Evidence-Based Medicine and the Reconfiguration of Medical Knowledge*

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Over the past decade, different parties in the health care field have developed and disseminated clinical practice guidelines as part of evidence-based medicine. These formal tools based on a scientific evaluation of the research literature purport to tell health care professionals how to practice medicine. Because clinical practice guidelines shift the knowledge base in the health care field through standardization, they remain controversial within and outside medicine. In this paper, we evaluate the predictive accuracy of four medical professionalization theories—functionalism, Freidson's theory of professional dominance, deprofessionalization theory, and the theory of countervailing powers—to account for (1) the shift from pathophysiology to epidemiology with guidelines, (2) the creation of practice guidelines, and (3) the effects of clinical practice guidelines on the autonomy of health professionals. In light of the mixed predictive record of professionalization theories, we conclude with a need for "evidence-based sociology" and a recalibration of basic premises underlying professionalization theories.

According to Freidson (1994), "The most pressing need confronting the study of professions is for an adequate method of conceptualizing knowledge itself" (p. 43). This diagnosis from a pre-eminent professionalization scholar is surprising because for decades Freidson has put knowledge and its authority at the core of his theories of professionalism. Following Everett Hughes' characterization of a professional mandate to control its work (Hughes [1945] 1971), Freidson emphasized that professions are distinguished from other occupations by the legitimate control they hold over their work. Such control does not need to be total; what matters most is that the profession itself determines and evaluates the technical knowledge used in its work; economic control is secondary (Freidson 1970a). Other professions scholars concur with the centrality of knowledge to professional identity and autonomy (Abbott 1988; Goode 1960).

If, as Freidson suggests, we should think of knowledge as the currency to be mobilized by professionals, how do new, contested formats of knowledge relate to what it means to be a professional? In the last decade, the health care field has been under the spell of evidence-based medicine—a social movement aimed to strengthen the scientific base of health care and determine the effectiveness of clinical interventions (Sackett et al. 1996). The turn to evidence-based medicine was made, in part, because studies documented the persistent variation of practice patterns, undermining the credibility of health care practitioners and raising questions about wasteful expenditures. Evidence-based medicine is presented as a solution for two of contemporary medicine's major concerns: (1) the quality of health care and (2) cost control.

Besides meta-analysis of research, databases, and evidence clearinghouses, the most common form to disseminate up-to-date evidence to health providers is through clinical

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practice guidelines. The U.S. Institute of Medicine defines clinical guidelines as "systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances" (Field and Lohr 1990: 38). Such guidelines offer detailed instructions on which diagnostic or screening tests to order, when to provide medical or surgical services, how long patients should stay in a hospital, and other aspects of clinical practice. Typically, a group of experts evaluates the scientific literature according to set criteria and then offers recommendations to practicing clinicians based on the strength of the scientific evidence. Guideline panels define a focus and audience for the guideline; retrieve, evaluate, and synthesize the evidence; summarize the benefits and harms; and determine the appropriateness of the intervention. Particularly in the last decade, the development of clinical practice guidelines has boomed: in the United Kingdom, for example, an estimated 2,000 guidelines are in varying stages of proposal and implementation (Jackson and Feder 1998). In the United States, estimates put the number of guidelines between 1,400 and 4,000, with currently about 1,000 new guidelines constructed annually (Rosser, Davis, and Gilbart 2001).

Because these protocols and guidelines purport to tell professionals how to conduct their work, they remain controversial among clinicians (Timmermans and Berg 2003a). Guideline advocates laud the scientific optimum that protocols and guidelines provide. Backed up by the best available evidence, it is purported that practitioners will finally know what works and when (Sackett, et al. 2000). However, critics of protocols remain suspicious of the clinical transparency exposed by guidelines. They fear that third parties will seize protocols and guidelines and use them against long-standing professional interests (Charlton 1997).

More than the fears and hopes of professionals themselves, clinical practice guidelines might elucidate a compounded aspect of sociological theorizing on medical professions: the epistemological characteristics of, and control over, professional knowledge. Several key figures in this literature have written about the role of clinical practice guidelines in the process of professionalization, but their writings are what Corbin and Strauss call "forward reviews" (1987). They mainly took stock of the *potential* of these new forms of knowledge to undermine or foster professional control without empirically investigating the guidelines and protocols. Instead of extrapolating from professions theory to examine practice guidelines, we use the case of clinical guidelines to evaluate the predictive accuracy and scope of medical profession theories. To do so we will first distinguish key theoretical differences that have developed over time with regard to the conceptualization of knowledge and autonomy in sociological theories of the medical profession. Our review covers functionalism, Freidson's professional dominance theories, deprofessionalization theory, and the theory of countervailing powers. We distinguish these theories based on the epistemological characteristics they attribute to professional knowledge and the relevance of internal or external control over this knowledge. Since practice guidelines have been prominent in health care for the last decade, this is an opportune moment to evaluate the strength of professionalization theories and their ability to account for the epistemological changes produced by these technologies.

KNOWLEDGE IN MEDICAL PROFESSIONAL THEORIES

Parsons (1951) noted that "modern medicine is organized about the application of scientific knowledge to the problems of illness and health," (p. 432), adding that the integration of science is incomplete and often resisted by physicians. Patients do not know what is wrong with them and therefore have to rely on a technically qualified physician for treatment and legitimation of their deviant sick role. Because of the functional primacy of physicians to keep the population healthy (and to fulfill social roles), competence standards regulate medical activity. In light of the high technical specificity of medicine, these standards are formulated by the medical profession and reflect a patterning of professional norms: valuing achieved characteristics (rather than ascribed), universalism (rather than particularism), functional specificity (rather than functional generality), affective neutrality (rather than a professional relationship based on affection), and an orientation to the collectivity (rather than to self-interests).[1] Parsons also

noted that, because of the expectation of technical competence in a field characterized by great uncertainty, there is a highly symbolic institutional "bias" towards unwarranted active intervention in medical practice (p. 469).

