his recommendations in order to provide clinicians with the skills to ask epidemiological questions relevant to immediate clinical practice (Sackett 1969:127). Sackett's recommendations gained momentum. They will be examined later on in regards to medical education, reform and the significance and relevance of epidemiological knowledge in clinical practice and doctor-patient interactions.

Questioning Medical Authority

The 1970s brought about numerous challenges to medical authority: "Questions were being asked about the validity of using traditional clinical authority as the basis for clinical decision making, and there were no grounds for appeal except by reference to the very authority that was being questioned" (Daly 2005:1). The validity of science was thought to be a solution to the "traditional" or conventional authority of the doctor. Common sense assumptions like "doctor knows best" could not stand up to questions about scientific validity and hard facts: how does the doctor know what to diagnose or prescribe? Where did that knowledge come from? Intuition? Somewhere else? The introduction of scientific methods to primary care, as we shall see, depended on this link between medical research and the clinic.

In the annual oration of the Massachusetts Medical Association[10], Donnell W. Boardman asked,

> In a time of medical priesthoods the doctor-patient relation was primarily the responsibility of the physician... In the era of the scientific method the physician has learned to look critically at the case and at its component parts, a valuable and useful process that has nonetheless separated the medical scientist from the sick person. (Boardman 1974:502)

Boardman noted that changes in technology also played a role in the questions surrounding the scientific basis of clinical care: technology was increasingly being used, but, he argued, physicians were in need of knowing when a situation would call for the use of new

[10] Each year since 1804, the Massachusetts Medical Society hosts an oration "to inform Massachusetts physicians of issues pertinent to current medical practice" (Massachusetts Medical Society 2013). Boardman's talk was titled, "Dollars and Sense in Medical Care and Health Services: Relation".

technology, why new developments were needed, and how this might affect the health of the patient.

There was also a concern among medical students about the relationship between medicine and other institutions. As McNamara (1972) explained, the students in medical schools during the 1960s were the students of social change, protest movements involving human rights. He saw the next generation of medical students as one that sought to reconnect medicine with the community, not the laboratory. McNamara documented the concerns of newly minted physicians as feeling isolated in their practice, calling for more involvement in community and researcher (laboratory) partnerships in order to produce better methods for their clinical practice. Students, he argued, saw medicine as a rapidly changing field, with new technologies emerging exponentially after the war, and they wanted to be a part of the revolution. The significance of the uncertainties of medicine, not only medical authority, but also the outcomes of clinical care, is observed in these student concerns. Medical practice relies on interacting with members of one's community and making decisions about those patients that may result in either life or death. The interest in having some knowledge or certainty about what medicine could offer would be later found in the assumptions and evidence of science. The interest in reconnecting with the community, as we soon see, was marginalized by the concerns of EBM and its emphasis on forming connections with science and technology.

Other events that influenced the identification of uncertainties surrounding clinical practice were the publication of social science studies from other disciplines that emerged

during the 1970s. The social perception of medicine was changing, as indicated by the following two exemplary studies. In 1967, the same year Feinstein's *Clinical Judgment* was published, David Sudnow published his well-known (to sociologists) study on death. Sudnow (1967) reported that the announcement of clinical death depended entirely on the attending physician's moral perception of the patient. Those who were deemed "clinically dead" by doctors were considered to be "potentially revivable" (Sudnow 1967: 37). Younger people were more likely to be revived than old, those who died at their own hands or by "stupidity" (e.g., motorcycle accident) were less likely to receive special attention for resuscitation. Sudnow's documentation of these variances in care demonstrated that medicine is practiced by practitioners who attach *subjective* meaning to preserving a patient's life, and they oriented the execution of their actions (e.g., decision to resuscitate) in light of broader cultural significance. Medical practice, despite common perceptions, is not objective, and these subjective meanings that physicians attach to their patients and their actions could account for variances in care. How could the public know whether the care they received or were about to receive was a product of an objective physician or an application of the physician's own morality?

Another social science study conducted by Wennberg and Gittelsohn (1973) documented regional variations in the delivery of medical care. Their study, published in *Science* (a major scientific periodical), showed that doctors treated patients with the same diagnosis in different ways, and that these variations could be explained by region. Similar to Sudnow's study, Wennberg and Gittelsohn's work disturbed the assumption that what

doctors learn in medical school is a body of knowledge and set of procedures ensuring that all patients with the same ailments will be treated equally. Further, who could say that the doctors in one region were providing better care than doctors in another region? Who was making the best treatment recommendations? These questions were unanswered, but they were treated seriously by the medical community as new theories and measurements were emerging for eliminating the uncertainty created by these kinds of disruptions to medical authority.

New Measurements for Eliminating Variation and Uncertainty

The randomized controlled trial (RCT) also appeared during the 1970s, and it has become what EBM considers the "gold standard" for valid knowledge about treatments and therapies (Sackett et al. 2001). The RCT is considered to be offspring of a 1940s clinical trial conducted by Austin Bradford Hill that tested the effects of streptomycin, a treatment for tuberculosis. In 1946, one clinic in the United Kingdom only had enough of the therapy to treat 50 patients, which was far less than the number infected. So, at the time, Hill, the attending physician, thought it would be unethical to do anything but a *randomized* clinical trial among the patients in his population (Chalmers 2001). The results of Hill's research were then published in 1948 (Hill 1948). Hill's method was modified by Archibald Cochrane's post-war research through the introduction of controlled groups to patient trials (Daly 2005:131-132). The RCT is a method of testing a medical intervention where a patient population is randomized into two groups: one that receives the treatment and one that doesn't (the "control group"). Scientific and statistical testing is applied to the results of the

trial. Then, the progress of the disease is the measured by comparing the difference between the results of those not receiving the treatment and those receiving the treatment. Doctors monitor patients participating in the trial, and the therapy (or placebo) is discontinued if or when the results are not beneficial to the patient. The success of the therapy or intervention is subject to statistical analysis to determine the effect of the treatment in the entire enrolled patient population.

In addition to the RCT, from the late 1970s and into the 1980s, Bayesian logic was introduced for the assessment of the results of RCTs and for the analysis of the probable outcomes of a treatment intervention for a particular patient. Medical judgments could be thought of as a "diagnostic probability" for determining the likelihood of the diagnosis of a condition given the observed symptoms of disease. Hendrik R.Wulff's (1976) *Rational Diagnosis and Treatment* explained the benefits of Bayesian logic for drawing "practical conclusions from the research of others" (p.3):

> It is necessary but not sufficient that the clinician has a thorough nosological knowledge. He will not become a good diagnostician, until he has learnt to estimate correctly the incidence of different diseases and the incidence of different disease manifestations among his patients. Bayes' theorem is the mathematical illustration of the concept of diagnostic experience. (Wulff 1976:84)

Bayes' theorem is a method for determining the probability of certain clinical judgments (e.g., diagnosis) over others, given the biological events. Subsequently, the decision between the likely outcomes of various treatment programs depends on an accurate diagnosis. This logic was later endorsed by the EBM Working Group in the medical curriculum.

At the end of the 1970s, Iain Chalmers and Murray Enkin started an initiative called the Cochrane Collaboration, named for Archibald Cochrane. The Collaboration was a database wherein physicians could search for RCTs that would provide evidence for judgments made in their practice. Chalmers' and Enkin's first database was known as the *Oxford Database of Perinatal Trials*, containing RCT studies relating to the obstetric field. They hoped that their collaborative efforts would improve the quality of care in their medical specialty: it was "a vast task of collating and synthesizing studies (mainly randomized controlled trials) into systematic reviews" (Daly 2005:7). They recommended that other specialties form their own databases for similar purposes. This initiative can be thought of as the first version of MedLine and PubMed and similar databases that are used today to gather evidence for clinical practice in EBM[11].

Reforming Medical Training and Education

Concerns over the rising cost of care in both the United States of America and Canada began to take a priority among the conversations in medical journals during the 1980s as well[12]. In the United States, changes to the structure of medical care and government cuts to teaching hospitals were cited as causes of concern for the institution and practice of medicine (e.g.,

[11] We return to the Cochrane Collaboration later in a discussion of social and political influences that enabled the proliferation of EBM.

[12] Contributions to medical journals come from a range of authors and positions. Both clinicians and researchers would contribute to major periodicals. EBM and medical training aimed to bridge this divide by creating physicians who could also be medical researchers, read and participate in medical research, and learn to apply this knowledge in their clinical practice.

Ingelhart 1982:133). Government cuts were thought to affect the futures of young physicians (American Medical Association 1986). Due to these concerns over the future of the practice of medicine, discussions about reforming medical education also emerged[13]. These discussions occurred in response to earlier concerns about expertise and medical reasoning in light of uncertainties about clinical care, as well as in response to uncertainties about the future and changing socio-historical scene in which medical practitioners found themselves. Other concerns in the literature about medical education included responding to new technologies that demanded new educational formats (e.g.,Waugh 1984:145), and responding to the demands of Medical Association student councils who wanted more rigid guidelines for certification (e.g., Davis 1982:1194). Other physicians discussed reforming the curriculum for the aims of instilling clinicians with certain characteristics rather than knowledge, per se (e.g. Light 1979:320).

At the start of the 1980s, medical school training programs began to make clinical epidemiology a mandatory course for medical students. At the time, students resisted

[13] A future research project might investigate the relationship between budget cuts and the inclusion of clinical epidemiology in the reform of medical education in the USA during the 1980s; that is beyond the scope of this research project. I do, however, discuss the inclusion of clinical epidemiology in one Canadian medical school program during the 1960s later on. I do not, at this time, have sufficient data to discuss its inclusion across Canada (archival research was only carried out in Ontario) or in the United States. I point out here that the adoption of clinical epidemiology in medical schools a few decades after its introduction in the medical literature signals the acceptance of this particular formulation of the solution to uncertainty in clinical care as well as the conditions for new problematizations to emerge later on in EBM.

epidemiology courses because the courses were statistically and mathematically complex. At the same time, however, students, wanted to know how to make decisions with certainty in the clinical setting (for example, see Daly 2005:23). In their book, Bursztajn, Feinbloom, Hamm, and Brodsky (1981) detail a "clash" of old and new "paradigms" of medical practice. The old paradigm is the laboratory scientist who looks for hard evidence for objective decisions. The new paradigm is the new generation of physicians; they are interested in probabilities and recognize that all decisions are made in the face of uncertainty (see also Pease 1981:1731). Daly, a historian of EBM, wrote the following about medical students in the 1980s:

> The scientific certainty of the narrow, focused science of the laboratory is experienced as elusive when any new clinician enters the complex world of the clinical consultation. Despite significant advances in treatment and cure of disease, clinicians make clinical decisions in the midst of residual uncertainty; they are unsure about the extent to which they are up-to-date with medical research, but they also know that medical knowledge is constantly evolving, often contradictory, and thus casts doubt on current practice. When that knowledge has to be applied to patients, no two patients are the same, nor are their complaints. (Daly 2005:9)

One of the first text books for medical school courses in clinical epidemiology was written by Robert Fletcher and Suzanne Fletcher at the University of North Carolina. Fletcher and Fletcher defined clinical epidemiology as the application of "epidemiologic principles and methods to problems encountered in clinical medicine" (Fletcher, Fletcher, and Wagner 1982:2). They went on to say, "It is a science concerned with counting clinical events occurring in intact human beings, and it uses epidemiologic methods to carry out and analyze the count" (Fletcher, Fletcher, and Wagner 1982:2).

Fletcher and colleagues also discussed the problems of medical authority and the scientific solution:

> Sometimes we were comfortable taking the word of a trusted authority. But the limitations of this approach were apparent. For one thing, experts often disagree and so could not all be right. Not only did they disagree about the wisdom of a given diagnostic or therapeutic approach, but also about the validity of the evidence upon which their recommendations were based. Also, most faculty were involved in laboratory research and found it difficult to apply the kind of scientific approaches used in the laboratory to the solution of clinical problems. Evidence that could not be reduced to "hard science" was sometimes viewed by them with uncertainty and suspicion. Moreover, it became clear that experts' personalities and self-interest colored [sic] their interpretation of clinical data, as they do for all of us. (Fletcher, Fletcher, and Wagner 1982: vii)

In addition to discussing a variety of important issues in clinical epidemiology, the basic argument of their book is that medical students should critically analyze and appraise the evidence they encounter in medical journals in order to make decisions about which data and evidence are valid and relevant (Fletcher, Fletcher, and Wagner 1982: 217).

By the publication of the third edition, Fletcher, Fletcher, and Wagner now advocate for the use of practice guidelines for physicians that are developed through EBM (Fletcher, Fletcher, and Wagner 1996:265). While it is important to continue questioning guidelines on the basis of inclusivity for all populations and the most accurate and up-to-date medical research, the use of guidelines, they argued, improves the health outcomes of patients (Fletcher, Fletcher, and Wagner 1996:266). It appears that Fletcher, Fletcher, and Wagner's position on student education and training in the first edition has changed by the third iteration. First, they argued for the importance of teaching the skills required for the critical analysis of evidence in medical education, which was in line with their epidemiologic

principles of "counting" the best evidence in clinical practice. The third edition, however, argued for a different convention in medical education, one that may appear antithetical to their stated aims of clinical epidemiology – the move toward practice guidelines. Practice guidelines may in fact remove the physician's analysis of the evidence completely, externalizing the appraisal of evidence to general rules to apply in particular clinical situations. I look at this externalization of the appraisal much closer when I discuss the case study of multiple sclerosis in the next chapter. The shift from the interests of clinical epidemiology to EBM may demonstrate the normative dimension of this problematization: EBM renders the problems of medicine visible in order to facilitate recommendations for their correction.

Justifying the New Science of Clinical Care

Another development in the 1980s, in addition to changes in medical education and the medical curriculum, was the formation of The Society for Medical Decision Making. This Society emerged from a conference organized in 1979 by Lee B. Lusted and Eugene L. Saenger in Cincinnati, Ohio. After this meeting, Lusted and Saenger went on to form the Society's first board. Its stated mandate concerned the use of laboratory science in medical decision-making. The following year, the Society inaugurated its own journal about decision theory, which primarily focused on "newly developed formal approaches to clinical decision making, such as using algorithms and decision tables when investigating common clinical problems" (Flarragin & Lundberg 1990: 279). In the April,1983 issue of the *Journal of the American Medical Association* (*JAMA*), Merz described decision theory, the theory upon

which the Society was founded, as "a systematic approach to decision making under conditions of uncertainty," exploring "probabilistic" versus "categorical" methods, and avoiding "deterministic" understandings of clinical practice (Merz 1983:2133). The new focus on probabilities (from Bayesian logic) replaced the taxonomic program suggested by Feinstein.

The goals of the Society were against the scientificity of laboratory medical science: "Contributing to this distinction is the uncertainty inherent in clinical information, in laboratory test interpretation, in the relationship between clinical findings and disease, and in the effects of treatment" (Merz 1983:2133). Uncertainty, here, meant the subjective interpretation of the results, not the validity of the results themselves. Individual physicians could be flawed in their logic and make poor decisions with poor health outcomes. Further, the remarkable benefits of decision theory, as cited by Merz, was its cost-effective nature, and the development of better education practices for training physicians. These two threads continue on in the 1980s and in discussions leading up to EBM.

In light of the changing landscape of medical practice, discussions between medical researchers and physicians continued from the previous decade about the scientific nature of clinical practice. Statements surfaced purporting and reaffirming the scientific merit of physicians' judgments, stating that their basis lay in physicians' interpretation of the "facts" collected (and, prior to that, the decision to collect specified facts through tests, through the questions asked when taking a patient's history, and so on) (King 1983:2479). Physicians were questioning the incomplete nature of science by appealing to the public mandate of

medicine – to act based on the best available knowledge and expertise. Researchers, however, asked questions related to the individual interpretations of evidence made by physicians. The main cause for concern seemed to be how the knowledge of medical research, such as results of RCTs, was being used and how this was related to questions about risk, treatment, and ethics (Lachlan, Wartman, and Brock 1988:3166). Because physicians' judgments are subject to "the same errors common to all human cognitive processes" (Silverstein 1988:1758), these questions led to the development of prediction mechanisms for medical decisions.

In 1988, the *Journal of Clinical Epidemiology* was founded by Feinstein and Walter O. Spitzer (a Canadian). Sackett also served on the first editorial board. In the inaugural issue, Feinstein announced his reasons for changing the name of the journal (formerly *Journal of Chronic Diseases*) and its new emphasis on an emerging field:

> The change of name, however, is merely a new label for the same wine. Everything else remains intact... The new title simply reflects the principle of 'truth of labelling'. It indicates distinctions that have actually been present in the 'wine' for a long time. (Feinstein & Spitzer 1988:1)

He noted that while some researchers may be repelled by the name change during a time when the definition and methods of clinical epidemiology were under debate, Feinstein hoped that the journal would help to start a movement to include the methods of clinical epidemiology in all aspects of medical practice (Feinstein & Spitzer 1988:6-7). This name change and new emphasis for an important medical journal points to changes in the field of medicine and the shift to a more scientific approach to clinical practice.

Some physicians argued that the scientific approach to clinical practice was a result of the tension between the art and science of medicine. The research that was surfacing about variability in the execution of care (e.g., Mulley 1988:540-541) seemed to be coming to a turning point. The articulation of uncertainty in medical judgments came to be associated with clinical practices that were not scientific. Clinical epidemiology provided a basis for translating knowledge about statistical probabilities to the bedside care setting. For this reason, the science of medicine was associated with a uniformity of care and a systematized strategy for making clinical judgments on a scientific (that is, predictable and reproducible) basis, whereas uncertainty was thought to come from the art of medicine:

> The traditional medical response to uncertainty. It comprises a knowledge base derived from the clinician's own individual clinical experience interpreted in the light of the collective experience of the profession, learned through apprenticeship to eminent practitioners, usually in technically sophisticated teaching hospitals. (Daly 2005:10)

The problem was, according to an interview with Kerr White, the "uncritical acceptance of biomedical science as the only scientific basis for evaluating the benefits and risks of clinical practice, and it derived. . . from the historical dominance of laboratory science in hospitals" (Daly 2005:42).

The uncertainties of clinical practice were in conflict with the science of the laboratory and the newly emerging field and methods of clinical epidemiology. Eddy (1990a) described the changes occurring in medicine that developed throughout the 1960s, 1970s, and 1980s as challenges to this kind of medical authority:

> What is going on is that one of the basic assumptions underlying the practice of medicine is being challenged... Simply put, the assumption is that whatever a physician decides is, by definition, correct. The challenge says that while

> many decisions no doubt are correct, many are not, and elaborate mechanisms are needed to determine which are which. Physicians are slowly being stripped of their decision-making power. (P.287)

An example of this challenge to physicians' authority can be illustrated by a Supreme Court case in Canada in 1990. In the *Snell v. Farrell* (2 S.C.R. 311[1990]) decision, the Court ruled that scientific evidence was not applicable for satisfying the burden of proof for the law and the balance of probabilities. The law no longer recognized the authority of the medical professional alone. The defence of an appellant physician could no longer rest on the laurels of "medicine knows best," particularly when proving that the in/action of the physician was the cause of the harm. In a court of law, scientific data may demonstrate the possibility that other natural factors may have caused or contributed to the harm experienced as a result of a medical intervention. After the case of *Snell v. Farrell*, however, any negligence that resulted from a physician's decision to continue a medical procedure was considered the physician's failure to understand the probability that harm could occur.

> Causation need not be determined with scientific precision... Medical experts ordinarily determine causation in terms of certainties whereas a lesser standard is demanded by the law. It is the function of the trier of fact, not the medical witnesses, to make a legal determination of the question of causation. (*Snell v. Farrell*,2 S.C.R. 311[1990])

Thus, the scientific ethos of medicine would not be held as valid over the defendant's complaint (Gilmour 2007:114). Laboratory science was not sufficiently credible for the public to rely on in order to trust or hold "correct" the acts of physicians. Uncertainty concerned individual physician judgment as well as public suspicion of medical authority and scientific validity.

At about the same time, articles appeared that sought to defend medicine as a public trust in order to improve the health of the population through research, training and education, and patient care (e.g., Schroeder, Zones, and Showstack 1989). There was an increase in general public funding for medical education. This increase was seen to represent the public's demand for better care from the next generation of physicians. The problems were the following: the public invested in medicine to provide the best possible care to its members, and, at the same time, the public no longer valued the laboratory as the standard for measuring care. They demanded something better. Further, it was becoming more evident that the clinician's decisions were not the final authority on the execution of care. Instead, there was a need to know what decisions were right and which were wrong given that the health of the public was entrusted to each individual physician.

Eddy (1990a:290) offered his solution:

> The solution is not to remove the decision-making power from physicians, but to improve the capacity of physicians to make better decisions. To achieve this solution, we must give physicians the information they need; we must institutionalize the skills to use that information; and we must build processes that support, not dictate, decisions.

This statement culminated in a series of conversations about "practice guidelines," defined by Eddy (1990b) as "generic decisions – recommendations intended for a collection of patients rather than for a single patient" (p.3077). Practice guidelines were intended to maintain the "art" of medical practice while providing certainty for determining the "correct" way to provide care (e.g., Battista & Hodge 1993:385). Eddy predicted some backlash against guidelines on the basis of autonomy; there would be some physicians in favour of clear-cut, simple standards for care, but some would cite constraints such as time, patient

preferences and compliance, and still others would "bridle at the notion of being mere technologists who follow preformed rules" (Eddy 1990b:3084). But for the most part, discussions about practice guidelines had been at the periphery of broader conversations about medical reform (e.g., Battista & Hodge 1993:385). The new science of clinical epidemiology provided a justification for formulating the "art" of decision-making and the interpretation of the doctor-patient interaction into a systematic knowledge and set of procedures for what ought to be done.

Linking Practice and Outcomes

Alongside conversations about practice guidelines emerged questions about the effects and outcomes of health education and physician training. One study questioned whether better education programs for physicians actually result in improved patient health (Tosteson 1990:234-238). Given the rapid introduction of new technologies and therapies, medicine was changing rapidly. Tosteson stated that medical education should give students the skills to self-educate, and that the way to do this is by implementing science as a part of clinical practice. Another example of these questions is a study that tested 112 physicians. The study asked respondents to evaluate the clinical decisions presented in vignette cases. The results showed mass disagreement between the respondents about whether the negative outcome of clinical judgments -- in particular patient cases -- was a result of inappropriate care (Caplan, Posner, and Cheney 1991:1960). These questions about the uniformity of the discipline and the basis upon which judgments can be evaluated also show that judgments are evaluated based on *outcome*. Further, a massive review of physician education revealed that continuing

medical education led to better physician performance (and sometimes better health care outcomes), thus stressing the importance of "practice-based" continued medical education (Davis, Thomson, and Haynes 1992:1116).

The problems that culminated in the 1980s were about:(1) the scientific basis of care; (2) the authority of medicine; (3) the relationship of medicine to the broader public; and (4) the contested nature of the link between physician training and curriculum reform for the improvement (or not) of health care. These conversations were underpinned by disputes over the identified variations in the ways that clinicians interpret evidence, provide care for patients with similar illnesses, and determine that the outcome of care was good or inappropriate. It was from these concerns that the EBM Working Group appeared, making a "move from a clinical epidemiology located in research to an attempt to intervene in clinical practice" (Mykhalovskiy & Weir 2004:1065). As we will see later on, the quest for better evidence was not just a solution to issues about the above uncertainties of clinical practice, but also a means by which recommendations for eliminating or reducing those uncertainties in clinical care could be articulated and subsequently implemented. In the following section, I consider the institutional, political, and economic relations that supported the emergence of the question of EBM.

CLINICAL EPIDEMIOLOGY: FUNDING AND INSTITUTIONAL SUPPORT

Having just explored the questions emerging in medicine from the 1960s forward, in this section I consider some of the major social influences that provided the conditions of

possibility for the creation and flourishing of the clinical epidemiology programme of research and teaching. Here I examine how the questions within the literature would later crystallize and stabilize. By setting the stage for what would be later reformulated as EBM, I explain how institutional, political, and economic relations supported a particular way of speaking about the problem of uncertainty in medical care, and how the solution to this problem offered by clinical epidemiology would stabilize in western medicine. Below I discuss the emergence of clinical epidemiology as well as its development through to the first statements of EBM. I begin in Ontario, where the Ontario Ministry of Education was under increasing "pressure from the. . . College of Physicians and Surgeons of Ontario, to bring to the attention of Government the urgent need for a new. . . Faculty of Medicine" (McMaster Archives, 146.2, Box 47, February 17, 1964).

Although the creation of McMaster medical school happened over a few years in the latter half of the 1960s, the location of a new medical school had been a topic of discussion between the President of McMaster and the Minister of Education since 1956[14]. Five years

[14]In 1956, then-president of McMaster University, G.P. Gilmour, wrote to Sir Francis R. Fraser, the knighted director of the British Postgraduate Medical Federation, for advice on pursuing the formation of a second Ontario medical school at McMaster. Following the advice given to him in a letter sent in March 1956, President Gilmour wrote to the Ontario Minister of Education, W.J. Dunlop, to inquire about the possibility of choosing McMaster as a location for the formation of the medical school. He noted that "a medical research laboratory has been maintained on the campus since 1948" (McMaster Archives, 146.2, Box 47, 1956:p.5). Gilmour's successor, President H.G. Thode, would later continue to pursue the development of a medical school at McMaster. It isn't until the annual 1962 meeting between McMaster University and the Committee of

later, H.G. Thode, then Vice-President and Director of Research, wrote a report to Premier Robarts titled, "McMaster University and Medical Education" (AO, RG 32-23, B354145, January 13, 1961). This document cited the results from a visit to the McMaster campus from Sir Francis Fraser, and it summarized plans for the opening of a new medical school at McMaster, "if and when an additional medical school is needed in Ontario" (p.1).

Ontario education is regulated and funded by the provincial government. At the time (the early 1960s), there was no special ministry responsible for universities and colleges. Instead, the Department of University Affairs was a sub-committee of and reported to the Ontario Minister of Education. The Committee on University Affairs was created by the Department of University Affairs Act in 1964 (OC 4157/64) to respond to increasing enrolments and new program needs in Ontario universities. The committee had a primary goal: "to study matters concerning the establishment, development, operation, expansion and financing of universities in Ontario and to make recommendations thereon to the Minister of University Affairs for the information and advice of the Government" (OC 4157/64, subsection 3.3). This committee was in charge of liaising with Ontario universities for the purpose of making recommendations about new programs and improvements to the Ministry of Education.

University Affairs, that there is a written agreement stating that McMaster University in Hamilton "was the logical site for the next medical school" (AO, RG 32-23, B354145, 1963). McMaster had long petitioned Government for the location of the new program.

During the same year, the "Royal Commission on Health Services" published its first report. The Commission's task was to

> . . .Inquire into and report upon the existing facilities and the future need for health services for the people of Canada and the resources to provide such services, and to recommend such measures, consistent with the constitutional division of legislative powers in Canada, as the Commissioners believe will ensure that the best possible health care is available to all Canadians.(Health Canada 2004)

This report is widely considered a scathing review of Canadian Health Services. Among the recommendations in the 1964 report, 36 pertained directly to universities, and 3 dealt explicitly with Canadian medical programs in Ontario. The report recommended the creation of two new medical schools in Ontario. McMaster University is explicitly named as the site of one of the new schools. The report suggested that both the federal and provincial governments make an equal financial commitment to the new schools.

Following the release of the report in 1964, John P. Robarts, Premier of Ontario, approved plans for the development of the McMaster medical school. Subsequently, he announced the expansion of the teaching facilities for medicine at McMaster. In a report created by McMaster University for the committee on University Affairs in 1966, the findings from the "Royal Commission on Health Services" report were cited as a rationale for the creation of a new approach "to the education of health personnel and to develop more effective ways of utilizing staff and facilities" (AO, RG 32-54, B177915, 1966, P.1). The report recommended that new approaches to medical education ought to be undertaken because Ontario's current medical school programs were out-of-date: "The evidence that our present schools of medicine required extensive renovation and expansion to bring them up to standards acceptable for our times is overwhelming" (AO, RG 32-54, B177915, 1964, p.1).

There was also new interest in creating a "health sciences centre" where hospital activities, clinical research activities, and instruction would be housed. The McMaster medical school was built on the assumption that the current methods of medical training and practice were insufficient. The support for the new program at McMaster is evident by the allocation of provincial grants totaling 50 million during 1965-66 (AO, RG 32-11, B241011, 1964: 190).

The sentiments of the "Royal Commission on Health Services" continued to be echoed throughout the 1960s, with an emphasis on increasing the role that university education would play in medical training, and ensuring that enrolments in the health sciences would be designed to meet the demands and needs of society. One example of this emphasis is found in the report titled "From the Sixties to the Seventies: An appraisal of higher education in Ontario by the presidents' research committee for the committee of presidents of universities of Ontario" (1966), which was created by the committee of presidents of universities of Ontario. H.G. Thode, then President of McMaster, wrote a report after the "go ahead" from the Ontario Ministry of Education about the plans for the location of the new medical school; it included information about the resources needed to open the medical school, and the schedule for its preparations, courses, and construction. President Thode's report to the Honourable John P. Robarts, Minister of Education for Ontario, aimed to make the first class at McMaster in 1967[15]. His report proposed a new model of medical training.

[15]This three year timeline (1964-1967) proved to be too tight for the McMaster goal, and the first class was later pushed back to the fall of 1969. There were five years between the Ontario Ministry of Education's investment in the medical school and its first class. Plans for McMaster as the location of the new medical school, as I have shown, were under way as early as the mid-fifties.

There were three major differences between the old model and the new model: (1) hiring full-time clinical training staff (who were previously part-time); (2) increasing the role of research in medical training and practice; and (3) the need for a university hospital on the McMaster campus. Many years of preparations went into creating the medical school at McMaster. In the following subsection I explore the basis upon which the first medical program was shaped.

Putting it all together: Creating a Medical Program for Researchers and Clinicians

After the Province gave the green light to the medical program, President Thode appointed John Evans as the Dean of Medicine to coordinate the development of the program and appoint faculty members to its new departments. Evans' role in developing the new program would be influenced by a young physician, David Sackett. Sackett's views on the relationship between research and the clinic were shaped by the rising concerns detailed in the literature covered in the previous section. The new curriculum created for the McMaster University medical program under Sackett's influence would receive a lot of attention in the late 1960s for its innovative approach to medical practice.

In a document about his reflections on the history of McMaster's medical program, John Evans stated,

> At the time, we recognised several problems of high priority related to the practice of medicine in Canada. That too few physicians were being trained was evident from the shortage of Canadian physicians and the yearly licensure of physicians of whom a large percentage were foreign-trained. In Canada...health professionals were poorly integrated in the care of many patients and had potential skills which were not fully utilized. Nevertheless, the cost of medical care in Canada was rising rapidly. (McMaster Archives, 145.8, Box 44, n.d.: p.2)

The programme for the new McMaster medical school would offer a solution to these problems that were also manifesting in the literature (and government documents) about the effectiveness of medical care and the various uncertainties identified by practitioners and the public alike. Evans itemized a number of problems particular to medical schools themselves; these include the following: (1) the separation between the university and the medical college; (2) the isolated and individualized nature of medical practice after graduation and licensing (as opposed to maintaining what he called "team building"); (3) the ignorance of individual doctors about the systemic issues that affected the delivery and organization of their care; and (4) the lack of ongoing education of physicians after graduation, "without keeping abreast of the ever-changing scientific background to medical practice" (McMaster Archives, 145.8, Box 44, n.d.: p.3).

The objectives of the medical programme were crafted so as to address these (above) identified problems. In the early statements for the creation of the M.D. programme, Evans included the following objectives: (1) the importance for graduates to be able "to identify and define health problems, and search for information to resolve or manage these problems"; (2) to develop "the clinical skills and methods required to define and manage the health problems of patients"; (3) "the ability to become a self-directed learner, recognizing personal educational needs, selecting appropriate learning resources, and evaluating progress"; and (4) "to assess professional activity, both personal and that of other health professionals" (McMaster Archives, 145.8, Box 44, 1966: p.1). As I have discussed earlier, these four objectives would be echoed in later EBM statements and medical programs.

The first clinical epidemiology and biostatistics (CE&B) department in western medicine was created among the new departments under the Faculty of Medicine at McMaster. Its creation would be shaped by these "problem-based" objectives and would greatly influence the new curriculum. At the time, clinical epidemiology was still a new field for research. Sackett was appointed as the first chairman of CE&B in December 1967 (McMaster Archives 151.5, Box 33, December 7, 1967). The McMaster Senate ratified the creation of CE&B in January 10, 1968 with the following statement:

> In the field of medicine, it is becoming increasingly apparent that the identification of causal mechanisms of disease occurrence, the elucidation of the natural history of health and disease, and the planning and evaluation of programmes of therapeutic and preventive measures requires the fusion of traditional methodologies from both clinical medicine and epidemiology. Although the applicability of epidemiologic and biostatistical techniques to problems of clinical and laboratory research is acknowledged, these latter disciplines do not, at present, include advanced competency in the former areas in their training programs. It is proposed, therefore, that an appropriate focus of competency in clinically oriented epidemiology and biostatistics be established at be established, at a Departmental level, in the Faculty of Medicine of McMaster University. (McMaster Archives, 184.5, Box 001, 1991: p.4)

The department was created to facilitate collaboration between research and clinical practice at both regional and educational program training levels. These goals were formed on the basis of expertise that would expand beyond the concerns of clinical epidemiology or biostatistics alone. The department noted that its role included health economics and health policy analysis among a number of applications (McMaster Archives, 184.5, Box 001, 1991: p.4).

The ways that CE&B would contribute to the medical program would be evident in the new approach to teaching medicine that McMaster would pilot. This method included full-time clinical staff at the university who would be teaching medical practice. By having

clinicians participate in the university, the initial ties between the "laboratory" and "the clinic" was observed. This new approach would come to change the operation of medical education by affecting university budgeting as well, as evidenced in the 1968 "Report on the Committee on University Affairs", created by the Committee on University Affairs (Douglas T. Wright Chairman):

> These changes, the rapidly increasing commitment to medical research, and the very high salaries required to compete with the opportunities offered by private medical practice, make the cost implication for the future quite staggering. . . While much more work will be required, there is already indication that the total cost of operation of medical faculties of the future, with their extra-ordinarily heavy commitment to research and their direct involvement in providing health care, cannot be seen simply as the cost of medical education, but must be acknowledged and supported as part of the total commitment by society to the development of health services. (AO, RG 32-23, B354530, 1968: p.18)

This new marriage between academic research and clinical training was first proposed in a prospectus that Sackett wrote for the Faculty of Medicine at McMaster in 1967. He proposed that the creation of the CE&B would be a focus at a departmental level, as well as facilitate the introduction of a new approach to teaching medicine. He referred to this new approach as a "critical incident" approach (now known as the problem-based approach). This approach offers "instruction to students in the faculty of medicine in areas pertinent and relevant to the physician's role as a counsellor [sic], provider of specific diagnostic and therapeutic services, member of a group of health care personnel, and "informed' citizen" (McMaster Archives, 144.6, Box 33, n.d.: p.3). His focus on teaching "statistics without numbers" was for implementing the "practical application" of clinical epidemiology in the care of individual patients (McMaster Archives, 144.6, Box 33, n.d.: p.6). The problematization of the link between medical science and its application to actual clinical

practice can be observed from the beginning of the CE&B department in its aims for contributing to the medical program.

In the first statements of CE&B in 1972, these early concerns place an emphasis on the relationship between medical research and its utilization for practice, particularly the evaluation of current services (McMaster Archives, 144.6, Box 33, n.d.: p.7). In "Objectives: Department of Clinical Epidemiology and Biostatistics," a document that was created following the approval of the department prospectus and proposal for the curriculum of study, CE&B articulated the department as a kind of under-labourer for methodology in collaboration with the research needs of the other departments in the Faculty of Medicine. CE&B "must strive to develop learning resources relevant to the practice of medicine...[and,] as practicing clinicians, to integrate and reinforce the application of biostatistical and epidemiologic principles in the evaluation and management of individual patients" (McMaster Archives, 184.5, Box 001, 1972: p.5). The document suggested the following strategy for implementation: the department would implement learning resources and have faculty members who do both research and clinical work teach and write practice books on how to implement epidemiologic methods in medical practice. For example, Sackett & Baskin's (1971) publication of *Methods of Health Care Evaluation* included materials such as video recordings and written resources for health care education and evaluation.

The emergence of CE&B and its objectives coincided with that of the medical program. Drafts of the "Objectives of the Faculty of Medicine of McMaster University" were primarily spearheaded by Sackett but emerged in collaboration between faculty members

through years of circulated memoranda and shared drafts of the statement between 1966 and 1972. The primary objective would be "to educate," providing an undergraduate program that could produce students who "are effective solvers of biomedical problems as a result of understanding principles essential to the solution of such problems and knowing how to seek out and use whatever information is required for their solution" (McMaster Archives, 184.5, Box 001, 1969: p.1). The collaborators aimed to provide a graduate program that would have students who "will apply fundamental knowledge to clinical problems and participate in the clinical phase of medical education" (McMaster Archives, 184.5, Box 001, 1969: p.2). Lastly, they sought to provide clinicians with skills for "solving clinical problems through the application of clinical skills and judgment, relating clinical problems to fundamental knowledge, and demonstrating appropriate attitudes toward their own continuing educations and toward the moral and ethical problems facing physicians in relations to patients, colleagues and society" (McMaster Archives, 184.5, Box 001, 1969: p.3). The priorities of continuing medical education programs were understood as a "personal responsibility of clinicians" and would respond to an identified problem of the gap between medicine and research. These programs aimed to "shorten the time between the [scientific discovery] of new knowledge and its safe application to clinical practice" (McMaster Archives, 184.5, Box 001, 1969: p.4).

The objectives for conducting research would be accomplished by the following areas: biomedical, applied medical research and clinical investigation, and operation research "on health care as [a] guide to educational programmes and [the] use of scarce health

personnel" (McMaster Archives, 184.5, Box 001, 1969: p.7). Additionally, the strong focus on conducting research to examine "the function of the health team so as to align education programmes with the individual's role" (McMaster Archives, 184.5, Box 001, 1969: p.7) reflected the growing need, detailed in the above literature, for research relevant to the individual clinician. The "Objectives" document also noted the importance of the collaboration between clinical epidemiology, the biostatics department and the medical program (McMaster Archives, 184.5, Box 001, 1969: p.9). The epidemiological research produced by CE&B would be not only relevant to the medical program, but that the rationale for the medical programme would be based on valid outcomes of medical research.

A related document created by CE&B, "Educational Objectives in the Undergraduate Medical Curriculum," stated that students were to be "concerned with mechanisms of general applicability rather than with content areas related to specific disease" (McMaster Archives, 144.7, Box 34, 1969: p.1). Two objectives were recommended:

> (1) "To help students become effective solvers of biomedical problems by understanding principles essential to the solution of such problems, and by learning how to seek out and use what information is required in their solution;" and
>
> (2) "To foster attitudes leading to behaviour as responsible physicians and scientists in their relation to patients, colleagues and society. Such behaviour is marked by compassionate concern for patients coupled with action to promote the public good when the physician is faced with ethical decisions" (McMaster Archives, 184.5, Box 001, 1969: p.1).

Students would be evaluated based on their proficiency in course objectives and curriculum and by their ability to identify probabilities for understanding the "causation" of disease (McMaster Archives, 184.5, Box 001, 1969: p.3). Student were also expected to have knowledge of demographic or "situational" factors for predicting disease behaviour

(McMaster Archives, 184.5, Box 001, 1969: p.11). By implementing these goals for medical education, an imagined student would be one who understood medicine on the basis of epidemiologic probabilities (e.g., for diagnosis, or that a treatment would be successful, etc.). The final "Revised Statement of General Goals – M.D. Program" stated that the student is expected "to be able to critically assess professional activity related to patient care, health care delivery, and medical research" (McMaster Archives, 145.8, Box 44, 1972:1.4(b)).

The creation of the new approach to medical training and practice signified the translation of problematized uncertainties in clinical care into concrete programs that intervene in medical education and training. The objectives of the medical program and its strategies for implementation are responses to needs for linking medical practice and its basis in medical research. In the CE&B document "Health Services Research: A Declaration of Intent: 1969-72," which was created after the first year of CE&B (McMaster Archives, 184.5, Box 001, 1972), a new research project was initiated to reform methods of measuring health services (which was then a current problem identified in Ontario). This new method would use "end-results" measures, combined "with cost-effectiveness and cost-benefit analysis" and by applying "experimental (rather than descriptive or analytic) methods to health services research, [permitting] the utilization of powerful analytic tools in the presence of maximum control of confounding variables" (McMaster Archives, 184.5, Box 001, 1972: p.4). Between research design and teaching objectives, the McMaster medical program set out on what would later be the successful reform of medical training and practice.

Concrete Establishments: Conditions for Success

Now that I have explained how problematizations of uncertainty came to stabilize in the medical program at McMaster, I will now discuss how these questions would crystallize in new spaces for medical education. First I consider the broader political concerns surrounding health care.

