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Mentoring institutional change: Intergenerational construction of meso-structure and the emergence of new logics in American healthcare

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ABSTRACT

The emergence of an evidence-based medicine logic represents a major change in the large and complex field of American healthcare. In this analytical case study, we show that the intellectual school of evidence-based medicine became an important meso-structure that facilitated the growth of the new logic in American healthcare. The new intellectual school was a community of scholars who generated shared rules and resources through intergenerational mentoring. The school engaged in advocacy to advance new intellectual paradigms for conceptualizing healthcare quality that, when connected with material practices in the field of American healthcare, came to form a new institutional logic.

Keywords: Logics, institutional change, mentoring, meso-structure, intellectual school, case study

INTRODUCTION

Recent accounts of institutional change have featured actors working to change institutions from within, enabled by social position or their unique skills, and drawing on a toolkit of different forms of work that can create, maintain, or disrupt institutions (Battilana, Leca, & Boxenbaum, 2009; Hwang & Colyvas, 2011; Lawrence & Suddaby, 2006; Lawrence, Suddaby, & Leca, 2011). However, these accounts of change conflate the vastly different institutional capacities of individual people compared to larger institutional actors such as organizations or professions. Moreover, to the extent that supra-individual actors can encompass many people behaving as a collective, prior work is also unclear about when and how individuals can coalesce into institutional actors. In contrast, interactionist theories, such as negotiated order and structuration theories (Giddens, 1984; Strauss, 1978), hold that structure is built and reproduced by individuals through their actions and interactions. These theories provide a way to understand how individuals aggregate, and how they can also collectively be a source of change, as interaction patterns change (Barley & Tolbert, 1997; Sewell, 1992).

Even if interpersonal interaction patterns are the source of institutional change, the distance between individual interactions and institutions is large, and it is not obvious how one leads to the other. One approach to bridge the gap is to identify intermediate, meso-level structures that serve as a platform for community-building and for institutional work. The concept of meso-structure has its roots in negotiated order theory, which conceptualized it as mediating the realm of structure and the realm of social interaction (Maines, 1982). Institutions provide general guides to action by identifying relevant actors, defining what is rational, and specifying what goals and actions are legitimate to pursue. More targeted than institutional rules, meso-structures are social processes and ordering in a specific domain of behavior that guide situated action. The idea of meso-structure draws on negotiated order theory's notion that social order is made up of a diverse and complex set of structures that can vary in their proximity to social interaction, from very far, e.g., the world economic system, to very close, e.g., a county fair (Barley, 2008).

A meso-structure, then, defines an intermediate level of structure that guides and channels interactions that can, in turn, shape less proximate or higher-order structures. For example, while the democratic state may be a social institution, diverse meso-structures might govern actions or interactions in differing arenas relating to the democratic state, including meso-structures governing political participation, bribery, or tax paying. Meso-structures situate action, providing a context to enact, reproduce, or alter larger social structures, and through which patterns of behavior achieve meaning (Maines, 1982), and they provide a link that ties external structures to personal interests (Fine & Hallett, 2014; Strauss, 1978). Meso-structures also serve as a platform where communities can coalesce. The specific domains that define meso-structures also attract people with congruent interests who can interact. Focusing on the meso-structural level enables a closer and more precise articulation of exactly what individual actions can result in institutional change, and how individuals form collectives to accomplish change. This concept also highlights that institutions are multi-level, nested systems of structures, with diverse meso-structures operating within larger organizational fields.

We develop an analytical case study of the development of the intellectual school of evidence-based medicine in the field of American healthcare and its role in the emergence of a new institutional logic that came to operate alongside the existing logic of professional autonomy. Intellectual schools are meso-structures in the sense that they are a defined realm of activity containing rules (i.e., norms and interpretive schemas) and resources (Sewell, 1992), that are also proximate sites of action for purposive efforts toward institutional change, serving as institutional actors through this process. In our analysis, we identify how inter-generational mentoring practices populated a new intellectual school that developed the conceptual basis for the emergent logic of evidence-based medicine and supported extended advocacy work to disseminate this paradigm to the wider institutional field of American healthcare.

Instead of collective action at a moment in time (Hardy & Maguire, 2008) or change that accrues over time in unspecified ways (Barley & Tolbert, 1997; Giddens, 1984), we find that individuals who initiate institutional change actively nurture and place the next generation in key positions to complete it. In doing so, the meso-structure, i.e. intellectual school in this case, can take on life of its own as an

institutional actor. This finding emphasizes the constructedness of agency, and how particular actors become central to institutional change, which has been underemphasized in recent work (Hwang & Colyvas, 2011).

INTELLECTUAL SCHOOLS AS A MESO-STRUCTURE

Meso-structures are analytical elements that mediate between individual action and institutions and serve as the means by which the actions and interactions of individuals can construct and re-construct the broader social order (Strauss, 1978). Like structures generally, meso-structures contain the norms, resources and interpretive schemes of an interacting group, but guide action in a limited domain (Barley, 1989). Taking a meso-structure approach seriously involves developing theory that identifies contextually specific mechanisms that link social interaction with institutionalized structures (Fine & Hallett, 2014; Maines, 1982; Strauss, 1978). Therefore, theorizing an intellectual school as a meso-structure requires specification of mechanisms through which members' interactions generate impact in the broader intellectual field in which the school operates.