Parsons' focus on rational, scientific criteria for the practice of medicine is in line with the policy goals of evidence-based medicine. Physicians' clinical decisions should be based on scientific, aggregated data related to known clinical outcomes, not on cumulative and anecdotal clinical experiences of individual practitioners (reflecting achieved rather than ascribed decision-making processes). Clinical practice guidelines also conform to the other normative requirements that Parsons distinguished for professional knowledge: The tools reflect expert opinions (functional specificity) to be used in similar patient situations (universalism) that downplay the subjective quality of patient-provider relationships (affective neutrality) for objective, measurable variables. Because practice guidelines aim to standardize medicine and reduce practitioner variation, they also reflect a turn towards institutionalizing a collectivity orientation in order to counter the economic self-interests of individual physicians. In light of Parsons' action theory, the turn to evidence-based medicine thus constitutes a further entrenchment of particular characteristics of professional knowledge and power, presuming that practitioners retain control in formulating clinical practice guidelines. It is exactly this presumption of practitioner control over knowledge that has been contested by Parsons' successors.

According to Freidson (1986), professionals are agents of formal knowledge. Like all occupations they perform a type of work, but they distinguish themselves from other occupations by the special character of the knowledge required to perform their tasks. Not any kind of knowledge begets professional power: Freidson emphasizes that professional knowledge needs to be exclusive, esoteric, theoretical, and discretionary to advance professional interests. Credentialing systems institutionalized by legal means as the result of professional lobbying provide a firm but not completely secure framework for professionals to earn a living. These positions allow professionals both control over, and discretion in, their work. After higher education and the acquisition of appropriate credentials, professionals act on secular formal knowledge, and it is the nature of their work and the institutions in which they work that animates knowledge.

Writing about the nexus between power and knowledge, Freidson did not anticipate the emergence of evidence-based medicine and clinical practice guidelines. He observed that professionals exercised power in the political economy by formulating technical product standards and developing personnel standards. In passing, he mentioned the danger of standardizing the actual content of medical work: "it is true that there are generally recognized standards of procedure that exist in medicine and law, for example, and that they become the focus of attention . . . but they are rarely officially codified. Nor are service outcomes. If they were, *of course, professionals would have considerably less discretion in performing their work*" (Freidson 1986: 203–204, emphasis added).

Two additional issues are important in light of Freidson's theorizing. First, Freidson emphasized the role of clinical autonomy in his discussion of professionals working in bureaucratic entities, supervised by managers. He did not believe that managers constrained professional power because, while administrators might allocate the resources for professional work, professionals still remain gatekeepers in the distribution of goods and services and are able to offset scarcity through the use of discretionary powers. A professional faced by standardization can shrug off scarcity, cut corners, routinize procedures, or soldier the system (Bowker and Star 1999).

Second, Freidson also claimed that internal differentiation in the profession with elites setting the standards for the rank and file professionals executing the work would not splinter the professional prerogatives because ultimately professionals themselves create the standards (Freidson 1970b; Freidson 1993). Even if state organizations or other bureaucrats chose standards, what matters to Freidson is who remains in charge of the formulation of such standards: "That official standards are implemented or enforced by lay rather than professional functionaries is of course important, but this does not reduce the importance of the professional source of the standards they are obliged to follow" (Freidson 1994: 40). Freidson ends his discussion of standards with an open question of whose interests ultimately will prevail when standards are implemented:

"Here, as elsewhere, we need to look more closely at the detail" (Freidson 1994: 205).

By the time that Freidson's 1970 treatise on professional dominance[2] gained a privileged place in theories of the medical profession, significant changes had already taken place in both the organization and delivery of health care services that challenged the hegemonic perspective. The changes included the corporatization of medicine, increased involvement of the government in the financing and regulation of health care, unprecedented growth in biomedical technologies, the emergence of "defensive medicine," the growth in physician administrators, ongoing specialization within medicine, an end to medicine's exemption from antitrust law, the codification of medical knowledge, and an increasingly distrustful public that took a critical stance toward medical authority (Haug 1973; Haug 1975; Light and Levine 1988). Taken together, these changes had implications for the medical profession's exclusive claim to medical knowledge and thus its autonomy.

Two such challenges to Freidson's model of professional dominance were the theoretical perspectives of proletarianization and deprofessionalization within medicine. While the proletarianization perspective (later renamed to the corporatization perspective, McKinlay and Marceau 2002) was primarily concerned with the nature of the work performed by physicians (Light and Levine 1988), the concept of deprofessionalization cut to the core of professional monopoly over esoteric medical knowledge. In contrast to the prevailing perspective that society would become increasingly "professionalized" (Wilensky 1974), Marie R. Haug (1988) hypothesized that the future of professions would more likely be characterized by a process of deprofessionalization. An increasingly educated public, new computer technologies, and emerging divisions of labor within the medical field posed significant threats to the medical profession's monopoly over knowledge, resulting in a decline in professional autonomy.