The documents created by Sackett and Evans offered solutions to the problems of their day, particularly what was referred to as the need for more or better health services "manpower." The prominence of this problem can be observed in various government documents. For example, during the meeting of the senior co-ordinating committee and the Vice Presidents of health sciences and representative of the Ontario Council of Administrators of teaching hospitals in 1969, the discussion focused on "problems relating to the development of Health Resources in Ontario," of which manpower was clearly noted (McMaster Archives, 146.2, Box 47, 1969:p.2). The Council stated the need for provincial intervention. The "Ontario Health Resources Development Plan" was devised for improving health services and care, including education and training and new methods for delivery of care. Throughout the 1970s, significant capital investment was poured into this initiative, totalling $640 million for education research and service requirements, which would increase physicians' involvement in training and teaching (AO, RG 32-23, B350860, 1969). The funds would be distributed throughout universities in accordance with the implementation of priorities, such as education. Of this grant, McMaster would receive $103 million (AO, RG 32-23, B350860, 1969: p. 4).

Government documents also contained concerns about scarce resources for training the currently employed professional. At the time, many solutions were offered, and they built upon the recommendations made in the "Royal Commission on Health Services" report. To demonstrate the widespread acknowledgement of this problem of training and "scarce resources," in 1964, the same year that the "Royal Commission on Health Services" was published, the U.S. Department of Health, Education and Welfare published "Medical Education Facilities." This report detailed the importance of site planning and related considerations for the construction of medical training hospitals and facilities. The U.S. report recommended the following to resolve issues relating to manpower: "The teaching hospital and clinical science facilities should be placed on the site so that the educational functions relate to and connect with the basic science facilities." The sites for training manpower (i.e., medical practitioners) would be university hospitals themselves, thus connecting new knowledge with existing forms of training and implementation. With both a large financial investment from Government and these new recommendations in mind, the McMaster medical facilities were developed.

Where would clinicians be trained? This was the major question while plans to develop a medical school at McMaster were initiated. The development of the medical school, which opened in 1969, depended on the creation of such training facilities. McMaster proposed to build a new health sciences building and training facility, the university hospital, where research and clinical training would be intertwined in both research and architectural

design. Its first class of incoming students was scheduled for the fall of 1969[16]. The McMaster Health Sciences building would combine primary patient care (400 in-patient beds) with an architectural design that brought medical research, a health sciences library, lecture theatres, and the clinic together. The building required a large financial investment from Government. Construction on the building began in 1968 and was completed in 1971, and it cost $56,918,000 (AO, RG32-23, B356178, 1971: 34).

The problematization of clinical care resulted in solutions that reach beyond the pages of medical journals; it influenced how medicine would be practiced in physical space by combining the hospital, instruction and training, and research spaces. The rationale for creating a building of this kind can be found in the 1969 draft of the "Objectives of the Faculty of Medicine of McMaster University," which stated that "a Health Sciences Centre will be constructed on campus to provide educational and research facilities for Medicine, Nursing, and other health professions" (McMaster Archives, 184.5, Box 001, 1969). "The building was designed to bring into close proximity the programmes for the various health professions and to integrate the facilities for education and research with those for patient care and clinical investigation" (McMaster Archives, 184.5, Box 001, 1969: p.9). The solution to the "gap" between medical practice ("the clinic") and research ("evidence") was

[16] Initially 20 students enrolled in the first year of the McMaster medical program. These students were housed in temporary quarters while the complex was completed. The enrolment targets of 64 incoming students per year would be met once the proper facilities could be completed. The new facility would not open until 1971 due to delays in labour and to union conflicts.

proposed by clinical epidemiology: it was necessary for the two departments to be *concretely* in the same proximity as well.

In an unpublished paper written on the history of the McMaster program, John Evans, the Dean of the new Medical School stated that "the Medical Centre represents the physical symbol of many of the principles" articulated in the Faculty of Medicine's objective statement (McMaster Archives, 145.8, Box 44, n.d.:p.6). The development of a medical centre that placed patient care, education, and research (manifest in both housing research departments and in the presence of the medical library) into the same "geographical proximity" was meant to "encourage their integration:" "Students from the outset will be oriented to human problems with the focusing of scientific attention on the problems of disease and the translation of research advances into routine clinical service" (McMaster Archives, 145.8, Box 44, n.d.: 6-7). The space itself was constructed for flexibility and integration, and it was designed with the possibility to reorganize the delivery of care, should the needs or foundations for those services change, or should a need arise for restructuring the economy of its operation (a rationale that could be shown through research).

In a personal correspondence to Dr. T. McKeown, Evans described the building as "designed to provide close working relationships for clinical and non-clinical departments and to integrate effectively the patient care, educational and research responsibilities of the clinical staff" (McMaster Archives, 146.2, Box 47, August 28, 1967). Sackett echoed the significance of the building's geography in a letter to Mr. E.H. Zeidler : the proximity of CE&B to the other departments was necessary "to function effectively as a teaching and

research unit of the Faculty of Medicine" (McMaster Archives, 144.7, Box 34, January 30, 1968). For Sackett, it was important to ensure the close relationship between the medical staff and, specifically, the department of CE&B, in order to maintain the CE&B's relevance to actual clinical practice. In a letter to G.P. Hiebert , Sackett complained about the preliminary design plans for the new facility. He argued that the importance of "the crucial relationship for the clinical epidemiologist is his continuing clinical relevancy" (McMaster Archives, 151.5, Box 33, November 21, 1968). Sackett was emphasizing the need for CE&B to be housed close to the department of medicine.

The June 1971 Newsletter of "Forum" published a portfolio of the new teaching hospital at McMaster, and called it "decentralized education:"

> The unconventional teaching program at McMaster was a major influence on the design. The medical students will be exposed, from practically the first day of their training, to actual health care functions. ... The effect of this program on the building plans is evident. Patient care and research facilities share the same floors. (AO, RG 32-23, B356178, 1971: p.31-32).

Funding Applied Problems

The decades leading up to the first statements of EBM by the Evidence-Based Medicine Working Group were heavily influenced by the initial objectives of the Faculty of Medicine, the design and construction of the Health Sciences Centre, and other concrete developments that ensured the continued success of clinical epidemiology. The *application* of medical science to the bedside was one of the primary concerns in the literature. A number of initiatives, discussed in this section, were funded by government and other agencies to support the new focus on applied medical and epidemiological science in clinical care. For instance, in the late 1960s, the Ontario government invested $600 million, with an additional

$175 million of federal funding to create regional health centres at the five Ontario medical schools(AO, RG 32-23, B350860, 1969). These centres conducted local research on the effectiveness of health care services and strategies from a clinical epidemiologic approach, following the McMaster research program.

Further, in 1971, the same year that the Health Sciences Centre opened, Sackett received a National Health Grant to create a health-care research centre for training clinical epidemiologists and health-care research workers in a series of seminars in health care evaluation methods (McMaster Archives, 184.6, Box 002, 1971). The seminars were to be held at McMaster beginning in November of the same year. Seminar titles included "The Use of Vital Statistics and Demographic Information in the Measurement of Health and Health Care Needs" and "Randomized Controlled Trials in Health Care"(McMaster Archives, 184.6, Box 002, 1971). These seminars not only facilitated the clinicians' responsibilities to continue their education post-graduation through the commitment of the CE&B department, but also provided instruction on the relevance and uses of clinical epidemiologic research in clinical practice. The funding support signifies the growing interest in applied research in the health sciences.

Further, in the same year (1971), McMaster received special permission from the Ontario government to create the M.Sc. program in Health Sciences during a time when there was an embargo on new programs in Ontario. Despite scarce resources in the Ministry of Education, H.H. Walker, Deputy Minister of Education, noted that the decision to invest in the new program was due to the "need for qualified people to study diagnostic and

therapeutic processes as well as the broad range of basic developmental and highly applied problems related to health" (McMaster Archives, 146.2, Box 47, June 18 1971). The embargo was originally caused by the budget announcement for 1968-69, which affected operating cost grants for universities (AO, RG 32-2, B167431, 1969: p.4). There was a lot of buzz around the new program at McMaster, and its successes can largely be attributed to significant investments that funding agencies and Government made for its facilities and its programs.

Funding support from international and external sources was another condition that contributed to the success of clinical epidemiology and its research, which aimed to intervene in clinical care. In the United States, Kerr White assumed the role of Deputy Director for Health Sciences in the Rockefeller Foundation. While serving at Rockefeller, White, a critic of "laboratory medicine," gained a reputation for funding studies in clinical epidemiology, a new and emerging field that he saw to be promising a better way of practicing medicine (Daly 2005:46). The International Clinical Epidemiology Network (INCLEN) was one such investment. In 1980, INCLEN created a training program whose "goal is to strengthen national health care systems and improve health practices globally by providing professionals in the field with the tools to analyze the efficacy, efficiency, and equity of interventions and preventive measures" (INCLEN 2013).

McMaster, and the CE&B department specifically, was one of the first three leaders in programme development and advance research and training for INCLEN. Through a large financial investment from the Rockefeller Foundation, INCLEN would go on to create

Clinical Epidemiology Units (CEUs): "[The] role of the CEU is to promote rational decision-making and the application of quantitative measurement principles…in the development of clinical and health care policy" in developing nations (McMaster Archives, 184.5, Box 001, 1994:p.51). CEUs would provide training in the methods of clinical epidemiology to facilitate programme and policy development in those targeted developing regions. The program was funded by the United States Agency for International Development, the World Health Organization, and International Development Research Centre, in addition to the Rockefeller Foundation.

The first INCLEN meeting was held in Hawaii in 1983. In attendance were representatives from McMaster, New Castle University (UK), and the University Of Pennsylvania (USA). According to the meeting agenda, "Report of First Annual Meeting of INCLEN," INCLEN was created in response to "health care issues such as increasing costs and unequal access to health care, inappropriate allocation of health care resources, and ecological consideration" (McMaster Archives, 215.6, Box 003, 1983: p.1). The agenda said that the purpose of INCLEN was to bring third world clinical faculty to developed countries for training in CEUs, which would produce clinicians who will be "better able to identify and evaluate significant health problem within their own countries" (McMaster Archives, 215.6, Box 003, 1983: p.1).

Although the focus of INCLEN was at the global level, the program itself sought to improve clinical care (at local levels) through the use of clinical epidemiology, its research and methods. The objectives of CEUs in INCLEN were identified as follows,

> 1) Conduct of clinical research and health care evaluation bearing on local health care needs; 2) development of adaption of epidemiological and statistical methods to improve the quality and efficacy of research; 3) development of programs to integrate epidemiological and population-based concepts into teaching programs designed for consumer of research results [i.e., practitioners]; 4) development of teaching programs, workshops, seminars and short courses for researchers in their respective countries; 5) obtaining long-term government or other financial support; and 6) development of clinical role models. (McMaster Archives, 215.6, Box 003, 1983:4-5)
>
> The objectives were:
>
> The establishment of clinical epidemiology units (CEUs) in schools of medicine will have a favourable impact on the provision of effective and efficient systems of health care which are appropriate for the health status of the population served by those medical schools, by: 1.1 educating, within a clinical setting, physicians to use interventions proven to be efficacious; 1.2 educating, within a clinical setting, physicians to establish arrangements for providing effective care efficiently; 1.3 encouraging (as a result of 1.1 and 1.2) a more rational approach to the allocation of resources for medical care in relation to the health status of the population. (McMaster Archives, 215.6, Box 003, 1983:p.1)

The funding of this major international project supported the proliferation of clinical epidemiology research programs, and McMaster was at the heart of it. The methods of clinical epidemiology were applied to clinical care by developing a network of scholars worldwide that would resolve problems of a population health nature respective to the needs of the participant's home country. INCLEN continues to operate at the time of this writing, demonstrating the ongoing significance of clinical epidemiology in medical training and practice beyond western countries.

Other local programs contributed to the success of clinical epidemiology and its stabilization at both McMaster and more broadly. Among those were classes for continuing education on the "Critical Appraisal of the Medical Literature" at McMaster. The goals of these classes anticipate much of the teachings of EBM: the use of medical literature can

contribute productively to the improvement of clinical care. Beginning in the 1980s, these classes were held at CE&B. The stated objectives were, "for the participant to understand and be able to apply to the medical literature some straightforward guides for assessing clinical evidence" (McMaster Archives, 215.6, Box 003, 1981: p.2). Further, all the way through the 1980s, members of the department individually conducted successful research programs, holding over 14 million in grants from external and internal funding (McMaster Archives, 151.5, Box 33, 1982). The creation of the graduate program in CE&B coincides with these developments as well.

The language of EBM occurred just before the emergence of the first EBM statements. In the "Department of CE&B Five-Year Overview 1986-1991," the years immediately preceding the first statements of EBM, the department redefined its research objectives. In addition to improving methodological design, measurement and evaluation in medical research and health services evaluation (McMaster Archives, 184.5, Box 001, 1991: p.5), the department added the following objectives:

> To develop new knowledge of the extent to which health care interventions, procedures or services do more good than harm to those, a) who fully comply with recommendations or treatment (efficacy); [and] b) to whom it is offered (effectiveness) . . . To develop new knowledge in the application of evidence to specific patient or health problems from the perspective of the health practitioners or policy makers (implementation). (McMaster Archives, 184.5, Box 001, 1991: p.5)

The application of knowledge and evidence to specific health problems of individual patients would also include measures of economic efficiency and/or optimal use of resources and disease mechanisms. The education objectives for the CE&B program included developing health professionals who can apply research "to the solution of a broad range of basic,

developmental and applied problems related to health care and to use such information to recommend appropriate policies in health and health care" (McMaster Archives, 184.5, Box 001, 1991:5-6). The application of evidence (clinical epidemiologic evidence) to individual patients was justified by recourse to the implementation of policy programs for patient care. The problem of the relationship between research and clinical care was reformulated over the next few years, and clinical epidemiology and later EBM would offer solutions to this problem by targeting the individual judgments of practitioners in order to resolve the identified uncertainties of medicine.

EVIDENCE-BASE MEDICINE: THE RISE TO DOMINANCE

> But the definition of evidence-based medicine that grabbed the attention of policy makers in the 1990s was more specific. The focus was on integrating *better* evidence into decision making – that is, evidence of the effectiveness for clinical interventions, together with procedures for incorporating this evidence into practice. This initiative placed a new responsibility on clinicians to seek out and use this kind of evidence in clinical decision making. (Daly 2005:12)

Above, I detailed the ways that the questions of the preceding decades problematized the uncertainties of clinical judgments in medical practice. I also looked at the creation of the McMaster medical school, and the influence of its new curriculum on medical practice. In 1992, the EBM Working Group (EBMWG) at McMaster published its first statements concerning how evidence for clinical judgments would come from scientific study, eliminating the contested nature of clinical authority and the fallibility of physician authority or "intuition." The EBMWG described clinical care as being organized by the following three assumptions: (1) "systematic attempts to record observations in a reproducible and

unbiased fashion markedly increase the confidence one can have in knowledge about patient prognosis, the value of diagnostic tests, and the efficacy of treatment"; (2) "the rationales for diagnosis and treatment, which follow from basic pathophysiologic principles, may in fact be incorrect, leading to inaccurate predictions about the performance of diagnostic tests and the efficacy of treatments"; and (3) "understanding certain rules of evidence is necessary to correctly interpret literature on causation, prognosis, diagnostic tests, and treatment strategy"(Guyatt et al 1992: 2421). When practicing EBM, doctors make medical judgments about a patient or particular case and course of action by assessing and consulting the highest quality of evidence. The principles of clinical epidemiology that emerged in the 1980s informed the development of EBM. EBM is about asking "how methods developed in epidemiology can be effectively applied to bring greater certainty to clinical decision making" (Daly 2005:24; cf. Fletcher & Fletcher 1982:82). To paraphrase Feinstein: "the answer to clinical uncertainty lay in science" (Daly 2005:27).

EBM proposed that the methods of the sciences, particularly the systematic assessment of evidence, would provide better and more reliable evidence than individual expertise or intuition[17]. The rules for the systematic assessment of evidence are organized by the principles of science, namely objectivity and reproducibility. I return to this point in Chapter Three. Further, the procedures for assessing evidence could be systematically taught

[17] In *The Philosophy of Evidence-based Medicine*, Jeremy Howick (2011) concludes that the methods of EBM do, in fact, provide valid knowledge upon which clinical practice can be based, with a few caveats (see chapters 10 and 11).

to trainees in the field, thus dispelling and eschewing the old model of medical apprenticeship. Students would not need to rely on the expertise or proficiency of their mentors; they would, instead, learn to assess the evidence on their own. EBM argued that the methods for the appraisal of available evidence would become part of the dedicated curriculum of medical practice, and the implementation of EBM could improve the effectiveness of medical judgments more generally.

After the appearance of EBM in the literature, conversations about practice guidelines became more predominant. EBM would come to provide the rationale for strategic intervention at the level of individual judgment. During the 1990s, the economic recession brought about concerns regarding the growing cost of medical care. For example, Schoenbaum (1993) suggested a way of measuring the outcomes of health care by developing guidelines that could improve the economic costs of medical care. If health care could decrease the number of medical procedures, it could reduce the costs of care; and if physicians made correct decisions more frequently, they would not order inappropriate tests or provide unnecessary, costly care. These guidelines for medical judgments were made in light of broader concerns about health care. The guidelines would use cost as the standard for improving medical care, and this seemed complementary to the systematic assessment of evidence proposed by EBM in order to produce better judgments in clinical practice. Proponents of EBM, particularly Sackett and colleagues (2000), refute the claim that EBM

was introduced to cut the cost of care. In fact, they state the opposite: improved health care will ultimately result in higher costs (Sackett et al. 2000:18)[18].

The increasing concern over health care costs led to questions about "how much evidence is needed to say that a treatment is 'appropriate,' that it should be used, and that it should be paid for?" (Eddy 1993:520). In his article, Eddy explained that the shift in the focus of the medical literature went from medical authority, the conventional assumption that "doctors know best," to questions about the credibility of clinical judgments. Eddy stated that using evidence in medical practice could respond to both questions about economic cost (e.g., what is appropriate cost) and questions about the reported variations in care from studies that emerged in the previous decades. Eddy (1993) argued the "battle" over evidence and how it could be used would ensue throughout the 1990s, and that it would entail three themes: sufficiency, burden of proof, and tension between old versus new treatments (p.521-523).

EBM provided metrics that could answer questions about when evidence was sufficient, adequate and accurate, and how to implement new treatments. Later statements issued about EBM concisely describe its task and goals as the "integration of best research evidence with clinical expertise" (Sackett et al. 2000:1). "Best research evidence" is defined as "clinically relevant research, often from the basic sciences of medicine, but especially

[18] In the next chapter I discuss Nikolas Rose's (1993) concept of *advanced liberalism* to analyze how economic "devices" have come to influence the development of EBM guidelines and how economic measures are influenced by "interested stakeholders" (e.g., hospital management and administration).

from patient-centred clinical research into the accuracy and precision of diagnostic tests (including clinical examination), the power of prognostic markers, and the efficacy and safety of therapeutic, rehabilitative, and preventive regimens" (Sackett et al. 2000:1). Clinical expertise refers to "the ability to use our clinical skills and past experience to rapidly identify each patient's unique health state and diagnosis, their individual risks and benefits of potential interventions, and their personal values" (Sackett et al. 2000:1).

From these assumptions and definitions of medical evidence and practice, EBM is broken down into five procedural steps: (1) "converting the need for information (about prevention, diagnosis, prognosis, therapy, causation, etc.) into an answerable question"; (2) finding the best evidence to answer the question;" (3) "critically appraising that evidence for its validity (closeness to the truth), impact (size of the effect), and applicability (usefulness in our clinical practice)"; (4) "integrating the critical appraisal with our clinical expertise and with our patient's unique biology, values and circumstances"; and (5) the evaluation of one's effectiveness and efficiency in the aforementioned steps (Sackett et al. 2000:3-4). Additionally, the guidelines for the "critical appraisal" of evidence are intended to reduce the "guesswork" of medicine, providing a systematic framework to interpret the evidence (Sackett et al. 2000:135-140).

EBM problematizes medical judgments, targeting the uncertainties associated with the "old" methods of medical training and the costs of health care. The first statements of EBM occurred at a time when questions surrounding medical practice asked for a systematic method by which physicians could be trained to use the best possible evidence to make

reliable, predictable, and objective medical decisions. During a time of rapidly increasing medical technologies and information, as well as concerns over the cost of care, EBM purposed to solve the problems of medical practice.

The Evidence-Based Medicine Working Group: Back at McMaster

EBMWG was an initiative that emerged in the department of CE&B. It was later described in a department review as an initiative that was:

> Undertaken and tested by Gord Grant, Deb Cook and colleagues as part of the Postgraduate Training Program and in the Department of Medicine. It is a multi-institutional collaboration designed to simplify the transfer of rules of evidence to be used by clinicians in decision-making and interpretation of clinical scientific literature. Negotiations have been completed to have a series of articles published in JAMA, with peer review. This initiative is expected to have a major influence on North American clinical practice, and will further promote the leadership of the Faculty in educational innovation. (McMaster Archives, 184.5, Box 001, 1994: 52)

In a few years time, the individual clinician – their decision-making and interpretation of the literature – became the site at which evidence-based measures could be implemented. CE&B also noted that there was growing recognition of EBM beyond North American practice. As mentioned in the previous section, clinical epidemiology and its scientific formulation of the clinic had been spreading locally and worldwide through Ontario regional centres and INCLEN, respectively. The stage was set for reinterpreting CE&B's mission and mandate immediately following the EBM statements.

The departmental mission statement would now read that CE&B was created in response to the "generally poor quality of clinical research world-wide, to foster rigorous and scientifically valid clinical research methods and their application in the Faculty. …Our over-riding mission can be summarized as: 'a dedication to effect improvements in health by

enhancing the quality of clinical research'" (McMaster Archives, 184.5, Box 001, 1994:3). This mission would be undertaken through education, research, and service within the faculty of health sciences. The new academic mission now read:

> Our academic mission seeks to advance knowledge in evaluative sciences related to population health and health care through interdisciplinary research, to disseminate knowledge and facilitate the transfer of research information through University and public educational programs, and respond appropriately to calls for methodologic assistance in order to effect improvements in health and to contribute to the communities we serve. (McMaster Archives, 184.5, Box 001, 1994:3)

Following these changes, in 1994 the department implemented four new evidence-based initiatives: (1) the creation of a community outreach program for establishing "evidence-based planning and decision making and the better inform research questions in the domains of clinical, health and social policy, and health services research"; (2) the development and approval of a new PhD program in Health Research Methodology; (3) the "establishment of the Canadian Cochrane Centre with colleagues across Canada and internationally to provide better access to the best available evidence for interventions in the health field"; and (4) the development of the Ontario Health Care Evaluation Network (OHCEN), a province-wide network for connecting researchers and decision makers (e.g., policy makers) (McMaster Archives, 184.5, Box 001, 1994:1).

The vast proliferation of this interest in applying evidence to particular patients through the individual judgments of clinicians started in 1993 with McMaster's first EBM workshop, "How to Teach Evidence Based Medicine." The name of this annual initiative was later changed to "How to Teach Evidence Based Clinical Practice." In 1998, 86 participants attended the workshop from as far away as Australia, New Zealand and Japan. Participants

took part in an "intense week-long experience exchanging their perspectives and their own teaching techniques while learning more about critical appraisal of clinical evidence" (McMaster Archives, 184.5, Box 001, 1992: 2). Workshop enrolments were up to 96 full registrations by 2000. The traction that EBM gained in a short span of time is evident in the support for EBM from both the financial commitments and workshop participation. The attendance of individual doctors demonstrates the growing perspective that doctors ought to learn the new evidence-based rules of medicine.

Meanwhile in England…

To further understand the proliferation of the EBM programme as the emergence of an "anonymous phenomenon," I turn to conversations that were ongoing in England, where major reforms were taking place in medical practice and research, and where there was renewed investment in clinical epidemiology and evidence-based recommendations. In 1971 the Rothschild and Dainton reports, collectively titled "A Framework for Government Research and Development," were published, totaling 53 pages (Civil Service Department 1971). The reports' major areas for concern were the relationships between financial resources and health services and care in the United Kingdom. What emerged from the Rothschild report was an emphasis on applied research. The report recommended the restructuring of the department of Research and Development in the United Kingdom toward applied research. The guiding principle of "customer-contractor" relationships would reorganize the allocation of funding. For example, the Medical Research Council, which was in charge of administering competitive funding for medical research, would now be

"contracted" by the Department of Health, which would determine the focus areas for research. The new interest in "applied" research was the justification for restructuring in medicine. There was an interest in generating information on specific *outcomes* in health services, rather than on the knowledge produced by research.

The shifting focus on epidemiologically measurable improvements in population health came to influence the production of knowledge itself. The Medical Research Council (MRC) expressed its hesitation about the recommendations in the Rothschild report (NA, UGC 30/71, 1971). The Council noted the serious effect restructuring would have on university research and the subsequent difficulties of generating the necessary knowledge for the departments to pursue their "periphery research" (NA, UGC 30/71, 1971:3-4). The MRC argued that the outcomes of knowledge production were not a part of the mandate of the research council: it was the work of Government to take the results and translate them into policy. The EBM focus, however, linked knowledge and recommendations for practice. The restructuring of health research laid the groundwork for what would later be a large Government investment in EBM.

The effects of the report were cited in "Paper for the Department Research Strategy Committee" in 1980, detailing the directions for the Department of Research and Development for the coming decade. The Rothschild report reallocated 25 percent of the Medical Research Council budget to the Health Departments (Civil Service Department 1971). The Committee also agreed that any research would be "primarily biomedical in

nature" (NA, MH 148/1162, 1980:12). Research about the link between health and knowledge would now be administered by the Department of Health.

The emphasis on epidemiological research and health services research (both applied fields) continued throughout the 1980s in the United Kingdom. It was during this time that Iain Chalmers set up the Cochrane Collaboration. While I have touched on this initiative briefly above, I now consider the social relations that contributed to the success of the Oxford Database of Perinatal Trials. Its creation paved the way for the proliferation of EBM.

Ian Chalmers was a clinician practicing in Britain. In 1978, he became director of the "National Perinatal Epidemiology Unit" in Oxford. Inspired by Archibald Chochane's writings that called for the use of systematic reviews of RCTs in medicine, Chalmers, who would later come to focus on health research, initiated an international collaboration to systematically review all published perinatal medical research (RCTs) from 1940 to 1984 (a total of 3500 studies). The results of the review were published in 1989 in *Effective care in Pregnancy and Childbirth*, *A Guide to Effective Care in Pregnancy and Childbirth*, and in The Oxford Database of Perinatal Trials. The success of the review was due in part to, simultaneously, the vast distribution to and demand from practitioners. The reviews, which were delivered in disk form, were written in such a way that practitioners could use their conclusions directly in their practices. These systematic reviews of controlled trials of perinatal care would be updated regularly, in semi-annual disk issues of an electronic journal, "The Oxford Database of Perinatal Trials".

The initiative gained attention worldwide and led to the establishment of the Cochrane Centre at Oxford in 1992 by funds from the Research and Development Programme of the National Health Service (NHS), then headed by Muir Gray. The name was later changed to The UK Cochrane Centre. The funding approval cited the importance of facilitating "the preparation of systematic reviews of randomized controlled trials of health care" (The Cochrane Collaboration 2013).

The creation of the Cochrane Centre received international accolades in major journals such as *The Lancet* and *The British Medical Journal* (*BMJ*). After the success of the Cochrane Centre, Gray, the representative for the Oxford Regional Health Authority of the NHS, saw another opportunity for international recognition: he was given £5 million to invest in new research and development initiatives[19]. The funds emerged from a standing committee set up for the House of Lords in the early 1990s. The committee would report to the Department of Research and Development and was funded by NHS funds. The Cochrane Centre was funded by NHS via Muir Gray and the committee; it paved the way for additional resources to support ongoing initiatives for improving health outcomes through medical research.

In 1994 Muir Gray used the £5 million to create the Centre for Evidence-based Medicine at Oxford University. He recruited Sackett to serve as its first chair and to develop

[19] In a personal correspondence with Sir Dr. Gray, he said, "At that time, the strategy was, get money and give it to Iain Chalmers." After the success of the Cochrane database and its applied clinical nature, these initiatives were well funded by national initiatives.

a clinical epidemiology program there. Sackett left McMaster to take a position in the Department of Medicine, Radcliffe Hospital, Oxford University. Instead of forming a clinical epidemiology program, Sackett decides to build the Centre for Evidence-based Medicine (CEBM) on the heels of the Cochrane Collaboration and the publication of the first EBM statements (McMaster Archives, 184.5, Box 001, 1994:1). One of the first projects undertaken by the Centre was the 1995 publication of the first issue of *Evidence-based Medicine*, an academic journal jointly published by *BMJ* and *Annals of Internal Medicine*. The format of the journal comprised of rewritten, structured summaries of research articles with commentary. The journal focused on translating medical research to recommendations for medical practice. The project began with, at first, the review of 50 medical journals written in English. The journal now reviews 100 international journals. Within 3 years of the first publication, the journal would have over 70,000 subscriptions.

These generously funded projects in EBM did not come without their critics. In a widely publicized debate, an editorial titled "Evidence-based Medicine, in its place" (1995) appeared in the *The Lancet*. The editorial stated:

> Cochrane, a fierce individualist ever at war with people who thought they knew best, would hardly welcome the elitism of much evidence-based medicine, and he would certainly scold the founders of Evidence Based Medicine for so far ignoring trials not reported in English and for boiling down the lively broth of published clinical research to a mere 12 mouthfuls per month. Advocates of evidence-based medicine can now afford to lower their profile to ensure that their evolving ideas find a secure place in medical practice. (*The Lancet* 1995:785)

Sackett replied in collaboration with Gray (and others) in the *BMJ* a few months later:

> Good doctors use both individual clinical expertise and the best available external evidence, and neither alone is enough. Without clinical expertise, practice risks becoming tyrannised [sic] by evidence, for even excellent external evidence may be

> inapplicable to or inappropriate for an individual patient. Without current best evidence, practice risks becoming rapidly out of date, to the detriment of patients. (Sackett et al. 1996:71)

EBM proponents have tried to eliminate elitism from its resources by writing articles in the journal in accessible and nonspecific language. The debate seems, however, to get at the nature of the "problem" of evidence-based medicine: when treating patients during times of uncertainty, how much should one follow the evidence and the recommendations? The question itself points to the site of the problem: the individual judgments of clinicians in their practice.

Since its creation, CEBM continues to run workshops and courses for training practitioners in the methods of EBM. For example, CEBM holds an annual "Evidence Live" workshop (it began in 2010) that targets the following medicine related audiences: academics, clinicians, administrators and managers, private and not-for-profit, and students. The two-day workshops are designed for anyone interested in evidence-based health practice, and they are put on by CEBM. The operating budget of the Centre, although originally funded by NHS, now runs completely by the tuition fees of participants in their courses and workshops. The research carried out there is funded by individual researcher grants, rather than Oxford specific funds.

More Information, More Confusion

Two of the major problems identified by EBM are the proliferation of medical information and the lack of sufficient recommendations that are evidence-based. As discussed above, databases began popping up after the Cochrane Collaboration started synthesizing research in

systematic reviews. For example, today other search engines such as MEDLINE, PubMed, and DynaMed provide online tools for searching out evidence for use in clinical practice. The EBM programme formulated various uncertainties that concerned the relationship between the clinic and the laboratory, and its proposed solution – the creation of more evidence – may well have incited the production of new forms of mass information. In the early 1990s, the proliferation of computer and database technology in medicine provided (almost) unlimited resources for clinicians to search out the results from RCTs and other research. Physicians began to ask questions about the fallibility and validity of information as a consequence of the increasing use of these search technologies and cultivation of information.

An example of these questions can be explained by looking to an historical example. For almost two thousand years (from antiquity to the nineteenth century), blood-letting was common-practice; it was considered the best treatment available for any illness. Now, however, research has shown that the practice can be detrimental. So how can clinicians know they are doing the right thing given the increasing amount of available information and changing technologies while at the same time being required to provide the best care available as a public trust? Researchers call for a way of assessing evidence in light of there being so much of it, especially given the changing role of the patient, the one who consumes medical care and sometimes demands treatments that are unproven technologies (Grimes 1993)[20]. In fact, the journal *Evidence-Based Medicine* states:

[20]A good recent example is the patient demand for unproven technologies like the Zamboni treatment, offered as a therapy (some say cure) for multiple sclerosis. The Zamboni treatment is a recent news-worthy (see for

> If you read Evidence-Based Medicine, you'll get all the important research material you need in just 6 volumes that are published throughout the year, saving you all important time to concentrate on other things. To further emphasise [sic] the point, a study found that you'd have to read 227 articles in the Lancet or 118 articles in the New England Journal of Medicine to get the relevant information that would be contained in 1 Evidence-Based Medicine article. (BMJ Publishing 2013)[21]

The journal responds to the physician's need to sort through a vast amount of information produced by medical research. The doctor, under the EBM programme, is required to treat patients based on the best available evidence; this is an onerous, task, however, as there is too much information available. *Evidence-Based Medicine* synthesizes research evidence and aims to resolve this problem[22].

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example Weeks 2011) innovation for curing multiple sclerosis, a disease of the neurological pathways of the brain and spinal cord. The procedure is carried out under the assumption that improving circulation and blood flow in major veins and arteries of the neck through a surgical procedure resolves the cause of the illness. The scientific community has strongly criticized the Zamboni treatment (e.g., Laupacis et al. 2011). For EBM the problem concerns whether this new information is good and accurate. How would physicians know if this is the best new practice or not? I discuss this process in greater detail in the next chapter.

[21] The study to which they are referring is: McKibbon, Kathleen Ann, Nancy L Wilczynski, and Robert Brian Haynes. 2004. "What do evidence-based secondary journals tell us about the publication of clinically important articles in primary healthcare journals?" *BMC Medicine* 2(33) doi:10.1186/1741-7015-2-33.

[22] The excess of information in a computerized society has been described by Jean-François Lyotard as a post-modern condition of knowledge. The post-modern age is characterized by technological transformations which have two principle functions: research and the transmission of acquired knowledge (Lyotard 1984[1979]:4). The principles of science, however, require that the legitimacy of truth continues to be substantiated in the face of opposing claims: Proof "means searching for and 'inventing' a counterexample, in other words, the unintelligible; supporting an argument means looking for a 'paradox' and legitimating with new rules" of

Other researchers hypothesize that the increase in information and its availability is affecting physician decision-making, leading to uncertainty. Too much information makes it more difficult to make good judgments, and it can lead to error (which I will discuss later) (Refelmeier & Shafir 1995: 302-305). Researchers also asked about how to measure the outcomes of medical judgments based on the use of evidence. Medical errors (the uncertainties of medicine) were supposed to be eliminated by introducing evidence into clinical practice. But this expectation was undermined by the concern with how to know what evidence was effective because the evidence was always changing. This problematization of uncertainty surrounding questions about what evidence is the best can be seen in recent efforts that measure the outcome of evidence-based care. For example, it was suggested in the 1990s that patient experience could be used to measure the "outcome" of a treatment and could improve patient care. Patient experience would be a measure like the subjective evaluation of one's satisfaction with medical services. This suggestion, however, became marginalized by the "incorporation of patient values" into EBM, but it remains a criticism of the EBM program (Reiser 1993:1012-1017). Patient values in EBM are evidence that weigh into a physician's decision. Some researchers call for an increase in the patient's role in health care. For example, one review article details how law, medical decision-making

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reasoning (Lyotard 1984[1979]:54). Although uncertainty in EBM (and in science more generally) will always exist due to the nature of knowledge to constantly search to verify itself, it is certain that there will always be uncertainty (e.g., more information, counterexamples, and so on). The proliferation and distribution of evidence (both in medicine and to other areas like policy formation) can be explained by this characterization of post-modern knowledge conditions. I return to the proliferation of evidence in Chapter Six.

theories, and education are being changed by the movement to include patient values and preferences as "evidence" for medical judgments (Laine & Davidoff 1996).

The Quest for Better Evidence

The link between medical error and uncertainty was further developed in the 1990s. In contrast to the questions that were asked from the 1960s through to the 1980s about the link between the lab and the physician's practice, the 1990s was characterized by an interest in measuring the outcomes of care. Some researchers asked if the new science of clinical care (EBM) and its recommendations (guidelines) actually made a difference in the quality of patient care (Laffel & Berwick 1993). There was an increase in the publication of studies aimed at identifying the conditions of medical error. One article wondered why the error rate in medicine was so high and considered that error was merely a product of the conditions in which medicine was practiced: for example, sleep deprivation, fatigue, and inadequate supervision are mentioned (Leape 1994). Bell (1995) compared medicine to other technologist disciplines like pharmacy to explain why medicine failed to adequately reflect on the occurrence of errors (p.457). He concluded that medicine failed to formulate sufficient strategies for learning from research about error and how technological changes affect practice (Bell 1995). Bell suggested that these known problems in medical training and practice could be reduced by changing the structure of medical education, : increasing collegial supervision for students, and avoiding long shifts.

Trends that involve the use of outcomes measurement in order to formulate interventions for the improvement of care continued throughout the 1990s. These initiatives

were formulated on the premise that evidence-based changes lead to good recommendations. Debates about the role of quality of life measures were also gaining momentum; these measures were the standard by which the outcome of medical judgments could be measured. For example, Leplège and Hunt (1997) asked how medicine ought to measure quality of life in order to quantify such a "subjective" category. Their article followed up on an article by Guyatt and colleagues (1989) that reviewed and recommended a variety of scientific instruments for measuring quality of life to determine the outcomes of RCTs more effectively (p.1447). Leplège and Hunt's article aimed to give scientific, objective validity to patient experiences so as to include a patient-centred measurement in the execution of evidence-based medical practice.

These questions about measuring the outcome of care as a method by which to standardize medical training and judgments were answered by the solutions that later emerge from the EBM Working Group. A series of publications on how to implement evidence-based training procedures into practice appeared during the late 1990s.One article discussed how to produce evidence by reading medical research articles (Richardson et al. 1999:1214-1219). The recommended procedure began by searching medical databases; Richardson and colleagues recommended MedLine, showing how, in just over a decade, MedLine had secured its place as an accessible and dominant database for storing information that linked research and clinical care (Richardson et al. 1999:1214). Next, physicians were instructed to ask the following questions of the article: (1) are the results valid, and does the research patient population represent the general population? (Richardson et al. 1999:1216); (2) what

were the results of the study, and were the measurements for probability sufficient? (p.1218); and (3) will the results help the current patient? (p.1218). The article recommended that doctors ask if their current patient fits the selection criteria (for patient population) of the study, and, if so, for the doctor to then consider the influence the study may or may not have (i.e., its relevance or validity) over their immediate judgment about the patient.

The above example demonstrates how *applying* evidence to the clinical situation becomes problematized within the medical field. The EBM guidelines demanded that new articles should be published that summarize research, particularly for the application of the results of research in clinical practice. This move from research to recommendations for care was premised on the need for more information and practice guidelines that would translate medical research into procedures for clinical practice. This need, Sackett says, stems from the teaching of "outdated methods" in medical education, the discrepancy between clinical judgments which improve with experience and actual performance outcomes which decline over time, and the growing pressures from social changes, such as time and economic constraints in the clinic (Sackett et al. 2000:2-3). EBM offered new developments in the field of clinical practice: new strategies for getting good evidence, systematic reviews, evidence-based journals that contain information for immediate use in clinical practice, information systems for searching out articles and evidence, and lifelong learning requirements and strategies for practicing clinicians (Sackett et al. 2000:2-3).

Institutional Support: Canada and Beyond

Other influences that enabled the proliferation of the EBM programme include the immense institutional support in Canada, the United States, and the United Kingdom. The following section will briefly touch on some of the major initiatives funded by various medical societies that supported the EBM programme, and how these countries contributed to the dominance of EBM.

In Canada, the creation of "Centres for Health Evidence" (CHE) in 1999 was funded by a Canadian National Health InfoWay grant in the provinces of Manitoba and Alberta. The Centres' mandate was to "help health practitioners know what to do because quality health information is assembled, integrated and packaged" for direct practitioner use (McMaster Archives, 184.5, Box 001, 2000:p.7:). Further, the Canadian Task Force on Preventive Health Care (CTFPHC), which was created in 1976, officially adopted EBM methodologies in 2002 as well as the Grading System for establishing confidence in various evidence-based recommendations (McMaster Archives, 184.5, Box 001, 2002: p.18). Also in 2002, the Canadian Medical Association began publishing recommendation statements from the CTFPHC online (McMaster Archives, 184.5, Box 001, 2002). These major endorsements by various national institutions of medicine in Canada signify the growing dominance of EBM methodologies.