By intellectual schools, we mean something very similar to schools of thought (Collins, 1998), or invisible colleges (Crane, 1972), or epistemic cultures (Knorr-Cetina, 1999), or scientific/intellectual movements (Frickel & Gross, 2005). Though these concepts each emphasize somewhat different aspects of intellectual groups, all deal with communities of scientists or intellectuals that “create and warrant knowledge,” (Knorr-Cetina, 1999: 1), by developing a set of agreed-upon questions and methodologies deemed important and valuable. Embedded in these ideas are three aspects of structure that support our ideas about intellectual school as meso-structure: 1) intellectual schools are communities of connected and interacting individuals, i.e., they are social, 2) the community's knowledge and knowledge production methods are resources that are generated by the community members, and 3) that the community contains norms and a belief system, i.e. schemas, that provides a basis of valuation of resources and behaviors. By

analyzing one type of meso-structure empirically, we show how this concept has the potential to resolve long-standing gaps in the discussion of institutional agency and change.

For example, while not explicitly using the meso-structure concept, recent research has called for theory about the role of intermediate structures in processes of institutional reproduction and change (Creed, Hudson, Okhuysen, & Smith-Crowe, 2014; Fligstein & McAdam, 2012; Ocasio, Loewenstein, & Nigam, 2015; Powell & Colyvas, 2008). In one such paper, Thornton, Ocasio, and Lounsbury (2012) envision institutions as multi-level systems, and propose that action is situated, i.e., the specific context of a given social interaction will shape the identities, goals, action schemas, and logics that individuals activate to guide behavior in different types of situations. However, the authors do not propose specific guidance for analyzing how these situated activities lead to institutional change.

The concept of meso-structure also offers a middle ground between what Hwang and Colyvas (Barley, 1989) call the “unfortunate dichotomy” of heroic individuals and cultural dopes, while moving beyond conceptualizations of agency that focus on how action produces and reproduces structure (Barley, 1989; Barley & Tolbert, 1997). Action toward a meso-structure requires neither unusual abilities nor mindless bending to institutional forces. For example, Leung et al. (2014) study the way in which Japanese housewives accomplished a change in their role definition in Japanese society in the 1960s through participating in a collective buying club. By expanding membership and tackling problems that arose in effective bulk buying, they gradually changed their role identity. From our perspective, the buying collective, specifically its norms, resources, and interpretive schemas, functioned as a meso-structure in that it gave housewives a platform to interact and enact newly expanded identities. Their actions and interactions purposively directed toward the buying clubs’ limited sphere of action had farther-reaching institutional effects, as they expanded what it meant to be a dutiful wife and nurturing mother.

Indeed, in the case of intellectual schools, meso-structure is a means by which diverse individuals can be constituted or structured into a collective institutional actor. Within the meso-structure of an intellectual school, the community of researchers that comprises it interacts regularly enough to maintain

interaction orders and patterns, and generate and hold bodies of knowledge and schemas for interpreting events and giving meaning to action. Empirically examining mechanisms by which intellectual schools are implicated in processes of institutional stability or change is one potential means of understanding action and change relating to a specific, though important, domain of activity.

MENTORING CREATES INTELLECTUAL SCHOOLS

The generation of community within intellectual schools is a key aspect of their creation. For an intellectual school to emerge and thrive, it must attract members and inculcate the new members with the school's distinctive belief system (Collins, 1998; Frickel & Gross, 2005). One direct way to do this is through mentor-protégé relationships. Mentoring, generally, involves interaction over a period of time and some benefit for the protégé's career (Haggard, Dougherty, Turban, & Wilbanks, 2011). Mentoring in communities of scholars and researchers is certainly characterized by sustained face-to-face interaction between advisors and their students, and advisors often actively work to place their students in jobs. However, for intellectuals, mentoring tends to involve learning not only the content of the field, but also the norms and interpretive schemes to assign meaning and value for the field. It is socialization into a profession, more than socialization into an organization, since students typically leave the organization where they studied. As such, the placement of student protégés is an opportunity for the spread of ideas and influence. For example, Collins (1998) notes the "chains of eminent teachers and pupils" (5) that form the center of schools of thought in the field of philosophy. Moreover, populating departments and organizations with protégés can create demand for other members of the intellectual school. Colleagues with congruent views on what kinds of research are interesting and valuable are desirable, because they can be collaborators or discussion partners, or at least ease promotion and tenure decisions. Having positions available for members of an intellectual school is critical for its growth and mobilization (Frickel & Gross, 2005).

DATA & METHODS

Data Collection

We develop a qualitative historical case study focusing on actions of key individuals in the history of evidence-based medicine, and on the process by which an evidence-based medicine intellectual school emerged over time, and became a dominant logic in American healthcare. Historical case studies are suitable for studying change processes that unfurl over extended periods of time where actions by diverse people can accumulate in a way that shapes some outcome, such as the emergence of a new institutional logic (Kieser, 1994; Yin, 2003). This case study was part of a larger project focused on the origins and effects of evidence-based medicine, and the emergence of health services research (Nigam, 2012, 2013). We draw primarily on a set of 20 oral history interviews with 19 key people involved in the emergence of evidence-based medicine. These oral history interviews were collected as part of a project by the National Library of Medicine focused on the history of health services research—the academic study of issues relating to the cost, quality and access to healthcare, and consisted of career histories that described people’s evolving careers, the relationships they form with others, and the ideas they advanced through their research.¹ We supplement this core set of interviews with an oral history interviews with John Wennberg published in *Health Affairs* (Mullan, 2004). We selected these interviews because of prior research suggesting that prominent early founders of health services research, including Wennberg, played a key role in establishing the intellectual foundation for evidence-based medicine. Complementing the oral histories, we also draw on primary documents such as papers published by key players in the evidence-based medicine intellectual school, secondary histories of evidence-based medicine, and Institute of Medicine reports relating to evidence-based medicine (For additional description of our historical case study methods see Nigam, 2012, 2013).