The penetration of computerized technology foreshadowed current debates about the impact of evidence-based medicine on clinical autonomy. The emergence of "information technology" and "decision support systems" (Stoeckle 1988) in clinical practice could shift the location of esoteric knowledge from individual practitioners to computerized systems that consequently would allow outside parties access to both the substance and application of medical knowledge in clinical practice (Haug 1988). When information systems are used to document medical histories, monitor the medical examination, and assist with diagnosis and directing treatment plans, Haug predicted that the autonomous discretion and judgment of individual practitioners faced erosion. In addition, deprofessionalization theorists predicted that computer technology allowed for the monitoring of physician decision-making by outside parties—including the corporate bureaucracies to which physicians are increasingly accountable (Stoeckle 1988)—and external, mechanized peer review (Haug 1973) to evaluate physician performance (Light and Levine 1988).[3]

The threats signaled by deprofessionalization theorists have since been developed further in the cybernetic, conflict theory of countervailing powers (Light 1991). According to Light, when one player in the health care field dominates, other players will react and redress the "excessive" power base of the dominator. Health care thus takes place in a market of "interdependent yet distinct" parties vying for resources, favorable public opinion, territory, and control (Light 1995:26). The so-called "golden age" of professional dominance during the 1950s and 1960s was a period of excess when the medical profession dominated the health care market. As a consequence, other parties (Light distinguishes government, consumers, corporate buyers, corporate sellers, and other health care providers (Light 1993)) attempted to chip away at the control of the medical profession. The rise of managed care, cost-containment, and the broader "buyer's revolt" constitutes one of the "ironies of success" (p. 73): Exactly because the profession was so powerful in setting up protected markets for health care providers, it created ideal markets for pharmaceutical and other health related, for-profit corporations. A high level of clinical autonomy may have led to the decline in trust in medical professionals in recent decades, as the lack of external controls led to spiraling costs and inefficient or even incompetent care. The weakening of professional power is thus to some extent from the profession's own doing, or at least an unintended consequence of its dominance. While Light observes that medical power is now declining, he disagrees with the viewpoint that this leads

to a final state of proletarianization, corporatization, or deprofessionalization; these concepts only describe moments in an ongoing process of fluctuating powers (Light 1991).

The theory of countervailing powers allows Light to detect a downward momentum in professional power, in part because of the erosion of the monopoly over medical knowledge in recent years (Hafferty and Light 1995). While most observers agree that the medical profession maintains general cultural authority in the health care field, Light and Hafferty argue that professionals have lost ground in the nitty-gritty aspects of their daily activities. They point to the emergence of a new elite of clinical researchers in medicine and speculate that these elite physicians will not pursue traditional professional interests, but instead develop closer ideological and working ties with corporate interests, dividing medicine from within. The destructive potential of these elite researchers is further exacerbated by the fact that they develop clinical practice guidelines to render medicine more scientific.

Concern with ongoing practice variation, lingering uncertainties of medical work, and escalating health care costs, led two different actors to develop practice guidelines: government third-party payers and professional expert panels. The alleged effects of guideline development that could enhance or erode professional authority and autonomy are threefold. First, guidelines could provide a more secure scientific footing that might enhance the overall professional authority of medicine. Second, protocols generated by expert panels might help to maintain traditional professional prerogatives because physicians are in charge of deciding what counts as evidence-based medicine. Third, guidelines created by third parties could threaten professional interests because third parties have fundamentally different interests (i.e., economic versus professional interests). This third effect is emphasized because it leads to a decline of clinical autonomy and is guided by principles of cost control:

> The arrival of medical effectiveness research raises the very real possibility that medicine's longstanding claim to a professional status based on its scientific expertise is about to be hoisted by its own petard . . . It appears clear that the payer-driven movement to assess effectiveness clearly threatens the autonomy of individual physicians. (Hafferty and Light 1995: 143)

Light consequently re-conceptualized the centrality of autonomy to professional power; autonomy is only one pole on a continuum of control in the medical profession.

In sum, all professionalization theorists agree that knowledge forms a cornerstone of professionalism. Yet clinical practice guidelines raise three divisive questions about the nature of professional knowledge and clinical autonomy in sociological theorizing:

First, are the epistemological characteristics of evidence-based medicine more important than control over the knowledge? Because Parsons emphasized the *character* of knowledge, disregarded other players in the health care field, and trusted informal intra-professional control mechanisms, his theory is the only one that would welcome evidence-based medicine as validating the particular epistemological kind of knowledge professionals need to remain competitive. For the other theorists, the ways in which guidelines reconfigure the knowledge-professional power nexus is more important.

Second, does it matter who develops clinical practice guidelines? A crucial assumption by the professionalization theorists (except for Parsons, who lacks this level of detail) is that clinical practice guidelines will stifle clinical practice because the guidelines reveal the actual content of the work. For Freidson, this negative effect is tempered by the fact that professionals formulate practice guidelines. The other social observers focus on the fact that many guidelines are created and supported by third parties to hold medicine financially accountable. The second question thus depends on the relevance of internal or external control over the creation of clinical practice guidelines.

Third, to what extent do clinical practice guidelines affect the daily work of clinicians? While Freidson predicts that physicians' discretionary power in actual clinical practice will offset any attempt at outside control, the other theorists assume that the guidelines will be hijacked by third parties to externally influence the decision-making processes of clinicians. They also point out that the loyalties of physicians in management positions are not necessarily professional but more likely managerial. The impact of clinical practice guidelines on daily clinical work is the key to understanding how these tools affect clinical autonomy.

The decade-old implementation of evidence-based medicine forms a unique "natural experiment" to evaluate sociological theorizing on professional knowledge and the new standardization movement. Turning now to the medical research literature on clinical practice guidelines, we will take up these three questions in turn.

CLINICAL PRACTICE GUIDELINES

The Epistemological Character of Practice Guidelines

There is little dissent in the medical literature that the reason for the recent influx of clinical practice guidelines constitutes an explicit turn to "universalistic" medical knowledge and away from "particularistic" treatment, in reaction to what Parsons considered an inevitable by-product of weak, informal, interprofessional control mechanisms: overuse, underuse, and misuse of medical interventions and technologies (Bodenheimer 1999). Foreshadowing the raison d'être of evidence-based medicine, Parsons explained overuse by the "lack of scientific development of the field" (Parsons 1951: 468).