Gordon Guyatt created and developed a medical resource called "UpToDate." UpToDate was heralded as the first system for evidence-based health care; it was focused on evidence for the management of care, as opposed to previous systems that emphasized

evidence about physiology (McMaster Archives, 184.5, Box 001, 2002:3). The medical profession's confidence in the solutions to uncertainty that EBM proposed for medical practice are evident in the use of EBM in medical societies and the subsequent creation of databases that were structured to facilitate the uptake of evidence-based health care recommendations.

These initiatives also reach beyond Canada, as already noted. The importance of translating medical research to practice at broader political and institutional levels in Canada was paralleled in the United States and the United Kingdom. The *Journal of the American Medical Association* (*JAMA*) launched *JAMA Evidence*. The online resource continues to offer textbooks and computerized applications. It is also a searchable database for clinicians to "integrate the best evidence with clinical experience" (American Medical Association 2013). The creation of *JAMA Evidence* followed a series of articles published in *JAMA* by Guyatt on how to use the medical literature (see above).

Additionally, in 1999 the United Kingdom created the National Institute for Health and Care Excellence (NICE) to "put guidance into practice" by providing a series of implementation tools, which included the publication of national clinical practice guidelines for various illnesses and procedures[23]. The focus of NICE is to improve health outcomes through evidence-based recommendations in order to "prevent, diagnose and treat disease and ill health" (NICE 2013). An example of the implementation of EBM in actual practice is the creation of a government body to reformulate and intervene in medical practice.

[23] For a detailed discussion of clinical practice guidelines, see Chapter Three.

DOMINANT PRESCRIPTIONS: ARTICULATION AND INTERVENTION

The problematization of uncertainty rendered medical judgments "amenable to intervention" (Osborne, Rose, and Savage 2008:521). The emergence of EBM depended upon a set of problems identified in the field of clinical practice related to various uncertainties. As discussed above, these uncertainties became targets of both thought (theoretical literature) and action (concretely, for example, in the creation of the McMaster medical school program and practice guidelines). Specific practitioners – and later the field more generally – began to question the relationship between the laboratory and everyday clinical interactions, the authority of the doctor's decisions, and whether physicians keep abreast of the rapidly changing technology and information about disease, the body, and treatments, and medical error, among other aforementioned questions. Practicing physicians identified uncertainties regarding the relationship between biomedical advances and clinical practice; they found there was a disjuncture between what science could measure and what could be known in the clinical setting.

The problematization of various identified uncertainties manifested in an impetus to provide a justification for what goes on in clinical practice. The institution of medicine responded by formulating a scientific basis upon which judgments could be made systematically, and the results of medical research could be translated into recommendations for medical practice and education reform. The emergence of clinical epidemiology was an attempt to merge the scientific foundations of biomedicine and biometric statistics with the clinical judgments made by individual doctors. Also, the creation of new medical databases

provided the "evidence" necessary for bringing scientific knowledge into clinical practice at a time when so many uncertainties existed regarding the hasty embrace of new technologies or the inability to remain timely with the best information for making diagnoses and treatment. Additionally, the rationale for creating the Faculty of Medicine at McMaster relied heavily on the relevance of epidemiologic methods for clinical practice. The Health Sciences Centre at McMaster concretized the solutions proposed by clinical epidemiology: it placed research and training side by side in a physical space, and facilitated the revision of medical training more generally. The conversations and programs that would emerge there would bring the EBMWG into existence.

Each of these major problematizations in the field of medicine can be understood as "creative events," leading to the first statements of EBM (Osborne & Rose 1997:97). Each problem, each targeted uncertainty generated new methods of thought for proposing new lines of action. The practices and procedures that rendered the problem of medical judgments "visible" (Osborne & Rose 1997:98), that is, the necessity to produce scientifically grounded evidence for clinical practice, also created the conditions for the problem to be taken up in various ways within the field of medicine and for new problematizations to emerge. There was a progression from the problematization of uncertainty to the formulation of the scientific basis by which programmes for intervening could be proposed and executed at the level of individual medical judgments. These programmes were created in order to eliminate uncertainty. These formulations of uncertainty in the EBM literature are related to the authority and ethos of the scientific method; individual expertise would be replaced by

knowledge produced by medical research. Rearticulating the problem of uncertainty in scientific terms rendered medical judgments amenable to scientific measurement and regulation. These interventions in clinical practice then produced the possibility for further intervention.

EBM is not necessarily the "new" paradigm that the EBMWG claims; it is the manifestation of a link between the problematic nature of medical judgments and practice and a program for continued intervention and improvement. For example, consider the proposed interventions that I note above: the reformation of the medical curriculum, education, and training; the development of outcome measures to create a scientific basis for evaluation and intervention in medical care; major government and research funding investment[24]; and the creation of databases, journals, and medical societies. These interventions are devoted to resolving these problematized uncertainties of clinical practice:

> By extracting from public health the research method that replicates an experiment in the field, clinical researchers aligned themselves with laboratory science, using statistical analyses of large numbers to reduce uncertainty... The problem was that evidence-based medicine then became subject to the same criticism levelled at biomedical science: that it lacked relevance to the complex world of clinical care. (Daly 2005:16)

One ongoing concern within the field of EBM is the problem of regulating the doctor-patient relationship. In Chapter Five I theorize this problem in clinical practice by discussing the emergence of the field of bioethics and the ethical dimensions of care and decision making in relation to the socially constituted nature of morality and the nature of this uncertainty. For EBM, "these were new uncertainties requiring new alliances with

[24] I discuss the influence of the private sector and its investments in Chapter Four.

nonmedical disciplines" (Daly 2005:48). Now that we have an understanding of the epistemological tensions and strategies of problematization that led to the emergence of EBM and its rise to dominance, the following chapter asks if the principles of EBM and the scientific grounds upon which EBM articulates problems and proposes interventions are actually working. I engage with a case study of multiple sclerosis to focus on the effects of clinical practice guidelines, the strategy by which EBM seeks to render medical judgments amenable to various interventions and regulations in clinical care.

Chapter 3

Deresponsibilization: Clinical Practice Guidelines and the Case of Multiple Sclerosis

ABSTRACT: In the third chapter I engage with a case study of multiple sclerosis (MS) to elucidate the principles in the EBM programme and to demonstrate how the tensions and contradictions of EBM are dealt with in the medical literature about practical problems. I ask if the principles of evidence-based medicine have the potential to meet the objectives of reducing uncertainty by producing clinical practice guidelines (CPGs) for rule-guided, procedural medical judgments. I do so by examining medical documents about CPGs and research literature about MS, an illness with many complexities surrounding its diagnosis and treatment. I show how EBM and the principles that organize its aims actually play out on the theoretical terrain of EBM to argue that the production of evidence to reduce or eliminate uncertainty generates epistemological inconsistencies. At the end of this chapter readers will understand the problematic logic of EBM and the contradictions that are illuminated by the case of MS. I discuss these contradictions by developing the concept of *deresponsibilization* as a potential effect of the EBM logic and principles.

EBM arose from an interest in developing a systematic, rationalized programme for medical reform, where medical practice is clinically oriented but based on the findings from medical research. This process can be understood as *problematization* by engaging with the work of Nikolas Rose. Although Rose has not directly analyzed EBM, I use this concept in order to

show how a certain set of practical problems came to be formulated for producing programmes aimed at intervention and amelioration. Rose (2007a) analyzed a similar timeframe in modern medical practice, and demonstrated that during the 1960s through to the 1990s, there were various "threats" that were articulated within the field of medicine. These threats were related to medical authority, and the subsequent problematization of these threats resulted in the reformulation of medical practice as one from the perspective of the bedside (p.262). Elsewhere, Rose has stated that medicine is comprised of multiple forms of knowledge and practices:

> Medicine is not a single entity: clinical medicine is only one component among many ways in which individual and group life have been problematised [sic] from the point of view of health. And medical knowledge, medical experts, and medical practices play very different parts in different locales and practices. (Rose 2007b:700)

One of the aims of EBM, as I will show below, is to generate and constantly revise clinical practice guidelines (CPGs). CPGs can be understood as a strategy of governmentality, and a result of the problematization of medical judgments. The strategies of EBM may produce the opposite effect of their intended objective. I return to this point later in the chapter by discussing the concept of *deresponsibilization*[25].

I have analyzed policy documents and the literature about MS by examining the assumptions and standards by which the rules for the assessment and production of evidence become valid (or not), and how this process informs medical practice (decisions to intervene,

[25]I discuss this concept later on in relation to governmentality literature. I extend many thanks to R. Paul Datta for his help in the development of this conceptual term. The formulation of this concept, however, is my own, and any errors or inconsistencies are mine alone.

or not). To begin this chapter, I examine the principles of EBM. For the purposes of this project *principles* constitute the "ways of formulating and conceptualizing a topic and can be seen as an authoritative way of discussing or discoursing about a topic" (Blum & McHugh 1984:3). The principles are the grounds (foundational premises) that give a statement its authoritative (or "truth") character. Principles can be thought of as the discursive structure that constitutes the grounds upon which something becomes evidence. The rules for the assessment of evidence are the procedure by which authoritative statements about the body of the patient, the test results, or effectiveness of the treatment, for example, can be made.

I draw out the principles of EBM in order to analyze and theorize the interplay between these principles and the objectives of EBM. I argue that EBM does not eliminate uncertainty in MS through the creation of CPGs. Instead, CPGs have the potential to externalize the judgments of individual practitioners.

EVIDENCE-BASED MEDICINE: A (TENUOUS) SOLUTION TO THE PROBLEM OF UNCERTAINTY

> Evidence-based medicine deals directly with the uncertainties of clinical medicine and has the potential of transforming the education and practice of the next generation of physicians. (Guyatt et al. 1992:2424)

> Evidence-based practice is currently the dominant policy framework for knowledge management in health care. It is based on the assumption that variation in clinical practice is caused by practitioner uncertainty about the relative effectiveness of health care interventions. (French 2005:177)

As demonstrated in the previous chapter, EBM is intended as a solution to identified variations in medical practice. To review, there are three assumptions that underlie EBM: (1)

medical practice must be based on systematic clinical observation that is unbiased and reproducible; (2) an individual's rationale may be flawed, leading to the use of incorrect methods and principles; and (3) the rules of evidence must be followed in order to make judgments about diagnosis, causation, treatment, and prognosis (Guyatt et al. 1992: 2421). When practicing EBM, doctors make medical judgments about a patient or particular case and course of action by consulting the highest quality of evidence. The rules for the assessment and production of evidence serve to facilitate a particular conception of "good evidence" – that which is scientifically valid and that which produces measurable outcomes of improved health. EBM aims to do more good than harm in a way that is measurable and subject to tests of scientific validity. Whether EBM actually accomplishes this aim is another question, which I address in this chapter.

As the dominant discourse in western medical practice, EBM is broadly regarded as fulfilling a need for accurate medical diagnosis and adequate medical training (Guyatt et al. 1992:2424). Further, as noted by French (2005) above and discussed in the preceding chapter, EBM has come to be the dominant framework for generating policies, specifically in the form of CPGs and training programs for clinicians. So, uncertainty is reduced by translating scientific medical research into recommendations for medical interventions at the level of clinician-patient interactions at the bedside; and, consequently, better health care (in principle) is that which follows the rules of evidence in order to deliver the best possible care in medical practice, which is determined by its outcome.

One manifestation of these principles is CPGs. CPGs are general rules for application in particular cases. These guidelines include ruling in and ruling out what clinical or paraclinical evidence is relevant for the sake of diagnosis, treatment, and medical interventions (e.g., further tests, therapies, or medical procedures). My question is this: what are the potential effects of this translation of medical research into recommendations for physicians (CPGs)? Researchers such as Murray (2006) argue that EBM has greatly improved the outcomes of medical practice, specifically for the diagnosis of MS. EBM, he contends, has allowed the detection and diagnosis of MS to occur earlier, given the new CPGs translated from research about the disease, which leads in turn to earlier medical interventions in the form of disease modifying therapies (Murray 2006:525). We will discuss these developments below. While EBM has led to many improvements in medical practice, the case of MS exposes the limits of EBM, as this is an instance in which applying guidelines may produce greater variation and uncertainty in medical interventions.

Ideally, the medical practitioner draws on the rules of EBM in order to render the evidence meaningful for a particular case (e.g., a patient presenting with possible MS symptoms). The guidelines for the "critical appraisal" of evidence are intended to reduce the "guesswork" of medicine, providing a systematic framework for the interpretation of evidence (Sackett et al. 2000:135-140). Interpreting a symptom using "clinical expertise" allows physicians to make clinical decisions based on "medically relevant" evidence by applying the EBM discourse, practices, and knowledge. The case of MS, however, provides us the occasion to consider the nature of the relationship between medicine and evidence by

demonstrating the complications that arise where the criteria for the assessment (interpretation) of "evidence" lack the precision of clear cut categories.

Rules for Medical Judgment: The Hierarchy of Evidence

It is helpful here to briefly discuss the hierarchy of evidence in EBM to further illustrate the guidelines by which evidence is rendered meaningful in a clinical situation. As noted above, "evidence" is articulated in the *assessment* of medical research, specifically in randomized controlled trials (RCTs), observational and comparative clinical studies, and mechanistic and expert reasoning, in order to make medical judgments about the diagnosis and treatment for a particular patient. While nowhere in the original article that coined "evidence-based medicine" do Guyatt and his colleagues define what exactly evidence *is*, recent statements seem to accept that evidence is anything that is *useful* for making good medical judgments (Howick 2011:24). What "good evidence" is depends on both the principles by which evidence is produced, according to the rules of EBM, as well as its actual outcome in the particular patient.

Later statements made by Guyatt and colleagues explain the theoretical hierarchy of evidence: "any empirical observation constitutes potential evidence, whether systematically collected or not. Thus, the unsystematic observations of the individual clinician constitute one source of evidence; physiologic experiments constitute another source" (2008:10). Systematic observations produced by RCTs are considered the best evidence, or what medicine refers to as the "gold standard" of evidence; they are seen to generate the most reliable and certain evidence. Unsystematic clinical observations that are made by individual

clinicians are considered the weakest form of evidence, and the most susceptible to the uncertainties of individual sensibilities. Clinician expertise and experience remains an asset for making judgments and decisions in the clinical setting, as mentioned above. See Table 1 for an explanation of how EBM ranks the strength of evidence and clinical research upon which judgments can be made:

Table 1. Ranking Evidence in Evidence-Based Medicine: Hierarchy and Definitions[26]

Type of Evidence (Strongest to Weakest)	Definition
N-of-1 Randomized Controlled Trial (RCT)	Both clinician and patient are blind to whether the patient is receiving the therapy or placebo. The patient's symptoms are measured and recorded. Treatment ceases when the clinician decides that the treatment is not effective.
Systematic Review	Evaluation and assessment of results from many RCTs on the same therapies or comparisons of more than one therapy for the same illness. The methodological strength and confidence of the findings are evaluated.
Observational Studies	The effects of treatment therapies (or no treatment, in some cases) are studied between groups of patients where the clinician has not randomly selected participants.
Unsystematic Clinical Observations	Everyday empirical observations from clinicians in their practice.

The physician ranks the evidence by employing the rules for its assessment. The questions that arise concern how the evidence is put into practice through individual clinical judgments, and how doctors can keep up with the vast amount of evidence produced by medical research. EBM resolves these problems by producing CPGs. The guidelines are

[26]Table data adapted from Guyatt et al. 2008:11-12

intended to serve as the baseline by which any judgment, potential or actual, can be measured and evaluated. I will discuss these guidelines further below in relation to the MS literature to illustrate the theoretical impetus to reduce uncertainty.

MULTIPLE SCLEROSIS: A CASE OF UNCERTAINTY

> Some [multiple sclerosis] patients do not have relapses for years, even without specific treatment. However, the clinical course of the disease is not predicted by particular clinical signs. It has as many different manifestations as there are patients. No one can say whether a particular patient would have done worse without therapy. (Langgartner, Langgartner & Drlicek 2005:885)

> There will never be a substitute for the experienced and astute clinician's "feel" for the patient. (Poser & Brinar 2004:147)

In the case of MS, there is a tension between the forms of evidence (empirical data such as test results and the increasing prevalence of MRI technology that I discuss below) and the clinician's individual reasoning and expertise (i.e., the physician's "feel" for the patient). I show here that physicians who rely almost entirely on MRI tests are misdiagnosing patients. First, I will provide some background information about the disease. Second, I will develop the principles of EBM in relation to MS in order to analyze how EBM is actually playing out in this particular case.

Background and Emergence of the MS Diagnosis

MS is a disease of the central nervous system (brain and spinal cord). There are currently four classifications for the diagnosis of MS, all with different patterns, treatment, and prognoses: Relapse Remitting MS (the most common form), Primary Progressive MS, Secondary Progressive MS, and Progressive Relapsing MS. MS is a degenerative disease that

entails a wide variety of symptoms due to its neurological location and effect on the central nervous system (signs of the illness include *any* neurological symptoms). It is estimated that there are as many as 55,000-75,000 Canadians who suffer from this debilitating disease (Public Health Agency of Canada 2012). There is no cure for MS, and it is unclear whether available treatments actually prevent long-term disability.

MS was documented as early as 140 years ago (for a comparative table detailing the historical emergence of diagnostic criteria, see *Appendix*). Since the 1960s, the diagnosis of MS has relied on medical criteria that observe symptoms that appear separately in both space (in areas of the brain and body) and time (multiple "attacks," i.e., the appearance of symptoms). During the 1960s, the diagnosis of MS gained medical confidence, which was due, in part, to innovations in medical technology. The introduction of the electrophoretic examination of Cerebral Spinal Fluid (CSF) protein by Broman and colleagues in 1965 allowed medical practitioners to use paraclinical evidence (i.e., tests) for the first time to support clinical suspicions and patient medical history. In the same year, Schumacher and colleagues published the first set of diagnostic criteria (six in total), which soon became the international benchmark used for making a diagnosis of the disease. Interestingly, it is here for the first time that the criterion of elimination is observed: the diagnosis of MS is possible when symptoms "cannot be explained by other disease" (Schumacher et al. 1965, as quoted in Poser & Brinar 2004a:149).

In the 1970s the Schumacher criteria were criticized on the basis that "the only way one could prove the diagnosis of MS was by biopsy or autopsy, the former, however, being

unreliable unless the specimen included the edge of the [brain] lesion, quite a rare event" (Poser & Brinar 2004a:151) . Then, in 1981, magnetic resonance imaging (MRI) revolutionized the study and diagnosis of MS. Criticisms of the Schumacher criteria and the rapid proliferation of MRI technology lead to the Poser criteria, which clarified definitions of terms like "attack" and "symptom," and provided the criteria for including paraclinical evidence (such as MRI and the analysis of CSF protein, among others) to diagnose MS (Poser et al. 1983).

During the 1980s subsequent studies were published that argued that MRI technology would revolutionize the medical understanding of the demyelinating progression of grey and white matter (e.g., Grossman 1986; Paty1988). In less than a decade, the MRI scan became the exclusive basis by which clinical neurologists all over the globe diagnosed MS; it had practically replaced patient history and clinical judgments, which was unfortunate due to the following fact:

> The abnormalities [viewed on an MRI] were non-specific and non-diagnostic, and that the correlation between the number, size, and location of "lesions" and the clinical signs and symptoms were extremely poor, they were also unreliable indicators of disability and prognosis. The MRI differential diagnosis. . . [that shows] patterns of changes often considered to be "typical of MS" can be seen in other conditions. (Poser & Brinar 2004a:154)

By the mid-1990s, it started to become apparent that the overuse of MRI to diagnose MS had led to mis- and over-diagnosis of MS in almost one-third of cases (Poser 1997:1915). MS can be confused with a wide range of neurological disorders. Some of the most common are: lupus, stroke, acute disseminated encephalomyelitis, neuromyelitis optica, sarcoidosis, and many others. Because the range of presenting symptoms for MS patients is so individual and

diverse, the diagnosis of MS is wrought with ambiguity. According to some MS researchers, "there are nearly 100 neurological conditions that have been identified as potential MS mimics and surely others are yet to be identified" (Singhal & Berger 2012:548).

Another development in the 1990s was the proliferation of various treatment therapies. For example, in 1993 the United States Federal Drug Administration (FDA) approved interferon beta (Basteron) for Relapse Remitting-MS. By 1998 this therapy was approved for use in other forms of MS as well (Bashir & Whitaker 2002:26). Interferon beta quickly became the most widely used therapy for individuals with MS.

By the end of the 1990s many new therapies were available for prescription and practice, and MRI technology had been in use for several decades. There was interest in rewriting the MS diagnostic guidelines to accommodate these changes. In 2001 McDonald and colleagues released new criteria for assessing MRI data and the clinical presentation of symptoms. The McDonald criteria states, "The diagnosis of MS remains a partly subjective and partly objective process. The diagnosis is best made by an expert who is familiar with the disease, its differential diagnoses, and the interpretation of paraclinical assessments (imaging, CSF analysis, and evoked potentials) that can supplement the diagnostic process" (McDonald et al. 2001:126). Some neurologists assert, however, that the diagnostic process is hardly as black and white as the "subjective and objective" combination put forth by McDonald– which continues to be the criteria used in most of the world. The reliance on MRI imaging to support medical judgments remains highly contested in neurological medicine. In a review of MRI testing for MS, Whiting and colleagues note:

> Our results suggest that magnetic resonance imaging is a relatively *poor test for both ruling in and ruling out* multiple sclerosis. In clinical practice a false positive diagnosis of multiple sclerosis is potentially more dangerous than a false negative one because it implies unnecessary successive tests and treatment, or needless anxiety and psychological distress for the patient. (Whiting et al. 2006:9; *my emphasis*)

Even the most recent research on MS acknowledges the imperfection of the use of MRI and the clinical presentation of symptoms alone, as other disease and pathologies may present with similar MRI findings and patient symptoms (Lassmann 2010), as discussed earlier.

The nature of MS and its "mechanisms of disease" remain largely unknown (Poser & Brinar 2004b; c.f. Lassmann 2010). This uncertainty about the nature of the disease poses problems for the management of MS symptoms. Therapies are developed by medical researchers on the basis of certain assumptions about the nature of the disease. Because so little is known about the nature of MS, there have been various failed therapies. In order for EBM to work, there must be a correct diagnosis of the illness. Diagnosis, however, relies on understanding the nature of the symptoms and the cause of the disease. Treatments correct what is assumed to be the underlying cause of the illness. For example, despite the advancement of medical imaging and procedural technologies in the last 60 or 70 years, the exact causes of MS remain contested. The most recent newsworthy controversy is (see for example Weeks 2011) the Zamboni treatment, which met backlash and criticism in the scientific community on the basis of its assumptions about the nature of MS (e.g., Laupacis et al. 2011; I return to this discussion later). While evidence-based practices in the neurological community attest that developing an understanding of the mechanisms of disease results in better therapies (Murray 2006:525), MS continues to have no (scientifically) known

aetiology (Oeseburg & Abma 2006:349). Further, there is also an urgency to diagnose and treat MS in presenting patients in order to manage and control attacks because it is assumed that MS is developing prior to the first attack (i.e., the criteria of separation in space and in time). The diagnosis of the disease, however, relies on clinical judgment; there remains no conclusive test ("objective evidence") for MS.

MS upsets the imagined certainty that is promised by the EBM approach. As discussed above, the diagnosis and treatment of MS are made in the face of uncertainty because the clinical criteria for the disease continue to be revised, medical technology is constantly changing, and the causes of the disease are not known. Because no scientific mechanisms for the disease have been identified, the assessment of relevant medical evidence remains problematic (i.e., for making both the diagnosis and prescriptions for the treatment of MS). Additionally, the history of MS has been wrought with uncertainty surrounding what constitutes evidence (e.g., what is an "attack," or the mechanisms and causes of the disease) as well as how anything can be known about an individual patient if the medical grounds on which expertise is based are so unclear. The rules of the evidence-based clinical procedure fall short of absolute certainty. Yet, the changing guidelines signal that the programme of EBM perpetuates in order to reduce the uncertainties of physician "intuition" or "subjective reasoning."

Controversies in MS: Troubling the EBM Programme

Not long after the diagnostic and treatment developments of the 1990s, systematic reviews begin to appear that questioned the validity and point out the limitations of the evidence

provided by various MS therapy trials (e.g., Clegg et al. 2000). These studies drew attention to the fact that it is the assessment of the evidence, specifically the guidelines, that are most in need of improvement. A recent study disputed the effectiveness of conventional treatment plans for those diagnosed with MS. In a longitudinal study comparing various cohorts of those who take Interferon-β (both historical and contemporary cases of untreated patients), Shirani and colleagues (2012:247) concluded: "Among patients with relapsing-remitting MS, administration of interferon beta was not associated with a reduction in progression of disability." While the authors stated that this most common treatment has some benefit to a few patient groups (and they recommend more research to investigate this), they stressed that the short-term benefits of the therapy are questionable, and highlighted that there is little evidence that, in the long term, Interferon-β is actually effective in preventing or slowing the degenerating effects of the disease. Their review shows that the nature of MS treatment programs is just as uncertain as that of the diagnostic procedures and guidelines. The tests that render evidence accessible as a resource for medical judgments – and the effectiveness of the therapies themselves – have come under question in the MS literature, and this is reflected in the continuous interest in revising the guidelines.[27]

In addition to debates surrounding the effectiveness of MS therapies, another recent controversy that exemplifies the problematic nature of the EBM programme concerns questions about when to begin treatment for MS. As discussed above, the diagnosis of MS

[27] The McDonald criteria were revised in 2005 (Polman et al. 2005) and again in 2010 (Polman et al. 2010) since their initial introduction in 2001. The specific changes for each iteration are discussed further on.

relies on the identification of lesions and "attacks" that are separated in both space and time. So, one question in the MS medical literature is related to the clinically isolated demyelinating event (CIS). Since the implementation of MRI technology, a division has emerged in the medical community concerning the timing of both diagnosis and treatment. One conversation in the medical literature demonstrates the conflicting positions. Frohman and colleagues (2006) argued for the revision of the McDonald criteria guidelines; they recommended that MS be treated with medical therapies before a diagnosis of clinically definite MS (CDMS) because there is no way to know how aggressive each individual patient's disease will be, should it later become CDMS (p.614). In other words, therapies might help slow down the degenerating effects of MS if implemented earlier in the diagnostic process.

Roach (2006) took another approach: he emphasized the ethical dilemma of denying treatment if an MS diagnosis is likely, but there is no way to know until the patient's symptoms fulfill the guidelines and criteria. Roach (2006:619) discussed the dilemma in relation to the history of seizures in children and the various approaches to treatment that have since emerged: in the past, delaying medical intervention has improved the outcomes of some of the available therapies. Given that much about MS and its function in the body is largely unknown, EBM is unable to adequately (in relation to its own principles for the evaluation of evidence) recommend guidelines. In 2010, the revisions of the McDonald criteria address this issue exactly, as discussed below.

IMPOSSIBLE CERTAINTY: TENSIONS AND CONTRADICTIONS

> [The] widely accepted definition of CPGs [was] developed by the Institute of Medicine in 1992, i.e., CPGs are "systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances." (Canadian Medical Association 2011:2)

In this section I discuss the problems, as stated in the EBM literature, associated with the clinical presentation of MS. For MS, the exemplary uncertainties are overdiagnosis, individual expertise and experience, and the need to eliminate uncertainty. I will show that EBM responds to these uncertainties by creating CPGs with the objectives of intervening and ameliorating medical practice. Uncertainty, however, is not resolved by these guidelines.

Overdiagnosis[28]

There is debate over whether MRI results produce reliable paraclinical evidence. The development of the McDonald Criteria was a response to the uncertainties of the preceding guidelines for diagnosis and treatment, the Poser Criteria. As noted above, Poser and colleagues reiterated and revamped the standards for MRI use and its status for making a CDMS diagnosis. These recent criteria, which have undergone two revisions at the time of this writing, are considered to have higher sensitivity and be more reliable and effective than the Poser criteria. Many studies have reviewed the effectiveness of the McDonald criteria,

[28]Overdiagnosis as a sociological concept is developed in Chapter Four. Here, however, I am discussing overdiagnosis as a medical concept: that is, when "individuals are diagnosed with conditions that will never cause symptoms or death" (Welch et al. 2011). Given that the MS research literature has identified the overdiagnosis of MS as a problem to be dealt with by EBM and the revision of guidelines and standards, I examine this problem in relation to questions surrounding the role that EBM wishes to play.

and have argued that these new criteria contribute to reducing overdiagnosis (e.g., Nielsen et al. 2005:783). False positives are still a serious concern in MS research. There are also guidelines recommending that physicians discuss the possibilities and risk associated with a false positive diagnosis with their patients due to the possible harm of prescribed therapies, should the diagnosis turn out to be in error (Whiting et al. 2006:9).

As noted above by Poser and colleagues (1997), the use of MRI technology has been fruitful for understanding MS as an illness, and is also considered the gold standard of evidence by neurological clinicians who are diagnosing patients with MS. However, Poser and colleagues, as well as researchers like Lassman (2010) and Whiting (2006), point out that the MRI alone cannot provide a clinically definite diagnosis of MS. There are other factors, not just the paraclinical test, that contextualize MS symptoms. In order to evaluate whether overdiagnosis is a success or a failure of EBM and its implementation for the clinical diagnosis of MS, I consider radiologically isolated syndrome as an example.

Radiologically isolated syndrome (RIS) is defined by "MRI findings [which are] suggestive of multiple sclerosis in persons without typical multiple sclerosis symptoms and with normal neurological findings" (Granberg et al. 2012:1). Supporters of EBM could argue that the abnormalities seen in an MRI exam demonstrate the success of EBM: early detection of MS is becoming easier because MRI results can now be used as evidence in patients with neurological symptoms. One review of multiple clinical trials found that during a five-year follow-up period, two-thirds of patients diagnosed with RIS became CDMS cases (according

to the McDonald criteria), and the other one-third developed another neurological pathology (Granberg et al. 2012).

Producing better guidelines to help "fast-track" patients who show RIS on their MRIs seems to allow those in need of disease-modifying therapies (DMT) to be treated prior to any subsequent attacks; this could be understood to be an effective measure for improving patient care in the field of MS study, diagnostics, and prognostics. Given this evidence, some recent literature has called for the revision of the diagnostic criteria and subsequent criteria for the administration of DMTs. One article called for the development of guidelines that will state when to prescribe DMTs if all the clinical criteria and guidelines have not been fulfilled (Brassat & Lebrun-Frenay 2012:1532). Essentially, comments of this nature are asking EBM to create guidelines to circumvent guidelines. It seems to undermine the point of having criteria for diagnosis and DMTs in the first place.

Here we have a tension within the literature regarding the production and adherence to guidelines for both diagnosis and intervention in cases of MS. EBM stresses the "necessity of obtaining the correct diagnosis before seeking and applying research evidence regarding optimal treatment" (Guyatt 2008:13). Guidelines are meant to regulate the assessment of risk (Guyatt 2008:14); they are intended to provide the best course of action, once the diagnostic criteria are satisfied. In the case of RIS, if the diagnostic criteria were expanded to recommend DMT to those who do not fit the criteria for CDMS, and all patients with those symptoms were assigned DMT, at least one-third of those patients would be receiving therapies for an illness that they do not have. Overdiagnosis is especially problematic when

the unnecessary therapies and/or the patient's undiagnosed, actual infliction could be detrimental to their quality of life or their health. The implementation of guidelines does not always resolve the issues surrounding diagnosis and treatment. Instead, the diagnostic criteria for CDMS are expanding to accommodate the increasing prevalence of MRI tests. Before discussing these criteria, I consider the problem of "too much information" that informs the creation of CPGs.

Expertise and Experience

As discussed in Chapter Two, EBM is an intended solution to the problem of synthesizing a massive amount of information, and CPGs are intended to resolve the problem of time constraints in medical practice. The vast amount of evidence that is searchable in medical databases is due to the ever-changing nature of knowledge produced by medical research; this is a huge problem for practitioners who adhere to EBM (Guyatt et al. 2008:14). Further, doctors increasingly see more patients per hour, putting further constraints on their time to review all the emerging research. In the face of time constraints, CPGs can facilitate the translation of medical research into recommendations for medical practice. But if the research contains conflicting reports, as illustrated by a number of controversies in neurology, then guidelines may not exist, or they may continue to be revisited and revised, as is the case with MS. Specifically, information about MS, the various hypotheses about its cause, and the various recommendations that follow (e.g., RIS, above) are major problems for a practitioner who is trying to formulate an evidence-based diagnosis or treatment plan.

Yet advocates argue that, despite these problems, EBM is still the best way to keep up with fast-changing information in the medical literature because it applies evidence to clinical practice (Straus & Sackett 1998:318). New journals have emerged to explicitly manage problems concerning physician time constraints. These journals, they argue, translate research evidence from thousands of journals into "answers" for clinical questions by providing recommendations for care/treatment (Davidoff et al. 1995).

Uncertainty: Revising the Diagnostic Criteria and the Guidelines

Guidelines provide a baseline for medical judgments. This section discusses the problem of CPGs as a response to uncertainty in illnesses like MS. I argue that given the principle of basing judgments on the best evidence in order to eliminate uncertainty, and given the persistent uncertainties in the case of MS, the only solution is to continuously revise these diagnostic criteria in order to better implement CPGs.

Guyatt and colleagues (2008) define clinical practice guidelines as strategies "for changing clinician behaviour: systematically developed statements or recommendations to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances" (p.775). The foundation of CPG implementation is the translation of medical research into clear rules and guidelines to execute in every particular case, and this is the solution EBM offers to any uncertainty. As such, the limitations of EBMs are demonstrated by the inconsistencies of guidelines that conflict with physicians' actual practices. Controversies over the best course of action, as demonstrated by MS literature, point to ongoing uncertainties about what is truly the "best" evidence upon which to base clinical

judgments. The diagnostic criteria are constantly changing in order to satisfy the EBM rule that a correct diagnosis is necessary to facilitate the implementation of CPGs.

As mentioned, the aetiology of MS is unknown and, therefore, uncertainty lies at the heart of any medical judgment in relation to it. Some recent research has looked at causes ranging from the impacts of stress (e.g., Mohr et al. 2012), to other questions surrounding levels of Vitamin D in patients (e.g., Weinstock-Guttman et al. 2012), to questions about the disease's genetic origins (e.g., Baranzini & Nickles 2012). Each of these studies makes its own recommendations for treatment based on its assumptions about the nature of the disease and the results of the study. Given all the conflicting results, it is expected to find a variety of controversies surrounding the recommendations for what practitioners *should do*. The guidelines for care cannot resolve the uncertainty of an illness for which no clear evidence exists regarding diagnostic decisions, let alone implement treatment strategies. One way this plays out in the case of MS is reflected in the recent revisions of the diagnostic criteria.

To recall, the Poser criteria was the standard established in 1983; its introduction included mainly taxonomic clarification and the criteria for using MRI technology and laboratory-supported evidence. In 2001 an international panel led by McDonald met to discuss revising the Poser criteria in light of the now-prevalent use of MRI to diagnose MS. The main contribution of the criteria was to clarify the clinical presentation and link it to supporting clinical or paraclinical evidence in order to diagnose CDMS. The 2001 McDonald criteria use MRI for all presentations, including RIS. As we will see, the prevalence of the

use of MRI is driving the revision of both the diagnostic criteria and the treatment guidelines in light of technological developments.

In 2005, Polman and colleagues convened an international panel to revise the McDonald criteria. The only major difference between the 2001 and 2005 criteria is found in the clinical presentation of the "insidious neurological progression suggestive of MS" category. The members of the panel redefined the necessary MRI observations: instead of requiring "nine or more T2 lesions in the brain," (McDonald et al. 2001) only "four or more T2 lesions with positive VEP[29] test" were required (Polman et al. 2005). Additionally, the required number of observations to fulfill the paraclinical evidence criteria was reordered. As noted in the previous example, the imaging evidence had become more significant, and more evidence was needed; this was indicated by the 2001 criteria stating merely "either/or" and the 2005 criteria requiring that two of three criteria were satisfied for a diagnosis of CDMS[30]. From these changes, we can see that MRI technology was not only becoming more prevalent in the diagnosis of CDMS, and the changes in the diagnostic criteria reflect this, but there is more credibility being handed over to the results of MRI testing.

Further changes were made to the criteria in 2010. Polman and colleagues again reviewed the diagnostic criteria for MS. Many more changes can be observed between the 2001 – 2005 documents and the most recent 2010 criteria. Even more reliance on MRI technology can be found in the 2010 document. For example, while previous revisions left

[29] VEP stands for Visual Evoked Potential test. This is another imaging test that measures the time it takes for a visual stimulus to be registered in the brain.

[30] See *Appendix* for a table that compares the three iterations of the McDonald diagnostic criteria.

the criteria of the dissemination in space and time intact for patients presenting with "two or more attacks and objective clinical evidence of one lesion" category, greater emphasis was placed on MRI to confirm the dissemination in space in the 2010 iteration of the McDonald criteria. Further, the non-imaging test (CSF protein test) was completely removed. This preference indicates that MRI is considered more valid than other forms of evidence, despite uncertainty (e.g., mis- and overdiagnosis) about its results.

Another change can be seen in the "one attack, but objective clinical evidence of two or more lesions" category. The 2001 and 2005 criteria stated that an MRI and subsequent attack would fulfill the diagnostic criteria for CDMS. More recently, however, the dissemination in time requires MRI evidence that is more specific, adding criteria for observing additional lesions to satisfy the diagnosis of CDMS. The latest revision calls for the presence of one lesion, as shown by an enhanced MRI, and at least one T2 lesion. Follow-up exams are required to compare the brain at different times on MRI, thus not requiring a subsequent attack to establish the dissemination in time, just observed lesions separated in time. T2 lesions are not necessarily demylineating events, but are "bright spots" in the brain where the tissue is understood to be "damaged." The priority of MRI diagnostics is increasingly prevalent, as noted by its inclusion in official diagnostic criteria.

Another substantial change in the 2010 criteria is with respect to CIS. Criteria are added for demonstrating the separation in space and time using MRI. Where there is one attack and MRI evidence of a lesion, there must also be other criteria that fulfill the separation in space and time. For space, MRI evidence can be used, as opposed to just

waiting for a second attack, if at least "1 or more T2 lesions in at least 2 of 4 MS-typical regions of the brain" are present (Polman et al. 2010). Additionally, dissemination in time may also be observed if MRI evidence shows other lesions; this is very similar to that discussed in the preceding paragraph. The dissemination in time does not necessarily require another attack if a baseline scan is established and subsequent scans show T2 lesions. These changes indicate that CDMS can be diagnosed earlier if multiple MRI scans are taken and evidence fulfills the criteria. MRI is increasingly used to measure and observe brain scans. If only one attack needs to be observed, but additional demylinating events are photographed, a patient can be diagnosed and started on disease modifying therapies (DMTs) earlier. To recall, this change responds to debates in the literature in the mid-2000s that argued for revising the McDonald criteria for CIS patients, allowing for earlier treatments with DMTs.

In the last category, "insidious neurological progression suggestive of MS," for which there were also changes between the 2001 and 2005 criteria, there are many revisions to the separation in space and time in 2010. Additional MRI evidence of lesions is required. There is also wiggle room here, however, for the clinician's judgments about disease progression retrospectively leading up to the clinical presentation (presumably by conducting a patient history). But these judgments must be supported by two of three additional MRI criteria. Dissemination in space is again supported by MRI T2 lesions, in either the brain and/or spinal cord. Here the use of the CSF protein test remains intact. As noted in the major changes between the guidelines, there is a greater emphasis on MRI evidence to be included when making a diagnosis of CDMS, and this is observed in the subsequent revision of the

clarification for the criteria. These changes reflect not only the greater reliance on MRI and imaging data for diagnosis, but also demonstrate where the medical field has focused its efforts in producing evidence about MS. Because an accurate diagnosis is necessary for the use of evidence-based CPGs, the criteria continue to be reassessed.

The criteria were revised to provide systematic recommendations for what physicians should do, as the use of MRI technology increases. The intent was to level the variation of diagnostic practices in order to reduce uncertainty. The increasing influence of imaging technology as the most dominant factor in guideline revision may be explained with reference to Michel Foucault's work on the apparatus of medicine. To recall from Chapter One, Foucault argued that the development of modern medicine depended on a historical shift, the autopsy (1973). In *Birth of the Clinic*, Foucault (1973) explains how death became the technical and conceptual phenomenon by which medical statements could be made to produce knowledge about both life (the living body) and disease (p.144-146). Death was the condition of possibility for combining seeing and saying (sense experience and discourse) to say something "medically relevant" about the patient's symptoms. This signifying apparatus generated not only the object of medicine (the body) but also the validity that any statement could have about it. The knower (i.e., doctor) executed and translated this relationship between seeing and saying through their position in a discourse (i.e., medicine).