¹ Interviews available at <https://oculus.nlm.nih.gov/cgi/t/text/text-idx?c=nichsr;page=browse;id=navbarbrowselink;cginame=text-idx;key=interviewee>

Data Analysis

We inductively analyzed the oral histories and other data sources, tracing out the process by which evidence-based medicine logics came to be institutionalized within American Medicine. Our initial analysis revealed mentoring processes as important to the emergence of evidence-based medicine logics. Looking more systematically at the role that mentoring played in our data, we saw that mentoring was an important component of the coalescence and perpetuation of a new and distinctive intellectual school. We noted that the actions of people who were critical in advancing evidence-based medicine were oriented towards advancing the new institutional school. This included actions to develop and disseminate new ideas about health care quality. It also included actions to gain resources and other institutional supports for the new intellectual school, or draw new people into the school. This helped us see the role that intellectual schools played as meso-structures.

We focused our analysis, then, to systematically examine how individuals engaged in actions oriented towards forming and creating a distinctive intellectual school, and to understanding the role that this emerging intellectual school played in theorizing and institutionalizing new logics of evidence-based medicine. While we code and analyze data reflecting the actions and careers of a wide range of people, we focus here on one major academic ‘family.’

FINDINGS

We find that a specific academic ‘family’-- Kerr White, his protégés, and a third generation of scholars who were mentored by two of White’s key protégés—played a particularly important role in creating the new intellectual school, and ultimately in advancing the new institutional logic. Our findings are consistent with prior research that focuses attention on the importance of two of White’s protégés—Robert Brook and John Wennberg—in making the intellectual case for evidence-based medicine (Gray, 1992; Timmermans & Berg, 2003; Weisz et al., 2007). We find that Brook and Wennberg were important as part of a larger academic family whose members were critical in articulating new approaches to conceptualizing healthcare quality. Both Brook and Wennberg mention White as a key intellectual

influence or mentor who shaped their thinking, and allowed them to develop the ideas that ultimately advanced evidence-based medicine in the United States. Both also trained diverse students who further elaborated on the ideas they generated, or helped connect these ideas to material practices in a way that established the new intellectual paradigm as the foundation for the emergent institutional logic. The diverse members of this family did not necessarily work together, and often had rivalries. As we explain more fully below, they nevertheless belonged to an intellectual school that was anchored in a social structure of shared rules (e.g. interpretive schema and norms defining the types of problems that are interesting) and resources (e.g. particular methodological tools for measuring healthcare quality, as well as institutional supports).

EVIDENCE-BASED MEDICINE IN AMERICAN HEALTHCARE

Between the end of World War II and the early 2000s a new institutional logic of evidence-based medicine emerged within the field of American healthcare. This new logic took its place alongside the existing logic of individual professionalism. Both are specific forms of professionalism (Freidson, 1984). Table 1 describes the two institutional logics, drawing on prior research about the emergence of evidence-based medicine (Lambert, Gordon, & Bogdan-Lovis, 2006; Nigam, 2012, 2013; Timmermans & Berg, 2003). The logic of individual professionalism was consistent with the larger system of professional dominance that prevailed in the U.S. healthcare system since the beginning of the 20th century (Freidson, 1970; Light, 1992; Scott, Ruef, Mendel, & Caronna, 2000). This individual professionalism logic was grounded in the widespread belief that medical work was innately complex, and as a result could not be codified in general rules. Instead, the quality of care depended on the case-by-case judgment of individual professionals. The medical profession's abstract body of knowledge under this logic focused on understanding the mechanisms of disease, and often drew on case reports of disease progression in specific patients.

In contrast, the logic of evidence-based medicine is rooted in the idea that individual clinical decisions should be grounded in scientific evidence. This logic is based on the belief that it is possible to

create rules codifying appropriate or high quality care for patients with particular conditions. This belief is reflected in the growing prevalence of clinical guidelines and quality measures. The profession's abstract body of knowledge under this logic was increasingly grounded in the findings of clinical trials, the 'gold-standard' for clinical evidence. Moreover, the emergence and growing importance of an evidence-based medicine logic was accompanied by expanded attention to methodological issues (e.g. in the conduct of clinical research and in the reporting of results) in medical journals.

The emergence of an evidence-based medicine logic began between the mid-1980s and the late 1990s. The elaboration of this logic persists to the present day. Prior research about evidence-based medicine focuses attention on the roles of a few key people, particularly John Wennberg and Robert Brook, in advancing the shift towards evidence-based medicine in the United States (Gray, 1992; Gray, Gusmano, & Collins, 2003; Nigam, 2013; Timmermans & Berg, 2003; Weisz et al., 2007).

Complementing these accounts, we show that Brook and Wennberg were important in advancing the new evidence-based medicine logic as members of an intellectual school that was focused on developing new approaches to healthcare quality—i.e. new frameworks and tools for thinking about, codifying, assessing, and improving healthcare quality. New paradigms for conceptualizing quality were an intellectual basis for the new logic. These new paradigms became institutional logics when they were connected to material practices (e.g. the production and use of clinical guidelines within medical specialties, government agencies such as Medicare tying financial payments to hospitals to performance on quality measures) within the organizational field. This intellectual school advanced the institutionalization of an evidence-based medicine logic through the work of at least three generations of scholars, whose efforts accumulated over time to both advance the intellectual school, and ultimately to shape the broader institutions of American healthcare. Some members of later generations of this school also played policy roles that were important in connecting new intellectual paradigms about quality to material practices.