The accepted history of evidence-based medicine is that in the United Kingdom Archie Cochrane made a strong case against overuse of medical techniques with questionable evidence (Cochrane 1972). He made a plea for investigating medical interventions with randomized clinical trials. Services that were harmful, not effective, or overly expensive could then be replaced by underutilized and better techniques. In the United States, the work of epidemiologist John Wennberg made the need for more scientifically supported medical care apparent. In the *Dartmouth Atlas of Health Care*, Wennberg (1999) maps the frequency of a variety of surgical interventions by geographical area. The results confirmed a great variability of surgical practices that could not be explained by chance. Already in 1984, Wennberg urged a greater place for clinical epidemiology in academic medicine (Wennberg 1984). A third figure associated with evidence-based medicine is David Sackett. As a clinical epidemiologist, Sackett developed research methods for applied testing of medical innovations, used these methods to evaluate the scientific validity and clinical merit of medical interventions, and educated physicians in applying the "current best evidence" from systematic research. Sackett was instrumental in coining and promoting the term "evidence-based medicine" and turning the randomized clinical trial into its methodological "gold standard" (Sackett et al. 1996).

In addition to the pioneering work of these three major figures, influential reports documenting inappropriate care from the RAND Health Services Utilization Study (Leape, et al. 1990), an increased awareness and problematization of rising health care expenditures (Vincenzio 1990), and the growing implementation of information technologies (Berg 1997) provided a fertile ground for the development of practice guidelines. Medical professionals have been attracted to guidelines because these tools promise to improve the quality of clinical decisions: "They offer explicit recommendations for clinicians who are uncertain about how to proceed, overturn the beliefs of doctors accustomed to outdated practices, improve the consistency of care, and provide authoritative recommendations that reassure practitioners about the appropriateness of their treatment policies" (Woolf et al.1999:528).

The professional impetus for clinical practice guidelines and the epidemiological base of evidence-based medicine's methodology is in line with Parsons professional normative patterning. Parsons, however, discussed the medical professional in isolation from other actors in the health care field. The success of clinical practice guidelines indicates that such a position is untenable. If educational insights would be the only benefit of clinical practice guidelines, they would never have received the attention and resources they command today. Clinical practice guidelines are prime examples of what Leigh Star (Star and Griesemer 1989) has named "boundary objects," tools that are both "plastic enough to adapt to local needs and the constraints of several parties employing them, yet robust enough to maintain a common meaning across sites" (p. 391). Though prompted by diverse reasons, government agencies, private insurers, courts, researchers, and patients have all rallied behind clinical practice guidelines.

Government agencies and third parties use practice guidelines for claims decisions and utilization reviews. The guidelines promise to improve efficiency and optimize value for money spent on care. Some observers suspect

that the financial motives of these parties form the real reason behind the guidelines' popularity: "Why such a strong interest in practice guidelines? The primary driving force is money" (Zinberg 1998:344). Others believe that without taking cost-effectiveness into consideration, guidelines might spell out ideal but inefficient practices (Eddy 1994). Patients benefit directly from improved health outcomes and indirectly from the potential of guidelines to inform health consumers about risks, and alternative options for care. Guidelines might also help biomedical researchers assess the weaknesses in the available scientific evidence and alert policy makers to underrecognized health problems and neglected patient populations (Woolf et al. 1999). Finally, courts also rally around clinical practice guidelines to flesh out an appropriate standard of care in medical malpractice trials (Hyams, Shapiro, and Brennan 1996).

While these non-medical actors in the health care field might be attracted to the authority imbued in the guidelines by scientific methodology, the fear in the medical literature (echoed by Hafferty and Light 1995) is that the true motivation is to wrestle control over clinical practice from medical professionals through cost-control measures. It is interesting to note that when the Congress considered the Omnibus Budget Reconciliation Act of 1989, medical professional organizations lobbied to turn practice guidelines into a more attractive alternative than expenditure targets for curbing the delivery of inappropriate services (Woolf 1990). The resulting legislation established the Agency for Health Care Policy and Research,[4] a government agency promoting the development and dissemination of practice guidelines with important financial resources. The American Medical Association consequently appointed a director of quality assurance and encouraged the development of guidelines within specialty groups. Medical professional organizations thus preferred practice guidelines to more intrusive measures for improving practice consistency and maintaining professional autonomy. The question is whether they received more than they bargained for.

Looking over the editorials in medical journals discussing the need or dangers of clinical practice guidelines on a professional level, this question remains difficult to answer. Parsons' normative patterning has been attractive to both professionals and others, while the issues of control over work delineated by the other professionalization theorists seem to express the fears of professionals about misuse of practice guidelines. Still, fears about misuse do not necessarily translate into actual misuse, in the same way that promises of consistency do not always deliver uniformity. One great fear has been that clinical practice guidelines would replace a communal standard of care in medical malpractice litigation. However, legal review articles show that clinical practice guidelines are rarely introduced in court, and when introduced they are used both for inculpatory and exculpatory reasons (Hyams, Shapiro, and Brennan 1996). At this point, there is no evidence that practice guidelines will be used against health care providers in court, but this has not tempered the rhetoric that it might happen.

More than the standardized format of clinical practice guidelines, in terms of professional knowledge the key finding is that these guidelines constitute a shift in the medical knowledge base from pathophysiology to epidemiology. The randomized clinical trial has replaced the autopsy as the gold standard in medicine, and it has consolidated a quantitative, population-based way of looking at health and illness. Proponents characterize the "new evidence-based medical paradigm" by the following two assumptions (See Evidence-Based Medicine Working Group 1992):

First, when possible, clinicians use information derived from systemic, reproducible, and unbiased studies to increase their confidence in the true prognosis, efficacy of therapy, and usefulness of diagnostic tests. Clinical guidelines are necessary to bring this information to those places where clinical knowledge is applied: the doctor's offices and clinical wards.