In modern medicine, with the advance of medical technology, medical knowledge is generated by new imaging tests that allow practitioners to "see" inside the patient before death. MRI, for example, provides a "map" of the brain that establishes norms for both the

healthy brain and the brain of a patient with MS (c.f. Kitsch 2011). For Foucault, the evidence produced by an MRI scan would be made possible by a "group of relations established [by a] specific body of rules [that] constitute conditions of appearance" for an object (Foucault 1972:49). This body of rules (medicine) constitutes the conditions of appearance – the way that subjects (doctors) know and recognize an object (symptom) and their relation to it (the ability to produce valid knowledge about it).

EBM is a discursive formation that generates guidelines according to its conditions of appearance. The condition of possibility for understanding what is *seen* in MRI as pathological allows practitioners to translate the seeing into saying – that is, making the diagnosis of MS, according to the diagnostic rules (criteria). The increasing prevalence of MRI technology (seeing) in the diagnosis (saying) of MS has led to the revisions of diagnostic criteria in order to facilitate the inclusion of patients for medical treatment, and this is also dictated by CPGs.

MRI technology also facilitates the political intervention in medical judgments through CPGs. Nikolas Rose (2007a) calls this political process the molecularization of life: "Contemporary biology envisages life at the molecular level, as a set of intelligible vital mechanisms among molecular entities that can be identified, isolated, and manipulated, mobilized, recombined, in new practices of intervention which are no longer constrained by the apparent normativity of a natural vital order" (p.5-6). Rose's work examined this biopolitical intervention upon the patient, whereas I am examining how this same process is used on medical physicians and their individual judgments.

The revision of guidelines depends upon these (MRI) "visualization techniques [which] increasingly operate through digital simulation. Some reconstruct an apparent mimetic realism at the molecular level through the use of algorithms that manipulate digital information" (Rose 2007a:14). The focus on these technologies and techniques of visualization results from these relations of molecular biopolitics (2007a:15): "ways in which such molecular elements of life may be mobilized, controlled, and accorded properties and combined into processes that previously did not exist. At this molecular level…life has become open to politics." The increasing presence of references to MRI technology in CPGs is an example of this type of molecular biopolitics. CPGs facilitate the increasing prevalence of MRI technology in guideline creation because of this interest in mobilizing medical knowledge for intervention in clinical practice. Beyond this relationship between the imaging and diagnosis, however, are broader social events that are generating CPGs. I explore these influences in the next section.

INSTITUTIONAL INFLUENCES: GUIDING GUIDELINES

The continuous creation of new or revised guidelines is perpetuated and influenced by outside institutions, specifically funding agencies and legal decisions. I demonstrate how the field of medicine is located in a broader social context and responds to concerns from interested stakeholders from "outside" the field of medicine.

Funding Agencies and Task Forces

This first section details the influence that funding agencies have, and how these agencies can change any current guidelines by generating research. For the case of MS, a timely example that I discuss here is one that received a fair amount of press in the western world: the Zamboni "liberation treatment" and the theory of CCSVI (chronic cerebro-spinal venous insufficiency). Singh and Zamboni published a paper in the *Journal of Cerebral Blood Flow & Metabolism* in September 2009, claiming that CCSVI causes MS. Their theory initiated a number of events that was then taken up by EBM researchers; specifically, this research aimed to revise treatment guidelines through new and emerging treatment technologies and procedures.

Singh and Zamboni (2009) argue that, in lay terms, the specific cause of MS is related to restricted blood flow in major arteries that deliver blood to the brain. Treatment recommendations state that performing a surgical procedure to "liberate" these vessels will eliminate MS and its symptoms. After its initial appearance and publication, the research article gained media attention, as its findings implied that MS was a curable condition. For example, in November 2009, Zamboni and his ideas received media attention in many countries, including on the CTV television network in Canada, in a report titled "Liberation Treatment: A whole new approach to MS". Within a few months of this broadcast, the MS Society of Canada began discussions with the Canadian Institutes of Health Research (CIHR) to fund a task force to investigate and test the claims of the Zamboni hypothesis and the "liberation treatment."

By the following summer, July 2010, the MS Society of Canada funded a Canadian task force and approved a working group "to provide advice and recommendations concerning chronic cerebro-spinal venous insufficiency (CCSVI)" (National Multiple Sclerosis Society 2012). Their advice was directed at the neurology field and its report recommended subsequent research in the area to generate evidence:

> The objectives of the scientific meeting were: to review evidence, current international efforts, and knowledge gaps related to the etiology and treatment of MS, with a special emphasis on neurovascular issues including the recently proposed condition called chronic cerebrospinal venous insufficiency (CCSVI); to review past, current and proposed international clinical trials related to the diagnosis and treatment of MS; and finally, to identify clinical research priorities for CIHR and the MS Society of Canada for the diagnosis and treatment of individuals with MS.(CIHR 2010a)

The summary report identified the MS Society of Canada as a key player in initiating the current research program, as well as noting the role that the media coverage of the Zamboni treatment played in bringing attention to this new theory and therapy:

> [A]n overview of the unprecedented television and media coverage of the "MS Liberation procedure"[was] witnessed with great intensity in Canada. As there are presently no "cures" for MS, a debilitating chronic disease, a large number of people with MS have understandably become very engaged by the prospect of this proposed experimental treatment. (CIHR 2010a)

The following year, August 2011, Ottawa recommended funding through the CIHR initiative "Evidence on Tap" to produce evidence available for use in generating MS guidelines for CCSVI and MS research. This initiative was in direct response to the report made available by the MS Society of Canada (CIHR 2012a):

> The mandate of the Scientific Expert Working Group is to monitor and analyze interim and final results from seven US and Canadian MS Societies funded studies, as well as from other related studies from around the world related to venous anatomy and MS... Based on the results, the scientific expert

> working group will reach conclusions regarding: (1) a common standard for reliably diagnosing the proposed CCSVI condition using imaging or other techniques; and (2) a potential association between impaired cerebral venous drainage and MS. (CIHR 2010b)

The stated need for a standard or valid and reliable guideline is in line with the EBM programme. The second conclusion the working group aimed to produce was related to research. The first priority, however, was to develop guidelines to assess clinical evidence derived by medical technologies in order to make judgments about medical intervention at the bedside – that is, "reliably diagnosing...the condition."

In addition to the CIHR and MS Society of Canada, other funding organizations began investigating the CCSVI hypothesis and treatment. In 2010, Newfoundland announced its own plans to fund a small observational study of MS patients who had the liberation treatment abroad. The study cost $320,000 (Government of Newfoundland and Laborador 2010)[31]. In 2011, the Hubbard Foundation funded an international research project that tracked patients who opted for receiving the Zamboni treatment abroad. The study included Canadian patients; researchers both tracked and followed up with those patients who underwent the procedure overseas (Ubelacker 2011). It is hoped that the report (not yet released) will generate more knowledge about the disease in order to provide more effective guidelines and treatment recommendations concerning the liberation procedure.

In September 2012 the MS Society of Canada announced that it has completed seven studies on CCSVI and MS. The first report stated that no link was found between the

[31] Saskatchewan also planned to put up $2.2 million to fund its own study of MS, however, it was cancelled due to lack of volunteers (Graham 2013).

Zamboni hypothesis and the liberation treatment techniques (National Multiple Sclerosis Society 2012). In the same month, CIHR (2012b) approved a clinical trial for CCSVI, monitoring for a two-year period 100 patients from British Columbia, Saskatchewan, Manitoba, and Québec who had the liberation treatment. That study is estimated to cost $5 million (Fayerman 2013), and its objective is to test how safe and effective the procedure is for eliminating MS symptoms. In 2013 University of British Columbia researchers announced that neither the Zamboni diagnostic criteria nor the liberation treatment were valid (Traboulsee et al. 2013).

EBM relies on medical research to translate medical knowledge into CPGs. Medical research requires funding initiatives to support its projects. These projects, however, can be influenced directly by patient groups, as was the case here: the MS Society of Canada spearheaded its own research and pursued funding through the CIHR's Evidence on Tap initiative. As the research of Carlos Novas has shown, patient groups play a significant role in influencing the production of medical research and guidelines: "through working alongside scientists, health professionals and political authorities, they [patient groups] attempt to shape in the present the future health and well being of specific populations" (Novas 2006:302). The results of the systematic reviews and the observational studies of seven patient groups were a result of campaigning by a disease-specific patient organization, the MS Society of Canada. Further, any guidelines that are created as a result of research findings stem from research funded by patient groups. These include guidelines such as the

standards for assessing the imaging and diagnosis of CCSVI. The patient groups are interested stakeholders.

The production of CPGs, then, may be far from "objective." These research initiatives are contributing to the production of evidence that facilitates intervening in the ways that medical practitioners are making judgments in the treatment of MS patients. Although the research about MS and CCSVI may produce valid evidence and results, according to the rules and hierarchy of evidence, the claim that EBM produces more objective judgments and eliminates the uncertainty associated with the subjective or individual interests of practitioners is not the case. The direction of research has been steered by the interests of patient groups.

As noted in the previous chapter, research into the effectiveness of new treatments, like the liberation treatment, is not a new practice under the EBM umbrella. The prioritization of generating standards for practice that can be translated to immediate care ("at the bedside") is integral to the EBM programme. These conclusions, in the forms of guidelines for care, are intended to translate research findings into relevant evidence and rules for assessing clinical evidence in practice, such as the results of an imaging test. This evidence is influenced by funding, and research is initiated and pursued by specific patient populations, such as the MS Society of Canada.

Patient groups may very well be participating in the production of their own unintended harms. The evidence and guidelines for applying evidence are products of patient interest groups: the initiatives "contribute to the elaboration of norms relating to how

biomedical research should be conducted and how its therapeutic and economic benefits should be socially distributed" (Novas 2006:293). Biomedical research into MS, as seen above in the mandate of the expert working group formed when the CIHR and MS Society of Canada collaborated to "make recommendations," is normatively directed toward generating guidelines for standard practice, which is in line with the EBM programme. Further, patient interest groups are not only influencing how evidence is produced, but also how these efforts should be directed, specifically toward patients suffering from MS, a specific patient population. These groups are influencing the production of evidence for their own ends, but also contributing to the normative standard of what constitutes good results from these collaborations: producing guidelines (and in this case, the reliance on MRI). The focus on MRI diagnostic technologies – even in CCSVI research – produces mis- and overdiagnosis, as discussed above. By directing research initiatives in the direction of new guidelines that use those same technologies, these societies contribute to the possibility of further harm.

Medical Judgment and Legal Responsibility

In addition to influences from patient associations and funding agencies, the production of guidelines is influenced by the changing landscape of legal responsibility for medical practitioners. This subsection shows that the creation of guidelines is both the consequence of outside influences and has implications for the practice of medicine. These materials will serve as introductory remarks for the following section, which will consider the recommendations of EBM for the development of CPGs (and their possible implications). Here, I show how legal decisions have contributed to this process. The changing landscape of

the law in Canada and the United States, for example, is contributing to the ongoing production of CPGs. As we will see in the following section, this creates a problem that may be counterproductive to the aims of public health care, deresponsibilization. But first, this section provides some materials for considering the emergence of this problem.

As early as 1995, three years after EBM first appeared in medical journals, physicians argued that CPGs could serve as a legal baseline for adjudicating malpractice suits: "Adherence to the guidelines could then be asserted by defendants [e.g., doctor] as an affirmative defence in a medical malpractice suit" (Costello & Murphy 1995:3). The guidelines could not only serve as recommendations for practitioners, but also as the justification and yardstick for measuring the distance between the actual care the patient received and what the ideal care situation might be. In Canada, it is possible to use EBM as part of a defence in medical negligence cases: "The findings of evidence-based medicine may be introduced in clinical care before they are widely adopted by the profession. . . [which] permits both traditional and more innovated practitioners defences against negligence claims based on their non-mainstream practice" (Dickens 2011:123). Other legal changes that would occur more than a decade later might also have the potential for perpetuating the production of CPGs and the deresponsibilization of health care.

In Canada it is the plaintiff's (the patient) obligation in medical negligence suits to demonstrate that the defendant (e.g., doctor) and his/her actions caused the patient harm. The *Resurfice Corp. v. Hanke* Supreme Court of Canada (SCC7 [2007]) decision, however, has the potential to change the landscape of practitioner responsibility. In this decision, the Court

ruled that it must be shown that "the defendant's [doctor] wrong *increased the risk*" the plaintiff would suffer the type of injury that actually occurred (Gilmour 2007:143). The Court concluded that two situations are important for considering causation in legal matters: (1) "it is established that each of the defendants carelessly or negligently created an unreasonable risk of that type of injury that the plaintiff in fact suffered;" and (2) "where it is impossible to prove what a particular person in the causal chain would have done had the defendant not committed a negligent act or omission, . . . the impossibility of establishing causation and the element of injury-related risk created by the defendant are central" (*Resurfice Corp. v. Hanke*, SCC 7 [2007]).

The decision implies that "the costs of uncertainty could be shifted to defendants [e.g., doctor] to avoid injustice, even when the plaintiff cannot meet the traditional test of causation" (Gilmour 2007:144)[32]. Although guidelines do not set the standard of care in Canada, they could be used as part of a defendant's argument regarding the nature of the standard of care in a given situation. For a practitioner to be found negligent, the patient

[32] The *Resurfice Corp. v. Hanke* (SCC 7 [2007]) decision is not a medical case law decision. Gilmour's argument, however, is interesting because she suggests that this unrelated case could influence the way that medical malpractice and negligence cases are handled in the future. Although no changes have yet been made to standard of care law, Gilmour suggests that this case has the potential to set a new legal precedent. For a detailed look at the causes of medical negligence in medical case law and medical defences, see Picard and Robertson's (2007) *Legal Liability of Doctors and Hospitals in Canada* chapters four and five, and six, respectively. Alternatively, readers could also consult "Chapter Three: Medical Negligence" in *Canadian Health Law and Policy* (Downie, Caulfield, and Flood 2011).

would have to demonstrate that substandard practice caused the harm. Medical practice, however, necessarily has a risk, as the outcome cannot be predicted by the clinician. Using evidence-based practice as a defence, the guidelines could be a solution to any uncertainty about the physician's duty of care. Guidelines are conceived as a result of the best evidence for predicting the best possible outcome in care because EBM relies on statistical probabilities for good outcomes. A physician who is following the guidelines for care could be conceived as following the best practice and treatment procedures. Following this hypothetical logic, only a physician who improperly executes the guidelines could be considered responsible[33].

In a case such as MS, however, I demonstrated that there are multiple or changing guidelines, so the question must be asked: how might the guidelines be used as a baseline?

[33] As an anecdotal footnote, during a John Dossetor Centre Health Ethics Seminar that I attended at the University of Alberta in October 2012, there was a presentation on end of life decisions in medicine. The presentation, which was attended by physicians, academics, and researchers, was led by a bioethicist and medical lawyer. Brendan Leier, the presenting bioethicist, stated at the end of his presentation (and I'm paraphrasing here), "And now we will get to the part you are all *actually* interested in hearing about: the legal implications." Dr. Leier was playing on the assumptions that the "values" and "moral dilemmas" of medicine may be interesting to physicians on an "intellectual" level, but the "real" consequences of medical errors are felt through legal channels. Legal decisions, like the one discussed above, have the potential to keep the power of the medical profession in "check" by denying physicians the supreme authority over patient care decisions. In a recent decision about end of life care, the Court held that doctors did not have the right to cease life support, even without an objective medical benefit (2013 SCC 53). I discuss this tension between social values and morals and the responsibility of the medical professional in the fifth chapter.

Discussions in the medical community have focused on this issue as well, concerning the conflicting or sometimes multiple versions of guidelines for diagnostics or treatment plans (e.g., Torrijos & Glantz 2007:449-450). One way that medical associations are attempting to resolve this issue is by creating national medical guideline databases, which is a current initiative in Canada. These databases have the potential to be the baseline for standardizing medical practice by way of their endorsement by the CMA and provincial colleges. In the next section I discuss how these guidelines are being produced in accordance with state mandates for improving the quality of care in Canadian health care settings. The creation of CPGs is the result of the responsibilization of the institution of medicine. I will then show how the production of guidelines may be problematic considering the nature of the production (i.e., interested stakeholders). Under the federal mandates to improve health care, however, a national CPG strategy may produce the *deresponsibilization* of the medical practitioner.

ANALYSIS: CLINICAL PRACTICE GUIDELINES AND DERESPONSIBILIZATION

This section brings together the above threads concerning the creation of CPGs, the influence of interested stakeholders, and the medical response to state decisions. I first consider the question, in what kind of world guidelines become a solution to the problem of uncertainty? Afterward, I discuss the broader social context, the conditions that give rise to CPGs. The stated goals of EBM concern improving medical care by eliminating the uncertainties associated with the outcomes of medical intervention. The creation of CPGs is the solution to

the problem of variations in care at the level of the doctor-patient interaction. Guidelines, however, are subject to influences from outside interests, such as patient groups and federally funded projects, as shown in the cases above. The responsibility that medicine has to its public (patients), however, is a concern taken up by state mandates, such as the legal institutions discussed above. By engaging with a number of documents from Canadian health institutions, I argue that CPGs have the potential to result in the deresponsibilization of medical practice, and this may in fact be counterproductive to the stated role of EBM.

Formal Rationality

In what kind of world are guidelines viable and desirable solutions to the problem of uncertainty in medical practice? Looking to Max Weber's work on formal rationality will allow me to explain the modern emergence of a particular way of regulating and calculating medical decisions through institutionalized practices. Rationalized action, as described by Weber's sociological project, is socially organized *Zweck*- or instrumentally-rational social action. Instrumentally-rational action is oriented by the auspices of goals. The reason medical doctors use the criteria for diagnosing CDMS in a particular presenting case is because the goals of medicine is to "maintain life" and "diminish suffering" (Weber 1946[1919]:144)[34]. This process is formalized by the rules of evidence (EBM) and any relevant CPGs that recommend treatment and intervention. These formal rules that orient social action also have a "normative authority" (Weber 1978:14) for the practicing doctor.

[34]For further discussion of Weber's statements about medicine and the task of sociology, see pages 214-217.

The instrumentally rational end of evidence-based medical judgments is to eliminate uncertainty. The grounds for assessing the adequacy of medical judgments are one's adherence to guidelines: "[This document] is designed to provide members with evidence-based guideline recommendations to assist with decision-making in patient care... Physicians are encouraged to carefully review the full AAN guidelines so they understand all recommendations associated with care of these patients" (American Academy of Neurology 2012)[35]. According to this statement, a good physician is one who consults all guidelines and makes a judgment based on the evidence and the recommendations.

Formal rationality aims to secure the ends of an oriented action through calculable, predictable action that is "technically possible and which is actually applied" (Weber 1978:85). Action that is formally rational is expressed in calculable terms with technical interventions, such as CPGs, which orient individual actions to the same end (eliminating uncertainty). CPGs are "calculated" inasmuch as they are prescriptions and procedures that are created with the goal of producing the best possible outcome of any medical decision, be it diagnosis or treatment. Formal rationality exists when the following is observed:

> *General rules,* which are more or less stable, more or less exhaustive, and which can be learned. Knowledge of these rules represents a special technical expertise which the officials [physicians] possess. It involves jurisprudence, administrative or business management ... [And] does not entitle the agency to regulate the matter by individual commands given for each case, but only to regulate the matter abstractly. (Weber 1978:958)

[35] At the time of this writing, there are no CMA or Canadian Academy of Neurology endorsed guidelines related to MS diagnosis or treatment. The use of the AAN guidelines is to show how the guidelines provide a rationale for adherence in medical practice.

To illustrate this relationship between general rules and abstract administration, consider the following guidelines for the diagnosis of CDMS: "The appearance of new T2 lesions or new Gd-enhancement three or more months after a clinically isolated demyelinating episode (and after a baseline MRI assessment) is highly predictive of the subsequent development of CDMS in the near term (Level A recommendation)" (American Academy of Neurology 2012). Guidelines such as those put forth by the AAN regulate at a distance; these guidelines are general rules that are meant to be applied abstractly in a particular case. By controlling medical practice through "complexes of routines," institutions like medicine are creating "generalized models formulating and justifying rules, built up into systems of thought and analysis" (Jepperson & Meyer 2011:64).

General rules, for Weber, were understood as a primary characteristic of bureaucratic institutions. Bureaucratic officers were at the whim of the rules, regulated by the hierarchical relations of the institution (e.g., super- and subordinate offices) and the abstract administration of general rules to particular cases. During the 1970s and 1980s, sociologists analyzed major changes in medicine in light of this Weberian concept. Ritzer and Walczak (1988:15) argued, for example, that changes in government policies led to the formal rationalization of the medical profession, which previously depended on principles of substantive rationality to organize its practice. Ritzer and Walczak (1988) draw on Weber's definition of substantive rationality and define it as the following: "The distinctive aspect of substantive rationality is that the effort to find the most rational means to ends is shaped by a coherent set of social values" (p.4). They argued that prior to the formal rationalization of

medicine, its practice was guided by the values and morality of individual doctors (whether that was to save live or to exclude individuals from treatment, as I discussed in Chapter Two with the work of David Sudnow). The problematic implications that follow from their argument concern that the adherence to the rules replaces beliefs or values in doing what is right for the patient.

Similarly, David Mechanic analyzed the process by which the medical professional became bureaucratic, and he concluded that those who created the general rules by which physicians ought to adhere were created by individuals with opposing interests: "Bureaucratic medical settings involve multiple interests, thus putting the physician under pressure to sacrifice certain potential interests of an individual patient to satisfy organizational needs" (Mechanic 1977:75). The need to follow general rules would override considerations about what is best for the patient. As I have discussed above, the various interests of the legal apparatus and patient groups, respectively, play a role in the EBM programme and the creation of CPGs. These conflicting interests are problematic because they may undermine the obligations of the physician to the patient at the expense of creating guidelines.

The process by which medical research is translated into CPGs is understood as institutionalization:

> The processes by which social processes, obligations, or actualities come to take on a rule-like status in social thought and action. So, for example, the social status of doctor is a highly institutionalized rule (both normative and cognitive) for managing illness as well as a social role made up of particular behaviours [sic], relations, and expectations. (Meyer & Rowan 1977:341)

Guidelines and rules are a systematic approach to ordering the unpredictable and incalculable through a formal rationality that structures the practices of clinicians. The normative authority of EBM lies in its impetus and programme, specifically its "institutionalized momentum" (Crawford 2004:522) for revising guidelines for practices to eliminate uncertainty. The controversies in neurology about the use of MRI technologies, their assessment, and discussions about how to use any results from such a test are symptomatic of the formally rational institutionalization of guidelines: "a distinctive feature of contemporary medical culture is *an escalating spiral of control and anxiety*" (Crawford 2004:506). The measures of control like CPGs are increasing, in turn, leading to intolerance of uncertainty: the institutional practices of medicine are governed by recommendations as well as guidelines targeted through the application of general rules to particular cases.

The creation and revision of guidelines is a formally rational process: it "is an attempt to restore a plausible coherence, consistent with the claimed efficacy of prevailing practices. It thereby reauthorizes structures of power through which – and *only* through which – rational coherence can be putatively achieved" (Crawford 2004:515). Further, various bureaucratic structures in modern societies control and manage uncertainty through a discourse of expertise to eliminate the uncertainties of everyday practices (Reddy 1996: 247-248). Only medicine has the power and expertise to generate and implement guidelines. Despite the reliance on expertise to generate guidelines, Mechanic argued that the formal rationality of medicine removes accountability and responsibility from physicians: "The bureaucratization of medicine also has the effect of diluting the personal responsibility of the

provider" (Mechanic 1977:76). I discuss the broader context of this deresponsibilization of medicine in the following subsection.

CPGs are problematic from this perspective due to the abstraction of the general from the particular, and also because of the influences from outside of medicine (such as the law and patient groups) that are contributing to the creation and institutionalization of guidelines. This institutionalization of general rules could produce what political theorist Hannah Arendt referred to as a tyranny of rules: "As we know from the most social forms of government....the rule by nobody is not necessarily no-rule; it may indeed, under certain circumstances, even turn out to be one of its cruelest and most tyrannical versions" (Arendt 1958:40). It is not that individual rule-makers are controlling the production of CPGs, but that the normative authority of the guidelines produced by EBM has the potential to marginalize individual responsibility and judgment. I return to a more detailed discussion about why medicine encounters difficulty with the regulation of influences from interested stakeholders in Chapter Four. For now, I examine the broader principles of EBM that could contribute to the externalization of judgments via the abstraction of general rules.

Deresponsibilization

According to CPGs, practitioners ought to follow guidelines when making diagnoses and prescribing therapies on the basis of formal rationality. The "moral authority" of CPGs, however, is due, in part, to the professional authority of medicine. Professionalization is the following process: when a "profession defines the fiduciary responsibilities of practitioners to clients and of the profession to the public" (Weir & Selgelid 2009:95). In Canada, the

CMA is the national body that determines the relationship between physicians and patients as well as between the provincial medical colleges and the health care systems. In the present section I analyze the conditions that opened up the possibility for institutionalizing CPGs, and how the professionalization of medicine is shaped by strategies that regulate the creation of CPGs. The Canadian government has enlisted the CMA to generate and implement national guidelines. Professionalization strategies construct the responsible subject (Weir & Selgelid 2009:95). Deresponsibilization, however, is a potential consequence of the mandate of EBM governance strategies, and may lead to increasing influence from outside the field of medicine.

At the turn of the millennium, the Canadian First Ministers of Health met to identify problems with health care systems across Canada. While health care and its management are under provincial jurisdiction, Canadians are guaranteed the right to a universal, accessible, portable, comprehensive, and publicly administered health care system. Concern over the cost and function of health care, however, led to the creation of the Health Council of Canada (HCC):

> In September 2000, First Ministers agreed on a vision, principles and action plan for health system renewal. Building from this agreement, all governments have taken measures to improve the quality, accessibility and sustainability of our public health care system and all have implemented important reforms. (Health Canada 2003)

The function of this new council is described as,

> Accordingly, [the First Ministers] agree to establish a Health Council to monitor and make annual public reports on the implementation of the Accord, particularly its accountability and transparency provisions. The Health Council will publicly report through federal/provincial/territorial Ministers of Health and will include representatives of both orders of government, experts and the

> public. To fulfill its mandate, the Council will draw upon consultations and relevant reports. (Health Canada 2003)

At first the HCC was only mandated to prepare an "annual report to all Canadians, on the health status of Canadians and health outcomes" (Health Canada 2004). The focus of these annual reports was health care system delivery. As time passed, the HCC was reoriented toward a new mission, to provide "a more accessible, higher quality, and sustainable health care system" (Health Council of Canada 2011:b). The new mandate of the HCC also stipulates that it will "let governments and the Canadian public know how progress towards this vision is coming along" (Health Council of Canada 2011:2). The close relationship between reporting on health care systems improvement and actively initiating projects for the betterment of health care is reflected in the HCC's mission and mandate.

The HCC works in partnership with a number of associations, including the Canadian Medical Association (CMA): "Our focus is on identifying best practices and innovation, so that planners, providers, administrators, and the public know where progress is being made, and how" (Health Council of Canada 2011:2). The HCC's relationship with the CMA gives it access to medical research as well, and this is the HCC's most recent focus, to "place greater emphasis on identifying, reporting and disseminating best practices and innovation in its public reports" (Health Council of Canada 2011:5). They will report to both Canadians and to physicians. This data for physicians is about best practices, and comes from evidence-based research and outcomes. The underlying rationale for communicating with the CMA and disseminating CMA-supported research is to improve the health of Canadians: "the Council considers progress in terms of its overall impact on the health status and health

outcomes of Canadians" (Health Council of Canada 2011:6). These communications inform practitioners of best practices as well as provide recommendations to the government on how to strengthen the health care system through the use of best practice guidelines (Health Council of Canada 2011:10-11). If CPGs could be developed for all major illnesses and disseminated to physicians across Canada, diseases such as MS could be detected earlier, and patients could be put on DMTs to manage their illness earlier as well, thus improving the health of Canadian society.

The HCC looks to the CMA for best practices, as it is the only medical body that regulates and researches its own practices, in regards to the standards set by the principles of EBM. An example of the power of this relationship is the "Canadian Clinical Practice Guidelines Summit" ("the Summit"), which was held in November 2011. The Summit was attended by various stakeholders in health care, including government ministers, representatives of the provincial colleges, various societies for effective practice, and private health consulting agencies. The published report of the Summit proceedings stated that the aims of the meeting were to reach "consensus that CPGs deserve attention at the policy level; developing a shared understanding of priorities to improve the overall CPG process; exploring the feasibility of a national CPG strategy" (Canadian Medical Association 2011:1-2).

Theories of "governmentality" (Foucault 2003: 236) can explain the creation of the HCC as a solution to the problem of health care and population health. Studies of governmentality are "investigations of political power" (Rose, O'Malley & Valverde

2006:83). The goals of EBM are a project of governmentality, but cases like MS demonstrate that EBM does not achieve its objectives. Foucault (2003) described governmentality as a product of the emergence of a specific form of knowledge collected about society (p.238):

> The ensemble formed by the institutions, procedures, analyses, and reflections, the calculations and tactics that allow the exercise of this very specific albeit complex form of power, which has as its target population, as its principal form of knowledge political economy, and as its essential technical means apparatuses of security. (Foucault 2003:244)

Modern governance, according to Foucault, is characterized by a need for an extensive knowledge production apparatus about (social) life with the objective of improving it. Knowledge is collected about target populations. Research in the institution of medicine is undertaken by following particular procedures, and the analysis of that information is carried out according to the rules of EBM. The collaboration between the CMA and the HCC signifies that a governmental program is underway given the emphasis on measurement and the production of knowledge about specific (disease group) populations. Apparatuses of security are concerned with securing the conditions under which the life of the population can be enhanced and developed. As a technology of EBM, CPGs aim to produce the conditions, in the form of general rules, which would control for variant in health care delivery. CPGs have the objective of improving health care and the "health outcomes of Canadians." Solutions to the uncertainties of medicine are derived from medical research and expertise. Additionally, political economy, expert knowledge of social, economic, and political factors of a target population, is another aspect of governmentality. By evaluating the cost of health policy, the objective of population health can be secured through the most

efficient means necessary. I return to this point about economic interests shortly and in the next chapter.

The publication of the Summit proceedings noted that the problem of good care is the production and implementation of knowledge: "this inability to keep pace with current knowledge is one of the reasons for the widening gap between what is considered to be optimal care and the level of care currently provided" (Canadian Medical Association 2011:1). In a specialized field like neurology, research about MS is constantly changing. CPGs about MS are developed based on specific knowledge about these patients, and could secure the health of those afflicted Canadians through general rules and guidelines. The HCC, the institution and profession of medicine (CMA), and the procedures of EBM (e.g., calculations for probability for the outcomes of a medical intervention) form complex relations between the knowledge of health care and the means by which the governance of health care seeks to secure these ends.

The guidelines govern the possible choices that a doctor can or cannot make in a clinical encounter. Foucault (1982) defined governing as the following: "To govern is to structure the possible field of actions of others;" thus, governing is "the conduct of conduct" (p.221). By delimiting the possible decisions and courses of action that a physician could take with a particular patient, CPGs provide a means through which the range of possible actions for physicians is secured. The guidelines determine how to read a test and make a diagnosis, and the guidelines have been produced by experts in order to delimit what therapies are possible for any MS patient in each medical encounter.

One of the strategies of EBM is to disseminate guidelines:

> Over the last year, provinces and territories have worked with health care practitioners and experts to assess how to overcome barriers related to the quality, coordination and use of clinical practice guidelines. Health ministers have agreed to collaborate on clinical practice guidelines, focusing on three to five specific ones where better care and cost savings can be achieved. (Quoted in Canadian Medical Association 2011:9)

By "disseminating best practices" as CPGs to practitioners, I contend that the targets of these interventions are the clinicians. These programmes have the objective of ameliorating health care by controlling for practice variation at the level of individual practitioner judgment. CPGs are strategies that are actualized to "manage the habits and activities of subjects to achieve that end" (Rose, O'Malley & Valverde 2006:84). Governmentality has a normative dimension; the courses of possible action that doctors can take are pre-structured on this basis of improving health outcomes. Governmentality, in this case, is concerned with questions about how health care *should* be governed in order to be improved, and CPGs generated by the institution of medicine are the solution to this problem.

Individual judgments of clinicians are also regulated by economic devices:

> "Governmentality". . . is a governmental *problematic* that seeks to activate the power of the "delegates" rather than the putative "sources" of power; whether those be doctors, managers, or whatever. . . . Wherever there is freedom in neo-liberal forms of problematization there is also assessment, audit, the modulation of norms; in other words, forms of freedom that keep us within the bandwidth of a certain range of acceptable conduct (economically, financially, educationally, pedagogically). (Osborne 2003:13-14).

CPGs enlist doctors as "delegates" insofar as it presents a series of choices that the doctors may follow. These choices, however, have been delimited by research and the objectives of EBM and improving health outcomes. The guidelines provide a baseline for assessing

individual conduct, reproducing the norm of what decisions ought to be made and in what ways. Guidelines are meant to keep the freedom of doctors within a "certain range of acceptable conduct." The HCC states that, "when designed and used properly, clinical practice guidelines (CPG) – evidence-based recommendations that help health care professionals make appropriate clinical decisions – can, and should, play an important role in the Canadian health care system" (HCC 2012a:2). Public Communications about the value of CPGs made by the HCC provide background information in four videos which are available to the public for free on their website. As indicated by "Video 2: Challenges for CPGs" published by the HCC, complex illnesses like MS pose problems for the objective of CPGs (HCC 2012b). Given the uncertainties surrounding MS, there are no adequate guidelines, which cannot secure the improvement of patient care. The goals of EBM cannot be achieved in a case like MS.

The general goals of CPGs as governmental strategies of EBM are to secure better health outcomes by intervening at the level of individual judgment. The political issues here are the techniques of government (Foucault 2003:245). These programmes of governing operate at three levels: economic, social life, and individual conduct (Rose and Miller 1992:173). The underlying principle is that rendering problems amenable to intervention creates the possibility of ameliorating or remedying the problem through effective strategies of control executed at the technical level of various institutions, organizations, and individual practitioners. Amelioration can be accomplished by governmental strategies that are deployed on the basis of knowledge generated by the CMA for correcting the problem

through CPGs that govern medical practitioners' individual conduct and judgments. These strategies demonstrate that problematizations of medical practice point to the "optimism of governmentality" (Miller and Rose 1990:4): "guideline use can have a modest to moderate positive impact on patient outcomes and the process of care" (Canadian Medical Association 2011:1). HCC states that CPGs can improve Canadian society through better health care, and lead to better health:

> There are many benefits to CPGs. They enhance patient quality of care by promoting effective clinical interventions and discouraging ineffective practices. CPGs can also reduce practice variations by helping clinicians across the country to deliver the most evidence-informed care regardless of geography or clinical setting. In addition, CPGs provide standards for the appropriateness of care to which health care providers and health care systems can be held accountable. CPGs may also contribute to system efficiencies by providing clinicians with information on the most cost-effective practices available. (HCC 2012:3)

As mentioned above, political and economic knowledge is central to governance. The HCC also considers knowledge of cost when measuring CPGs efficiency and effectiveness. Securing the judgments of individual clinicians in order to control for practice variation also requires an evaluation of the cost.

Governing through the individual judgments of medical practitioners is explained by Rose's work on governmentality and advanced liberalism: "Advanced liberalism asks whether it is possible to govern...through the regulated and accountable choices of autonomous agents" (Rose 1993:298). Maureen Charlebois, director of clinical adoption at Canada Health Infoway, is quoted in an official CMA document as saying, "This [creating CPGs] isn't about technology, it's about changing [physician] behaviour" (CMA 2011:7). The uncertainties about changing technology in MRI evidence are of little concern to the

developers of CPGs. Of real significance is securing the means by which individual doctors make choices in health care. CPGs are a strategy that aims to regulate individual clinician judgments to control for uncertainties related to practice variation. HCC statements echo this kind of accountability: "In practice, CPGs can range from simple checklists to elaborate decision trees or diagnosis pathways, depending on the type of care, clinical condition, or patient population the guidelines are meant to support" (HCC 2012a:3).

CPGs both disseminate best practices and *implement* them through devices such as audits and feedback instruments (CMA 2011:7):

> Health care providers are challenged to stay abreast of continuously emerging clinical research and, as a result, constantly evolving CPGs. Health care providers also must identify the most appropriate CPG from many that are available from a variety of sources. Some key concerns are that CPGs vary widely in terms of their design, the sophistication and rigour of their methodological development, the nature of input of experts and patients, and the influence of special interests. There needs to be repositories of high quality CPGs that clinicians can access efficiently. (HCC 2012:4)

What Rose calls "expertise in the conduct of conduct – authority arising out of a claim to a true and positive knowledge of humans, to neutrality and to efficacy" (1993:284), externalizes the autonomy of medical practitioners. CPGs are the ensemble of expert knowledge about health care as well as the practices of individuals, CPGs are installed in health care programs in order to ameliorate the health of society by governing the judgments of individual practitioners. Garland (2001) refers to these measures as responsibilization strategies; they involve "a way of thinking and a variety of techniques designed to change the manner in which" individuals act (p.124). The concept of responsibilization was first coined in sociological and criminological research that examined the ways that responsibility in

crime control is shifted to the individual (O'Malley 1992:259). When it comes to medical practice, the responsibility of population health is shifted to the individuals who are administering care – the practitioners. In the case of medicine and responsibilization, governmental strategies enlist the medical profession for managing uncertainty (Dent 2006:459). As I show below, CPGs potentially have the opposite effect.

To paraphrase Rose and colleagues, by examining the formulation of the particular governing strategies of CPGs, how these strategies problematize uncertainty and what techniques it implements (Rose, O'Malley & Valverde 2006:97), it becomes clear that this particular problematization of medical judgments by EBM offers solutions that could *deresponsibilize* the medical practitioner. To my knowledge, this term has not yet been used in the medical literature. In the remaining few paragraphs of this chapter, I illustrate what contribution my development of this concept makes to the governmentality research literature and to medical sociology. The systematic integration of CPGs in order to "improve the quality of care in Canada" (HCC 2012:5) may externalize the judgment of the individual practitioner. While governing the conduct of the individual doctor by securing the field of possible actions through the implementation of general rules (CPGs), the guidelines could relocate the responsibility of the medical doctor (subject). Studies about "changing physician behaviour, which show that fairly simple interventions can have a large impact on the quality of care" (Canadian Medical Association 2011:3), are results of the EBM problematization. These guidelines, however, have the potential to restrict the individual practitioner from implementing his or her own judgment. Instead, the guidelines could become the basis for

individual conduct, and separate the doctor's judgment from what medical decision should be made. It is interesting to note, however, that where there are no guidelines, according to policy statements, it is the doctor's judgment that remains the authority: "Patients should also appreciate that there are many instances when providers will supplement CPG recommendations with their own clinical judgment and expertise to deliver care that is tailored to a patient's specific needs"(HCC 2012:3).

For the case of MS, this particular formulation of the solution (EBM) to the problem of uncertainty underpins the impetus to constantly test, review, and revise the criteria for MS diagnostics. Once an accurate diagnosis has been obtained, no judgment would be required by the practitioner so long as s/he follows the treatment strategies outlined in the CPGs. Even the diagnostic criteria are increasingly revised, as seen above with the discussions surrounding the McDonald criteria. The clinician's individual "feel" for the patient (i.e., his or her judgments) could be externalized by guidelines developed from the results produced by MRI tests.

At the time of this writing, there are no national guidelines for MS searchable through the CMA web database. The CMA and HCC initiative, however, will potentially lead to the creation of national Canadian guidelines for MS. The National Institute for Clinical Excellence (NICE) in the United Kingdom guidelines for MS state that "there is little evidence upon which to base recommendations," but NICE maintains that the proper implementation of MS guidelines, "if adopted, should lead to better standards of care and thus better outcomes from this often distressing condition" (Royal College of Physician

2004:viii-ix). The production of guidelines in the face of "poor evidence" points to the prevailing dominance of the governmental assemblage that structures medical practice by the EBM programme. Given the latest CMA initiative, there is the potential that CPGs could continue to be generated without sound and valid evidence. The externalization of judgment is a potential consequence of the prioritization of the creation of CPGs.

The governmental strategies of CPGs are problematic because they may produce contradictory effects to their stated objectives: deresponsibilization would undermine the EBM programme that obliges the physician to assess the evidence. The case of MS illuminates the principles of EBM as well as demonstrates the limits of CPGs. Given the nature of uncertainty in a complex disease like MS, the uniqueness of illness cannot be captured by general rules abstracted for the implementation in each particular case. MS sheds light on some of the uncertainties of medicine in general, the ambiguity of the body and the consequences of any intervention. I will return to the ambiguous nature of the body in medical decision in Chapter Five. It is possible that the lesson that MS offers to EBM is that the evidence may resist systematization (e.g., the unique nature of MS symptoms) and that CPGs could remove the individual clinician's "feel" for the patient. The principle of rule-guided practice, as implemented in CPGs, is the normative constitution of good medical judgments. Because good medical judgments are those that execute decisions based on the best research evidence, these guidelines are necessarily the foundation upon which assessments of good practice rely. Guidelines have a normative authority over individual

practice. However, this problematization of medical judgments may be resulting in the deresponsibilization of the conduct of individual practitioners.