MENTORING GENERATES MESO-STRUCTURE

We found that researchers who developed new approaches to health care quality mentored other scholars, resulting in the community that comprised the intellectual school, and ultimately promoted new institutional logics. As described earlier, mentoring in the case of new intellectual schools not only transmits values and norms, but also teaches the distinct body of knowledge of the school and how to evaluate and warrant new knowledge, making mentoring an institutional action because new logics are underpinned by systems of knowledge. Figure 1 presents our model of how mentoring focused on creating and strengthening an intellectual school led to change in institutional logics over time. In a departure from existing change models, we find that institutional change occurs not simply over time, but, more specifically, across generations. In the first generation, multiple individuals, alone and collectively, began doing a new type of research and came to see themselves as members of an emerging intellectual school. They engaged in advocacy to advance the ideas they were developing, and to gain institutional supports for their nascent intellectual school. At the same time, they engaged in mentoring the next generation who became members of the new intellectual school. This next generation of scholars reinforced and continued the intellectual paradigm change initiated by the first generation by developing and advancing ideas and research that were consistent with evidence-based medicine, advocating for institutional supports for the growing intellectual school, and mentoring yet another generation of scholars. Both the intellectual school, and new logics rooted in the ideas developed by this intellectual school became more fully institutionalized with successive generations.

Generation 1: Emergence of a nascent intellectual school

After World War II, Kerr White and a few other researchers coalesced into a community that worked to systematically examine patterns of medical care and tie them to notions of care quality. White retrospectively described the goals of this nascent intellectual school as getting “physicians to think more broadly about disease and medical care” (Berkowitz, 1998f). The first generation in this intellectual school engaged in advocacy by advancing new ideas about healthcare quality in academic research and engaging in political actions to create institutional supports for evidence-based medicine. In addition, they

nurtured a subsequent generation of protégés who could continue with their work. We focus attention here specifically on Kerr White as an exemplar of intellectual leadership; however, other scholars (e.g. Cecil Sheps, Avedis Donebedian) were also important first-generation members of the intellectual school.

Institutional Context. This intellectual school coalesced in a larger institutional environment where the government was becoming increasingly involved in health care, providing funding for new jobs and new types of research and creating an opportunity space for the intellectual school to establish itself. In the decades immediately following World War II, the federal government funded the construction of hospitals throughout the country in the effort to expand access to care. It funded the expansion in the system of medical education by creating or funding new medical schools, creating the modern National Institutes of Health, and by greatly expanding funding for biomedical research. In 1965, the federal government created the Medicare and Medicaid programs, greatly expanding the government role in paying for medical care for the elderly and poor (Dunn & Jones, 2010; Nigam, 2013; Scott et al., 2000).

Advocacy for an Intellectual School. It was within this context of an expanded government role in healthcare that an intellectual school focused on new approaches to healthcare quality emerged. White recalls an interest in issues relating to healthcare quality early in his career, recounting “I wasn't sure that doctors always did more good than harm” (Berkowitz, 1998f). He pursued this interest in an academic career that unfolded in the context of growing government support for healthcare. He took his first faculty job at the University of North Carolina, which was recently created with federal support as a four-year medical school with a research-oriented faculty, and pursued research projects that were enabled by new sources of federal funding.

The shift towards evidence-based medicine school depended, in part, on drawing together faculty who had common research interests in developing new approaches to healthcare quality. Describing the creation of the School of Public Health at UNC, White recounts the formation of one such group:

“I became friends with many of its new faculty, particularly John Cassel, a social epidemiologist who was a long way ahead of his time; a remarkable fellow.... Bernie Greenberg, another friend and colleague, was head of biostatistics in the School of Public Health. Bernie later became Dean of the School of Public Health. I learned a great deal from him. We were all good friends ... and I used to participate in their

seminars in the School of Public Health and we all collaborated on research” (Berkowitz, 1998f).

White also recounts how he and others were significantly inspired by the research of Jerry Morris—the head of the U.K. Medical Research Council's Social Medicine Research Unit at the London Hospital. Morris was the keynote speaker at a conference sponsored as part of the founding year events planned for the School of Public Health. White recounts

An article by Morris published in the British Medical Journal, titled ‘The Uses of Epidemiology’, impressed me greatly. Morris demonstrated that epidemiological concepts and methods could be applied to better understand and evaluate the provision of health services. Among other things he emphasized the importance of determining whether medical interventions of all kinds did more good than harm”(Berkowitz, 1998f) .

Members of the intellectual school engaged in advocacy to support or advance it. This advocacy took two forms. First, members of this nascent school did and published research that advanced new understandings about healthcare quality. As a way of advancing the legitimacy and importance of the new ideas, publishing was a form of discursive advocacy. Publishing also led to the accumulation of a body of knowledge that described the intellectual school. This advocacy began with (and contributed to) the early emergence of the intellectual school. For example, informed by Morris’ work, White and his collaborators at UNC conducted a large study of patient referral patterns in North Carolina that was funded by a grant from a newly created federal research program focused on ‘hospital facilities research.’ The study looked at referral patterns from general practitioners to specialists at university-based medical centers. White recounts:

There were two questions that intrigued me: Are we doing more good than harm in what we do for patients? And second: Are we responding to each patient's real needs, expectations, and what they want from the clinical encounter?(Berkowitz, 1998f)

The study resulted in multiple publications in leading medical journals, coining the term “primary care,” documenting massive miscommunication which had the effect of patients’ perceived health problems going unaddressed, and advocating for each patient to have a primary care doctor who could coordinate their care through the larger healthcare system.