Second, an understanding of pathophysiology is necessary but insufficient for the practice of clinical medicine. All pathophysiological inferences should be subordinated to the question of whether diagnostic or therapeutic interventions have been proven to be effective in sound empirical studies. An understanding of certain rules of evidence is necessary to evaluate and apply the medical literature effectively.

The shift from pathophysiology to epidemiology does not necessarily explain any changes in overall professional power, but its effects are crucially relevant in understanding the content of contemporary medicine. At least on a broader policy-organizational level, behind the turn

to statistics and population health lies a shift on how to research, learn, advance, and intervene in health (Woolf 1999). The turn to evidence-based medicine also involves a shift of focus in funding priorities by federal and private organizations and a dislocation of the locus of medical knowledge from the individual to the aggregate level (Hacking 1990). Instead of opening a few corpses, medical students might need to crunch a few numbers to learn about medicine. The consequence is the installment of a different "clinical gaze," with new visualization techniques, health priorities, and resulting in new power relationships to monitor and manage (Foucault 1973). These intra-professional changes escaped much of contemporary theorizing on the medical profession with their emphasis on overall power fluctuations and the form of knowledge. Ironically, it is the much-ignored functionalism of Talcott Parsons that offers a vantage point to analyze the content shift of professional knowledge.

Who Develops Practice Guidelines?

Returning to the issue of control over professional knowledge, Freidson and more contemporary professionalization theorists have emphasized the importance of *who* creates guidelines. Freidson essentially argued that if physicians remained in control of guideline development, these tools would be less likely to chip away at professional power, while Hafferty and Light predicted that if third parties impose their own guidelines on clinicians, the power balance would have shifted away from professionals. To get a handle on the wide diversity of guidelines, we classified the clinical practice guidelines in the National Guideline Clearinghouse[5] by organization (see Table 1). The clearinghouse posts submitted summaries of guidelines produced within the last five years. We distinguished between professional organizations; government organizations on a federal, state, or local level; business organizations; hospitals, advocacy-research organizations; universities; and umbrella guideline organizations. In terms of the players in the health care market, of the 1223 guidelines, about 52 percent came from within professional organizations, 27 percent were created by government organizations, and less than 4 percent came from health care business organizations. This would suggest that professional organizations have a majority stake in the guideline development field.

This impression is confirmed when we look at some of the guideline committees of the non-professional organizations. The U.S. government's Preventive Services Task Force (part of the Agency for Healthcare Research and Quality in the Department of Health and Human Services) not only creates guidelines but is also a leader in developing the methodology of evidence-based medicine (Harris et al. 2001). The Task Force committee consists of 15 members: 12 MDs and 3 PhDs. Eleven of the members are senior faculty affiliated with universities, two are research scientists, and one is an executive director of a research-advocacy organization, while the last member is a senior director of a drug company. One of the two scientists works for the Robert Wood Johnson foundation, and the other works for a hospital. However, even these two scientists formerly held faculty positions.

Medical professionals are also prevalent in the formulation of practice guidelines by busi-

TABLE 1. National Guideline Clearinghouse Guidelines by Organization

	Organizations	Guidelines	Percentage
Professional Organizations	100	633	51.76
Government Organizations	58	335	27.39
Advocacy-Research Organizations	22	110	9.00
Business Organizations	4	48	3.92
Universities	11	45	3.68
Guideline Organizations	2	34	2.78
Hospitals	6	18	1.47
Totals	203	1,223	100

ness organizations. American Healthways, Inc., a large disease and care management company active in the United States, created a guideline for the inpatient management for people with diabetes. The company assembled a panel of primary care physicians, specialty physicians and other health care professionals representing private practice, health plans, and institutional perspectives to construct the guideline. Their recommendations were submitted for review by the company's scientific advisory council and selected faculty specialists at Vanderbilt University Medical Center. Finally, the guidelines were modified and endorsed by a consensus conference of over 100 physicians. Advocacy-research organizations also maintain professional practice or scientific advisory boards comprised of physicians to create clinical practice guidelines. The American Diabetes Association, for example, devoted a recent issue of its journal, *Diabetes Care* (American Diabetes Association, 2002) to guidelines formulated by expert physicians and approved by its professional practice and expert committees. Similarly, guideline organizations create guidelines in-house with expert panels. Even when guidelines are constructed outside professional organizations, they are still created by members of the medical profession.

This observation might satisfy Freidson's claim that the important issue in guideline development is the professional control over the process of development. Hafferty and Light might counter that it is erroneous to deduce that researcher-physicians' loyalty remains with practicing clinicians. Once the medical profession stratifies itself into elite positions (such as university appointments or management positions) their prerogatives might shift toward curtailing clinical practice for reasons of cost control (Coburn, Rappolt, and Bourgeault 1997). Aren't most of the physicians creating guidelines outside the clinical realm and part of academia or research institutions? In all organizations mentioned above, physicians with academic or research positions indeed dominate the clinical guideline development process.

In our opinion, the preeminence of academic professionals confirms the epidemiological shift of medical knowledge rather than an intrusion of managerial prerogatives. In order to construct a clinical practice guideline, the creators review the published literature and rank the quality of the available evidence.[6] These evaluations thus require intricate knowledge of the actual research field and of advanced methodologies to evaluate the strengths and weaknesses of research designs and statistical results. Several studies have shown that a large proportion of practicing clinicians do not master basic epidemiological concepts and principles (see, for example, Young and Ward 2001), forming a barrier not only for guideline creation but also for guideline implementation.