In this chapter, I have shown that the CPGs may erode the physician's clinical autonomy and responsibility. This trend is could be problematic because as the authority of the physician is undermined, the influence of outside agents, such as pharmaceutical companies, is potentially amplified. I explore this matter in greater detail in the next chapter.

Chapter 4

The Political Economy of Evidence: Breast Cancer, Medicalization, and Interests from the "Outside"

ABSTRACT: Chapter Four argues that evidence-based medicine (EBM) is influenced by concrete, economic processes that come from the "outside" of medicine, which affects the way that medical research produces evidence and guidelines for clinical practice. This chapter engages with the case of breast cancer. Recent controversy surrounding the use of mammography stirs up questions concerning breast cancer evidence and the basis for medical interventions (e.g., Weeks 2012). In medicine, overdiagnosis occurs when a patient has been diagnosed with an illness that will never cause symptoms or death (Welch et al. 2011). Sociologists, however, might attribute the overdiagnosis of breast cancer to the medicalization of breast abnormalities, which can be understood as a form of medical control (Zola 1972:497). Following Coburn (2006) and Rose (2007b), I argue that the production of medical evidence is increasingly dominated by pharmaceutical funding agencies. I move beyond the medicalization thesis by examining the material relations that contribute to the production of evidence, rather than explaining how medicine exercises control over the individual meanings women attribute to their breasts. At the end of this chapter the reader will understand the political economies that are influencing and changing the nature of medical practice, the production of practice guidelines, and the delivery of medical care.

> Doctors have lost the monopoly of the diagnostic gaze and of the therapeutic calculation: the clinical judgment of the practicing physician is hemmed in and constrained by the demands of evidence-based medicine and the requirements of standardized, corporately framed diagnostic and prescribing procedures. The practice of medicine in most advanced industrialized countries has been colonized by, and reshaped by, the requirements of public or private insurance, their criteria for reimbursement, and in general their treatment of health and illness as merely another field for calculations of corporate profitability. (Rose 2007a:11)

The principles of evidence-based medicine (EBM) generate the need to produce guidelines that are based on the best available evidence, and may lead to the externalization of the judgments of individual practitioners, deresponsibilizing their practice. The "evidence" of EBM, however, is produced in a political economy of "corporate profitability" that is "colonizing" medical judgments. In a world where "physicians in training are more likely to rely on authoritative EBM sources than to conduct their own critical appraisal of the literature" (Timmermans 2010:319), there may be an increasing reliance on clinical practice guidelines (CPGs). As discussed in the previous chapter, there are national initiatives in Canada that aim to create a national CPG database. These initiatives follow the example set by other countries, including the United Kingdom and the United States.

As noted earlier, these guidelines are limited by issues of disease complexity, making it important to consider the potential effects of deresponsibilization in the future. In this chapter, however, I take up another issue, the economies of the guidelines themselves. Influences from "outside" the field of medicine, medical research, and clinical practice are contributing to the development of both evidence and the implementation of particular practice guidelines. To what extent these material relations are influencing the evidence-based development of CPGs will be explored by considering the following questions: what

are the conditions of production that produce evidence? And, subsequently, how do these relations influence the field of medicine and its practices?

This chapter understands medicine as socially produced, where the medical judgments of individual physicians are subject to their position in a broader field of practices, institutions, and relations. Following sociologist Pierre Bourdieu, I examine the relations that have produced medical evidence. Medicine is a field of contested forces. I have shown that the broader social context of funding agencies and patient groups, for example, influence the creation of guidelines. This process is connected to larger relationships, be they to national research initiatives like Canadian Institutes of Health Research (CIHR), or the interests of definite populations (patient groups). EBM aims to suggest "that a formal set of rules must complement medical training and common sense for clinicians to effectively interpret the results of clinical research" (Guyatt et al. 2000:1291). These rules, or guidelines, are produced objectively by laboratory research, and are significant for improving patient health.

For EBM to work (given the objective criteria outlined in its principles) the production of medical evidence would happen within a vacuum, rather than in a broader field of relations and interests, such as those that seek to benefit from the commercialization of any innovation or advancement in therapy. This chapter explores these claims of objectivity by engaging with another case study. This time I take up recent controversies in breast cancer screening. I show that EBM and the guidelines for its practice are taking place in what Bourdieu might call a contested "field," rather than the current understanding that evidence is produced by "objective" scientific research.

The field is a "structure of objective relations" (Bourdieu 1983:312), a "relational configuration endowed with a specific gravity which it imposes on all the objects and agents which enter in it" (Bourdieu & Wacquant 1992:17). The various agents in the field of medicine include, but are not limited to, medical practitioners, medical associations, the government, patient groups, and pharmaceutical companies. Each agent may have its own objectives (e.g, EBM to reduce uncertainty; the government to produce CPGs to eliminate practice variation, the pharmaceutical industry to make profit, and so on). I will show how the struggle of each agent to meet its objectives affects the programme of EBM. To paraphrase the words of Bourdieu (1988), in the structure of the medical field, there is a struggle for "the power to impose the laws of functioning of the field most favorable to" achieving its objectives. In medicine, there is a struggle between the following: economic endeavours; the pursuit of profit and the commercialization of scientific discovery; and objective medical research, which is the basis for the formulation of CPGs. In this case, economic forces have an influence over the ability of EBM to fulfill its objectives.

Bourdieu's conception of the field (and agents within the field) allows me to return to my earlier discussions about the production of knowledge and the political economy of governmental strategies. I have shown that these strategies do not fulfill the objectives of EBM, and now I will show how the production of knowledge occurs within a political economy. I examine these material relationships and the political economy of the production of guidelines by, first, providing some context to the problem of outside influence. I show how medical policy documents recognize that "interested stake-holders" are influencing the

production of evidence. Next, I provide some background on the case of breast cancer, specifically the *overdiagnosis* of breast abnormalities. I consider a medicalized explanation of overdiagnosis before moving to a material, concrete picture of what economic influences are playing a part in the production of evidence. I will also explain how the implementation of any one guideline leads to the development of an entire economic sector and how new economic sectors might result in the development of new guidelines. I do this by considering the genetic and the pharmaceutical industries and their respective influence on breast cancer treatment guidelines.

The economic interests of pharmaceutical companies are a driving force in the creation of CPGs and thus have the power to structure the field of medicine to attain their own ends (i.e., profit). Interested stakeholders are dominating the production of evidence, and this is evident in the emergence of various economies that contribute to and benefit from guideline implementation. The limitations created by these influences from the outside are also explored. This chapter provides a rationale for rethinking the relationship between medical practice and uncertainty.

"INTERESTED STAKE-HOLDERS": GUIDELINE CREATION AND THE INFLUENCES FROM "OUTSIDE" OF MEDICINE

My examination of the national initiative to develop a CPG database in Canada revealed that the EBM problematization of uncertainty produces various strategies for intervening in individual instances of medical practice. These strategies for intervention target the site of

medical judgments, externalizing the judgments of individual practitioners, and deresponsibilizing physicians in their practice. While there have been concerns about CPGs being a form of "cookbook medicine" in the medical literature, my analysis of EBM has theorized the limitations of these strategies and policies. Now I turn to another concern with the evidence-informed or evidence-based policy programme of EBM and the production of guidelines: the "interested stakeholders."

In this section I discuss measurement tools that aim to assess the influences from outside of medicine for the creation of evidence-based CPGs. After a brief discussion about the quality of guidelines, I will show how this problem of interested stakeholders is understood in medicine. In medicine, the topic of quality is important for making recommendations to policymakers. It is through debate over and review of the quality of guidelines that the influence of stakeholders has been made transparent. I will later demonstrate that this process does not limit the influence of outside interests, especially economic ones. I first consider official policy statements and what they have to say about this problem.

Despite the stated need for "trustworthy and credible repositories for CPGs that clinicians can access efficiently to keep up-to-date" (Health Council of Canada (HCC) 2012:4), there are problems with the production of guidelines, as the institution of medicine has made clear to policymakers. As noted in the previous chapter, these problems include the quality of the guidelines (HCC 2012:4), the single-disease nature of guidelines, and the *conflicting interests* of stakeholders who produce guidelines. The Canadian Medical

Association (CMA) lists the following obstacles for guideline development: greater financial investment is needed to make valid guidelines; the people or entities that develop guidelines often have conflicts of interest; and "multiple conflicting guidelines are being developed by different groups in an uncoordinated way, creating a 'morass'" (CMA 2011:4).

The HCC has identified five areas in which CPGs can be improved: multi-morbidity, electronic clinical environment, measuring effectiveness (constant reassessment), patient engagement, and developing national standards (HCC 2012a:6). These concerns build from research literature about the effectiveness of guidelines in general. There is moderate confidence, at best, on the effectiveness of CPGs in the research literature. There have been three known systematic reviews that analyze the effects of CPGs. On the heels of the first EBM statements, Grimshaw and Russell (1993), two supporters of EBM, published a paper that sought to test whether evidence-based CPGs are effective with regards to the outcomes of care (p.1317). They argue that although the clinical significance of their findings may be questionable, "explicit guidelines do improve clinical practice, in the context of rigorous evaluations" (Grimshaw & Russell 1993:1321). These evaluations are meant as checks and balances to test the effects of guidelines and their implementation strategies. The evaluation procedure is intended to review the guidelines and eliminate those that are not improving patient health. In some cases, the evaluation procedure is meant to point to areas where physicians are not employing guidelines in their practice, and to encourage strategies for implementation.

Nikolas Rose (1993) refers to these measurement strategies as economic devices: "'Advanced liberal' government entails the adoption of a range of devices that seek to recreate the distance between the decisions of formal political institutions and other social actors, and to act upon these actors in new ways, through shaping and utilizing their freedom" (p.295). The focus on auditing the effects of guidelines is a result of advanced liberal governmentality. Grimshaw and Russell suggest that implementation strategies (guidelines) need to be measured on a regular basis, checking for their effectiveness on the outcomes of health care, which may constrain the freedom of practitioners. By auditing the decisions and outcomes of physicians, practitioners will regulate their judgments in accordance with guidelines (and in the interest of legal accountability as discussed earlier). I explained that, the previous chapter, these strategies are antithetical to the aims of EBM because they externalize the judgments of individual practitioners. These kinds of mechanisms have an effect of regulating both government intervention and the individual judgments of physicians.

In 2004 Bahtsevani and colleagues analyzed the outcomes of patient experience, attending personnel, and health care organization in selected health care facilities. They concluded that more research on the relationship between guidelines and health outcomes was necessary, as they could not say with certainty that the evidence-based care improves health outcomes. The generalizability of their research is at issue:

> We found a tendency toward support for the idea that outcomes improve for patients, personnel, or organizations if clinical practice in health care is evidence-based, that is, if evidence-based clinical practice guidelines are used, although these findings could

> be specific to the settings and context of the studies reported in this systematic review. (Bahtsevani et al. 2004:433)

Also in 2004, Grimshaw and colleagues published a health technology assessment report that they prepared for the National Health Service, Department of Research and Development Health Technology Assessment Programme in the United Kingdom. This document reported on a systematic review of guideline development and implementation strategies. They concluded that "the majority of interventions observed modest to moderate improvements in care" (Grimshaw et al. 2004:iii), and that "there is an imperfect evidence base to support decisions about which guideline dissemination and implementation strategies are likely to be efficient under different circumstances" (Grimshaw et al. 2004:iv). The report suggested that it is necessary to determine a scientific rationale for implementation strategies and guideline development on the basis that "there was considerable variation in the observed effects both within and across interventions" (Grimshaw et al. 2004:61).

Both the Health Canada (HC) initiative and the policy documents resulting from the Clinical Practice Guideline Summit (the Summit) in 2011 rely on the three above studies. The solutions to the problems of implementation were formulated by two working groups, the GRADE (Grading of Recommendations Assessment, Development and Evaluation) Working Group and the AGREE (The Appraisal of Guidelines for Research and Evaluation) Collaboration. GRADE is headed by Guyatt (one of the original EBM working group members), and it is a ranking system for evidence. The ultimate criterion for ranking evidence in this system is the guideline's outcome *for a patient*: "Recommendations depend on evidence for several patient important outcomes and the quality of evidence for each of

those outcomes" (Guyatt et al. 2008:997). Guidelines and recommendations are given either a "strong" or "weak" recommendation on the basis of this criteria and the evidence to support it. The CMA currently uses this system in its CPG database.

AGREE is an international collaboration that is developing a valid, international grading system for guideline creation:

> As the number of published guidelines proliferates, there have been calls for the establishment of internationally recognised standards to improve the development and reporting of clinical guidelines. Moreover, there is a pressing need for internationally recognised criteria that are valid, reliable, and useful for various assessment purposes in different countries, both for guideline developers and clearing houses as well as individual users of guidelines. (Cluzeau et al. 2003:18)

Under the AGREE instrument, the quality of the guidelines varies – some are absolute, some less certain. The appraisal is intended to provide discretionary advice, assessing the process of the guideline development, but it assesses neither the conditions under which the evidence was generated, nor the quality of the results. It is acknowledged, however, that no means exist to confirm the "validity of the instrument" (Cluzeau et al. 2003:3).

In a recent publication, AGREE stated that the next step for its appraisal instrument will be based on feedback from a number of stake-holders about how useful the original instrument is and how easy it is to implement (Brouwers et al. 2010:E839). Their initiative was funded by CIHR, and was "focused on the application, appropriateness and implementability of recommendations in clinical practice guidelines" (Brouwers et al. 2010:E840). There were major changes between the first iteration of the instrument and the latest, The evaluation instrument wording was changed from, "The patients to whom the guideline is meant to apply are specifically described" to "The population (patients, public,

etc.) to whom the guideline is meant to apply is specifically described" (Brouwers et al. 2010:E841). There were also revisions to the cost-effective measure criteria. Further, as concerns this chapter, there is a new emphasis on measuring the influence from interested stake-holders. One change that reflects this emphasis is that "The guideline is editorially independent from the funding body" has been changed to "The views of the funding body have not influenced the content of the guideline" (Brouwers et al. 2010:E841).

The development of a grading system that recognizes the influence of stake-holders from outside of medicine points to a shift in policy development. While previously there was an interest in establishing measures and general rules to create guidelines which can be explained by the Weberian concept of *formal rationality* discussed in the previous chapter, this latest change denotes the recognition that medicine is susceptible to various economic interests as well. The standard for reviewing a guideline that has been developed "independent" of the "views of the funding body," is reflected in the concerns of the HCC and CMA as well. I ask if these strategies for the regulation of outside influences are working, given the roles EBM wishes to play with regard to CPG creation, evaluation, and implementation. I also ask how outside influences are impacting the development and implementation of CPGs for breast cancer. I examine the economies that emerge from the endorsement and implementation of any one CPG (and practice) over another. But first, a brief background about breast cancer.

BACKGROUND: THE CASE OF BREAST CANCER

Breast cancer is a disease that starts in the tissue of the breast. The two most common types of breast cancer are: (1) ductal carcinoma, which infects the ducts that transport milk to the nipple; and (2) lobular carcinoma, which starts in the lobules, the part of the breast that produces milk. There are other more rare forms of breast cancer that begin in other tissues of the breast. Breast cancer that is labeled "invasive" has afflicted the surrounding tissues as well as the ducts or lobules. "Non-invasive" breast cancer is often referred to as cancer "in situ" and has not invaded the surrounding tissues. Cancer that is in situ may become invasive if left untreated. Breast cancer is often detected through the use of mammography, an imaging test (an x-ray of the breast tissue) that makes it possible to see a lump developing within the breast ducts of lobules. Other subsequent tests that confirm the diagnosis of cancer are biopsy and lumpectomy. Both tests involve removing fluid or the tumour (or a part thereof), and extracting cells from the sample in order to test the cells for malignancy. If the tests are positive, the tumour is considered cancerous and must be treated.

There are a number of treatments for breast cancer, including chemotherapy, radiation therapy, and surgery. Surgical procedures include mastectomy, in which the lump (tumour) or entire breast is removed. The type of medical treatment that is recommended depends on the stage of the cancer (see table below), its aggressiveness, and its sensitivity to hormones; these factors can determine the aggressiveness of the cancer as well as its likelihood of recurrence. Regardless of the treatment, women who have had breast cancer often continue to take preventative pharmaceutical treatments, such as tamoxifen, for a time.

Table 2. Diagnostic Classification and Standard Treatment Recommendation[36].

Diagnosis and Classification	Treatment
Stage 0 (also called ductal carcinoma in situ DCIS)	Lumpectomy and Radiation therapy; or Mastectomy[37]
Stage I and II	Lumpectomy plus radiation therapy; or Mastectomy with removal of some lymph nodes; Chemical therapy after surgery is also common
Stage III	Surgery plus chemotherapy
Stage IV	Surgery plus additional therapies[38]

Medical research has linked the development of breast cancer with various factors, some of which are "lifestyle" factors, while others are considered beyond the patient's ability to change. For example, excessive alcohol consumption is considered a lifestyle factor that influences the development of breast cancer (e.g., Holm et al. 2012), whereas family history and genetic predisposition are considered factors that cannot be changed. HER2-positive

[36]Data adapted from A.D.A.M. Encyclopeadia of Medicine 2012

[37] There is some disagreement among medical professionals about treatment protocol for DCIS patients. See, Vernig et al. (2009) for a systematic review of available diagnostic techniques and treatments, and the problematic nature of treating DCIS. See also Sakorafas et al. (2008) for a discussion of the controversies surrounding various techniques for the treatment of DCIS.

[38] Stage IV breast cancer is often terminal, and medical efforts are made to prolong the life of the patient as well as improve the symptoms, but there is a low chance of curing the cancer. According to best available data, the National Cancer Institute in the USA shows that fewer than one in five women who are diagnosed with stage IV breast cancer will live an additional five years (see National Cancer Institute 2003). The five-year survival rate for all stages and forms of breast cancer in both the USA and Canada is greater than 80 percent (see National Cancer Institute 2010 and Statistics Canada 2010).

breast cancer refers to a gene mutation that alters a cellular protein, and causes cancer cells to grow and reproduce rapidly. The hormone estrogen causes cancer cells to multiply, making the cancer more aggressive, and increasing the risk that the disease will return (e.g., Slamon et al. 1987). An innovation in breast cancer research was the 1995 discovery and identification of two genetic mutations that increase the risk of breast cancer: BRCA1 and BRCA2 (Wooster et al. 1995; see also Krainer et al. 1997). These genes regulate the production of proteins that ward off cancerous cell growth. The mutation can occur in men and women, and its presence increases a person's chance of developing breast cancer by as much as 80 percent (Carter 2001).

There are a number of preventative therapies for breast cancer in women who are considered "high risk," (i.e., those who have the BRCA1/2 genetic predispositions). There are also therapies to prevent the recurrence of cancer in women who have already been treated for the disease. Two of the most common treatments are tamoxifen and surgical procedures. Tamoxifen is a pharmaceutical drug that blocks estrogen, which has been shown in some cases to promote tumour growth. The two most common surgical procedures are bilateral prophylactic mastectomy (BPM) and contralateral prophylactic mastectomy (CPM). BPM is a surgery during which both breasts are removed to prevent cancer. This procedure is often done on women who are "high risk" but who have *not* been diagnosed with cancer. CPM is a procedure in which both the healthy breast and the breast that contains the tumour are completely removed to eradicate the cancer and prevent it from recurring in the healthy

opposite breast. There is evidence that these procedures do not lower breast cancer mortality rates (e.g., Lostumbo et al. 2010).

Tamoxifen first appeared on the market for breast cancer in the early 1970s. Prior to this, it was being developed as an anti-fertility drug (Jordan 2003:208). It gained recognition as a successful hormone therapy for breast cancer in 1998 when a systematic review was published in the *Lancet* by the Early Breast Cancer Trialists' Collaborative Group (EBCTCG). It has since been shown to substantially reduce 15-year mortality rates, according to a meta-analysis published in the *Lancet* in 2005 by the EBCTCG. These articles contributed to the adoption of tamoxifen by the medical profession as a proven therapy to improve breast cancer prognosis in pre- and post-menopausal women. Tamoxifen is considered an example of huge economic success, as it went from being a drug with very little use, prescription, and profit, to a billion dollar industry in less than two decades (Jordan 2003:208). In the United States, Tamoxifen is well-known, if not for its innovations in breast cancer treatment and prevention, then for a precedent-setting case surrounding its patent. AstraZeneca holds the patent to produce and distribute the drug with the approval of the United States Food and Drug Administration (USDA). AstraZeneca had to fight a number of legal battles before being awarded a back-dated patent in 1985 for 17 years (dating back to 1965). In Canada, there are four licensed producers and distributors of tamoxifen: Mylan Pharmaceuticals, Pharmascience Inc., Pharmel Inc., and Teva Canada Ltd. (Health Canada 2012).

Controversy over the economic gains generated by tamoxifen's distribution and production continue today. AstraZeneca and Barr, another pharmaceutical company, allegedly colluded to monopolize the US market. The "generic" brand of tamoxifen, manufactured by Barr, is priced at only 5 percent less than the brand label manufactured by AstraZeneca. Lawsuits filed in the early 2000s by the Prescription Access Litigation (PAL) Project accused AstraZeneca and Barr of violating anti-trust laws: "The result of their collusive agreement was that women with breast cancer were forced to pay very high prices for a drug crucial to their treatment" (PAL 2007). These cases were permanently dismissed and closed by the US Supreme Court in 2006, which stated that no violation had occurred (United States Supreme Court, case 466 F.3d 187, and decided 2006). We return to a detailed discussion about tamoxifen later on.

The case of breast cancer is a good illustration of the material and concrete conditions that shape how guidelines are created as well as the economic benefits for particular industries when guidelines are implemented. Unlike multiple sclerosis, the diagnosis and treatments for breast cancer are considered relatively straight-forward. While there are complexities surrounding the imaging and medical diagnosis of breast cancer, similar to discussions in Chapter Three, the material conditions that are contributing to the overdiagnosis of breast cancer can be linked to the conflicting interests of medicine and the stake-holders who have an influence over the field of medical practice.

Controversies in Breast Cancer: Screening in the News

After a few decades of mammographic screening, research and reports emerged from task forces that discouraged preventative screening for women. This subsection presents material about the guidelines that emerged in relation to recent research and taskforces that identified an overdiagnosis of breast cancer. These data will open up questions of political economy and the field of power in medicine.

In 2007 the World Health Organization (WHO) changed the recommended age for women to be screened for breast cancer from 40 years of age and older to 50 and older (WHO 2007). In 2009, the US Preventive Services Task Force followed suit, recommending that only women over 50 should be undergoing mammographic screening for breast cancer. The Task Force also discouraged self examination before 50. This report also influenced the way Medicare and private insurance companies cover screening tests. What prompted the change in screening practices? And what reactions did this change arouse?

In a news story about the change to screening practices in the United States, the Associated Press (2009) reported that the new advice was sharply challenged by the American Cancer Society.

> 'This is one screening test I recommend unequivocally, and would recommend to any woman 40 and over,' the society's chief medical officer, Dr. Otis Brawley, said in a statement. The task force advice is based on its conclusion that screening 1,300 women in their 50s to save one life is worth it, but that screening 1,900 women in their 40s to save a life is not, Brawley wrote. That stance "is essentially telling women that mammography at age 40 to 49 saves lives, just not enough of them," he said. The cancer society feels the benefits outweigh the harms for women in both groups.

Similarly, the *New York Times* reported:

> Dr. Peter Albertsen, chief and program director of the urology division at the University of Connecticut Health Center, said that [overdiagnosis causes harm] had not been an easy message to get across. "Politically, it's almost unacceptable," Dr. Albertsen said. "If you question overdiagnosis in breast cancer, you are against women."(Kolata 2009:A1)

Despite this pushback from angry representatives from the American Breast Cancer Society[39], Canada assembled its own task force in 2009, the Canadian Task Force on Preventative Health Care for Breast Cancer. In a report published two years later, it concluded, "the absolute benefit of screening on breast cancer mortality was small in women of all ages and may be partially offset by harms related to false-positives and overdiagnosis" (Canadian Task Force on Preventative Health Care 2011:31). Mammographic screening for women under age 50 *is not* recommended. Not surprisingly, a similar debate ensues in the Canadian media.

The National Post ran a story about women whose lives were saved by early screening and detection:

> Women like Ms. Leclair, though, are at the heart of a fierce debate about the merits of such tests for younger women, re-ignited this week when an independent task force recommended against regular mammograms for those between 40 and 49, saying they had few benefits and considerable risks. (Blackwell 2011)

[39] See also King's (2006) monograph about the neoliberal and profit driven relationships among philanthropy, breast cancer screening, and activitism campaigns in the United States. King argues that controversies surrounding breast cancer screening are a result of the consumer-oriented culture of charity for breast cancer screening and treatment initiatives.

There were also reports that "the Canadian Breast Cancer Foundation is challenging new recommendations that say routine mammograms aren't needed for women younger than 50" (Hamilton Spectator 2011).

There was controversy about the value of women's lives and the rights of women to receive mammographic screening in both the results of the WHO research and reports and task forces in the United States (and later Canada). The Canadian task force made the following recommendations for women who do not have an identified genetic mutation or high risk in their family history, and who have an average risk of developing breast cancer:

> Although screening mammography reduces mortality from breast cancer among women aged 40–74 years, the absolute benefit is small — especially for younger women — and is partially offset by harms caused by unnecessary intervention. Despite its potential to reduce mortality, appropriate use of mammography will require thoughtful discussion between clinicians and patients about the balance between benefits and harms. Finally, available evidence does not support the use of MRI scans, clinical breast examination or breast self -examination to screen for breast cancer among women at average risk. (Canadian Task Force on Preventative Health Care 2011:2000)

The Canadian Task Force concluded that "for women at average risk who choose to have screening mammography, an interval of every two to three years appears appropriate" (Canadian Task Force on Preventative Health Care 2011:1991). These recommendations are based on the fact that "a greater reduction in mortality is seen with mammography for women at average risk aged 50–74 years than among similar women aged 40–49 years; however, harms of overdiagnosis and unnecessary biopsy may be greater for younger women than for older women" (Canadian Task Force on Preventative Health Care 2011:1991). Another commentary appeared in the *Canadian Medical Association Journal* (*CMAJ*) that argued that screening does not make a difference: there is no decrease in the rate of

cancerous tumours from regions with screening versus regions without; this research showed that screening is not necessarily lowering the incidence of cancer, and is instead contributing to overdiagnosis (Gøtzsche 2011:1957-1958).

In 2012, Bleyer and Welch published an article in the *New England Journal of Medicine* which concluded that the increase in preventative measures for breast cancer, such as increased mammography screening and therapies, were not lowering the mortality rates of the disease: "The imbalance suggests that there is substantial overdiagnosis, accounting for nearly a third of all newly diagnosed breast cancers, and that screening is having, at best, only a small effect on the rate of death from breast cancer" (Bleyer& Welch 2012:1998). Their findings suggest that as many as 1.3 million women in the United States were overdiagnosed (Bleyer & Welch 2012:203). The implications of their research are far-reaching:

> And although no one can say with certainty which women have cancers that are overdiagnosed, there is certainty about what happens to them: they undergo surgery, radiation therapy, hormonal therapy for 5 years or more, chemotherapy, or (usually) a combination of these treatments for abnormalities that otherwise would not have caused illness. (Bleyer & Welch 2012:2005)

The publication of these findings also gained a lot of media attention. While the effects of breast cancer screening had been debated in medical journals in years leading up to this study (see, for example, Ernster 1996; Berry et al. 2005; Virnig et al. 2010; Gøtzsche 2012), the media attention has reheated controversy among both medical professionals and breast cancer patient groups.

Within the profession, critical responses to Bleyer and Welch focused on their methodology. To some researchers, the data used in the study was invalid, citing major improvements in screening technology (Costanza 2012:446). Other researchers state that Bleyer and Welch were only providing a conservative estimate of overdiagnosis (Keen 2012:447). Researchers Elmore and Fletcher (2012) demonstrate that the problem of overdiagnosising breast cancer in women has long been debated. They warned against medical intervention when mammography reveals an abnormality, as medicine does not have the tools to assess whether the cancer will be harmful or not:

> This may be a tough sell for women with anxiety as a result of the "watch-and-wait" approach, as well as for radiologists who do not want to miss any sign of disease and fear malpractice lawsuits. Nevertheless, unless serious efforts are made to reduce the frequency of overdiagnosis, the problem will probably increase as newer imaging modalities, such as breast magnetic resonance imaging, are introduced. (Elmore and Fletcher 2012:537)

There was also backlash from various cancer societies, as there was when stake-holders balked at previous recommendations to change screening practices; but this time there were reports about the harms of overdiagnosis for everyone. The national paper of record for Canada, the *Globe & Mail*, reported the following:

> Many cancer advocates denounced the new guidelines. Associations representing radiologists, who sometimes receive research funding or other forms of payment from companies making imaging equipment, have even said the new rules will cost lives.(Weeks 2012)

> Many breast cancer patients have their healthy breast removed along with the affected breast despite the relatively low risk of developing cancer in that healthy breast, according to a new study... 70 percent of the women who opted to have both their affected and healthy breast removed did *not*have those risk factors. (Huffington Post 2012)

The number of women reported to have had unnecessary procedures due to faulty diagnosis was astounding.

The medical community has recently published research that explains overdiagnosis in breast cancer due to medical imaging. Researchers highlight the alternative measures (to screening) that have helped lower the mortality rates of breast cancer. In an Australian study published in 2012, the researchers concluded the following:

> Adjuvant therapy probably accounts for most or all of the mortality reduction in these younger women, and at least two-thirds of the observed reduction in mortality for the 50–69 year old Australian women invited by BreastScreen. Therefore, any benefits of mammographic screening in this targeted population must now be weighed against the harms of over-diagnosis and unnecessary treatment. The benefits of adjuvant therapy for breast cancer have been profound and mortality rates should continue to fall as further improvements are translated from clinical trial outcomes into practice. (Burton et al. 2012:954)

These findings are similar to Chu and colleagues who argued as early as 1996 that adjuvant therapy was the most important factor contributing to "increasing survival rates" for women with breast cancer in the United States. They estimated that, despite the increase in the number of women being screened for breast cancer, the decrease in breast cancer mortality in the 1980s was not a result of changes in screening practices and educational campaigns, but that these subsequent changes were a result of adjuvant interventions (Chu et al. 1996:1571). A number of other studies from various countries across the globe have also argued that screening cannot account for decreasing rates of mortality for breast cancer (see for example, Berry et al. 2005; Jatoi & Miller 2003).

Despite the recommended changes to guidelines about mammographic screening, those women with an increased risk of breast cancer are still encouraged to go for regular

screening:"[The guidelines] do not apply to women at higher risk because of personal history of breast cancer" (Canadian Task Force on Preventative Health Care 2011:1995). Recent celebrity news sparked what is now referred to as the "Angelina Effect" where women with a family history of breast cancer are going for genetic screening. In May of 2013 actress Angelina Jolie made international headlines by having a BPM – both of her breasts were surgically removed in an act of prevention against cancer. Jolie had a family history of breast cancer, and tested positive for the BRCA mutation that increases the risk of breast cancer (The Associated Press 2013). Jolie's story has created confusion about the difference between family history and genetic risk (Borzekowski et al. 2013). The possibility of harm, however, has also increased, according to the US Preventive Services Task Force: unnecessary testing could lead to unnecessary genetic counseling and procedures (BPM) (Lupkin 2013).

MEDICALIZATION AND OVERDIAGNOSIS

In this section I engage with the important medical sociological concept of *medicalization* to explain the overdiganosis of breast cancer. By thinking through this explanation, I explore the limits of a sociology of medicine. Medicalization explains that medical controversies, such as the one described above in relation to breast cancer screening and mortality rates, are a problem of medical power: the harms done to women who were not in need of medical intervention for a breast abnormality was due to an exercise of power in the medical field. Only by exploring this concept will we understand why medicalization is not adequate to

explain the broader political economy that influences both research and guidelines (policy), revealing that something else is happening.

To recall from the previous chapter, the definition of overdiagnosis offered above by Bleyer and Welch (2012) is the most common; it is when a patient is diagnosed with an illness that will never cause symptoms or death. Sociological explanations of overdiagnosis, however, focus on medical authority. Medicalization is the broader concept that explains the processes by which the medical field exercises its power. Medicalization "describes a process by which nonmedical problems become defined and treated as medical problems, usually in terms of illnesses or disorders" (Conrad 1992:209). A breast abnormality seen in a mammogram result is medicalized when doctors treat it as a medical problem (c.f. Sadler et al. 2009:413). Doctors use medical knowledge to define the body (or "spots" seen on an MRI test) as normal and abnormal. Medical sociologists understand that this process can target both individuals and social groups. They also see that:

> Evidence claims about the medicalization of a particular practice must involve medical rationales, purposes, or meaning, voiced by a society at large, populations, or individuals within that society. To recognize a social practice as "medicalized" requires justifying the practice in terms of health or illness considerations. (Sadler et al. 2009:414)

We will return shortly to the sociological understanding of the normative valences of the medicalization process, the use of medical rationales to justify medical intervention. First, I briefly discuss the emergence of this concept.

In the 1970s sociologists turned their focus to the institution of medicine to examine social power and social control. Irving Zola (1972), a contemporary of Peter Conrad (above), described the process as, "phenomenon accomplished by 'medicalizing' much of daily living,

by making medicine and the labels 'healthy' and 'ill' *relevant* to an ever increasing part of human existence" (p.487). Zola (1972) identified various factors that led to the increasing rates at which medicine was medicalizing the everyday human condition: (1) the (Weberian) bureaucratization of the medical profession and expertise (p.487); (2) the rise of preventative medicine as a public health concern (p.488) ; (3) the decreasing stigma of medical conditions coupled with the increase in individual responsibility to regulated medical regimen (p.489-490); and (4) the prevalence of a new "*moral* rhetoric," "needed to describe a supposedly amoral phenomenon—Illness" (p.492).

The power of the medical profession could be observed through its absolute jurisdictional authority over the body and medical procedures, like diagnosing a "lump" as "cancerous" through imaging technology and tests (Zola 1972:492). Medical professionals have the monopoly over the use of medical knowledge and reasoning, and this acts as a rational force in society. Patients accept medical definitions and knowledge as the absolute authority over their health. Zola (1972) also argued that the profession of medicine was increasingly involved in policy making: it was to the "physician-surgeon that society is turning (and the physician-surgeon accepting) for criteria and guidelines...the physician is increasingly becoming the choice for help for many with personal and social problems" (p.495-496)[40].

[40]Philosopher Ivan Illich (1976) is another well-known known critic of medical power. In his book *Medical Nemesis* (Illich 1976), he argued that medicine undermines health. The process by which medicine harmed its patients was *social iatrogenesis*, which is "when health care is turned into a standardized item... or when suffering, mourning, and healing outside the patient role are labeled a form of deviance" (Illich 1976). See also

Conrad built upon Zola's above characteristics of medical power and the medicalization of everyday practices: "We mean defining behavior as a medical problem or illness and mandating or licensing the medical profession to provide some type of treatment for it" (Conrad 1975:12). Medicalization, as a process, is a condition of possibility for control (Conrad &Schneider 1980a :216): medicine can provide the rationale or justification for the "individualization of social problems" (Conrad 1975:19).

> The medical profession is a profession of experts; they have a monopoly on anything that can be conceptualized as illness. Because of the way the medical profession is organized and the mandate it has from society, decisions related to medical diagnoses and treatment are virtually controlled by medical professionals. (Conrad 1975:18)

Medicine, and by extension EBM, underlies the justification for removing a woman's breast and abnormal lump. It is the individual woman's responsibility to understand her body as abnormal, as defined by medical knowledge and physician experts, and her responsibility to allow medicine to return it to its normal state through medical intervention.

Conrad and Schneider (1980) described this rational force as follows:

> On the conceptual level a medical vocabulary (or model) is used to "order" or define the problem at hand; few medical professionals need be involved, and medical treatments are not necessarily applied. On the institutional level, organizations may adopt a medical approach to treating a particular problem in which the organization specializes. Physicians may function as gatekeepers for benefits that are only legitimate in organizations that adopt a medical definition and approach to a problem, but where the everyday routine work is accomplished by nonmedical personnel. On the interactional level, physicians are most directly involved. Medicalization occurs here as part of doctor-

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Chapter Two, "Medicalization of Life" in *Medical Nemesis*. Social science research that engages with Illich's arguments are focused on explaining the ways that medicine obscures social inequality. For my purposes, I am focused on explaining how medical practice occurs wihin a contested field of power.

> patient interaction, when a physician defines a problem as medical (i.e., gives a medical diagnosis) or treats a "social" problem with a medical form of treatment (e.g., prescribing tranquilizer drugs for an unhappy family life). (Conrad &Schneider 1980 :211)

Medicalization defines medical practices as protecting the interest of the medical professional and the power of the profession to define phenomena as those requiring their jurisdiction and expertise (Sadler et al. 2009:415). They do so with a range of tools, a specialized medical language, and the legitimacy of medical knowledge and research. "The professional dominance and monopolization have certainly had a significant role in giving medicine the jurisdiction over virtually anything to which the label 'health' or 'illness' could be attached" (Freidson 1970:251).

There is a history of feminist literature that takes up the social power principle behind the medicalization position on medical authority. For example, in 1975, Nathanson explained women's experience of illness as different from the "sick role" experienced by men. Feminist literature on the topic of medicalization is not about demonizing the power of the institution of medicine per se, but feminists caution against the implications of medicalizing particular experiences: "The biomedical model also focuses on individuals separate from their social context, prefers action rather to watchful waiting, cure rather than prevention, heroic technical fixes and individual solutions to political or social problems" (Purdy 2001:260). At the other end of the spectrum, some feminists see medicalization as strictly a feminist issue:

> Although all people are subject to medicalizing practices, medicalization is a feminist issue because women, along with other marginalized people, are particularly disadvantaged by it. Medicalization is a means of social control that interlocks with other practices of domination to increase the damage caused to the lives of marginalized people. In addition, insofar as marginalized people by definition "deviate" from the norm, standard features ("natural"

> processes) of their lives stand at greater risk for medicalization. (Garry 2001:263-264)

Woman's experience becomes understood as deviant and medicalized when "men and men's bodies represent the biomedical standard, and women and women's bodies are the biomedical other" (Barker 2010:151; see also Lorber & Moore 2007). Medical authority is an instrument of social power, individualizing women, and creating a moral imperative to correct their abnormal bodies.

For medicalization studies, medical authority is understood to be a normative application of medical knowledge: "It seems that too often the physician is guided not by his technical knowledge but by his values, or values latent in his very techniques" (Zola 1972:498). These concerns were briefly discussed in Chapter Two as well in relation to David Sudnow's study of emergency rooms and the designation of "clinically dead." The criticism offered by the medicalization literature is directed at the normative dimensions of medical authority (Conrad 1992:210). Even the more recent literature predicts that there will be a need for the normative assessments of medicalized phenomena (Sadler et al. 2009:424). The reification of social problems (cf. Berger & Luckmann 1966) as medical ones lies at the heart of the medicalization literature, as does using medical knowledge and procedures to control individuals: "Medicine enforces social norms on individuals" (Reiheld 2010:76). The power of medical authority is the medical rationale for understanding the individual body and responsibility to get well.

Medical sociology can explain the overdiagnosis of breast cancer as a result of the power of medical authority and its jurisdiction over women's bodies:

> Reading the women's accounts, there is a strong sense that they value the reassurance obtained from screening mammography but, through the technological imaging process, their breasts become "virtual breasts", outside of their control and themselves and in need of technology to monitor them... Women had to trust the experts to interpret the results of the mammography for them. The result remains "out there," communicated through an expert, and contained within the medical arena: it is not something that she can bring into her lived experience. The breast is medicalized, observed and followed up by doctors. It is an unknown to the woman and there is no ongoing link between the embodied and the visualized breast. (Griffiths et al. 2010:662)

The results from Griffiths and colleagues support the medicalization thesis. Women accept the authority of the mammography, and specifically the knowledge produced by medical experts who interpret the results. This research, they argued, is antithetical to breast awareness campaigns that encourage women to get tests: it necessitates that women rely on medical knowledge.

Griffiths and colleagues continue:

> From our data, it is clear that, at present, women see mammography screening as key to tackling breast cancer, and afford it great legitimacy... Our findings suggest for breast screening there is a complex interplay of medicalization and women's agency, modulated by the nature of the medical screening technology and the imperative women feel (or do not feel) for their own role in self-monitoring for breast cancer. (Griffiths et al. 2010:664)

It becomes necessary to accept the medical definition of a breast abnormality. The normative power of a medicalized explanation of women's individual bodies is observed through the medical interpretation of the body. Medical interventions promise to restore the woman's body to normalcy. Yet, to consider the implications that follow from the conclusions of Bleyer and Welch (2012), although women find reassurance in mammography and medical knowledge of their breasts, the screening is producing greater uncertainty in their lives. The purpose of the test is to see inside the breast in order to say for sure whether it is healthy or

not. The tests, however, seem to produce the opposite effect: women are having subsequent procedures unnecessarily; abnormalities are overdiagnosed.