For White, this initial study motivated subsequent studies aimed at better understanding system-level patterns of medical care and their implications for healthcare quality. In addition to discursively advancing new ideas that made the new intellectual school distinctive, studying healthcare quality in an evidence-based way involved putting in place systems for collecting new forms of population-level data on health services. For example, he described attempting to put in place a system for collecting hospital discharge data that would allow the hospital to systematically collect data on patient care treatment, recounting:

I suggested to the medical school faculty that we look at our hospital's discharge abstract data... I suggested that we try to install this [hospital discharge data abstracting system] at Chapel Hill. I was laughed at. My colleagues said, "You obviously don't know where you are. This is a university teaching academic center. We are the gold standard for medical care; when we say it's so, why it's so. We don't need all this kind of stuff." I replied, "Well, if it's so, then I'm like Alice in Wonderland; I would just as soon see it done on paper." But they wouldn't let me. So we embarked on an analogous, although simpler, abstract study, in our hospital's outpatient General Medical Clinic (Berkowitz, 1998f).

This quote illustrates the prevailing individual professional logic of the time, and resistance to new ways of thinking about healthcare quality.

White later took a job at the University of Vermont as head of a newly created Department of Epidemiology and Community Medicine. He recounted that he was attracted to the idea of being able to do a population-based study in a small state. Throughout his subsequent career, White published research that would advance the intellectual school, and put in place a research infrastructure that would allow others to work with and advance the emerging school. For instance, after moving to a job at Johns Hopkins University in the School of Public Health, he got resources to hire a research team to develop the initial survey for the National Ambulatory Medical Care Survey, a longitudinal sample of patient records from ambulatory care settings that remains an important dataset for research assessing the quality of outpatient care to the present day (Berkowitz, 1998c, 1998f).

In addition to doing and publishing research, members of the first generation of the nascent intellectual school also engaged in advocacy that would create and institutionalize resources in support of the emerging intellectual school. For example, White and other faculty at medical schools across the

country who were interested in new approaches to healthcare quality worked collectively to lobby a foundation officer at the Carnegie Foundation to create the Clinical Scholars Program – a fellowship program for doctors at five institutions. This program offered career supports for more junior scholars who could potentially become a part of the new intellectual school (Berkowitz, 1998f; Brown, 2003a, 2003b). White also engaged in political advocacy within the federal government leading to the creation of the National Center for Health Services Research (NCHSR) as a federal agency that would support research on healthcare quality (McCarthy & White, 2000).

Mentoring to Expand the Intellectual School. While advocacy helped advance the ideas developed in the intellectual school and create institutional supports, mentoring was the key mechanism by which the first generation of scholars recruited new members into the intellectual school, making possible its longevity and impact over time. White directly mentored at least four protégés who were critical to the emergence of evidence-based medicine in the United States (see Table 2), including both Robert Brook and John Wennberg, two key figures in the expansion and establishment of evidence-based medicine (see Figure 2). White’s mentoring influenced them intellectually, drawing them into the intellectual school. In addition, it helped establish them in their careers, putting them into positions to carry the new intellectual school forward (R. H. Brook, 1997).

John Wennberg (2010) credits White for teaching him to embrace epidemiological approaches towards studying disease and medical care, recalling “Kerr White... taught me the importance of using the tools of epidemiology to study the health care system...” (xi). Robert Brook similarly credits Wennberg as a mentor, recounting “Kerr actually spent individual time and really went over great books and articles that had appeared in this field. He would carve time out of his busy schedule, 45 minutes to an hour once a week, for many weeks to discuss them” (Brown, 2003b).

In addition to spending time to influence protégés intellectually, White also helped his protégés develop their careers, equipping them to advance intellectual school over time. White was very important to Brook’s early career. White recounts how he worked with Brook on his first research study:

When I went to Hopkins I thought it would be nice to replicate some of Morris' ideas. Bob Brook was a student, so I approached Hopkins and again we were rejected with the ploy: "You don't know where you are. What we do sets the gold standard for care everywhere!"... So we went to Julie Krevans, with whom I worked quite closely. He was the head of medicine at Baltimore City Hospital, a Hopkins affiliate. He let us do the study there and, sure enough, we found all kinds of problems: x-rays not looked at, appointments broken, lab results buried away. Bob Brook published the findings in the New England Journal of Medicine. He got his start investigating all this material (Berkowitz, 1998f).

White was also instrumental in helping Brook get the training and early jobs from which he launched his career. Brook developed his abilities and skills as a researcher when he pursued a Sci.D degree during medical school. He did this degree as part of the first cohort of the Clinical Scholars Program, a fellowship program that White helped to create at Hopkins, with funding from the Carnegie Foundation (R. H. Brook, 1997; Brown, 2003b). The program, which was later moved to the Robert Wood Johnson Foundation, continues to be an important means of training members of the evidence-based medicine intellectual school today. Brook got his first job as a public health fellow working for the NCHSR, an organization that White helped create. The fellowships were funded by the NIH Health Services Research Study Section when White was its chairman. White was similarly helpful in advancing Wennberg's career, recounting

When I went to Hopkins Jack Wennberg was one of our first students. On graduation he was looking for a job. I said, "Why don't we get you up to Vermont and you can look at the hospital discharge abstract data for the entire state". Wennberg took the job in Vermont and started to mine the data (Berkowitz, 1998f).

Wennberg echoes White's account, recalling:

The whole process [of starting research on geographic variations] was made feasible by Kerr White's work. Kerr had been at the University of Vermont prior to coming to Hopkins, where I was fortunate to study with him. Kerr had persuaded most Vermont hospitals to join a hospital discharge abstract system called the Physician's Activity Study... We thus obtained information on virtually all hospitalizations of Vermont residents" (Mullan, 2004: 74).