While the source of clinical practice guideline development holds a place of importance in the sociological literature, it is not the subject of many debates in the medical literature. Instead of questioning the makeup of expert panels, guideline advocates express concern about guidelines formulated solely on the consensus of clinicians because the simple consolidation of common practice defies evidence-based medicine's larger goal of rationalizing medicine (Eddy 1996). Another major concern is the raw material of guideline construction; observers note the widespread systematic publication bias in the medical literature. Aborted or unsuccessful trials rarely get published, and because running a clinical trial is very expensive, some conditions and patient groups lose out (e.g., there are few clinical trials on pediatric populations or on women and minorities, and most trials are funded by drug companies (Epstein forthcoming)).[7]

One of the few articles that discussed the composition of guideline development committees questioned the link between guideline creators and the pharmaceutical industry (Choudhry, Stelfox, and Detsky 2002). Surveying authors of clinical practice guidelines, the researchers found that the majority of guideline authors had some interaction with the pharmaceutical industry, and about 7 percent of authors declared that their own relationship with the industry influenced their recommendation, while 19 percent believed it influenced their colleagues. Yet the guideline authors considered it inevitable that experts would have relationships with industry because the pharmaceutical industry funded most medical research. In the only observational study of the process of creating clinical practice guidelines, the authors noted that professional roles had an effect on the contributions to group discussions, but they did not claim that such group dynamics affected the

content of the practice guideline (Pagliari and Grimshaw 2002).

The medical literature on clinical practice guidelines shows that the affiliation of the guideline creators is largely a non-issue; rather, the internal criticism is focused on the standardizing form of practice guidelines. The composition of the different committees supports Freidson's prediction that physicians would remain in charge of guideline development. While these physicians are largely drawn from academia, this does not necessarily reflect that they adopted a business or cost-control work ethic. At most, the composition underscores the shift to epidemiological knowledge criteria. Still, this does not mean that Freidson's overall analysis is correct and that clinical practice guidelines reflect physicians' continued control over their work. In the following section, we will show that both Freidson, Haught, Hafferty and Light overestimated the role of guidelines in daily clinical practice.

Professional Compliance with Clinical Practice Guidelines

In Freidson's view of the medical profession the discretionary character of medical work is closely tied to the exclusivity of medical knowledge on a professional level. Because of their transparency and accessibility, clinical practice guidelines might undermine the exclusivity of knowledge on a macro level, but discretionary powers might still attenuate the standardizing forces in daily clinical practice. Light and others presume that the ipso facto existence of clinical practice guidelines indicates an erosion of both professional and clinical autonomy. The political crux of these new forms of knowledge is thus in daily patient-physician encounters: If clinical guidelines change how physicians practice medicine, they would prove themselves to be effective policy tools. Professional organizations could institute a united front of uniform practice, and third parties could manage cost-effectiveness through protocols. We begin with a review of the effects of asthma guidelines on clinical practice.

Asthma is an ideal disease for clinical practice guideline development. First, it is a serious public health concern, constituting the most common chronic illness of early childhood, affecting in 1999 an estimated 17 million people, including 5.6 million children. The incidence of asthma has been rising: Between 1969 and 1995 asthma related disability in children increased 232 percent. Currently, more than 5,000 people die yearly from the condition, and asthma leads to an estimated 470,000 hospital admissions and an average of 13.7 ambulatory care visits per person annually in the United States (Camargo and Richardson 1999). Second, in recent decades, some of the old tenets of asthma treatment have been revised based on epidemiological research (e.g., nebulizers have given way to the pressurized metered dose inhaler-spacer combination; it is increasingly important to tailor asthma treatment to a regularly updated assessment of the severity of asthma; and recent research has also emphasized the importance of educating relatives and patients on continuous asthma treatment). There thus exists an easily identifiable "wrong" old practice and a better "updated" expert practice. Third, asthma has been an early target for standardization via protocols (Hackner et al. 1999). In addition to multiple local protocols, the United States' National Asthma Education Program of the National Heart, Lung, and Blood Institute convened expert panels to publish a first set of guidelines in 1991, a second set in 1997, and an update in 2002 (referred to as EPR-I, EPR-II, and Update 2002). Finally, recent studies show that, from over 100 different pediatric guidelines, asthma guidelines are among the best known (Flores, et al. 2000).

The overall effect of asthma clinical practice guidelines is mixed and, considering the public health stakes, disappointing. For example, one 1995 self-report survey of emergency department directors indicated that four years after EPR-I guidelines had been published, only 45.5 percent of respondents had heard of the guidelines, about 24 percent had read the guidelines, and the survey documented a persisting wide variety of asthma treatment practices that often contradicted the guidelines (Crain, Weiss, and Fagan 1995). A national survey of U.S. pediatricians showed that, while about 88 percent of these professionals expressed familiarity with asthma guidelines, only 35 percent used any guideline (Flores et al. 2000). A 1999 study showed that after a hospital committee adapted the EPR guidelines, pilot-tested it for six months to neutralize any barriers, and educated the staff

involved, adherence to the clinical protocol was only 68 percent (Smeele et al. 1999). Several studies indicate adherence with some tenets of the protocols but not with other critical elements (Jans et al. 2000; McDermott et al. 1999). Low compliance to EPR guidelines has been shown to be a national instead of a regional problem, cutting across a wide variety of health plans, indicating that health plans—even while strongly supporting the most cost-effective protocols (Bourgeault et al. 2001)—have few means to impose protocol adherence (Meng et al. 1999). At the same time that studies confirm that adherence to the current guidelines is less expensive overall and provides better patient outcomes (Johnson et al. 2000), the use of anti-inflammatory medicine, for example, remains inconsistent with the national guidelines (Goodman et al. 1999). Internationally, asthma treatment continues to be characterized by treatment variation in spite of guidelines (Lagerlov et al. 2000).