In another study about the effects of a breast cancer diagnosis and the overdiagnosis of abnormalities, Breslau (2003) argued that there is a strong relationship between medicalization and the somatic distress experienced by women with breast cancer: "Medicalization reinforces somatic illness in distinct ways" (p.171). Not only is overdiagnosis an instance of the medical profession medicalizing *any* abnormality, but medicalization is necessary for an individual's complaint to become legitimate: "Symptoms reported by patients are legitimate only if they have an organic basis and are caused by disease, can be diagnosed, treated with medication" (Breslau 2003:151). Medicalization can also explain the backlash against policy changes for decreased levels of screening. Women's concerns about their body can only be legitimized by the profession of medicine after a phenomenon like breast lumps or abnormalities become a medical problem. Denying women the access to medical knowledge delegitimizes the fears, anxieties, and complaints of women who worry.

Breslau (2003:150) also uses the example of breast surgery and the changing perceptions of the body and "womanness" after a mastectomy. Medicalization leads to real harm, causing distress before, during, and after treatment to the patient, whether the diagnosis was correct or not. While these treatments may save lives, they also cause iatrogenic harms. Medicalization has the potential to reinforce medical authority over women's bodies. For another example, Moynihan and Cassels (2005) question the role of big

pharmaceutical companies in marketing and "creating" disorders on the female body, such as menopause (p.41-60), PMS (p.99-118) and female sexual dysfunction (p.175-195), which, they argue, lead to real harms for women who are diagnosed with those pseudo-medical disorders.

The medicalization literature is not entirely about the orchestrated efforts of one profession, medicine, and its exercise of individualizing social power on other groups or fields. In fact, Conrad's early research on what is now known as ADHD (Attention Deficit Hyperactivity Disorder) cited the role of the pharmaceutical industry as driving the medicalization process (1975:14-15). The focus on the professional control over social problems, however, provides no way of explaining how this industry is related to the authority of experts over lay persons. Moynihan and Cassels (2005) argued that pharmaceutical companies are driving the increased medicalization of everyday life. In a case study of "high cholesterol," a condition with a market value of more than $200 billion at the time of their research, they showed that "the definition of what constitutes "high cholesterol" is regularly revised, and like other conditions the definition has been broadened in ways that redefine more and more healthy people as sick. Over time, the boundaries that define medical conditions are slowly widened and the pools of potential patients steadily expanded" (Moynihan & Cassels 2005:3). Moynihan and Cassels go on to discuss how the panels of experts who are assembling the guidelines have ties with major drug companies, and these are seldom disclosed in the final publications and distributions to clinical practitioners (Moynihan & Cassels 2005:4-7). This research is important for thinking about how the

expansion of the medical criteria to include more patients for a particular diagnosis produces economic benefits for implementing various guidelines. The influence of the multi-billion dollar pharmaceutical industry on medical practice merits closer attention, which I provide in the next section.

THE ECONOMIES OF GUIDELINES

The limitations of medicalization are in its explanation: it aims to explain how the interpretations of individuals have become aligned with the medical profession. Further, it also presupposes that the power of medicine is strictly instrumental, rather than examining medicine as one actor in a field of multiple institutions shaped by political relations (Coburn 2006). Rose (2007b) sees medicalization as a smaller piece to a larger puzzle that has enabled medicine to dominate the life sciences and appropriate particular phenomena:

> The term medicalisation [sic] obscures the differences between placing something under the sign of public health (as in the contemporary concern with childhood obesity), placing something under the authority of doctors to prescribe, even though not treating a disease (as in the dispensing of contraceptive pills to regulate normal fertility) and placing something within the field of molecular psychopharmacology (as in the prescription of drugs to alleviate feelings that would once have been aspects of everyday unhappiness). (Rose 2007:701)

The process of medicalization occurs within a broader set of social and political economic relations (Rose 2007b:702). In this section, I explore the emergence of CPGs in relation to broader economic influences. Coburn, who argued that medicalization is an outdated concept, stated that the best approach to study medicine and its relationship to other institutions is political economy: “When medicine is analyzed as part of a changing political

economy, rather than simply as an actor in a field of competing professions, the limits, constraints and enabling resources of medicine are brought into focus" (Coburn 2006:441). By exploring the link between medicine and health care as a political economy of various relations and influences from the commercialization of medical research (e.g., Rose 2007:170-171; see also Cooper 2008), I will explain the material and concrete conditions that produce evidence and the infringement of market forces in medicine. From there, the economic gains that arise when guidelines are endorsed and implemented can be ascertained.

Through an engagement with common political economy concepts such as "production, value, growth, crisis, resistance, revolution" (Cooper 2008:3), I show how the conditions of emergence of medical knowledge depend on other economies, such as the genetic and pharmaceutical industries. The creation of evidence and the subsequent guidelines that are developed from research are connected to the interests of funding agencies. I am neither suggesting that doctors are the dupes of the various industries that fund their research, nor implying that the instrumental power articulated by the medicalization literature should be relocated to a different domain. Instead, I ask a question of larger scale, about the kinds of projects that gain traction and the results that are picked up for commercial production. In the form of these investments, market forces determine the very projects and innovations that are funded and that receive attention.

In this section I examine the influence of two industries on medical (scientific) discovery: genetic testing and pharmaceuticals. By analyzing the connections between these industries and their economic basis, I show how the evidence generated by research and its

subsequent commercialization affects the development of CPGs. In turn, the implementation of guidelines also benefits particular industries and specific companies. The endorsement of any one guideline or set of practices over another generates conditions for the (re)production of profit. Economic investment in particular areas of research allows private interests to structure the medical field to their benefit. The private capital investment in medical research contributes to particular discoveries; these are the conditions for the reproduction of capital.

By understanding the link between scientific innovation and the economies that surface to respond to medical needs, I show that EBM is subject to broader material, concrete relations of production. These relations structure guideline development and industries take up the implementation of guidelines as opportunities to produce profit. I focus on the overdiagnosis of breast cancer to elucidate these relationships as part of the broader influences on medical judgments in practice.

BRCA1/2: Clinical Practice Guidelines and the Genetic Industry

Many CPGs, including those endorsed by the CMA, recognize the importance of identifying women with the BRCA genetic mutations: "Since BRCA gene mutations are called actionable genetic mutations, genetic testing and offering further preventative methods as prophylactic surgery can save lives. Patients are recommended to be referred to the genetic counseling" (CMA 2012:13). Recommendations for genetic screening (and subsequent medical interventions for BRCA-identified women) are the result of economic relations that have emerged in the last 15 years. In order to show how the genetic industry has influenced

the creation of guidelines like the aforementioned, I look to the United States, where the patent for these lifesaving technologies began and continues to reside.

Cooper (2008:18) argued that it was "Reagan-era science policy – a policy...with massive investment in the new life science technologies and their commercialization" that generated the necessary conditions for the emergence of a new industry of scientific innovations and their marketable products. These new possibilities for the medical sciences have led to new forms of medical technology. In 1980, human genes were first granted patent protection, which allowed for the commercialization of products or services resulting from these scientific innovations. Commercial protection signified a new distinction between the discovery of properties of nature and the principles governing natural phenomena and innovation. A patent can be placed on invention, *not* discovery, which is of "particular importance in the fields of biotechnology and genetic engineering" (Abbott, Cottier, & Gurry 2011:165).

Cooper (2008) wrote, "What counts here is the variable code source from which innumerable life forms can be generated, rather than the life form per se. Hence the biological patent allows one to own the organism's *principle of generation* without having to own the actual organism" (p.24). These rights protect the invention for commercialization: "Courts in the United States and the European Union in its Biotechnology Directive have accepted that synthesizing the end product of a DNA sequence (using identical genetic information with previously known methods of synthesis) represents 'invention'" (Abbott, Cottier, & Gurry 2011:167; also see, for example, *Amgen v. Hoechst Marion Roussel*, 457

F.3d 1293 [2006]). They went on to say, "This decision seems largely based on argument from the commercial biotechnology sector that investment in the discovery of new medicines and compounds will not take place in the absence of adequate financial incentive, and that patents for DNA-based products will provide that incentive" (Abbott, Cottier, & Gurry 2011:167). Agents from the commercial biotechnology sector are struggling with the legal and political apparatus of society in order to protect their ability to generate profit from medical innovations.

The 1996 discovery of BRCA-1 has generated a new form of patient for medical practice. The personalized medicine movement relies on the knowledge produced by genetic testing to inform patients of their medical risk for developing certain conditions, like breast cancer. Some scholars argue that this has had profound impacts on personhood and identity; the individual is now one who is "genetically at risk:"

> Forms of subjectification [which] are linked to the emergence of complex ethical technologies for the management of biological and social existence, located within a temporal field of "life strategies", in which individuals seek to plan their present in the light of their beliefs about the future that their genetic endowment might hold. (Novas & Rose 2000:487)

Sociologist Maren Klawiter has applied this concept of the genetic "risky subject" to breast cancer. She argued that during the 1990s the biomedicalization of breast abnormalities became an issue of social importance: "The biopolitics of screening created new subjectivities and sensibilities – namely, a widespread sense of risk and responsibility among healthy women who now occupied shifting positions on a breast cancer continuum" (2008:281). The demands for genetic testing, and the guidelines that regulate their use, point to the influence that one sector of economic production has on a population of women.

Myriad genetics created the test for breast cancer genetic screening:

> Myriad Genetics is the only place to go for BRCA1/BRCA2 mutation testing. The Salt Lake City biopharmaceutical company has a monopoly on the test. Its scientists discovered the BRCA1 and BRCA2 genes in 1996 and patented their use for assessing the risk of genetically related cancer. (Brice 2007)

In 2007, Myriad Genetics held the patent on the BRCA-1 and -2 mutations as well as all accompanying diagnostic procedures and tests. As we will see later on, their rights to this "intellectual" genetic property has been challenged. Myriad has become the exemplary case for legal regulation about genetic patents. In the years leading up to the discovery of the BRCA genetic sequence, Myriad was formed by one of the many groups of researchers from around the globe working on this problem.

> In 1991, Skolnick's group formed Myriad as a spin-off from the Centre for Genetic Epidemiology with the aim of obtaining the funding needed to complete the research. Myriad secured funding from Eli Lilly and Co., a US-based pharmaceutical company. The National Institutes of Health (NIH) contributed $5 million to the University of Utah research team. Then in 1993, Myriad raised $10 million in a private stock offering, $1 million was equity from the pharmaceutical giant Eli Lilly and Co. Eli Lilly also provided another $1.8 million over 3 years to search for the genes associated with hereditary breast cancer in return for licensing privileges for diagnostic kits and therapeutic products on *BRCA1*. (Gold & Carbone 2010:S41)

The funding for the research that led to the discovery of the BRCA-1 sequence emerged from various sources, including national grants in the United States as well as from a pharmaceutical company[41]. Myriad was incorporated for the sole purposes of securing

[41] It is also important to note that researchers from across the globe were working on mapping the genetic susceptibility to breast cancer. A Canadian team worked alongside Myriad in the early 1990s to help locate the chromosome, and concluded that BRCA was also related to ovarian cancer (see Narod et al. 1991).

funding, and for the possibility of commercialization. After Myriad's secured a patent for the BRCA genetic sequence and the method for performing the test,

> Myriad opened a US$30-million laboratory in late 1996. It began marketing three principal diagnostic tests: (1) the Comprehensive BRACAnalysis, which involved full sequence testing of the *BRCA1* and *BRCA2* genes (offered at the time at US$2400), (2) the Single Site BRACAnalysis test (offered at US$395.00), and (3) the Multisite three BRACAnalysis, three mutation *BRCA1*/*BRCA2* analysis, which identified mutations that were particularly prominent in the Ashkenazi Jewish population. (Gold & Carbone 2010:S42)

Myriad began marketing a commercial product immediately: they commercialized a method for testing the genes of women who might be at a higher risk of developing breast cancer. The cost for the tests ran into the thousands of dollars. I will return to the profit of this industry shortly, after a brief discussion of the use of this patented test and gene sequence in Canada.

> The Canadian Intellectual Property Office (CIPO) granted Myriad three patents based on a patent application the company filed in 1995. Two patents covering *BRCA1* and mutations of *BRCA1* were granted on October 10, 2000 (patent numbers 2,196,797 and 2,196,790). On April 3, 2001, Myriad was granted a patent on the diagnostic test (patent number 2,196,795). CIPO also granted Myriad a patent on *BRCA2* on April 3, 2001 (patent number 2,239,733) . . . Myriad's marketing strategy in Canada began by the announcement that, on March 9, 2000, it had awarded MDS Laboratories (MDS), a private company, the exclusive right to market the BRCA tests in Canada. Myriad would provide proband [individual under study] sequencing and leave it to MDS to arrange for individual mutation testing within its "network of physicians and hospitals." (Gold & Carbone 2010:S43)

In 2006 MDS was sold to "Borealis Infrastructure Management Inc. in a CAD$1.325 billion transaction... a company with US$1 billion in life sciences revenues[;] following this transaction MDS expects to generate 95 percent of its revenues from global markets by the end of this fiscal year" (Life Labs 2006). Today, Life Labs owns what was once MDS Labs,

and they state that, in relation to their exclusive rights to offer the BRCA Analysis test, "LifeLabs has developed an exclusive relationship with Myriad Genetics to provide this testing to Canadian women" (Life Labs 2013).

Canada allows both genetic sequences and sequencing technologies to be patented (Canadian Intellectual Property Office 2009, see sections 17.02.01 and 17.04.01, respectively). Life Labs is bound by intellectual property law that protects Myriad's rights to profit from the commercial use of the BRCA test. Patent protection across member countries first became an issue at the turn of the nineteenth century. The first draft of the "Paris Convention" in 1878, and the subsequent signing of the treaty in 1883, is now administered by World Intellectual Property Organization (WIPO) (Abbott, Cottier, & Gurry 2011:203-209). Chapter Five of the WIPO handbook protects four principles of scientific innovation and invention, including two important ones: national treatment (5.10-5.19), and the right of priority (5.20-5.32). In item number 5.10, "National treatment means that, as regards the protection of industrial property, each country party to the Paris Convention must grant the same protection to nationals of the other member countries as it grants to its own nationals." Life Labs may operate the test, but Myriad owns the patent on both the genetic sequencing and technology.

The costs of a Myriad BRCA test have increased over the last five years. According to a report released by Myriad in 2007,

> Testing charges vary. It costs $3200 to test the first person in a family, according to Robert Resta, a genetic counselor with Swedish Medical Center in Seattle. Testing first-degree relatives parents, siblings, and children-costs an additional $400 per person. For Ashkenazi Jews, the test costs about $500

> because their susceptibility is based on fewer mutations than the general population, thereby requiring a simpler test, Resta said. (Brice 2007)

Within a 10-year span, the cost of the test had risen by $800. Because Myriad owns the patent on the genes and genetic testing procedures, Myriad is free to increase the cost of the test without worrying about market competition. At the time of this writing, the test costs somewhere in the $4,000 range (it varies by client and family history). The first challenge to Myriad's monopoly on the BRCA DNA sequence and testing methods came in 2009, when a lower level court ruling struck down Myriad's patents (*Association for Molecular Pathology v. USPTO*,669 F.Supp.2d 365 [2009]). After this ruling Myriad raised the cost of its BRCA test by several hundred dollars (Conley et al. 2011). Myriad later appealed and had the ruling reversed (*Association for Molecular Pathology v. Myriad Genetics Inc.*,09-CV-4515 [2011]). This ruling protected the right to patent human genes.

Myriad also holds patents on a number of other genetic tests that I do not discuss here because of my focus on the case of breast cancer. In reports on the annual revenue for Myriad in 2011, "BRACAnalysis testing accounts for a striking 88% of the company's nearly $400 million in annual revenues, with only 2% of those sales occurring ex-US" (Conley et al. 2011). These numbers jumped significantly by 2012, with Myriad "generating over $105 million from its BRACAnalysis® test in the second quarter for calendar year 2012" (Cook-Deegan et al. 2012:3). Myriad reported that the success of its BRCA test in 2012,

> which represented 74 percent of total revenue in the second quarter, was $110.3 million, a 9 percent increase over the same period of the prior year . . . Total revenue for the first half of fiscal 2013 was $282.6 million, an increase of 21 percent over the $233.3 million reported for the first half of fiscal 2012. (Myriad 2013)

Even though genetic mutations account for only 5-10 percent of all cases of breast cancer (Klawiter 2008:2), the huge profits that Myriad has generated have, in the majority, come from the marketing and commercial use of the BRCA test. Part of what makes the profit from the BRCA commercialization controversial is the backlash from the medical community as well as the latest arguments and litigation regarding genome patenting. While both medical associations and patients see the benefits of the Myriad test and sequence for the improvement of breast cancer, the medical research community is suspicious of the secretive nature of the research conducted at Myriad. Unlike most companies and research labs, Myriad does not share its research with the international scientific community. This decision has allowed Myriad to continue its genetic research by stockpiling a vast amount of data from its test subjects in a large database that only it can access. This evidence is then used to develop other genetic and medical innovations, which could reproduce the conditions for ongoing opportunities to profit (e.g., reproduction of its capital through additional patents).

> The company initially stopped sharing this information with other researchers in 2004 because of difficulties in matching data formats. However, in 2005 it adopted a deliberate policy of retaining the data as a trade secret, according to a study led by Robert Cook-Deegan of Duke University in North Carolina, a former member of the US Office of Technology Assessment. Since then, Myriad has refused to share data on BRCA gene variants – which is normally done by placing the information in public databases – on the grounds that the data is proprietary information gathered as a result of its BRCA Analysis tests, on which it retains the patent rights. (Connor 2012)

Any further research and discoveries that emerge from the databases at Myriad will be evidence for changes in practice guidelines as well. The amount of data that Myriad has gathered is in the hundreds of thousands of individual patients, according to some reports, and its access to information mapped upon the genomes of individuals who have paid for the

test contain information about what is called "variants of unknown significance." These variations could affect the necessary care a woman with the genetic results might need. Withholding genome sequencing information may be a result of the commercial pressures to maintain its monopoly on the test and any subsequent discoveries.

Myriad's monopoly on the BRCA sequence, however, may have come to a halt. In 2012, the US Supreme Court agreed to hear further arguments about the *Association for Molecular Pathology v. Myriad Genetics Inc.*(569 U. S. [2013]) case. The review of the case was sparked by complaints by the American Civil Liberties Union, which had been challenging the practice of securing patents for genes (Associated Press 2012). On June 13, 2013 the Court issued its conclusion, which was not favourable to Myriad: "A naturally occurring DNA segment is a product of nature and not patent eligible merely because it has been isolated... [Natural phenomena] lie beyond the domain of patent protection" (*Association for Molecular Pathology v. Myriad Genetics Inc.*569 U. S. ___ [2013]:p.2). The decision was unanimous, and it voided Myriad's exclusive rights to the BRCA gene:

> "Myriad did not create anything," Justice Clarence Thomas wrote for the court. "To be sure, it found an important and useful gene, but separating that gene from its surrounding genetic material is not an act of invention." (Liptak 2013)

The decision may affect Myriad's profits due to the change in patent protection for its commercial product. Less than a month following the decision, however, Myriad filed litigation against five different companies who were now offering the BRCA test. The first Court document stated that the US Supreme Court decision affected only 5 of Myriad's 515 patent claims (*Myriad Genetics Inc. v. Ambry Genetics Corporation*, Cal Bar. No. 255358[2013]). Myriad is asking the Court for damages and permanent injunctions,

preventing other companies from selling or using its products. At the time of this writing, no decision has yet been made in these litigation suits. Some speculate, however, that these lawsuits are bullying tactics: "Myriad presumably filed those suits — against vulnerable defendants — to send a message that it would maintain its testing monopoly by enforcing patent claims that had survived the earlier litigation" (Conley 2013). Defendants may also feel pressured into a settlement, given the vast amount of capital and resources that Myriad has to prolong litigation. The result of any decision, however, has the potential to change the commercial incentives for the genetic industry[42].

Despite current litigation, the effects of Myriad's discovery and monopoly on the market appear to have been far-reaching. For example, each province in Canada has guidelines for ordering a genetic test and identifying those individuals at risk of genetic mutation (and in need of subsequent testing). Further, guidelines for those who test positive for the mutation include recommendations of increased surveillance, as well as adjuvant therapy, or even PBM (e.g., AB Health Services 2011). Implementing these genetic screening guidelines continues to benefit this industry, and Myriad (and Life Labs) in particular. Implementing these guidelines also fuels the research process, as Myriad maintains ownership of databases and medical information that are not shared with other scientific endeavours; this secrecy is against the norm of the genetic research community (Cook-Deegan et al. 2012). The evidence contained in those databases, out of which new innovations will presumably appear, will make their way in to medical practice in the form of guideline revision. The genetic industry produces a plethora of research evidence, which is

[42] In Canada Myriad still owns the patent to the BRCA1/2 genes.

subject to GRADE recommendations, and then implemented in policy, which is translated to clinical practice. Myriad would profit from the recommendations for the use of its BRCA test. The secrecy of the data in the genetic industry – and Myriad's practices specifically – are antithetical to the aims of EBM. It is not possible to verify the evidence upon which the outcomes of genetic research are translated into recommendations; this may very well highlight that the evidence that EBM is most concerned with is the health outcomes of a procedure rather than its scientific rationale or relations of production.

The American College of Physicians and Surgeons recommend guidelines for genetic screening, an endorsement that has led to Myriad's national success:

> A family history can also help identify women who may have *BRCA* mutations that place them at substantially higher risk for breast and other types of cancer... These women should be referred for counseling and recommendations specific to this population, as recommended by the U.S. Preventive Services Task Force. (Qaseem et al. 2007:511)

Some insurance companies cover the costs of the genetic test in the United States, as well as any additional screening or preventative measure required by those who test positive for the mutation. In Canada we are seeing the emergence of policies and CPGs for those patients who have sought the test on their own:

> Screening mammograms may be performed in diagnostic facilities and billed to the Medical Services Plan only under the following circumstances...for women under age 40 who have a confirmed BRCA1 or BRCA2 mutation, or have a very strong family history of breast cancer. (British Columbia Guidelines and Protocols Advisory Committee 2007:1)

In British Columbia the provincial health care system pays for the costs of additional screening practices, medical visits, and medical procedures such as BPM.

Further, the recommendations for BPM for women who test positive for the mutation are also a result of the evidence produced by Myriad and the commercialization of the genetic sequence. The genetic industry is producing not only evidence, but may be influencing the guidelines that follow from this evidence. These are "practices of subjectification that operate in genetic terms – in terms of genetic forms of reasoning, explanation, prediction and treatment of human individuals, families or groups – and their place within this wider array of ways of thinking about and acting upon human individuality in 'bodily' terms" (Novas & Rose 2000:491). These economic interests are influencing new genetic forms of rationality. Not only does genetic knowledge influence what individual patients understand and do, medical practitioners would be expected to use this form of genetic reasoning and evidence to inform patients about the tests and their risks[43]. The CPGs that recommend that "risky subjects" get genetic testing have been produced by a company with private interests.

Genetic technologies locate the breast cancer patient within a web of relations. The legal and political structures that provide avenues for the commercialization of patented genes also protect the interests of corporate capital and the profit motive behind genetic inventions and discoveries. Companies like Myriad in the genetic industry produce evidence about an individual's genetic risk of breast cancer, but these data are kept secret and hidden

[43] For example, the work of Sarah Gibbon (2006) showed that women and genetic counsellors coproduced the social obligation to have genetic testing. Women understood that it was their personal responsibility to find out if they were carrying one of the BRCA mutations.

away from the scientific community. The conditions for the reproduction of profit are twofold: Myriad's patents for BRCA testing methods allow for Myriad to maintain a monopoly on the industry; and the secretive nature of the data allows Myriad to conduct further research from which new tests may emerge. Given that economic investment is guiding the directions of medical discoveries and research, these economic interests are structuring the medical field toward its own ends (more profit).

Before the breast cancer patient even swabs their cheek to send in their DNA for sequencing, s/he has been subjected to the guidelines that have been created by private interests through the uptake of secret evidence. The guidelines about genetic testing, and subsequently the recommendations that follow after a result has been obtained, are the conditions of reproduction for profit. Myriad creates the medical evidence, which is implemented into practice guidelines, which recommend that patients buy the test from Myriad, and Myriad makes a profit. The interests of capital are antithetical to the aims of EBM and the production of CPGs: there is a conflict between the objectives of medicine and the objectives of the genetic industry.

Adjuvant Therapy

Canadian guidelines recommend that women who have the BRCA mutation, and who do not opt for BPM, are prescribed adjuvant therapy for five years. According to researchers, tamoxifen is considered the "gold standard" for breast cancer therapies (Johnston 2012). The drug has been shown to reduce the occurrence of breast cancer in those women who have the genetic mutation. This subsection details the rise of tamoxifen and the conditions for the

production of evidence upon which current practice guidelines rely. For example, the CMA (2012) supports the use of tamoxifen: "Tamoxifen 20mg per day is the standard therapy" (p.8). It is also prescribed for women who have had a mastectomy or chemotherapy, as it is still considered the best adjuvant therapy to prevent a recurrence of cancer (Virnig et al. 2010). The success of both pharmaceutical therapies and the industry more generally have led to concern in the medical profession. I will briefly discuss the CMA and the problem areas for guideline development and commercial interests they have identified. Doing so will allow me to explain how the profession of medicine is aware of the influence that the pharmaceutical industry has over its guidelines and practitioners, but, as I will later show, is not able to mitigate its influence.

The origins of the strength of the pharmaceutical industry are said to lie in the investments in chemical production during the 1970s: "It was largely at the initiative of these industries that molecular biotech would be born as a commercial venture" (Cooper 2008:21-22). Since then, "soaring sales have made drug companies the most profitable corporations on the planet" (Moynihan & Cassels 2005:xx; see also Henry & Lexchin 2002:1590-1595). In fact, two of every three registered clinical trials are funded by private industry in both Canada and the United States (Bourgeois et al. 2010). The controversy surrounding breast cancer overdiagnosis concerns the number of women who have received unnecessary therapies and medical interventions. This section argues that the pharmaceutical industry influences the production of both evidence and practice guidelines.

As noted above, the influence of "interested-stakeholders" from outside the medical profession is a concern when guidelines are created. Other indications that the profession of medicine acknowledges the influence of this industry are found in official CMA documents. The CMA has official positions and statements about professionalism that detail the boundaries and appropriate relationships between the profession and "commercialism." The first statement, published in 2001, defines professionalism as an ethic of practice: "a strong commitment to the well-being of others, high moral standards, mastery of a body of knowledge and skills and a high degree of autonomy" (CMA 2001:2). This statement goes on to define the various threats to medical professionalism under the heading, *Physician and the Pharmaceutical Industry*:

> Pharmaceutical companies and other commercial organizations have for many years pursued relations with individual physicians that have been widely interpreted as a threat to the profession's ethic of service... .As associations seek to develop new business lines and revenue sources, they need to widen their surveillance of possible conflicts with their professional values. (CMA 2001:6)

Since the early 2000s medicine has identified the problematic relationship between the pharmaceutical industry and the professional practice of medicine. The CMA prohibits certain relationships with the industry as a solution to the conflicts of interest that may ensue if physicians accept funding or kickbacks from the industry representatives[44]. The above policy was revised in 2007, and currently reads:

[44]See Lo and Field (2009) for a detailed review of the objectives of the pharmaceutical industry, how they target individual medical professionals, and subsequent conflicts of interest.

> Physicians understand that they have a responsibility to ensure that their participation in such collaborative efforts is in keeping with their primary obligation to their patients and duties to society, and to avoid situations of conflict of interest where possible and appropriately manage these situations when necessary. They understand as well the need for the profession to lead by example by promoting physician-developed guidelines. (CMA 2007:1)

It is up to individual physicians to manage their relationships with representatives from pharmaceutical companies and with the industry more generally. Further, any judgments about treatment regimes and prescriptions are expected to be based on the best evidence, not the influence of these companies: "Physicians should not dispense pharmaceuticals or other products unless they can demonstrate that these cannot be provided by an appropriate other party, and then only on a cost-recovery basis" (CMA 2007b:5).

The CMA favours cost-effective measures for prescribing therapies to patients. In a world where pharmaceutical companies attain patents that protect their therapies, however, any prescribed treatment emerges from commercial interests and incentives. While the institution of medicine governs the relationships between individual doctors and the pharmaceutical industry, the implementation of medical procedures and strategies is affected by the influence of pharmaceutical innovations (be they therapies or evidence of their effectiveness). The production of evidence occurs within a political economy, where the pursuit of medical profit has created a billion dollar industry that influences guideline development and implementation. To further understand how this process presents a problem to the CMA as well as fuels the production of evidence upon which guidelines are based, I turn to look at one of the highest-grossing pharmaceutical companies in the world, AstraZeneca (Moynihan & Cassels 2005:1).

AstraZeneca, located in Sweden, is a pharmaceutical company whose largest source of profit is cancer therapies. In a recent business report, AstraZeneca stated that Zoladex (injection therapy for the treatment of cancer) accounted for over $1.1 billion in 2011 sales, which was up 3-percent over the previous 2 years and makes it one of the company's top 10 medications (AstraZeneca 2011:3-4). Worldwide, cancer therapies account for more than $60 billion (AstraZeneca 2011). AstraZeneca markets seven products for cancer, four of which are for breast cancer. These products include Nolvadex (also known as tamoxifen). The report notes that tamoxifen remains a "widely used breast cancer treatment" (AstraZeneca 2011:70), despite being out of patent protection. How did this therapy become the "gold standard" in adjuvant therapy for breast cancer? And, how does it continue to account for such a large profit margin for a company that no longer holds the intellectual rights to produce and sell it?

The story of tamoxifen began with three scientists, Arthur Walpole, Michael J. Harper, and Dora M. Richardson, who were conducting research to identify anti-fertility agents. The contraceptive industry was developing in the 1960s, and ICI Pharmaceutical Division (now AstaZeneca) was searching for a non-steroidal anti-oestrogen contraceptive to market against Merrell Company's fairly unsuccessful product (Jordan 2003). Merrell and AstraZeneca were two agents struggling for the control of economic capital in the pharmaceutical field (cf. Bourdieu 1989).Early tests conducted by Walpole on mice and rats, however, cast doubt on the potential effectiveness of the drug as a contraceptive in human subjects. When it came time to apply for a patent, Walpole, who was interested in cancer

therapies, cleverly included the phrase "control of hormone-dependent tumours" on the patent application. The inclusion of this phrase was part of an effort to develop the chemical for its effect on the sexual cycle[45]. Eventually the Merrell Company product failed due to toxicity and law suits, and it was withdrawn from the market, leaving an opening in an otherwise unforeseen market for ICI Pharmaceutical Division.

In 1971 the first report emerged detailing the success of tamoxifen as a therapy for breast cancer (Cole et al. 1971). Building on this development, in 1973 Walpole convinced ICI Pharmaceutical Division to market tamoxifen as a breast cancer therapy in addition to fertility drug (Jordan 2003:207). That same year tamoxifen was approved and made available in clinical practice for estrogen-receptor positive cancers. By 1976 research had shown that tamoxifen was not only an effective therapy but also a preventative therapy for breast cancer as well (Jordan 1976).

Tamoxifen continued to rise to prominence during the 1980s when reports emerged about the effectiveness of its extended use. In 1983 Baum and colleagues published an article in the *Lancet*, a "clinical report demonstrating that extended adjuvant tamoxifen therapy saved lives" (Jordan 2003:212)[46]. The study itself was a "fluke" because the clinicians

[45] The patent was filed in the United Kingdom in 1962, and then approved in 1965. There were patent problems in the United States, however, and the patent was not awarded until 1985, when it was given retroactive protection back to 1965.

[46] At the time of the publication of the study, the *Lancet* did not require that the author disclose any conflicts of interest or name any funding agencies that supported the Nolvadex Adjuvant Trial Organization. We might speculate, however, that using the commercial name of the product (Nolvadex) in the trial group title might

running the controlled trial decided serendipitously to run the trial for two years of therapy instead of three; this "conversation between laboratory scientists and clinical trialists has been the hallmark of the development of tamoxifen" (Jordan 2003:210). In 1984, after glowing reports, the National Cancer Institute (NCI) in the United States endorsed tamoxifen as the treatment of choice for breast cancer. After that endorsement, the US Court of Appeals retroactively awarded the patent for tamoxifen to ICI Pharmaceutical Division. Legal protection for commercial profit came after scientific and patient group endorsements. There is a relationship between the interests of patient groups and the economic incentives of industry.

Four months after the patent was awarded in the United States, Barr applied to sell a generic version of tamoxifen under the auspices of the upcoming expiration of the patent. Then, in 1987, ICI Pharmaceutical Division filed a lawsuit in New York State against Barr and its supplier, Heumann, for patent infringement (*Imperial Chemical Industries v. Heumann*, 126 F.R.D. 467, 469 [1987]). ICI Pharmaceutical Division aimed to protect its right to reap the benefits and profit from its newly NCI-endorsed product. Its claim to the patent protection was found invalid in 1992 by the New York courts. Immediately following the verdict, ICI Pharmaceutical Division filed an appeal:

> In 1993, while the appeal was pending, the parties [ICI Pharmaceutical Division and Barr] entered into a confidential settlement agreement (the

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indicate an industry-funded initiative (as opposed to using the scientific name, i.e., tamoxifen). There is no way to be certain whether the trial was funded by private interests or not. This study proved to be a milestone for the success of the therapy.

> "Settlement Agreement")... In the Settlement Agreement, Zeneca (which had succeeded to the ownership rights of the patent) and Barr agreed that in return for $21 million and a non-exclusive license to sell Zeneca-manufactured tamoxifen in the United States under Barr's label, rather than Zeneca's trademark Nolvadex (R), Barr would change its...certification, thereby agreeing that it would not market its own generic version of tamoxifen until Zeneca's patent expired in 2002... Zeneca also agreed to pay Heumann $ 9.5 million immediately, and an additional $35.9 million over the following ten years. The parties further agreed that if the tamoxifen patent were to be subsequently declared invalid or unenforceable in a final and...unappealable judgment by a court of competent jurisdiction, Barr would be allowed to revert to [the original] certification. (*Joblove v. Barr, AstraZeneca* 991 466 F.3d 187 [2006])

After an undisclosed settlement agreement, ICI Pharmaceutical Division retained its patent protection through the 1990s. Legal conflicts had ensued over economic competition. ICI Pharmaceutical Division won a lawsuit in 1997 against three other generic companies.

In 1998 the market for tamoxifen achieved further economic success after the drug was approved for non-cancerous therapy (i.e., stage 0 or "pre-invasive"). On the heels of this decision, another study was published to show that "women taking a selective oestrogen-receptor modulator to prevent or treat osteoporosis would have a reduced incidence of breast cancer" (Jordan 2003:213). The endorsement of tamoxifen by the medical profession also aided ICI Pharmaceutical Division to protect its rights to the profit of a new drug even beyond the expiration of its patent. Supporting research solidified the dominance of tamoxifen in the market as the "gold standard" of therapy. There is a link between one company's profits and the use of this therapy for non-cancerous abnormalities:

> Mammography screening led to a new category of women at risk. . . but this increasingly large category of "high risk women" – women diagnosed with *noninvasive* breast cancer – did not thin the ranks of women with *invasive* breast cancer. . . . The number of women with DCIS has grown with leaps and

> bounds while the number of women with invasive breast cancer has barely declined. (Klawiter 2008:5)

The ability to see new abnormalities with improved mammographic imaging technologies connected the drug market to a whole new group of women, those women who are pre- or at-risk-of breast cancer. The approval of the drug for preventative therapies, coupled with advancements in screening technology, provided the conditions for economic gains after the implementation of practice guidelines that facilitated the use (and sale) of tamoxifen (Nolvadex). In 2002 the Nolvadex patent expired, and genetic forms began to emerge. Despite being out of patent protection today, Nolvadex continues to be one of AstraZeneca's top selling products. In 2011, the company reported that revenue from Nolvadex alone was$99 million[47]. Further, the influence of the medical community's endorsement of Nolvadex continues to benefit sales, despite studies that show tamoxifen is not as cost-effective as other therapies when considering a Canadian health care context (Delea et al. 2006).

As I demonstrated above with the genetic industry, the interests of economic industry have shaped the medical field. Pharmaceutical companies are able to influence the medical field because EBM is susceptible to the following formula: generate evidence, guidelines are produced, products (therapies) are sold, and then companies reinvest in new therapies. The

[47] In Canada, Mylan Pharmaceuticals ULC is approved by Health Canada to sell generic brand tamoxifen. The annual sales for all its products, however, total $6.7 million. The worldwide sales reported by AstraZeneca for just this one therapy far outweigh the small market Mylan has in Canada. Although generic versions are available, AstraZeneca's profit is the highest in terms of this one therapy.

profit accrued by AstraZeneca during the period of patent protection has created new avenues for investment and profit seeking. In 2001 a study emerged that led to the creation of a whole new drug group for cancer therapy (SERMs – selectiveoestrogen-receptor modulators) based on tamoxifen research (Jordan 2003:210). More research funded by AstaZeneca led to more patented technologies for drug products. The CMA endorsed SERMs as the standard for breast cancer therapies:

> Data from placebo-controlled randomized trials and a meta-analysis demonstrate that treatment with the selective estrogen receptor modulators (SERMs) tamoxifen or raloxifene reduces the risk of breast cancer in women at high risk for the disease... Although breast cancer prevention using [a SERM] can reduce the incidence of new primary breast cancers, *there is no data that this reduces breast cancer-related or overall mortality.*Therefore while this strategy cannot be considered as a standard of care, it can be discussed with individuals at high risk with discussion of the risks and benefits. (CMA 2012:2; *my emphasis*)

Although the CMA acknowledges the disparity between mortality and prevention therapy, it continues to endorse this treatment for breast cancer, including stage 0 patients (those that are not cancerous). While there are conflicting reports about the benefits of tamoxifen for mortality incidence, the therapy is credited as the most significant contribution to breast cancer research: "Endocrine therapy for early-stage breast cancer has had the biggest single effect on enhancing survival from the disease, with tamoxifen alone contributing to saving many thousands of lives" (Johnston 2012: 25). Personalized strategies are also applauded for their contribution to breast cancer management in the literature. These strategies are the genetic testing, such as BRCA Analysis. The only reason for the testing is

so that those who test positive can be put on the most appropriate therapy, such as tamoxifen for preventative measures (Johnston 2012[48]).

EBM aims to adopt only the best therapies based on the best available evidence for CPGs. The case study of tamoxifen raises questions about whether this is actually happening. The confusion surrounding the effectiveness of tamoxifen indicates that there may not be a better therapy. Pharmaceutical companies, however, can influence the production of guidelines by producing the best evidence (according the rules of evidence). These companies can influence what practitioners actually do (e.g., prescribe tamoxifen) by investing in the production of evidence. RCTs, such as those conducted to demonstrate the effectiveness of tamoxifen early on, cost millions of dollars. Private industry can afford to make these investments.

Although the objectives of CPGs are to eliminate the uncertainties associated with practice variation, the pharmaceutical industry can influence which therapies are implemented by generating the best evidence (by following the measures of validity of EBM). Thus, economic interests can structure the medical field toward its own profitable ends. Both the NCI and the medical profession participated in the economic success of the drug through their endorsements, despite having different objectives. In order to explain how prescriptions for tamoxifen in breast cancer cases (including stage 0) became common practice and later became solidified in practice guidelines, it is important to see how the

[48] The glowing comments made by Johnston should be taken as cautionary, however, because he noted that he received honoraria from AstraZaneca when carrying out his research.

evidence upon which those guidelines were created (and continue to be endorsed) was produced.

The implementation of CPGs have resulted in *both* profits for pharamaceutical and genetic testing industries *and* the profit motives of these economically interested agents have resulted in the formation of new CPGs. The "constraints and enabling resources of medicine" come predominantly from the private sector. CPGs and the medical field are enabled by private economic interests, but also constrained by those same interests. For both Myriad and AstraZeneca, the ability to protect their intellectual property provided the opportunity to generate both research evidence and profit from new therapies. Without the initial capital investment in genetic research and new therapies, there would be no evidence (which is necessary for EBM to function). Large trials, the best form of evidence, require massive funding. Once the evidence is created and assessed, these tests and therapies can be implemented by the institution of medicine for physicians in their actual practices. Economic interests have enabled the creation of CPGs, and the logic of the medical field under EBM has allowed this struggle to be won by private sector agents. Thus, EBM enables economic agents to flourish and reproduce their capital.