In addition to Brook and Wennberg, White mentored a number of other scholars who went on to play an important role in advancing the intellectual school developing new approaches to healthcare quality. Other protégés include Clif Gaus, who went on to head a federal agency created with a mandate

to develop evidence-based clinical guidelines, and Barbara Starfield, who pioneered new approaches to thinking about quality in pediatrics (Berkowitz, 1998a, 1998b, 1998f).

Summary. The first generation of scholars, exemplified by Kerr White, helped establish solid foundations for the new intellectual school, including distinctive rules and resources that structured the emerging community. With their research, they established the intellectual foundations for a new evidence-based medicine paradigm, defining norms about what types of research on quality was interesting. Their research, in developing systems for collecting data, also created collective resources used by future generations. Through their political advocacy, they were able to create a range of institutional supports for evidence-based medicine as additional resources. Their actions, however, were not enough to advance new institutional logics, which involve symbolic systems connected to material practices. Instead, the new intellectual school was able to effect change because of the first generation's efforts to mentor a new generation of scholars who would continue and expand on the work that they started.

Generation 2: Persistence of new intellectual school and emergence of evidence-based medicine logic

Protégés of the first generation expanded on work developing new approaches towards healthcare quality. Their work enabled the persistence of the new intellectual school, and expanded and solidified the intellectual foundations for evidence-based medicine and began to connect new paradigms about quality to material practices, establishing a new logic. Drawing on the nascent meso-structure created by the first generation, the intellectual school in this generation took on features of an institutional actor. Again, we illustrate the actions of the second generation of scholars by following exemplar protégés of Kerr White.

Institutional Context. The second generation of scholars in the new intellectual school began their careers in the 1960s, when the government role in healthcare and federal support for research was continuing to expand. Members of this generation also benefitted from the presence of a number of

institutional supports (e.g. dedicated federal funding for research on quality, cost, and outcomes, a federal agency in support of research on quality, fellowship and graduate programs for training new scholars) that were created, in part, through the advocacy of members of the first generation of scholars. Over time, members of the second generation also were able to draw on new organizations (e.g. the Medicare program) that were created as part of the expanding government role in healthcare, and were important in connecting the ideas developed in the intellectual school to material practices. At this time, logics of individual professionalism still dominated in the American medical profession. Moreover, key gatekeepers at medical journals and funding agencies were disinterested in or opposed to the ideas advanced by members of the new intellectual school. However, the changes in the institutional context enabled more effective advocacy by the new intellectual school, and set the stage for the rise of evidence-based medicine logics.

Advocacy by a Growing Intellectual School. Mentored by Kerr White, key members of a second generation of scholars took up his work, and began to advance the growing intellectual school by doing research and advancing their ideas. John Wennberg used his position in Vermont to do research documenting geographic variation in patterns of medical care first in Vermont, then in Maine, and later comparing Boston and New Haven. His research examined geographic variations across small areas in patterns of medical treatment, making the case that these variations could not be explained by differences in the underlying prevalence of disease. In documenting wide variation in the use of surgical procedures in his studies, he made the case that there was a lack of adequate scientific basis for much medical practice, and that improving the quality of care would involve better grounding clinical practice in science and evidence (J. Wennberg, 1984, 2010; J. Wennberg & Gittelsohn, 1973).

This advocacy for the new intellectual school was hindered, in part, by opposition within the medical profession. Wennberg described why he initially published the findings from his variations research in the non-clinical journal *Science*, recalling “I didn’t choose it. We tried the conventional medical journals and received form-letter rejections... *Science* was the journal of last resort, but we were delighted to get the paper accepted” (Mullan, 2004: 75). He published a series of studies on geographic

variation in the *Maine Medical Journal*, also after receiving rejections from all the major medical journals (J. Wennberg, 2010). Over the next decades, as his ideas began to take hold and his reputation as a scholar became established, he was able to publish his work in major medical journals. In addition to publishing in medical journals, Wennberg actively worked to bring his work to a larger audience. For instance, he summarized the main arguments from his research in the popular science magazine *Scientific American*. In 1984, he contributed to a special issue focused on geographic variation in the journal *Health Affairs*, which aims to communicate to both research and policy audiences. He spoke at a press event at the U.S. Capitol held in conjunction with the launch of the special issue, allowing him to communicate his work to Congressional staffers and other policy makers.

Robert Brook similarly conducted and published research to advance new approaches to quality from early in his career (Brown, 2003b). His earliest published work focused on tools for quality assessment and measurement (e.g. Robert H Brook & Appel, 1973). He did this research at Hopkins, and later at the NCHSR, before moving to the RAND Corporation to take a job as a clinical director. At RAND, he published a series of studies measuring the appropriateness of care, and documenting the widespread prevalence of inappropriate care (e.g. Chassin et al., 1987). Like Wennberg's work, this research made the case that there were quality problems in American healthcare, and that much clinical practice was inadequately grounded in science or evidence.

In addition to doing and publishing research, members of the second generation of scholars engaged in political advocacy work to advance the new intellectual school. Wennberg, for example, cultivated political ties to Senators, Representatives, and other political players. Because of these political ties, Wennberg was regularly asked to testify about quality-related issues in Congress, and eventually played a pivotal role in advocating for legislation creating and funding a number of Patient Outcomes Research Teams (PORTs) in the mid-1980s (Salive, Mayfield, & Weissman, 1990; J. E. Wennberg, Barry, Fowler, & Mulley, 1993). These interdisciplinary teams were tasked with gathering evidence to define appropriate care practices for particular types of patients, and working with medical professionals and professional associations to change patient care practices. These research teams played a role in

developing some of the first evidence-based clinical guidelines (Salive et al., 1990), which were an important means by which the new ideas of the intellectual school were connected to material practices, thereby turning them into an emergent institutional logic. Wennberg, Brook, and Clif Gaus all played key roles in engaging in political advocacy for the creation of the Agency for Health Care Research and Policy, a new federal agency with more authority than the NCHSR, with a specific mandate to fund research teams to create evidence-based guidelines (Gray, 1992; J. Wennberg, 1992). This lobbying was not necessarily coordinated. Instead, different people, enabled by the rules and resources of the intellectual school, came to lobby, individually and collectively, for institutional supports. In doing so, the intellectual school took on features of an institutional actor.