The overall lack of behavioral effects of clinical practice guidelines is not limited to asthma diagnosis and treatment (Armstrong 2002). Generally, a meta-analysis over a variety of medical conditions reports a mean adherence rate of 54.5 percent (Burstin et al. 1999). A comprehensive study in the Netherlands found adherence to guidelines hovering around an average of 67 percent (Grol 2001). Other authors have determined that the probability that physicians will follow clinical practice guidelines is about 50 percent (Grilli and Lomas 1994). Two surgeons conclude, "The most certain statement concerning such guidelines is that physicians do not use them." (Griffen and Fischer 1997: 31). These findings are interpreted as disappointing and insufficient, leading to articles with titles such as, "Why don't Physicians follow Clinical Practice Guidelines?" (Cabana et al. 1999). After spending millions of dollars on 19 guidelines between 1992 and 1996, with little measurable results of changed physician behavior, the government Agency for Health Care Policy and Research retreated from guideline development, profiling itself more as a clearinghouse and sponsor of guidelines (Katz 1999). Health Maintenance Organizations have also come to the conclusion that "clinical guidelines alone may not be sufficient tools of quality assurance for children with chronic or complex conditions" (Rolnick et al. 2000: 38) and that the promised cost savings of guidelines have been largely unfulfilled (Savoie, Kazanjian, and Bassett 2000).

None of the professionalization theorists predicted the marginal effect of guidelines on clinical practice. Instead, they extended their theories to warn about the demise of exclusionary professional knowledge. Freidson did allow for the possibility that physicians' discretionary powers might be able to counter standardizing forces. If we look at a meta-analysis of barriers to guideline development, there might be some evidence for this prediction (Cabana et al. 1999). Among the barriers to development were a lack of awareness of the guideline, followed by a lack of familiarity with the guideline; disagreement with the guideline; self-efficacy; differing outcome expectancy; an inability to overcome the inertia of previous practices; and the presence of external barriers to perform the recommendations. From this list, a differing outcome expectancy, disagreement, and inertia of previous practices could be interpreted as discretion trumping standardization. However, Freidson also missed the major points that clinical practice guidelines have had little effect on physician behavior and that the opposition between discretion and standards is difficult to maintain in a field saturated by formal tools.

The sociological literature on the medical profession overestimated the relevance of clinical practice guidelines in the work of clinicians. This optimism can be diagnosed as a form of technological determinism—the notion that technology is an inherently political force shaping society. Sociologists of science and technology have largely abandoned this approach for a more interactive and dynamic analysis of technology in practice (see Bijker, Hughes, and Pinch 1989) but it unfortunately survives in several pockets of the sociology of health and illness (see Timmermans and Berg 2003b). Going back to Marxist and conflict theoretical writings, the attraction of technological determinism is that it allows the author to construct a highly symbolic case against medical hegemony (Illich 1976); unfortunately, even in highly technologized medical settings, the empirical reality often does not validate the dire pronouncements. Clinical practice is often much messier and complex than suggested by this form of theoretical reductionism.

RECALIBRATING MEDICAL PROFESSIONALIZATION THEORY

The contemporary American medical professionalization literature did not accurately anticipate the varied effects of clinical practice guidelines: Theorists added great predictive power to what is largely considered a non-issue (who creates the guidelines); they overestimated the role of clinical practice guidelines in clinical practice; and, except for Parsons, they missed what is truly peculiar about the turn to evidence-based medicine (i.e., the move from pathophysiology to epidemiology). This mixed record reflects foundational problems in this literature. The American sociological literature on professions is preoccupied with the question of whether the medical profession is overall gaining or losing power. Freidson admitted that this is an unanswerable question: "some are saying 'the cup is half empty,' and others 'the cup is half full.' More important, most talk past one another because they are not attending to the same data" (Freidson 1993: 32). The last few decades of theorizing shows, however, that selective data use and interpretation has allowed anyone to make a case for either continued professional dominance *or* professional decline. The problem is not so much a question of data criteria, but of reference points, theoretical scope, and systematic, empirical research. The reviewed professionalization theorists have typically not followed from systematic research in the health care field, but rather from the collection of, and commentary on, "recent developments" imbued with agency and intentionality. Too often the conclusions of such scholarly work have been binary oppositions (e.g., HMO's care about cost control while professionals are motivated by maintaining the financial status quo), ecological fallacies (mixing micro clinical practice and macro organizational levels of analysis), and rhetorical positioning (such as technological determinism).

In order for the sociological professionalization literature to remain relevant, we need more systematic research in which the results do not lead to an either-or position on professional power but elaborate and revise dominant theoretical assumptions in the medical sociological literature. In "evidence-based sociology" it is insufficient to collect health care trends, confirming established ideas and ignoring counter elements. Similar to evidence-based medicine, well-entrenched but unsupported sociological theories need to be discarded or adapted in light of systematic and comprehensive empirical investigations. In this regard, Heather Hartley's comparative study of interprofessional competition between certified nurse-midwives and physicians is exemplary (Hartley 2002).[8]

A greater sensitivity to systematic empirical research needs to coincide with a shift in theoretical focus; we would be better served as a field by moving from a focus on quantity (gain-loss of professional power) to quality (characteristics of power and knowledge). Instead of estimating overall power fluctuations, it would be more useful to take a step back and study what professional power and knowledge exactly consists of for specific medical professionals in the 21st century. Evidence-based medicine's challenge to medicine does not consist of behavior modification, but of a movement toward a different scientific basis for medical knowledge: epidemiology and population health. The turn to epidemiology signifies a reconfiguration of the medical knowledge base, offering a different ontological and epistemological underpinning of medicine. As such, the shift in the knowledge base offers third parties new vantage points to impose their interests on medical practice, opportunities for new parties to increase their influence (e.g., pharmaceutical and biotech companies), and new challenges for health care practitioners to maintain their wages and treat patients without predetermined outcomes. In this sense, Freidson was right: We need to re-conceptualize medical knowledge (and professional power) to grasp the qualitative changes in the health care field and assess the relevance of this knowledge shift.