The current therapies and instruments will remain endorsed by practice guidelines until better ones are found or until there is sufficient evidence that they have no benefit (each of these scenarios would be assessed by guideline creators using GRADE and the rules of EBM). Guidelines are based on the best available evidence, and the evidence itself has been

produced in order to be taken up by policymakers. Although evidence-informed policymakers who develop and implement national CPG strategies have expressed concerns about the commercial interests and influence from industry, policy-makers do not have the methods to assess and adjudicate the process by which research evidence is taken-up for guideline development. The political economies of these guidelines work against the principles of EBM.. The guidelines themselves are a normative dimension of medical practice: they are the impetus to eliminate uncertainty, but they are structured by the dominant agents of the field, industry.

Chapter 5

Uncertain Judgments, The Grey Zone, and the "Good": A Proposal

ABSTRACT: Chapter Five theorizes the implications of the preceding chapters for understanding the nature of "good" judgments. If evidence-based medicine problematizes judgments in medical practice that results in the creation of practice guidelines that have the potential to deresponsibilize the practitioner, and if the creation and implementation of guidelines occurs within a broader system of political economy (as worked out in the proceeding chapters), then how can practitioners know when good evidence is produced and good judgments are made? This chapter first examines the codes of ethics that have emerged since EBM, and then analyzes the normative principle that values the elimination of uncertainty. Then, I propose that the relationship between the limits of medical evidence (facts) and the problem of medical judgments is reformulated in light of the Grey Zone of medical practice, theorizing uncertainty as a collective good (values).

> The recognition that we are "in touch" with something real and a creative pursuit of what eludes us then become a path to truth in the face of the trauma that is human suffering.
> (Gillett 2006:13)

The previous chapters raise the question of ethical considerations in the practice of medicine. If the creation of all evidence is subject to both social and material conditions, such as the potential deresponsibilization of the practitioner and the political economies that shape the production and reproduction of evidence (as worked out in the proceeding chapters), then the question of the *good medical judgment* remains for the evidence-based programme. In EBM,

the outcome of a medical intervention is the measure of whether a good judgment was made (or not). Practitioners use measures of epidemiologic validity, such as those listed in the hierarchy of evidence, to assess the outcomes of medical interventions. But, as I have shown, the translation of medical knowledge and research into programmes of implementation (such as clinical practice guidelines) raises further questions about ethics – what the doctor *ought* to do with the evidence, and how s/he ought to translate these concerns to caring for the patient.

This chapter engages with the heart of the problem – the action of practitioners who aim to do "more good than harm" (to recall a phrase used in the creation of the McMaster medical school from Chapter Two). EBM relocates the measure of what makes a good judgment to the outcome of clinical care, rather than in the pursuit of healing as an end in itself. In this chapter, I will show that there is a tension between the professional obligations of medicine (e.g., to follow practice guidelines) and the physician's moral obligations. The medical profession, as noted in the previous chapter, has acknowledged the uncertainties surrounding guideline creation and "interested stakeholders." So where does that leave the practitioner who has a professional obligation to make good evidence-based judgments and a moral imperative to respect patient values?

CODE OF ETHICS: THE PRINCIPLES OF MEDICAL ACTION

> Consider modern medicine, a practical technology which is highly developed scientifically. The general "presupposition" of the medical enterprise is stated trivially in the assertion that medical science has the task of maintaining life as such and of diminishing suffering as such to the greatest possible degree. Yet this is problematical. . . . Whether life is worthwhile living and when – this question is not asked by medicine. Natural science gives us an answer to the question of what we

> must do if we wish to master life technically. It leaves quite aside, or assumes for its purposes, whether we should and do wish to master life technically and whether it ultimately makes sense to do so. (Weber 1946[1919]:144)

I begin my analysis by considering codes of ethics produced by major medical associations in western medical practice. Like Weber, I understand medicine as a cultural practice that is guided by its directive to save lives and end suffering ("doing more good than harm"). Science cannot tell society how individuals ought to live (Weber 1946[1919]:143). Sociological investigations, however, can examine under what circumstances knowledge becomes worthwhile in a given culture. In a later essay, Weber elaborated on the value-concept of culture: "The concept of culture is a value-concept. Empirical reality becomes 'culture' to us because and insofar as we relate it to value ideas. It includes those segments and only those segments of reality which have become significant to us because of this value-relevance" (Weber 1994a[1904]:76). The cultural relevance of medical practice can be understood in relation the social necessity to maintain life and diminish suffering. The codes of ethics are an empirical reality shaped by value ideas, how physicians ought to act, for example, and they represent the values of the cultures in which they were created. I analyze the codes of ethics in light of the cultural presuppositions and circumstances that make medical practice worthwhile.

Medical science presupposes that it is worthwhile to know the processes and pathologies of the body, and that medical techniques and interventions can master them. Codes of Ethics reflect the values of the community within which the task of medicine becomes worthwhile. The social relations that generate this need to know and to master the body manifest in the codification of the question of good judgments in ethical codes of

medical practice. The normative impetus of EBM is to make "good" judgments using the best knowledge about the body (and medical therapies). The need to eliminate uncertainty is a consequence of the problematization of medical judgments in EBM, as developed in the preceding chapters.

In this section I compare the ethical codes of Canada, the United States, the United Kingdom, and the World Medical Association. Each Code of Ethics states the core activities of medicine. For Canada these are "health promotion, advocacy, disease prevention, diagnosis, treatment, rehabilitation, palliation, education and research" (CMA 2004:1). The Codes are meant to provide a "compass," a guideline for the practicing physician, who not only navigates the best possible evidence to make decisions, but also has an obligation to produce good outcomes from medical decisions. The idea that the outcome of medical science has the "task of maintaining life" is "*situated* within complex contexts of economic, political, stratification, and legal forces" (Kalberg 2002:lx). This chapter engages with questions about the circumstances under which such an endeavour becomes worthwhile. Each Code of Ethics recognizes the problematic nature of ensuring that all judgments have good outcomes. Despite the innovations of EBM, the ethical codes remain an important question for doctors in their practice.

Each of these four codes was updated after the first statements of EBM to reflect the changing nature of medical practice. Each code has outlined guidelines for practicing physicians following the principles of EBM, specifically mentioning the importance of patient values, the problem of "interested stakeholders," and the imperative to make good

judgments when practicing medicine. According to the CMA (2004:1), "physicians may experience tension between different ethical principles, between ethical and legal or regulatory requirements, or between their own ethical convictions and the demands of other parties." Given the conflicting nature of the obligations that confront the practitioner, the code is "based on the fundamental principles and values of medical ethics, especially compassion, beneficence, non-maleficence, respect for persons, justice and accountability" (CMA 2004:1).

I understand the organization of medical practice by considering a sociological definition of ethics. Medicine outlines both professional obligations as well as social values in each code of ethics. To paraphrase Weber, medical codes of ethic can be conceptualized as an attempt to add a "value rational"[49] dimension to the practice of medicine, which is itself generally an "instrumentally rational" type of action. In *The Protestant Ethic and the Spirit of Capitalism*, Weber analyzed protestant writings in order to understand how the ascetic lifestyles and the obligation of saving money of protestant belief systems rationalized western economic activity. He concluded that the "duty of the individual" to organize her/his life according to religious principles (such as saving one's money) was understood as a supreme good (Weber 2002:16-17). For Weber (2002), values have a moral character (p.54) insofar as they influence how individuals organize their lives and practices. Protestant values, such as asceticism, were "a norm-bound style of life that has crystallized in the guise of an

[49] *Wert*- or Value-rationality is defined as action that is oriented by beliefs or values: "Determined by a conscious belief in the value for its own sake of some ethical, ascetic, religious, or other form of behaviour, independently of its prospects of success" (Weber 1978:24-25). A physician who acts in accordance with the Hippocratic Oath is a simple example of value-rational action, where the practice of medicine is guided by the ultimate value to "never do harm."

'ethic'" (Weber 2002:21). Protestants understood and believed in the value of asceticism, and organized their lives according to this principle.

The Weberian formulation of "ethics" is interesting sociologically because it allows me to analyze the codes of ethics as the crystallization of cultural values and beliefs as norm-bound styles of life. The ethic of the physician is prescribed by these codes, and it influences how they organize their practice. Under the principles of EBM, practitioners have a duty to make good, evidence-based judgments, and they have a duty to do more good than harm. These duties are the "social ethic" of EBM, and signify that the values of medicine have a normative influence on the decisions of individual doctors. The codes of ethics created under EBM imply "a notion of duty that individuals ought to experience, and do, vis-à-vis the content of their…activity. This notion appears regardless of the particular nature of the activity" (Weber 2002:18). Values have a transcendental quality; they represent a collective interest while also affecting the individual's understanding. In EBM, the values of medicine have crystallized in the Codes, where there are ethical obligations for individuals which prescribe how they ought to organize their medical practice.

The following codes of ethics contain a varying number of "rules" for governing the actions of practicing physicians. All agree that the fundamental duties include the well-being of the patient and society, practicing medicine with integrity, and resisting influences that would undermine that integrity, among others. For example, the CMA lists 54 "rules" that are fundamental to the practice of medicine, whereas the American Medical Association (AMA) lists only 9; and the latest revision of the World Medical Association (WMA) code of

ethics in 2006 states that there are 12 general duties of a physician, including 10 specific duties towards patients. The AMA and the WMA alike begin each code rule with the phrase, "a physician shall".

In the latest 2001 revision of the AMA Code of Ethics (created in 1957, later revised 1980), the preamble stated,

> The medical profession has long subscribed to a body of ethical statements developed primarily for the benefit of the patient. As a member of this profession, a physician must recognize responsibility to patients first and foremost, as well as to society, to other health professionals, and to self. The following Principles adopted by the American Medical Association are not laws, but standards of conduct which define the essentials of honorable behavior [sic] for the physician. (p.2)

The central focus throughout the code is on the physician's personal duty to uphold the rules.

Similarly, The British Medical Association published a 957-page manual spelling out the various legal and professional standards for medical practice. Ethics and legal concerns are intertwined. The volume also details 21 scenarios and topics that are considered relevant to medical practice, such as health records, genetics, and euthanasia, to name a few. Titled *Medical Ethics Today: The BMA's handbook of ethics and law*[50], and in its 3rd edition in 2012, the manual states that medical ethics "requires critical reflection... It involves a search for morally acceptable and reasoned answers in situations where different moral concerns, interests or priorities conflict" (Brennan et al. 2012:2). The authors focus on the importance of evaluating the process of decision-making as much as the decision itself: "Decisions of

[50] *Medical Ethics Today* is published by the British Medical Association (BMA) Medical Ethics Department in order to deal with medical and legal issues for practitioners working in health care. This edition is edited by Brennan and colleagues.

what doctors ought to do must therefore be tested against the ethical principles of society" (Brennan et al. 2012:2-3). The stated aim of the book is to "identify the foreseeable areas where new dilemmas are likely to occur, but providing advice for such future challenges is particularly difficult when the provision of health services faces significant reorganization" (Brennan et al. 2012:4). They specifically mention the significant restructuring of National Health Service as a changing landscape. To recall, the NHS was restructured along the lines of EBM and medical policies in the early 1990s.

Despite differences that may be related to specific legal codes and ramifications, all codes of ethics agree that it is the duty of a medical practitioner to exercise their professional judgment. Further, each code (1) takes the patient as central, (2) includes provisions that warn against conflicts of interest, and (3) outlines guidelines for the physician's practice and duties to the profession. I examine these three themes below.

Theme I: Duties to the Patient: Facts vs. Values

Each Code acknowledges the importance of societal or population health, and the means by which to secure this goal is through good judgments at the individual level. EBM provides the basis upon which to intervene in medical judgments through the implementation of CPGs, for example. The emphasis on the individual patient in Codes of Ethics also reflects this individualized programme.

Medicine, however, combines both social and scientific commitments (i.e., to both the patient's values and to the validity evidence, respectively), which will be understood in relation to Weber's argument about the relationship between facts and values. Medicine not

only presupposes that its rules for producing evidence are valid, but also that this evidence is "worth being known":

> Today one usually speaks of science as 'free from presuppositions.' Is there such a thing? It depends upon what one understands thereby. All scientific work presupposes that the rules of logic and method are valid; these are the general foundations of our orientation in the world; and, at least for our special question, these presuppositions are the least problematic aspect of science. Science further presupposes that what is yielded by scientific work is important in the sense that it is 'worth being known.' In this, obviously, are contained all our problems. For this presupposition cannot be proved by scientific means. It can only be interpreted with reference to its ultimate meaning, which we must reject or accept according to our ultimate position towards life. (Weber 1946:143)

The facts produced by scientific methods are organized by the values of the social group. As noted above, medicines takes as its central task to maintain life and diminish suffering. The value of human life is the principle to which these tasks are oriented. But, as Weber notes, science can provide neither a "worldview" nor a code of conduct (Weber 1946:150). What science can provide, however, is "the technology of life by calculating external objects" (Weber 1946:150). Medicine can measure the processes of the body by using scientific methods for producing valid knowledge in order to "gain clarity," but it cannot tell doctors what to do or how to live (Weber 1946:150-151).

Science can only specify the means by which knowledge can be produced, such as using a test to gain knowledge of a cellular count in the body: "Science…is a 'vocation' organized in special disciplines in the service of self-clarification and knowledge of interrelated facts" (Weber 1946:152). Science cannot explain whether its objectives are worthwhile; medicine does not specify whether a life is worth saving, for example. These are the limits of science. Weber stated that, "whenever the man of science introduces his

personal value judgment, a full understanding of the facts ceases" (Weber 1946:146). The Codes of ethics state that it is the duty of individual physician to use medical facts to make value judgments. In the following subsections, I demonstrate how there is an inconsistency between the Codes (and articulation of the values of medicine) and the practice and programme of EBM (rules for the assessment of medical facts).

The CMA (2004) has stated that physicians have many duties to their patients: these include, initiating and dissolving physician-patient relationships, communication, decision-making and consent, privacy and confidentiality, research, as well as duties to society more generally, to the profession, and to oneself. Under the category concerned with "decision-making," the CMA Code states a physician ought to do the following:

> Recommend only those diagnostic and therapeutic services that you consider to be beneficial to your patient or to others. If a service is recommended for the benefit of others, as for example in matters of public health, inform your patient of this fact and proceed only with explicit informed consent or where required by law. (CMA 2004:2).

Both individual and collective (social) values are central to the physician's obligations. The Code would recommend that a practitioner recognize and put in to motion practices that are committed to social needs (public health) and individual ones.

The AMA Code outlines similar values. The first statement in the AMA Code reads, "A physician shall be dedicated to providing competent medical care, with compassion and respect for human dignity and rights" (AMA2001). Physicians can know when the administered care was competent by looking to the outcome on the body or on the disease, as determined by evidence-based CPGs. What remains uncertain, however, are measures for understanding the values of the patient. These interests require that the physician has a duty

to make value judgments, which lies beyond the collection and analysis of medical facts. Similarly, in the United Kingdom, the key duties of the doctor are outlined by the General Medical Council (GMC). These duties are, to care for the patient according to the guidelines created by National Institute for Health and Clinical Excellence (NICE), duties to the public, upholding the standards of medicine, and to continue medical education throughout their career (Brennan et al. 2012:6-7). Caring for the patient can be measured through both the statistical validity of various practice and treatment recommendations and value judgments about what the physician ought to do.

The 2009 publication of the WMA Ethics Manual (2nd edition) also contains this tension between facts and values. It highlights the "centrality of the patient in any discussion on medical ethics" (WMA 2009:6). There is a tension between the facts about the body of the patient and the social obligations of the physician to things like dignity, the patient's values, and the public. EBM would see that the interest of the practitioner ought to be focused on the facts of the patient and the tested therapies, whereas the Codes focus on both the body and social values. The doctor's duty is to organize medical practice around such value judgments as the patient's best interests; this understanding is stated as a collective concern within the profession itself. Before moving on to a discussion of the profession, I turn to the second theme.

Theme II: Conflicts of Interest: Integrity and the "Third Party"

The medical profession is also concerned with managing conflicts of interest that arise between the duty to care for patients and the "interested stake-holders" that influence medical

practice. For example, the BMA notes that managing conflicts of interest are the biggest questions that the profession of medicine grapples with today (Brennan et al. 2012:3). The economic influence of profit within medicine forms another dimension of the relationship between the methods that produce scientific facts and social values.

The CMA Code (2004) states that an area of concern is the relationship between the "third party" and duties to patients: "When acting on behalf of a third party, take reasonable steps to ensure that the patient understands the nature and extent of your responsibility to the third party" (p.2). The CMA also notes that, in regards to research responsibilities, physicians ought to be informing patients about who funded the research, and any possibilities for harm. Similarly, the WMA (2006) insists that physicians ought to resist influences for "personal profit:" they are "not [to] receive any financial benefits or other incentives solely for referring patients or prescribing specific products."

The need to inform patients about possible harm is an ongoing topic of concern in medical and social scholarship. For example, the AMA has a Council on Ethical and Juridical Affairs (CEJA) that publishes on "Current Opinions with Annotations," which details the society's current perspectives on matters of ethical importance for physician conduct, including research practices. The principles of the CEJA are developed through a deliberative process, and "the Code serves as a contemporary guide for physicians who strive to practice ethically" (AMA 2001:2). The duties of the physician are the crystallization of social values about the patient's health (e.g., acting in their best interest). The influence of economic interests on the production of medical facts, however, is understood by legal scholars as

questions of medical authority. Questions about the ethics of research and the influence of drug testing "raise issues that compromise the social perception of the medical profession. Colleges must take steps to ensure the integrity of the profession is maintained" (Caulfield et al. 2004:367).

In the United Kingdom there are steps to secure the integrity of medicine against outside influences; these steps were initiated by the GMC. The GMC created a professional society governing misconduct. This society is similar to the CMA tribunals that assess medical complaints from patients. The duty to uphold social obligations, such as disclosure to patients, presents itself as an ethical concern in both scholarship and in actual policies and committees designed to deal with complaints. These committees implement programs to manage these economic influences in the practice of medicine. The Codes signal that there are conflicts between the methods that produce medical facts and the social values identified as ethical problems.

Theme III: Relationship between Profession and Practice: Obligations and Duties

The practice of medicine, according to the CMA, entails various principled commitments, as detailed in sections I and II. While there are no places where the CMA Code says to "use the best evidence," the infusion of values (e.g., the patient's best interests and understandings) alongside medical facts (e.g., test results, using evidence to make decisions, measures of validity, and so on)signifies that there are conflicts between these two that contribute to the practice of medicine. Each Code provides a response to the problem of uncertainty: how can medical practitioners know for certain that "appropriate care" was provided for the patient?

For the CMA, it may look like this: good judgments are those that follow the 54 rules. The AMA, however, states that good judgments are those that meet the standards set out in the Code:

> The AMA was founded in 1847 with the primary goals of establishing a code of ethics for the profession and setting standards for the education and training of physicians. The AMA *Code of Medical Ethics,* the world's first national code of professional ethics, continues to be the embodiment of professional self-regulation essential to the practice of good medicine. The current *Code* includes the "Principles of Medical Ethics," which are not laws but standards of conduct that define honorable behavior [sic] for physicians. These principles form the basis for the opinions in the *Code,* widely considered the most comprehensive ethics guide for physicians. (AMA 2001:8)

There are duties to follow medical guidelines and professional rules, but as discussed above, these duties presuppose that maintaining life is worthwhile, a social value. This section builds on the previous two sections and examines the social obligations physicians have toward the profession and their practices. As the AMA puts it,

> In times of possible epidemics, physicians have an ethical responsibility to protect the health of the general public. When quarantines and isolations are necessary, they are based on valid science and do not arbitrarily apply to a particular racial, socioeconomic or ethnic group. (AMA 2001:4)

The practice of medicine, as indicated by the Codes, has an obligation to society. In an epidemic, for example, it is most necessary to adhere to the obligations to the profession, as the medical association has outlined the duties of medicine to protect the public. In the case of an epidemic, the duty of the physician is to protect the health of society. The social value placed on public heath, however, would supersede the value placed on the rights and freedoms of an individual patient if, for instance, the patient must be quarantined. Placing a patient under quarantine in order to uphold the health of society is an example of the

prioritizing of social values over professional obligations to the patient's best interests (e.g., the professional rules). Further, the CMA also contains sections that detail obligations to the patient and society. For example, both the well-being of the patient and society are listed under the fundamental responsibilities of the physician (CMA 2004:1). It is also stated that it is important to maintain the health of society in order to maintain the health of individual patients (CMA 2004:3). To further illustrate the relationship between social values and medical facts in the Codes, I turn to a detailed discussion in *Medical Ethics Today*.

The BMA states that in order to eliminate uncertainties associated with ethical dilemmas between patients, society, conflicts, and so on, there are a number of steps that a physician can take: (1) Recognize the situation as one that raises an ethical issue or dilemma; (2) Break the dilemma down to its component parts; (3) Seek additional information, including the patient's viewpoint; (4) Identify any relevant legal or professional guidance; (5) Subject the dilemma to critical analysis; (6) Be able to justify the decision with sound arguments (Brennan et al. 2012:14-17). The steps outline both facts and values: information (i.e., evidence), the patient's values and viewpoint, the society's legal codes, and the individual's physician's judgments. These rules inform the organization of medical activity should any ethical conflicts or questions occur. The physician must also be able to justify each decision with an argument. The logic of any argument would need the "self-clarification and knowledge of interrelated facts" (Weber 1946:152), meaning that the standards set out by various methods of medical practice (i.e., information, legal codes, etc.) must be met. It is through the practical engagement with these various facts and values that the ethical dilemma

can be resolved and eliminated. If all the legal codes are observed, the best evidence is used, life is maintained and suffering is diminished, then conflicts are said to be resolved. Thus, medical decisions and ethical obligations rely on this tension between scientific facts and social values.

Additionally, the manual also describes the function of NICE in relation to the ethics and duties of the practitioner. NICE functions by

> …Providing health professionals, patients and the public with authoritative, robust and reliable guidelines on current best practice... . Guided by evidence-based practice, NICE is responsible for collecting and evaluating all relevant evidence and considering its implications for clinical practice, with reference to both clinical and cost-effectiveness (Brennan et al. 2012:552).

The recommendations for good judgments stem from medical and scientific evidence, yet correspond to societal concerns. The inconsistency here between evidence and economic and social values (e.g., cost effectiveness) highlights that no matter how much evidence there is, it still does not tell doctors what to do; those concerns are spelled out by social relations and expectations.

Additionally, the BMA recognizes that risk is inherent to medical practice, and recommends ways to control it (Brennan et al. 2012:865-872). They list a number of scientific and social factors that may put limitations on a physician's practice, including patient values or cost constraints. The guidelines are meant to resolve the problems associated with any conflicts between evidence and values that may occur in medical practice. In the United Kingdom there are institutional mechanisms for monitoring and improving quality, including NICE: "Evidence-based national service frameworks set out what patients can expect to receive in major care areas or disease groups and quality markers

exist for a wide range of services" (Brennan et al. 2012:876). If an area of care is of importance, it is measured and reviewed. Changes are then made to national guidelines. The guidelines were created with the assumption that they resolve these conflicts between social values and scientific facts through the methods of science. As I have stated in Chapter Three, however, the use of CPGs has a deresponsiblizing effect on individual practitioners.

In response to questions concerning good judgments, the Codes treat the ambiguities of this tension as resolvable. Guidelines, such as those in the United Kingdom, or any of the Codes discussed here, outline the right ways that physicians ought to act in their practices. Both EBM and the Codes are manifestations of a logic which, according to Weber, separates facts and values. The normative dimensions of these Codes are rooted in the fact that they require physicians to recognize their duties to the treatment of patients based on both the medical evidence and the values of the patient.

THE LIMITS OF ETHICAL ACTION AND MEDICAL INTERVENTION

Now I consider the implications of the deresponsibilization of medicine. The Codes of Ethics studied above contain a tension between the split nature of the facts of medical science and social values. The Codes are rules for managing the networks of medical practice. They constitute a particular kind of physician, one who has a duty to engage with both evidence and patient values in order to make medical judgments, and this duty was created to fill a social need within society to diminish suffering and maintain life. Below I examine the ethics of medicine from a sociological perspective by theorizing the overarching principles of EBM and the Codes of Ethics in light of Weber's (1994) two concepts "the ethic of principled

conviction" and the "ethic of responsibility." As I discuss below, an ethic of responsibility entails accountability to the consequences of one's actions, while one who takes an ethic of principled conviction does not take responsibility for the results following from a decision[51].

Weber conceived of the vocation of science as having an ethical dimension. The scientist, be it medical, social, or natural, would stand "in the service of 'moral' forces; he [sic] fulfils the duty of bringing about self-clarification and a sense of responsibility" (Weber 1946:152). The duty of science is to clarify society's understanding of the world by creating knowledge about it. Medical science creates knowledge of the human body and disease in order to fulfill the moral needs of society. The "moral forces" to which the medical field is in service signifies the social obligation of science to produce knowledge about health, a social value. The duty to provide clarification is also a responsibility. Scientists use knowledge to provide self-clarification, which is a responsibility that goes beyond just feeling an individual experience of understanding. Scientists also recognize the social expectation to clarify and provide knowledge of the world. As EBM conceives of the physician, s/he must understand the facts of disease and evidence for its treatment. The Codes also detailed that responsibility goes beyond individual duty; they fulfill a moral mandate set by society to diminish suffering and maintain life. The work of science, however, ends when values judgments have to be made about the evidence. I turn to a discussion of politics in order to consider the "sense of responsibility" individual doctors have to society.

[51] I thank Zohreh BayatRizi for suggesting that I engage with Weber's conception of political responsibility as a response to the potential implications of the deresponsibilization of medical judgments.

Medicine is mandated by society to fulfill its values: diminishing suffering and maintaining life. Weber defines politics in an extraordinarily broad definition: "embracing every kind of independent *leadership* activity" (Weber 1994:309). Medicine holds a leadership role over human life by producing facts about it and acting on the basis of both facts and values (as discussed in the previous section). For Weber, political action requires a version of responsibility to which officials (technicians of general rules) are not accountable. In drawing this comparison between politicians and doctors, I show that physicians can reserve a space for good judgment by adhering to an ethic of responsibility which cannot be bound by formal rationality.

Weber discussed the profession and ethics of politics by drawing a distinction between politicians and officials. Although both roles may be associated with work that is generally considered a part of "political office," their duties encompass different relations to responsibility:

> [The politician's] actions are subject to quite a different principle of *responsibility*, one diametrically opposed to that of the official. When, despite the arguments advanced by an official, [sic] his superior insists on the execution of an instruction which the official regards as mistaken, the official's honour consists in being able to carry out that instruction, on the *responsibility* of the man issuing it, conscientiously and precisely in the same way as if it corresponded to his own convictions. Without this supremely ethical discipline and self-denial the whole apparatus would disintegrate. By contrast, the honour of the political leader, that is, of the leading statesman, consists precisely in taking exclusive *personal* responsibility for what he does, responsibility which he cannot refuse or unload on to others. (Weber 1994:330-331)

For an official, their duties are carried out by following the orders of his or her superior officers. The emphasis is placed on following instruction rather than on the ends to which any instruction is oriented. This relationship to responsibility was theorized in Chapter Three:

CPGs imagine that the "ideal" physician is the one who follows the rules in each particular case. What is important in both CPGs and the Codes discussed above is the importance of the impartial execution of the rules. To paraphrase Weber, evidence-based CPGs rely on the "discipline and self-denial" of the practitioner who follows the rules. The political leader, however, must take responsibility for the consequences that follow from any action, including those of the subordinate officers. This leader must take personal responsibility for both what s/he decides, and this cannot be deferred to others. A doctor who acts with this kind of ethic would understand that the consequences of their decisions are theirs personally.

The question that arises here concerns the logic of this relationship. Weber does not assume that good judgments are the result of political leadership, while poor choices are the result of rule-following. Leaders can make poor decisions:

> At times people have believed that that these two possibilities were mutually exclusive alternatives, and that either the one or the other was correct. But is it in fact true that any ethic in the world could establish substantially *identical* commandments applicable to all relationships, whether erotic, business, family or official, to one's relations with one's wife, greengrocer, son, competitor, with a friend or an accused man? (Weber 1994:357)

For EBM it is not simply a matter of stating that all good decisions are those that maintain life and diminish suffering[52]. Doing so would lend itself to creating a body of rules ("commandments") that ought to be followed and executed in every situation. This is not unlike the way that the Codes above are conceived, as a body of rules that is applicable to all relationships, all patients and their values.

[52] I return to this point in the next section with a detailed example about how good judgments may, in fact, not maintain life. For now, I will stick to explaining the distinction between the two ethics of political action.

EBM proponents understand that not all uncertainties can be predicted or mastered through rule-following: "Clinicians must be ready to accept and live with uncertainty and to acknowledge that management decisions are often made in the face of relative ignorance of their true impact" (Guyatt et al. 1992:2421). Although there are bodies of rules that aim to control for uncertainty by establishing rules for "application to all relationships," this statement from the original publication of EBM signals that the consequence of judgments really matter in medical practice. A form of responsibility must be accounted for given that the nature of any decision may be in ignorance of its forthcoming consequences. A treatment recommendation, for example, may fail to diminish suffering despite the doctor's best efforts.

Weber turns to a discussion of consequences and the "ends" to which all action is oriented:

> 'Consequences,' however, are no concern of absolutist ethics. That is the crucial point. We have understood that ethically-oriented activity can follow two fundamentally different, irreconcilable maxims. It can follow the 'ethic of principled conviction,' or the 'ethic of responsibility.' It is not that the ethic of conviction is identical with irresponsibility nor that the ethic of responsibility means the absence of principled conviction – there is of course no question of that. But there is a profound opposition between acting by the maxim of the ethic of conviction (putting it in religious terms: 'The Christian does what is right and places the outcome in God's hands'), and acting by the maxim of the ethic of responsibility, which means that one must answer for the (foreseeable) consequences of one's actions. (Weber 1994:359-360)

There are two kinds of ethics for political leaders: the ethic of principled conviction and the ethic of responsibility. First, I discuss the ethic of principled conviction, which is one that follows the adage, justification of the means by the ends. Weber enters into a lengthy discussion of pacifism and political leadership. The pacifist refuses to use violence because

s/he is guided by the conviction that violence is never necessary and is inherently wrong. The consequences that may fall from this decision, however, are not the fault of the leader: The leader was right because s/he stuck to her/his principles. If the outcome is negative, it was "god's will," or "wasn't meant to be," and so on. If the decision is successful, the leader will still consider her/himself to be right because s/he stuck to her/his principles. The conviction that the principle is always correct supersedes any responsibility for the consequences.

This kind of conviction may be seen in looking at ethics committees and tribunals that deal with patient complaints about physician decisions. The uncertainty that Guyatt and colleagues mentioned above is dealt with through adherence to the rules, which is like the Codes of ethics (above) which aims to delineate the principles of medicine which apply in every case:

> We see that the ethics of medicine...can be understood as a mutation from the endlessly circuitous contestation over right and wrong practice exemplified in debates ascribed to the conventions of ethics and its wrangling over the permissible limits on medical intervention and discretion, on patient autonomy, restrictions of medical prerogative and the like, as questions that could only be settled by authoritative fiat, by self-monitoring tribunals administering codes of professional ethics, or by attempts to enforce norms of medical reasonableness. (Blum 2011:102)

As Blum discusses, ethics is imagined in the medical profession as a problem of good and bad judgments, which can be mediated by the Codes themselves and tribunals that are set up to assess the physician's adherence to those principles. This form of ethics is understood as an ethic of principled conviction. The principles themselves are rarely questioned, and the consequences of medical judgments are ruled in light of correct (or incorrect) administration of the rules. Doctors who can say that they followed their duties, as outlined in the Code of

ethics, would not understand themselves as responsibility for any consequences of their decision.

The other form of ethics for political leaders is the ethic of responsibility that understands that "one must answer for the consequences of one's actions." Weber described this kind of ethical action as one of maturity, where a leader is aware of the consequences for any action, and takes responsibility for it. Weber quotes Martin Luther's famous "here I stand I can do no other" to demonstrate that the ethic of responsibility means that sometimes in life individuals must "make sins":

> No ethics in the world can get round the fact that the achievement of 'good' ends is often tied to the necessity of employing morally dangerous means, and that one must reckon with the likelihood of evil side effects. Nor can any ethic determine how far the ethically good end 'sanctifies' the ethically dangerous means and side-effects. The decisive means of politics is the use of violence. It seems that the ethics of conviction is bound to flounder hopelessly on this problem of how the end is to sanctify such a means. Indeed the only position it can logically take is to reject any action that employs morally dangerous means. (Weber 1994:360)

Although Weber is here discussing political leadership, I theorize that medicine's mandate to maintain life deals with matters of both death (and life). Rectifying the ends of any medical judgment with the means creates a problematic tension between saving a life and diminishing suffering. Some medical interventions require the patient to endure suffering with the aim of curing cancer, or a wound after major surgery, and so on. If medicine is to be bound by the formal rationality of rule-following via an ethic of principled conviction, it would never be able to act in order to treat cancer, which may require suffering (e.g., breast cancer treatment sometimes require removal of the breast, altering the body, and causing stress and other

possible harms). Medicine aims to do more good than harm, but this relationship requires an ethic of responsibility for the consequences of any decision.

For Weber, these two ethics are incommensurable: "It is not possible to unite the ethic of conviction with the ethic of responsibility, nor can one issue an ethical decree determining which end shall sanctify which means, if any concession is to be made to this principle" (Weber 1994:362). The ethic of responsibility requires a "slow, strong drilling through hard boards, with a combination of passion and a sense of judgment" (Weber 1994:369). The desire to save lives or diminish suffering may be the intention, but the unpredictability (and sometimes irreversibility) of medical interventions are limits that cannot be overcome by technology or biostatistical measures of probability. Every medical intervention contains this paradox. How can the relationship between evidence and judgment be retheorized? Rather than take up the task of eliminating uncertainty through a principled conviction to the adherence to procedure and rules, I will next examine under what circumstances uncertainty can be understood as a collective "good."

THE GREY ZONE OF "GOOD" JUDGMENTS

In the previous section I explained the two different forms of ethics outlined by Weber and how these relate to EBM. Now I will work through a detailed example that engages with the ethic of responsibility to theorize how this may look in practice. I present the ethic of responsibility as an alternative to deresponsiblized medical practice. The amelioration of uncertainty in the EBM programme, as I have shown, is potentially limited by an

externalization of individual judgment, called deresponsibilization. There are also material limitations to EBM, as I discussed in Chapter Four: evidence cannot be the sole basis for every decision because there are economic and political structures at work in the processes of evidence production and implementation. The Codes of ethics point to the conflicting nature of the ethical dilemma of medicine: there is difficulty negotiating the social and scientific obligations present in EBM. Is there a way to reserve a space for good judgments that is not bound by formal rationality? How does this look in the face of uncertainty?

In this section I consider medical judgments as practices within a *Grey Zone*. I draw on this concept, as presented by Alan Blum (2011), in order to rethink the principled conviction of EBM and ultimate ends of eliminating uncertainty. The Grey Zone is defined as the following:

> The interpretation of culture and health and illness is often thought of as a zone of ambiguity in which the necessity for clear-cut actions and decision-making of practitioners and clients involved in relationships to modern medicine is always haunted by unspoken assumptions, understandings and equivocations that cannot be completely mastered and made explicit. We call this region of ambiguity the Grey Zone because it is the space of indeterminacy upon which all determination ultimately depends. . . . The Grey Zone is based upon a proverbial sense of the distinction between "black and white" dualistic thinking that posits unambiguous alternatives as if choosing between them is the fundamental ambiguity (either/or) and a more pervasive sense of irresolution that haunts all words and deeds. (Blum 2011:9)

For Blum, the Grey Zone is a metaphor; it is a symbolic representation of the fundamental ambiguity that is inherent to medical practice. Blum's research engages with the work of Jacques Lacan in order to demonstrate the "remains" of any attempt to symbolize (or produce knowledge about) the body. To explain the structure of this phenomenon and the relationship between knowledge and the body, which is fundamentally ambiguous within

medical practice, I will briefly explain the Lacanian registers upon which Blum's metaphor is based (Blum 2011:19-23).

The Real of the Symbolic: "Locating" the Grey Zone

The symbolic register is the realm of signifiers (not icons or figures): They are "differential elements, themselves without meaning, which acquire value only in their mutual relations" (Lacan 1977:279). The symbolic generates the possibility to speak about/act towards our world. Making a diagnosis, for example, is a practice in the symbolic register; these statements can be made about a body or disease and they are both meaningful and intelligible to others. The symbolic order is composed of "a complex network of rules and other kinds of presuppositions" (Zizek 2006:9). Medicine is a symbolic order with specific terms for classifying and speaking about disease and the processes of the body. EBM also rests on certain presuppositions about the nature of evidence (e.g., rules for validity).

But this process of the symbolization of the human experience (i.e., "nature", the physical aspects of the disease) will always leave a remainder; the real is "that which eludes us" in our encounter with it and always remains beyond symbolization (Lacan 1977:53). The real is that which lies outside of language and representation. For example, every diagnosis is a name for various symptoms and biological processes. The name only signifies that to which it refers: "The real resists symbolization" (Fink 2004:173). The diagnosis of any illness is an act of treating the real by the symbolic: the speaker gives a linguistic name that has meaning to other doctors and the patients, and that name has implications for further medical action (e.g., prescriptions). The symbolic, however, never fully captures the real (e.g., the physical

symptoms of the disease): "What is supposed to be, through its links to external reality, the source of signification, indeed belongs to the real. But this is a real that resists symbolization...the impossible" (Stavrakakis 1999:27). The body, the object of medical symbolization, is never fully accessible:

> Linguistic articulation presupposes a certain loss, the exclusion of something through an act of decision. . . . What is lost is an unmediated access to this real. Now we can only try to encounter the real through symbolisation. We gain access to reality, which is mainly a symbolic construct, but the signified of the signified 'reality', the real itself, is sacrificed forever. (Stavrakakis 1999:34)

It is here that the Grey Zone is located: the nature of medical judgments is their attempt to symbolize the real (the physical body), which must sacrifice its totallization of that which is signified in language (the origin, the symptom). Reality, thus, is a construct, the actualization of any linguistic representation of that which is signified by human action: "Lacanian realism is, however, alien to all other standard versions of epistemological realism in the sense that this real is not the ultimate referent of signification, it is not something representable, but exactly the opposite, the impossible which dislocates reality from within" (Stavrakakis 1999:69). Reality is that which is accessible through the symbolic – medical practitioners using the symbolic (e.g., medical language and knowledge) to treat the real (e.g., the body and its symptoms) as that which can be represented in language; the real is that which remains, impossible to symbolize and thus exists independently of our knowledge of it (Frauley & Pearce 2007:4). The relationship between medical knowledge (and diagnosis and treatment) and the body (and its symptoms) is structured by the fundamental ambiguity of medical practice, referred to as the Grey Zone.

Ambiguity is necessarily a product of the symbolic (language): the real of the symbolic will always exist beyond the human ability to know or say anything comprehensive about it, yet it is that which is referred to (the signified) in speech. What the disease *is* can only be known through the use of language and knowledge, the symbolic register, thus leaving a remainder, something unknown or impossible to symbolize about its nature. Reality, as constructed by the actualization of the symbolic, is unsettled by the uncertainty of that which cannot be known. As I discussed in Chapter Three, multiple sclerosis (MS) is a disease for which the diagnostic criteria continue to change because very little is known about the disease process. Although there is a name for these symptoms, their exact nature is not known. Given the uncertain and ambiguous nature of medical practice, how can one act with an ethic of responsibility? Before considering this question, I first explain the either/or relationship that is characteristic of the Grey Zone.

Either/Or

Earlier I discussed the distinction between the ethic of principled conviction and the ethic of responsibility. In the ethic of principled conviction, individuals assume that an action is either entirely right (good) or morally wrong, violating one's beliefs (bad). The Grey Zone lends itself to this kind of either/or distinction. One way that I propose to "heal" this relationship is to represent the value of ambiguity. The ambiguity to which the Grey Zone refers appears in the distinction between the real (e.g., body) and symbolic (e.g., evidence) as

an either/or[53]. For an example of how the Grey Zone is discussed in medical narratives, consider Jerome Groopman's (2006) description of medical error in *How Doctors Think*:

> I long believed that the errors we made in medicine were largely technical ones – prescribing the wrong dose of a drug, transfusing a unit of blood matched for another person, mislabelling an x-ray of an arm as "right" or "left." But as a growing body of research shows, technical errors account for only a small fraction of our incorrect diagnoses and treatments. Most errors are mistakes in thinking. And part of what causes these cognitive errors is our inner feelings. (P.40)

Groopman's statements contain two distinctions about poor medical judgments ("error") where the formulation of the Grey Zone can be observed. The first comes from his conception of error, that errors may be technical, a simple mistake involving "this" or "that," a "right" or a "left" arm. The second distinction is found in his statements about errors in thinking, that there are judgments that are influenced by our emotions, which are wrong, because they cause error. This kind of relationship between extremes is where we can locate the Grey Zone, as a space inherent to any decision that lies in between the opposing ends of a conceived spectrum. This kind of representation of the either/or problem rests on the assumption that there is a right and wrong way to do something, and that these rules can be known (although not always in advance).