Mentoring the Next Generation. The second generation of scholars went on to mentor a wide range of students who played a critical role in perpetuating and gaining legitimacy for the new intellectual school. For example, as a clinical director at the RAND Corporation, Brook recruited and mentored both Kathleen Lohr and John Ware. He played an important role in encouraging Lohr to get her Ph.D. and become central to the intellectual school, and in serving as the principle investigator on Ware's studies developing measures of patient-reported health outcomes. Elliot Fisher was also an important protégé of Wennberg's. He continued Wennberg's work on geographic variations in health care, and went on to develop the concept of Accountable Care Organizations and to lobby for their inclusion as part of the Obama healthcare reform legislation as a key mechanism for ensuring quality, a more recent example of ideas from the intellectual school becoming connected to material practices (Obama, 2016). Beyond these specific examples, both Brook and Wennberg went on to mentor a generation of scholars. Brook, for example, got a grant to fund clinical scholars at UCLA-RAND, training a wide range of academic doctors and introducing them to increasingly well-established evidence-based approaches towards healthcare quality (Brown, 2003b). Wennberg similarly created a Master's program targeting physicians at an institute he directed at Dartmouth (J. Wennberg, 2010).

We estimated Brook's and Wennberg's mentoring activities through an analysis of their co-authoring relationships. Drawing on conventions of publishing in the health sciences, in which the

principle investigator is listed as the last author of a study, and the study lead is listed as first author, we identified all co-authors on papers where Brook/Wennberg were last author, and all co-authors except the last author where Brook or Wennberg was first author, as protégés. For the few studies with two authors, we include the other author as a protégé. Figure 2 presents our estimates of the cumulative number of new protégés by year for both Brook and Wennberg. Both were prolific mentors, working with a large cohort of scholars to do research that advanced the intellectual school.

Summary. The second generation within the new intellectual school conducted research that solidified the intellectual foundation for evidence-based medicine, documenting that much clinical practice was insufficiently grounded in science. This research helped solidify the rules (e.g. norms and schemas highlighting that clinical practice should be grounded in science, and that it is worth testing whether practices actually have an evidence basis) and resources, in the form of methodological tools, for the intellectual school. In addition to publishing research and advancing their ideas within the medical profession, they communicated their findings to policy audiences, connecting the ideas developed within the school to material practices, and lobbied for and achieved research funding and political support, i.e. resources, for the growing intellectual school. Moreover, scholars in this second generation trained a large number of protégés, exposing them to and potentially inducting them into the new intellectual school.

Generation 3 and beyond: Consolidation of the logic of evidence-based medicine

A third generation of scholars consolidated the new intellectual school, and played an important role in advancing the logic of evidence-based medicine. This generation built on the ideas advanced by Wennberg, Brook, and others in the second generation, by continuing to publish research and engage in political action to support the intellectual school. John Ware, for example, left RAND and went on to serve as the principle investigator on the Medical Outcomes Study—a large study which went on to develop methodological tools for measuring patient-experienced health outcomes for a wide range of different patient populations and disease categories. The study resulted in over 150 publications, largely methodologically focused, and made progress for developing a standard set of measures for patient-experienced outcomes that could be used in a wide range of clinical trials to assess the benefits of

different types of health interventions (Berkowitz, 1998d). Kathleen Lohr moved from the RAND Corporation to the Institute of Medicine (IOM), an Academy of the National Academies of Sciences. Lohr made a career there as a Senior Scientist, Deputy Division Director, and then Division Director (Berkowitz, 1998e). During her career at the IOM, she played an important role in institutionalizing the new approaches to quality developed by earlier generations and ultimately in institutionalizing the logic of evidence-based medicine. She played a role in launching a program of work at the IOM focused on health care quality. This included serving as a senior investigator on, or commissioning Study panels that produced reports on evidence-based clinical guidelines, new approaches to quality assurance in Medicare, and ultimately on the state of quality in American healthcare (Institute of Medicine, 1990, 2001; Lohr, 1995). These reports had an important effect on gaining widespread acceptance in policy circles of the new approaches towards quality developed within the new intellectual school, and in institutionalizing the evidence-based medicine logic in the United States (Lohr, 1995).

DISCUSSION AND CONCLUSION

In this inductive historical case study, we have developed a model of institutional change that highlights the role of meso-structure in enabling individuals to act on institutions. Individual action seems so insignificant in the face of institutional arrangements that explanations for bottom-up institutional change must involve mechanisms to amplify it, if they are not to rely on heroic talent. The rapidly expanding literature on institutional work has brought individuals forcefully back into institutions (Lawrence & Suddaby, 2006; Lawrence et al., 2011), but most of these studies have explored only limited strategies for studying how individuals drive institutional change (Hwang & Colyvas, 2011), and have relatively neglected more collective mechanisms. We inductively theorize the utility of meso-structures that serve as a proximate object toward which to direct social action, and as a platform containing rules and resources on which community can be built and collective social action plays out, and ultimately as scaffolding toward institutional change. Meso-structures become institutional actors when they coordinate

and transcend individual activities, which can be directed at a range of institutional aims, and persist beyond the direct involvement of key members.