One potentially relevant sociological question about clinical practice guidelines is how to make these formal, standardizing tools work in practice. For example, how does a clinician looking over a protocol map a course of diagnostic or therapeutic action while taking physical observations and test results, patient preferences, financial-organizational constraints and opportunities, and time issues into consideration? An empirical investigation of the process of making sense of a protocol (rather than implementing it, which presumes passive adaptation) might show that the gap between formal rules and discretionary power is not as wide as presumed but that "discretion"

requires formal tools such as guidelines (Timmermans and Berg 1997). In this view, clinical experience is not a by-product of accumulated patient encounters, but actively *constituted* by epidemiological research. Practice guidelines, then, encapsulate a microcosm of particular instances of autonomy, accountability, objectivity, and professional status to be enacted in practice. Different protocols offer different configurations (Mol 2002). EPR-II guidelines, for example, emphasize the involvement of patient education, but because the protocols are not formulated for patients they attain a limited return (Meng et al. 1999). The sociologist's task then is to decipher the implied and accomplished microcosm of acting professionally with the help of specific practice guidelines. This refocus does not require an abandonment of the critical political concerns that have animated much of the professionalization theories. Asthma guidelines have been hailed for removing racial disparities because of their "race-blindness" (Cabana and Flores 2002). Such characterizations, like the democratization of learning promised with the adoption of guidelines in medical education (Timmermans and Angell 2001), require empirical investigation of whether, how, and under what circumstances inequalities are removed and simultaneously enabled by standardizing technologies.

Similarly, we need to take a step back and consider what it means to be a medical profession in the current era. Sociologists have documented the astonishing diversification in occupational, financial, organizational, technological, and governmental developments splintering the current health care field (Clarke et al. 2003; Leicht and Fennell 1997). Still, theorists then proceed to discuss *the* medical profession as if it is a monolithic entity with a well-defined singular interest. To the list of possibly dividing factors, we should now add evidence-based medicine and clinical practice guidelines as different kinds and forms of knowledge (Baer 1987). The question is how "interdependent yet distinct" (Light 1995) parties can generate sufficient uniformity to imbue them with the label of "profession." Are professionals truly distinctive, or do practice guidelines move the health care players towards "institutional isomorphism" (DiMaggio and Powell 1983)? Freidson (1994) posits that professionals might be uniquely situated as the information workers in late-modern societies, but his analysis extrapolates the adaptability of current professional characteristics to the presumed needs of future societies. Others regard professionals as a dated occupational form of the twentieth century and note that the expert society requires a different power elite working from flexible knowledge modules (Reed 1996). Again, the issue is one of the achievement of a particular quality: Does knowledge bind people in the health care field together, and, if so, how are group loyalties accomplished? Perhaps the divisions are not along traditional professional lines (i.e., nurses versus doctors); instead, it could be that support for clinical practice guidelines generates heterogeneous alliances of health care actors.

Such a reorientation follows the lead in the European scholarship on the relationship between the state and professions, which has been preoccupied with the question (also difficult to answer) of whether the professions are autonomous from the state. Relying on the Foucaultian notion of "governmentality," Terry Johnson (1995) has instead made a case for viewing professions as forms of knowledge engaged with government entities in the production of political problems and means for solving them. Nick Manning (2002), for example, explored how the British government, in collaboration with some psychiatrists, sponsored the development of a new psychiatric classification of "dangerous and severe personality disorder" in order to incarcerate potentially violent offenders before they committed crimes. Here, government and professions "make up people" (Hacking 1986) under the umbrella of evidence-based medicine for regulative purposes. Such collaborations question whether traditional group boundaries still hold relevance.

In sum, after three decades of debating the unsolvable question of professional dominance with insufficient empirical verification, limited predictive value, and deeply-entrenched theoretical positions, the most productive pathway of future professionalization theory might be to re-examine the basic concepts and premises of this literature and, after empirical verification, discard the ideas that have outlived their usefulness. At the same time, it is important not to throw out the proverbial baby with its bath water. The theory of countervailing powers, for example, brought a refreshing historical approach to the teleological writings

of previous eras. Its analysis of a "buyer's revolt," and the tension between social control and accountability, explains much of the antagonism between, for example, state government officials and pharmacies on Medicare drug reimbursement. However, considering the diversity of phenomena covered up by the labels "profession" or "health care player," and considering the stalemate in the current literature, the field is ripe for a recalibration of basic premises. The question is not how much power changes but what professional power consists of in the face of shifting forms of knowledge.

NOTES

1. Parsons notes that while the physician's motivation might be characterized by self-interest, the institutionalization of altruistic elements lead to a situation in which it "is to a physician's self-interest to act contrary to his own self-interest" (Parsons,1951:463; see also Light, 2000).
2. While Freidson's approach is often summarized as one of professional dominance (after the title of one of his 1970 books), he actually distances himself from scholars such as Ivan Illich (1980) and others who ascribe hegemonic powers to professions (Freidson, 1986).
3. However, see Berg (1997) who actually studies these technologies.
4. This agency was later renamed to the Agency for Health care Research and Quality.
5. The National Guideline Clearinghouse is sponsored by the American Medical Association, the American Association of Health Care Plans, and the federal Agency for Healthcare Research and Quality. It contains a database of current guidelines at www.guideline.gov. We accessed the database in October 2002.
6. The methodology for the ranking and classification was first formulated by the Canadian Task force on the periodic health examination Canadian Task Force on the Periodic Health Examination. 1979.
7. Whether the entire medical knowledge production business is dominated by pharmaceutical companies is an important question that requires careful empirical analysis.
8. For other examples of how actual research leads to nuanced views, see Schlesinger, Bradford, and Perreira (1997), Rappolt (1997), and Abbott (1988, 1991).

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