Virtue ethics in the field of bioethics is another example that will further illustrate the Grey Zone as a formulation of the relationship between opposing extremes. One such solution offered to the conundrum of uncertainty is "clinical wise reasoning" (Edmondson,

[53] There is the symbolic and the real, the phenomena or noumena (to borrow the language used by Immanuel Kant). The dualistic representation of the problem is key for understanding the nature of the Grey Zone. The concept of the Grey Zone allows this dualistic representation to be worked out relationally.

Ricca, Woerner 2009). It is described as, "Mastery of what can be known about the subject, benevolence towards hearers, and excellence of character in terms of fairness, concern and responsiveness to the other person" (Edmondson et al 2009:244). This definition draws from Aristotle and suggests that doctors should be sensitive to their patient's individual and emotional needs. This method recommends that learning to master these characteristics ought to become part of doctor training and education. Similarly, the "virtue epistemologist" (a kind of bioethicist) proposed by James Marcum (2009) focuses "on the intellectual virtues of the epistemic agent required to deliver knowledge or the epistemic goods, as well as on the vices that hinder such delivery" (p.250). The "virtues" that can be learned through training are, (1) intellect, (2) perceptual virtues of sight, hearing, and the senses, and (3) conceptual virtues, the ability to understand the world and form concepts (Marcum 2009:254-257). The clinician is expected to use these virtues to apply the appropriate information in clinical practice (i.e., make judgments) (Marcum 2009:262).

By reducing the problem to a series of characteristics that can be learned, these models offer no solutions to the problem of uncertainty. So long as any doctor possesses particular "good" characteristics (e.g., the mastery of appropriate medical knowledge, being a "good listener", or applying clinical knowledge in practice), this affords her/him the authority to make choices on behalf of what is best for the patient. As I discussed above with Weber, attempts to create any "body of commandments" indicates that there is an ethic of principled conviction. Also, the implementation of general rules that dictate the procedure by which one

may learn and apply "good listening" may be limited by the deresponsibilization of the practitioner.

The either/or relationship between good and bad judgments illustrates the ambiguity inherent to medical practice; these distinctions presuppose that good or bad judgments can be determined in advance. The use of a determining principle, such as a distribution of patients (as discussed in Chapter Two), cannot be determined in advance because each patient and case are unique. How physicians are attempting to live with these differences can be viewed by movements in the literature such as Patient-Centred Care and the importance of the patient's individual values in evidence-based decision-making (Sackett et al. 2000:1).

Patient-Centred Care

EBM claims to help improve patient care (Guyatt et al 1992:2421). Before turning to my final discussion of the role of the Grey Zone in EBM, I first consider whether a movement that advocates for the rights of patients can offer a solution to the principled conviction of EBM and its objective to eliminate uncertainty. Patient-Centred Care (PCC) is defined as a humanitarian solution to the biomedical model of medicine (Lay 1972). In PCC, patients are seen as individuals, unique cases for the doctor to encounter and treat according to the patient's personal and emotional needs. The PCC model argues for the individualization of care, that the doctor and patient work cooperatively, and that the doctor is attentive to the "subjective meanings" of the patient rather than focused solely on the objective details of the patient's medical history (Fehrnsen & Henbest 1993:50).

Mead and Bower (2000) elucidated five different perspectives and approaches in the PCC literature: (1) the biopsychosocial perspective (e.g., stress can cause illness, so illness is more than just the healthy biological functioning of person); (2) the "patient-as-person" (e.g., illness is a lived experience so medicine should make judgments based on this commitment to individual experience rather than on the individual instance of the disease entity); (3) the model of sharing power and responsibility (e.g., medicine should not paternalistic, it should recognize the legitimacy of lay/patient knowledge and cooperate with patients, they are active consumers of medicine); (4) the therapeutic alliance (e.g., doctor is emotionally attuned to the patient's needs which is a skill learned through education); and (5) "doctor-as-person" (e.g., doctors have personal preferences and values) (p.1088-1091). These models, however, cannot overcome the ambiguous nature of medical practice. Patient care relies on the diagnosis and treatment of an illness that will always escape symbolization. What can be learned from this model is that both the doctor and the patient share in the ambiguity surrounding the nature of medical practice. The assumption that, by prioritizing the patient's individual values, there is a "right" way to administer medicine underlies these approaches, which indicates that the Grey Zone cannot be resolved by these methods.

Further, these approaches understand the patient as an active participant in their care. A major criticism of this perspective is that it is a product of the neoliberal agenda (Dent 2003a). In an examination of the "implications of making patient choice and public involvement central to health policy for the medical profession and the governance of health care" in the United Kingdom, Dent (2006:460) found that the implementation of policies

regarding patient choice actually undermines the possibility for patients to choose. After the 1997 election, the National Health Service (NHS) was reconfigured to empower patients; one such change was the creation of the Patient Advice and Liaison Service (PALS). According to PALS, this service helps patients do the following: "resolve concerns or problems when you're using the NHS" and "tell you how to get more involved in your own healthcare" (PALS 2013).

The creation of public services like PALS is considered a governance strategy (Dent 2006). Although the service was created to improve patient choice, it turns out that patients have a limited number of choices, and they are only able to choose things like where (i.e., what hospital) to have their surgery rather than being able to choose their surgeons (Dent 2006). Services such as PALS have led to the "proto-professionalization" of patients (Dent 2006: 458-459; cf. De Swann 1988), where patients have a lay understanding of medicine and lose trust in the medical care they are receiving on the basis of quality and satisfaction. It is unclear whether other options would have the same shortcomings in Canada, as illustrated by the United Kingdom context; however, as discussed in Chapter Three, the implementation of management strategies and economic devices for the regulation of "patient choice" are a form of domination (Rose 2008).

Alternative Judgments: The Ethic of Responsibility

In this final section, I will provide an example of how physicians might make judgments in the face of uncertainty. Sharing decisions with patients is also a way of dealing with the ever-present uncertainty in medicine. In previous eras deference to authority has been the

mechanism physicians used to cope with uncertainty (e.g., Goldman 1980, see p.156-175). The renewed interest in patient choice, however, may indicate that physicians and patients are willing to openly acknowledge uncertainty, and physicians may be willing to invite patients to participate in uncertain decisions (Laine & Davidoff 1996:155).

The following example will further elucidate this relationship between doctor and patient and the ethic of responsibility[54]. In a Sunrise Rounds blog post titled, "Against Medical Advice?" on August 3, 2012, Doctor James Salwitz, an oncologist, writes about a difficult area in medical decision-making:

> Stan is a 57-year-old man with curable colon cancer who requires surgery. Unfortunately, that surgery will result in a colostomy[55]. Without that specific operation, there is an increased risk the cancer will spread. Stan is smart, aggressive and independent. He wants us to modify the treatment to avoid the colostomy. However, such a compromise is outside standard of care, and not supported by what modern medicine understands about colon cancer treatment.
>
> In my office, Stan and I talk at length and he poses a challenging question. He says, "Doc, if I was a friend of yours what would you recommend?" After a moment of thought, I decide that is easy. I would give a recommendation that makes cure most likely. Hundreds of thousands of patients live active lives with colostomies, but very few live such lives with active colon cancer. Therefore, I would tell my friend to have the surgery, accept the colonoscopy, giving the most compassionate support I could muster.

[54] This example was selected because of the media attention it received (e.g., it was discussed on CBC's *White Coat Black Art* among other places). Additionally, the example illustrates how a doctor can make judgments with an ethic of responsibility.

[55] According to the *Gale Encyclopaedia of Medicine*, a colostomy is "a surgical procedure that brings a portion of the large intestine through the abdominal wall to carry feces out of the body." It is a way to treat colorectal cancer, but it is only necessary in rare cases.

> However, then I had a conversation inside my own head. I asked me, Jim Salwitz, not Dr Salwitz, what I would do... To my surprise, I had a moment of bright light insight and intuition. I might very well accept the risk of colon cancer recurrence, nary even death, and not get the colostomy. I was stunned! Patient Jim overrides Dr Jim...
>
> I told Stan about my personal "decision." I told him that although the data was unclear, it was likely he was taking a higher risk of cancer recurrence and death if he did not have the colostomy. I emphasized that a full life was possible with a colostomy. However, I told him that from a standpoint of risk verses perceived quality of life, I might personally choose to avoid the surgery.

In this post, the doctor changed his judgment from one based on the outcomes of care (the likelihood of survival after surgery) to one of "personal decisions." By shifting from what he calls Dr. Salwitz to Jim Salwitz, the doctor recognized that decisions can be made on the basis of having a "full life." Above, the experience of the patient is related to quality of life after the surgery– whether it is *worthwhile* to live, rather than an emphasis on the medical necessity to maintain life. Salwitz's focus on quality of life harkens back to Weber's question about whether life is worthwhile living. Medicine (Dr. Salwitz) cannot provide an answer to this question. His reformulation of what it at stake (the quality of life) requires an ethic that deviates from the EBM programme. An ethic of responsibility can reserve a place for an alternative way of making medical judgments.

The Grey Zone that Salwatiz was dealing with concerned both the uncertainties about the recurrence of cancer ("the data was unclear") and the quality of life with a colostomy. The patient's body is a space of ambiguity, resisting total knowledge of its future. Not only were the consequences of any particular decision unclear, but each option (to have the operation or not) carried with it great risks and produced new possibilities for living, either living with colostomy or living with a potentially fatal illness. The limitations were in the

acknowledgement of risk, that it could not be predicted in advance what the outcomes might be. I will now discuss the circumstances under which doctors can make judgments that are oriented by an ethic of responsibility.

The method by which the doctor arrived at his conclusions was through a "conversation inside [his] own head." Weber referred to this method as *Verstehen,* or sympathetic understanding: "Empathic or appreciative accuracy is attained when, through sympathetic participation, we can adequately grasp the emotional context in which the action took place" (Weber 1978:5). The insights Salwitz gained from such reflection were political in nature: the questions that the patient must tackle were not only limited by the nature of any human action or decision, but they were questions about the future and the kind of life the patient wanted to have. By recognizing the limits of any medical action or intervention, the physician was able to consider his own preferences as another perspective, a different way of understanding the same problem and choice. This kind of reflection would be unlikely given the normative expectations emerging through the use of CPGs. If CPGs are to become the standard of medical care, both legally and professionally, there will be consequences for doctors that do not follow the general rules set out for good practice. Reserving a space of thinking through medicine as a collective and political action may resist the normative programme of EBM.

By engaging in this method of sympathetic understanding and reflection, Salwitz (above) created a new way of thinking about the patient's values and the medical recommendations: Salwitz described an occasion to rethink the medical recommendations

about “what ought to be done” based on the probable outcome of a particular procedure, and he treated it, instead, as something other than a problem of either/or. The basis for this method of judgment was not the epistemological commitments of EBM. It was not the probability of the outcome of colon cancer that became the thing by which to formulate the solution. The decision did not become “good” under an overriding conviction to a principle determined by outcomes and probabilities or rules of ethics. Instead, the judgment was based on a commitment to “answering for the consequences of one’s actions.” The impossibility of knowing the body or what the consequences will be in advance required that the grounds for medical decisions were reformulated to include this kind of responsibility. Salwitz stated that he would support whatever decision the patient made: “Stan’s choice is not supported by research, data, my personal experience, nor by experts in the field. Nonetheless, if he decides to choose that path [decline the operation], I will support him” (Sunrise Rounds 2012). The necessity to follow the recommendations, as CPGs and EBM requires, can be resisted through the use of sympathetic understanding, and considering how any judgment could be otherwise in the face of many uncertainties of medical practice.

In this example, it is not the outcome of the patient’s health that became the overriding principle that organized all medical decisions and actions, as that would be a reassignment of the same logic of principled conviction as EBM. Nor do I suggest that evidence, information, and knowledge are irrelevant to any action. Even other critics of EBM have upheld the need for good evidence: “The definition of evidence is important...because it illustrates the struggle between patients, scientists, doctors, and public health administrators

over the interpretation of scientific results and how to decide the proper goals of medicine" (Saarni & Gylling 2004:172). What I argue here is that the conditions of EBM limit the possibility of this kind of ethic of responsibility as an alternative to EBM.

The ethic of principled conviction precludes the possibility of questioning whether the principles to which the rules adhere are right or wrong, and it is not possible to think in terms that are not bound by the either/or distinction. Medicine could benefit from a relationship to alternatives such as one formulated here via Weber and Blum. Under the EBM formula, however, this is nearly impossible. The potential desresponsibilization of the practitioner, the material conditions that produce evidence, the codes that regulate professional conduct, and the implementation of CPGs and strategies to eliminate uncertainty all reduce the possibility for alternate kinds of thought and action to flourish. Although the Codes of ethics require that physicians make value judgments, departing from the duties of medical science and the assessment of evidence proposed by EBM, there are limited opportunities to genuinely consider whether the elimination of uncertainty is a worthwhile objective, or is a life is worth living should that uncertainty be "resolved." It appears in the above example that it was the challenge to Salwitz's medical authority that incited him to take pause, to exercise his reflection and sympathetic understanding.

I do not propose that this ethic of responsibility can be strategically implemented through check-lists on the wards, or RCT evidence. The methods of EBM cannot cure ambiguity, despite their desire to. The principle by which practitioners can make decisions in their practice is one of a commitment to life to heal ambiguity together: "Healing ambiguity

not curing it; ambiguity is not a disease or sickness" (Blum 2011:245). Ambiguity is a part of the human condition; it resists being fully symbolized on the body or in the outcome of any decision.

The lessons learned from Salwitz is that acting in the best interest of the patient may go against the guidelines, evidence, Codes of ethics, and mandate of medicine to maintain life and diminish suffering: the patient's values may result in their death, and the doctor would not be acting in the patient's best interest, according to EBM and the Codes should he let that happen. Doctors who can take personal responsibility for the consequences of their decisions are acting with an ethic of responsibility, just as seen above in the example of Salwitz. By acknowledging that the consequences of medical decisions have to be *lived with* and may not maintain life or diminish suffering, and that these decisions are made by both patients and doctors, the uncertainty of medical practice becomes a collective endeavour. Rather than the doctor acting on the basis of eliminating uncertainty, this problem can be healed by using one's sympathetic understanding.

Chapter 6

Evidence, Policy, and the Sociology of Medicine

ABSTRACT: In the final chapter I discuss the relationship between uncertainty and medicine in contemporary research on the sociology of medicine. First, I summarize the broader argument of my entire project. Next, I examine some of the newest appropriation of these trends in evidence-based policy. I theorize the implications of this "evidence-based" programme for policy formation in light of my conclusions, and I also reengage with the governmentality literature and the sociology of medicine in order to consider the forms of power related to the evidence-based strategies. I conclude by discussing directions for future research in the sociology of medicine.

> In demanding that clinical medicine be evidence-based, the EBM movement invited the question of what constitutes evidence in medicine. (Tonelli 2009:330)

EBM has changed medical epistemology. The emergence of questions surrounding what constitutes evidence in medical practice was the result of a particular problematization of uncertainty and clinical judgments. Upon these epistemological commitments, clinical judgments could only be valid if they follow the rules of science, specifically randomized controlled trials (RCTs) and measures of statistical probability. In Chapter Two, I detailed a sociological history of EBM, where it came from, and how it became dominant in Western Medical practice. EBM emerged from a reformulation and rebranding of clinical epidemiology, where, in decades leading up to the first EBM statements and throughout the

1960s, 1970s, and 1980s, the uncertainties of clinical care could be controlled by applying probability measures from research about the outcome of therapies and medical interventions. The announcement of EBM brought with it the promise of predictability by introducing evidence-based CPGs to individual practice. The questions of the scientific basis of individual judgments in the clinic were translated into concrete programs for medical training and education, beginning at McMaster University in Canada.

At McMaster, the new structure for medical education and practice was the first instance where the pairing of this problematization and actual education reform was observed. Training programs were carried out in a new architectural space that placed practice and research side-by-side in the hospital, and the principles that structured physician training became "problem-based" rather than authority-based. New training models supported the proliferation of clinical epidemiology: questions and problems emerging from the "local" individual level (i.e., the program designers like Sackett) became "anonymous" (i.e., newly minted physicians who understood medical practice as one that relied on RCT research).

The implementation of evidence-based CPGs based on the principles of EBM to eliminate uncertainty has the potential to deresponsibilize practitioners, as I concluded in Chapter Three. Cases like multiple sclerosis (MS) demonstrate how disease complexity and variation in treatment strategies are obstacles for CPGs. Despite the promise of certainty offered by CPGs and evidence-based recommendations, their effects could produce practitioners who are no longer responsible for their judgments or their patients. The

changing landscape of legal responsibility and negligence is shifting the "buck" to an idealized practitioner who could demonstrate that they followed the recommended procedure (rather than convention), and who could show their knowledge of risk by recourse to statistical probability. EBM has potentially created an effect opposite of the objectives of its programme by externalizing the judgments of individual practitioners to guidelines that act as general rules to be applied in particular cases.

Medicine might respond here that CPGs, with effective evidence, can correct this error, as it is the complexity of disease that shows the limitations of the guidelines, that better technology will produce scientifically valid evidence upon which we can facilitate better judgments. The Fourth Chapter undertakes a political economy of EBM to anticipate this response. I engaged with another case study, this time breast cancer, to show that the objectivity of evidence is imagined. The production of evidence is, instead, subject to material and concrete relations characterized by a struggle with the field of medicine to define its objectives. This chapter analyzed how overdiganosis was possible, given an increase in breast cancer screening and the advancement of new technologies. The effects of overdiagnosis had been harmful for women who were not in need of medical therapies due to unnecessary medical interventions, which were in accordance with practice guidelines. Guidelines that recommended further testing, be it follow-up mammography, MRI, or even genetic testing, and subjected many women with "stage 0" cancer to treatments that were likely irrelevant, such as adjuvant therapy or surgical removal, were unnecessary. The implementation of these guidelines produced profit for the companies that had invested in

breast cancer research, and the investment in breast cancer research produced new evidence upon which guidelines were created.

The evidence for these guidelines was created by research initiatives that had been supported by private investment, and was legally protected and kept secret under patent protection. This evidence was then taken up by medical associations and task forces to create guidelines. Implementation of these guidelines could result in the reproduction of capital for those most likely to profit: the companies who funded the therapy, its tests, and the "evidence" upon which the recommendations were based. The economic interests were predominant and allowed the field of medicine to be structured toward the objectives of profit. The concrete contradictions here, then, could be understood as follows: (1) the patent expires, then companies must find new markets and fund research for new innovation to stay afloat; (2) therapies become overproduced, like the emergence of generic brands producing more of the same; and (3) there are real harms done to patients who did not need medical intervention in the first place. As private interests search out new avenues to generate capital, and as therapies are deployed by guideline strategies and subsequently prescribed by medical practitioners adhering to those CPGs, patients may suffer unnecessarily.

Finally, the fourth chapter redirected the conversation to the significance of uncertainty within the EBM programme. Chapter Five engaged with the ethical implications for medical practice. The limitations of various "Codes of Ethics" reveal a similar logic to CPGs. Those Codes of Ethics imagine a world where those tensions and uncertainties in medicine could be managed, reduced, or eliminated. I argued that medicine could be

reformulated by transforming health into a collective problem, as a political issue oriented toward acting together despite the inherently ambiguous nature of medical practice. Medical decisions or courses of action (medical intervention) can be examined in light of whether "life is worthwhile living," when and what this means, through an ethic of responsibility that sympathetically aims to understand alternative meanings and values.

Further, given the inherently uncertain nature of medical practice, any attempt to control the outcome is impossible, unpredictable, and may have irreversible consequences. An alternative form of medical practice would require an ethic of responsibility, which does not hold the same conviction to the principles of EBM. EBM and its related codes of ethics contain principles oriented to both the production of facts through the measure of "validity" that organize medical practice, and values, such as those of the patient and the necessity of making a value judgment based on the evidence. The work of EBM departs from its scientific principles once physicians make value judgments, what they *ought to do* with the evidence. By retheorizing medicine in light of its political dimensions (via Weber) medical practitioners can make judgments on the basis of something *other* than facts and evidence, while taking responsibility for the consequences of their decisions, and sharing in the uncertainty of medicine collectively, with patients.

IMPLICATIONS

The facts of medicine, evidence that is validated by epistemological commitments to statistical probabilities such as RCTs, cannot inform value judgments; doing so departs from

the scientific commitments of EBM. The objectives of EBM are a proposed solution to the Grey Zone of medical practice, to control for uncertainty by translating scientific research into clinical mores, and by implementing general rules for individual practice. The implementation of evidence-based policies and guidelines creates normative pressures to make "good" judgments, which are only those based on "good," – that is epidemiologically valid, evidence. The EBM programme slips between these normative demands, where pursuing alternatives to what is recommended in a guideline could be punishable by professional or legal sanctions, and admonished by scientific ethos. Programs that are shaped by the EBM model are a reformulation of this same problematization of uncertainty, whose commitments to controlling individual practice through guidelines and policies may have similar effects of deresponsibilization, and could be relying on "evidence" that has been produced by influences and interests from the privatized "outside." In the next section I consider some of these implications for emerging evidence-based fields as well as for a sociology of medicine.

Evidence-Based Everything

The EBM model has seen mass proliferation in other health-related disciplines as well. As two examples, both nursing and physical therapy have adopted evidence-based strategies for their training and practice models. *Evidence-based Nursing*, a *BMJ* Group quarterly academic journal publication, has been in circulation since January 1998. In physical therapy,

Dianne Jewell's (2010) *Guide to Evidence-Based Physical Therapist Practice* (second edition) details how therapists can bring evidence into their practice[56].

The EBM programme also reaches beyond health professions. In the last decade or so, the term "evidence-based" has emerged in relation to social and government policy. For example, in an article published in the *New York Times*, David Bornstein wrote about the growing importance of evidence-based policymaking in discussions to reduce the United States national debt:

> Many federal programs fail to show results when subjected to large rigorous evaluations. But while it's easy for budget hawks to call for the axe, we have to remember that cutting a program doesn't make the problem go away. We'll still have people who are unemployed, unskilled, aging, chronically ill, disabled, living in substandard housing, and so forth. In many cases, their problems, if ignored, will become more costly for society over time. (Bornstein 2013)

Nonprofit bodies and think-tanks like the Coalition for Evidence-Based Policy in the United States are answering these calls for evidence-based policymaking (EBP). The Coalition was created in 2001. Its mission statement says, "The Coalition is a nonprofit,

[56] As an anecdotal footnote, a recent experience with my personal physical therapist revealed his interest and fascination with measures of "range of motion." As it was explained to me, range of motion is an assessment technique to figure out joint mobility. Assessments, however, are determined by the therapist's own subjective assessment of this range. "How can we be sure," he asked me, "that what I think is a good range of motion is the same as what another therapist would tell you?" He discussed a number of courses that he was taking that were concerned with controlling for variation in assessment techniques. These kinds of concerns are reminiscent of some of the earlier conversations in medicine about variation in care discussed in Chapter Two. Training programs such as the one that my therapist was attending are strategies to intervene in his practice to refocus his judgment by evidence-based guidelines.

nonpartisan organization, whose mission is to increase government effectiveness through the use of rigorous evidence about 'what works'" (Coalition for Evidence-Based Policy 2013). The Coalition generates evidence about targeted groups of individuals, such as at-risk youth, or out-patients. The reports are then circulated to government officials for help with policy creation and implementation. These kinds of partnerships emerge from government interests in finding experts to produce knowledge about an identified problem.

I order to elucidate the political nature of evidence-based programme, I draw on the work of Nikolas Rose and what he calls "experience in the conduct of conduct." Liberal political strategies rest on the assumption that individuals are free subjects, but that knowledge of the population could be used to solve social problems at the individual level: "Authority arising out of a claim to a true and positive knowledge of humans, to neutrality and to efficacy – came to provide a number of solutions which were of considerable importance in rendering liberalism operable" (Rose 1993:284). Rose would see the "evidence-based" programme as one that facilitates governance policies by producing "expert" knowledge about targeted populations and producing programs to resolve, regulate, or correct their conduct. By collecting information about targeted and problematic groups, policies aim to intervene strategically to correct the problems. These strategies, however, are focused upon influencing what individual people actually do.

For a Canadian example, Policy Horizons Canada (PHC) is an organization in the public service whose mandate is "to provide timely and integrated perspectives on policy issues for the Deputy Minister community" by, "bridging people, ideas, data, issues and

evidence in a safe and open environment; co-creating knowledge for understanding complex Canadian policy challenges, and experimenting with new tools and methods" (PHC 2013a). The organization is governed by a Steering Committee of Deputy Ministers, including the minister of Human Resources and Skills Development Canada, and various co-chairs from the policy committees of the *Coordinating Committees of Deputy Ministers*. PHC describes their approach as follows:

> Evidence-based, evidence-informed or knowledge-based policy development refers to an approach that levers the best available objective evidence from research to identify and understand issues so that policies can be crafted by decision makers that will deliver desired outcomes effectively, with a minimal margin of error and reduced risk of unintended consequences. (PHC 2013b)

The number one reason PHC cites for taking this approach is that it improves policymaking by "reducing uncertainty" (PHC 2013b). The relationship between government and this policymaking organization in Canada is similar to that of the Coalition above: "The authority of expertise becomes inextricably linked to the formal political apparatus of rule, in attempts to tame and govern the undesirable consequences of…life" (Rose 1993:285). PHC is a government organization, created by and reporting to ministers in parliament. PHC purports that their policies "reduce uncertainty," that they create policy to "deliver desired outcomes" and "reduce the risk of unintended consequences" of any political decision. Similar to the formation of CPGs that rely on expert knowledge produced by clinical epidemiology and medical research, PHC aims to inform government on policy through the use of expert knowledge. The policy programs of government direct and mandate the generation of knowledge in order to correct identified problems.

One of the areas of major importance is education across this field of EBP and government-organization collaborations. For example, the Alberta Education Action Agenda for 2011-2014 has the following recommendations: "Alberta's education community needs to harness the power of research to continue to be on the leading edge of educational practice and benefit from innovation in other parts of the world. This will enable better evidence-based decision making in educational policy and programming" (Alberta Education: 2010:8). Rose offers some insights into the emergence of "advanced liberal" governance which will allow me to explain this new interest in EBP:

> These changes have arisen, on the one hand, through a series of critiques that have problematized welfare from the point of view of its alleged failings. On the other hand, they have been made possible through a range of new devices for governing conduct that have their roots, in part at least, in the "success" of welfare. A new formula of rule is taking shape, one that we can perhaps best term "advanced liberal". Advanced liberal rule depends upon expertise in a different way, and articulates experts differently into the apparatus of rule. It does not seek to govern through "society", but through the regulated choices of individual citizens. And it seeks to detach the substantive authority of expertise from the apparatuses of political rule, relocating experts within a market governed by the rationalities of competition, accountability and consumer demand. (Rose 1993:285)

While liberal programs use expert knowledge to produce policy, advance liberal programs depend upon expertise in order to regulate individuals toward the ends of governmental power. To recall, there was a detachment between medical expertise and the physician due to questions concerning practice variation and the convention knowledge that "doctor knows best." Similarly, in EBP, there is a separation between experts and accountability. Policies can be created using expert knowledge, and the product of these policies can be guidelines which delimit the field of possible choices for individuals, like medical practitioners or educators.

The EBP programme, emerging from EBM, provides a solution to questions about governance, that is, the intervention into individual conduct through strategies within policymaking that target specific populations and their identified "problems." We can see how Rose's critique of advanced liberalism provides an explanation for the linkages between policy-making and the evidence-based programme for governance strategies. EBP, like EBM, outlines a step-by-step procedure for creating evidence-based policy: "ask focused question → search for evidence → appraise evidence → implement evidence at policy level" (Greenhalgh & Russell 2009:308). The way these strategies work at the policy level is the following:

> They are an inevitably schematic way of identifying a number of distinct - if not sharply delineated or mutually exclusive – problematizations of rule: ways of asking what should be ruled, by whom and through what procedures. It is these problematizations that accord the activity of politics its intelligibility and possibility at different times; it is these problematizations that shape what are to be counted as problems, what as failures and what as solutions. (Rose 1993:285)

In 2013, the United Kingdom Department for Education published a paper by Ben Goldacre titled "Building Evidence into Education" (United Kingdom Department for Education 2013). Goldacre, a medic, is known for his Ted Talk on "Battling Bad Science." His paper argued for RCTs in policy and Government. He proposes that policies should be tested through RCTs for effectiveness: are the "strategies" (e.g., interventions) producing a measurable effect (e.g., correcting the social conduct of individuals to eliminate an identified political and governance problem)?

> In this model, a policy problem is defined and research evidence used to fill an identified knowledge gap, thereby solving the problem. The relation between the research evidence and the resulting policy is assumed to be essentially linear and direct. (Greenhalgh & Russell 2009:305)

As I have demonstrated throughout this dissertation, this relationship is far from "direct" and is instead limited by various material influences, as demonstrated in the case of CPGs.

While the EBM programme has changed medical epistemology, I might ask if these kind of governmental strategies shape the kind of world we want to live in, where variation is a cause for intervention and control. A place where the State "gets smarter and smarter, and more and more opaque as to whom its interventions are targeted at and why" (Davies 2013). The questions that these forms of evidence-based policies or guidelines raise concern theories of power.

The EBM programme reveals how technologies of governance can be inspired by formulations that emerge through the health and life sciences. These programs are a specific yet complex form of power for intervening in the lives of individuals and operate through the condition of freedom:

> The freedom upon which such modes of government depend, and which they instrumentalize in so many diverse ways, is no "natural" property of political subjects, awaiting only the removal of constraints for it to flower forth in forms that will ensure the maximization of economic and social well-being. . . . Advanced liberalism asks whether it is possible to govern without governing society, that is to say, to govern through the regulated and accountable choices of autonomous agents – citizens, consumers, parents, employees, managers, investors. As an autonomizing and pluralizing formula of rule, it is dependent upon the proliferation of little regulatory instances across a territory and their multiplication, at a "molecular" level, through the interstices of our present experience. It is dependent, too, upon a particular relation between political subjects and expertise, in which the injunctions of the experts merge with our own projects for self-mastery. . . . This is not to say that our freedom is a sham. It is to say that the agonistic relation between liberty and government is an intrinsic part of what we have come to know as freedom. (Rose 1993:297-298)

Although liberal government values the freedom of individuals, it undermines this freedom by "automatizing" a formula to intervene at the level of individual conduct through

political strategies (such as EBP). By producing individuals, be they teachers, education administrators, or doctors, at the ground level who are accountable to a range of choices already delineated in a set guideline, governance can correct identified problems by separating freedom from the "free choices" of individuals. The power of these strategies, like those of CPGs, can be observed in the normative influence of guidelines, as well as the material sanctions that guide their actions. By delimiting a field of possible action through the deployment of guidelines, governance is a way of regulating the conduct of individual practitioners: "Power can subject [individuals] to government" (Foucault 2003:201). Policies and guidelines are created from the perspective that an individual must be guided to make good choices. The medical practitioner who makes "subjective" judgments is formulated in the EBM literature as one whose actions need to be controlled for uncertainty through formulas in the form of recommended strategies (i.e., CPGs).

The Sociology of (Evidence-based) Medicine: Directions for Future Research

This brings me to my final point about doing the sociology of medicine in a world where governmental strategies often convert "expert" social science knowledge into "evidence" upon which to base their interventions[57]. Another implication of my argument concerns the normative dimensions of social science recommendations, political economy as a technology

[57] ...Or maybe not, as Canadian Prime Minister Stephen Harper reminded us on April 25, 2013, "Now is not the time to commit sociology." Some have argued that Canada's government seldom looks to social science research in formulating its policies (Brym & Ramos 2013), but that is a topic for further research.

of governmentality, and the formulation of ethics in medical judgments. I conclude by considering directions for future research in the sociology of medicine.

Treating EBM as one discourse among many opens up the possibility for medicine to engage with the knowledge and understandings produced by various perspectives, be they those of patients or other sciences. A sociology that is oriented to the Grey Zone of medical research (or of any human action) brings a plurality of voices (e.g., "interdisciplinarity") to a discourse (i.e., EBM) that has been shown to constitute doctors who have an ethic of principled conviction towards the elimination of uncertainty (i.e., through RCTs and commitments to "validity"). Engaging with multiple perspectives allows medical practitioners to imagine a form of resistance to the programme set forth by EBM as one engaged with civil society and the community within which their actions become meaningful, as demonstrated by Dr. Salwitz decision. It also enables practitioners to re-engage with the limitations of their practice: uncertainty is a collective problem and it cannot be eliminated by steadfast adherence to the rules and the facts. Even EBM requires the physician to make value judgments about what to do, but these concerns depart from the strictness of guidelines and the scientific program of research..

One way of demonstrating that medicine is but one voice among many is to engage is sociological work that elucidates the social and historical dimensions of discourse and practices. By showing that particular modes of thought and action emerged in response to complex problems and questions, the social nature of (medical) science can be explored and analyzed. For example, sociologist William Walters recently suggested that "genealogical

studies are dedicated to the task of denaturalizing objects and subjects, identities and practices that might otherwise appear given to us" (Walters 2012:118). By illuminating the plurality of conversations that were once ongoing and showing how one particular set of questions became predominant, other marginalized concerns can be examined, and the conditions that led to their emergence can be questioned, explained, critiqued, and understood. Although the practices of medicine may be necessary and significant to society, the implications for the EBM program require analysis and reflection.

Walters (2012) suggested three methods of carrying out such social science research endeavours: (1) lines of descent, (2) counter-memory and re-serialization, and (3) the retrieval of forgotten struggles and subjugated knowledge (p.117-140). The first concerns research that investigates how particular institutions came to be as they are today, even when they seem "complete" today (e.g., what is the "family tree" of medicine?). The second looks to examine how "old" ideas are taken up and reappropriated in other institutions (e.g., how did the evidence-based idea emerge in education?). The last aims to examine the work of marginalized knowledge that is not well-known or was replaced by dominant historical narratives (e.g., how have contemporary and alternative forms of medicine been marginalized by the EBM programme?). Future research might develop the social history of medicine, its consequences and implications, in relation to its translation into EBP programs. By exploring the various lines of descent of our current world, alternative knowledge can be hypothesized, questioned, and considered, and the implications of any political strategy can be analyzed and critiqued.

Future research might also develop the relationship between guidelines and medical practitioners drawing on the work of Dorothy Smith (1990). By engaging in qualitative research with the users of CPGs, further research could seek to understand and explain *both* the texts of EBM as authoritative statements produced by the social relations of medicine *and* the ways that guidelines are engaged by active readers in local settings. This research could test the concept of deresponsibilization theorized in this project: are the guidelines activated by practitioners in a way that externalizes their judgments? Original empirical research could produce a sociological analysis of the connections between the authoritative principles of EBM, the creation of guidelines to eliminate uncertainty, and the actual, particular uses of guidelines in local settings as instances within social, institutional, and discursive relations.

Appendix

History of MS Diagnostic Criteria 1868 – 1983[58]

Author(s)	Date	Diagnostic Classifications	Diagnostic Criteria
Jean-Martin Charcot	1868	N/A	Triad of: - Nystagmus - Intention tremor - Scanning speech
Allison & Millar	1954	Early Probable Possible	History of symptoms associated with the disease Physical disablement (usually remitting) Dissemination in Time
Schumacher et al.	1965	Clinically Definite MS	1 Objective signs of dysfunction of the central nervous system; symptoms not acceptable 2 Evidence of damage to two or more sites 3 Predominantly damage to the white matter 4 (a) Two or more episodes of at least 24 h separated by at least 6 months (b) Slow or stepwise progression over 6 months 5 Age of onset 10–50 years 6 Diagnosis by a neurologist; signs and cannot be explained by other disease
McAlpine, Lumsden & Acheson	1972	Latent Probable MS Probable MS Possible MS	History of Remitting Symptoms Evidence of MS in the past history Changes in CSF

[58] Data for this table synthesized from Poser and Brinar 2004a

Author(s)	Date	Diagnostic Classifications	Diagnostic Criteria
Poser et al.	1983	Clinically Definite MS Laboratory-Supported Definite MS Clinically Probable MS Laboratory-Supported Probable MS	*Clinically definite MS* 1 Two attacks and clinical evidence of two separate lesions 2 Two attacks and clinical evidence of one, and paraclinical evidence of another, separate lesion *Laboratory-supported definite MS* 1 Two attacks and either clinical or paraclinical evidence of one lesion, plus CSF oligocloncal bands or elevated IgG 2 One attack and clinical evidence of two separate lesions, plus CSF oligoclonal bands or elevated IgG 3 One attack, clinical evidence of one lesion, and paraclinical evidence of another, separate lesion, plus CSF oligoclonal bands or elvated IgG *Clinically probable MS* 1 Two attacks and clinical evidence of one lesion 2 One attack and clinical evidence of two separate lesions 3 One attack, clinical evidence of one, and paraclinical evidence of another separate lesion, *Laboratory-supported probable MS* 1 Two attacks and CSF oligoclonal bands or elevated IgG

History of McDonald Criteria and Revisions

Clinical Presentation	**2001**[59]	**2005**[60]	**2010**[61]
Two or more attacks; objective clinical evidence of 2 or more lesions	None	None	None
Two or more attacks; objective clinical evidence of 1 lesion	Dissemination in space, demonstrated by MRI *or* Two or more MRI-detected lesions consistent with MS plus positive CSF *or* Await further clinical attack implicating a different site	Dissemination in space, demonstrated by: MRI *or* Two or more MRI-detected lesions consistent with MS plus positive CSF *or* Await further clinical attack implicating a different site	Dissemination in space, demonstrated by: Greater than or equal to 1 T2 lesion in at least 2 of 4 MS-typical regions of the CNS (periventricular, juxtacortical, infratentorial, or spinal cord); *or* Await a further clinical attack implicating a different CNS site
One attack; objective clinical evidence of 2 or more lesions	Dissemination in time, demonstrated by MRI *or* Second clinical attack	Dissemination in time, demonstrated by: MRI *or* Second clinical attack	Dissemination in time, demonstrated by: Simultaneous presence of asymptomatic gadolinium-enhancing and nonenhancing lesions at

[59] Data from this column is from McDonald et al 2001
[60] Data from this column is from Polman et al 2005
[61] Data from this column is from Polman et al 2011

Clinical Presentation	2001[59]	2005[60]	2010[61]
			any time; or A new T2 and/or gadolinium-enhancing lesion(s) on follow-up MRI, irrespective of its timing with reference to a baseline scan; or Await a second clinical attack
One attack; objective clinical evidence of 1 lesion (monosymptomatic presentation; clinically isolated syndrome)	Dissemination in space, demonstrated by MRI *or* Two or more MRI-detected lesions consistent with MS plus positive CSF *and* Dissemination in time, demonstrated by MRI *or* Second clinical attack	Dissemination in space, demonstrated by: MRI *or* Two or more MRI-detected lesions consistent with MS plus positive CSF *and* Dissemination in time, demonstrated by: MRI *or* Second clinical attack	Dissemination in space and time, demonstrated by: For DIS: 1 or more T2 lesion in at least 2 of 4 MS-typical regions of the CNS (periventricular, juxtacortical, infratentorial, or spinal cord)d; or Await a second clinical attack implicating a different CNS site; and For DIT: Simultaneous presence of asymptomatic gadolinium-enhancing and nonenhancing lesions at any time; or A new T2 and/or gadolinium-enhancing lesion(s) on follow-up

Clinical Presentation	2001[59]	2005[60]	2010[61]
			MRI, irrespective of its timing with reference to a baseline scan; or Await a second clinical attack
Insidious neurological progression suggestive of MS	Positive CSF *and* Dissemination in space, demonstrated by 1) Nine or more T2 lesions in brain *or* 2) 2 or more lesions in spinal cord, *or* 3) 4–8 brain plus 1 spinal cord lesion *or* abnormal VEP associated with 4–8 brain lesions, or with fewer than 4 brain lesions plus 1 spinal cord lesion demonstrated by MRI *and* Dissemination in time, demonstrated by MRI *or* Continued progression for 1 year	One year of disease progression (retrospectively or prospectively determined) *and* Two of the following: a. Positive brain MRI (nine T2 lesions or four or more T2 lesions with positive VEP) b. Positive spinal cord MRI (two focal T2 lesions) c. Positive CSF	1 year of disease progression (retrospectively or prospectively determined) plus 2 of 3 of the following criteria: 1. Evidence for DIS in the brain based on_1 T2 lesions in the MS-characteristic (periventricular, juxtacortical, or infratentorial) regions 2. Evidence for DIS in the spinal cord based on 2 T2 lesions in the cord 3. Positive CSF (isoelectric focusing evidence of oligoclonal bands and/or elevated IgG index)

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