We find that the meso-structure of an intellectual school, populated in large part through mentoring, is one way that individuals enlist others and generate momentum for change. Intellectual schools are not the only type of meso-structure, nor is mentoring the only mechanism. We discussed earlier Leung et al.'s (2014) study of a collective buying club as an example of meso-structure; and Barley (1989) theorized career scripts as a meso-structure. In this study, we add intellectual schools as another meso-structure that supports collective formation and action toward institutional change.

Intellectual Schools as Meso-structures

In focusing on intellectual schools as a bounded locus of action that can explain change or reproduction in institutions, we build on a tradition of research that aims to develop theory for conceptualizing processes of institutional change (Hardy & Maguire, 2008; Hwang & Colyvas, 2011; Lawrence et al., 2011; Nigam & Ocasio, 2010). Our meso-structure approach, however, extends prior theory on institutional change in two ways. First, restricting attention to a particular domain of activity enables identification of specific types of agentic action (i.e., mentoring) linked to specific institutional changes (i.e., a new intellectual community and new logics). Second, taking the idea of institutions as multi-level social structures seriously (Barley, 2008), a meso-structure lens suggests that much action by individuals can be oriented toward proximate targets but nevertheless lead to institutional change.

Intellectual schools are such a realm of action. Individuals' actions to build a new school of thought through mentoring creates analytically and practically proximate opportunities to diverge from existing schools and deliberately create new meaning. When Kerr White mentored John Wennberg and Robert Brook at Johns Hopkins and later sponsored them for research appointments at the University of VT and NCHSR; when Robert Brook and Joseph Newhouse mentored Kathleen Lohr at RAND, encouraging her to pursue a Ph.D.; when White's efforts to establish NCHSR and Wennberg's later efforts to establish AHCPH and their roles in governance of these federal units resulted in funding for

research positions in the evidence-based medicine school; these concrete actions had the effect of building community and collective action that is necessary to change institutions.

A meso-structure lens can reveal more specific mechanisms of institutional change in a broad range of contexts. Inter-organizational relationships are one potential example. While researchers have not explicitly considered scripts governing inter-organizational ties as a meso-structure, they have noted that the features and meanings associated with ties across diverse organizational forms and the broader structure of ties can impact processes of institutional change (Nigam & Ocasio, 2010; Powell, White, Koput, & Owen-Smith, 2005). Prior work has also highlighted how individual actions, such as changing employers, can alter both inter-organizational relationships and broader institutional structures (Broschak, 2004; Dokko & Rosenkopf, 2010). Explicitly considering inter-organizational relationships as a meso-structure would involve theorizing how larger institutions encode the meanings and practices associated with inter-organizational relationships, how individual and organizational actors fashion specific inter-organizational ties and assign meaning to them, and how they potentially engage in action to alter institutions to facilitate or legitimate novel types of inter-organizational relations. Our research suggests that exploring inter-organizational ties as a meso-structure might focus attention on domain specific material actions or practices of institutional entrepreneurs (e.g. joint patenting or staff movement across allied or merged organizations), and may uncover local actions that accumulate over time, ultimately leading to change in institutions (Powell & Colyvas, 2008).

Institutional Meso-structures Can Involve Multiple Generations

Another important aspect of our findings is the strongly intergenerational nature of the work that proponents of the new intellectual schools performed. Theory about institutional change has been unspecific about the role of time. For example, Barley and Tolbert (1997) contend that institutionalization is a continuous process and recommend evaluating institutions at successive points in time in order to observe change. Our research provides a more specific theorization of how time plays into institutional change. Rather than time measured in months or years, our findings suggest that

institutions can change through explicit relationships between mentors and protégés that generate intergenerational transfers of changing norms, resources, and interpretive schemes. The pacing of change, then, is governed by the pacing of individuals' careers and career progression, from relatively junior protégés to more senior positions in which individuals might be able to mentor others and place them into key positions. Moreover, in contrast to other studies of institutional work, our focus on mentoring highlights the activities that individuals take in shaping next generations of institutional entrepreneurs that consolidate changes and continue with the work of institution-building. Our case shows that institutional change can be an extended process, spanning generations.

In our study, we show multiple generations working on institutional change. Kerr White did not just help his students get jobs; he helped them get key positions at the University of VT and NCHSR that would enable them to follow in his footsteps and reinforce the new intellectual school. He also influenced the use of NCHSR dollars to fund positions and projects in universities and to fund dissertation research, like that of John Ware. White's use of mentoring to change institutions over generations was deliberate and explicit. However, we also recognize that mentoring routinely transmits values along with knowledge, and that the expansion and reinforcement of the intellectual school is a by-product of this normal activity, as well as a result of deliberate action. Brook's mentoring of young doctors was a source of joy and pride for him, rather than a purely instrumental way of advancing a change in logics.

In this study, we show how the intellectual school of evidence-based medicine enabled a community of scholars that advanced a new paradigm about quality, forming an intellectual basis for the emergence of an evidence-based medicine logic. Future research can consider a meso-structure approach more generally for understanding institutional change. The limited sphere of action and proximity of meso-structural arrangements allows for a wider scope of ways in which individual action can change institutions. It can encompass action that is oriented toward changing more minor institutional arrangements and even action that is not explicitly oriented toward institutions at all. Meso-structure's emphasis on social interaction also encourages explicit consideration how individuals come together to generate and maintain structure that can lead to identifying specific mechanisms for socially interacting

collectives to form. Our study focused on mentoring, which is particularly important to scholarly communities and intellectual schools. Other types of meso-structures may lend themselves to other mechanisms of community-building. In sum, considering meso-structural elements can be a source of new insights into institutional maintenance and change.

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Figure 1: Institutional change through meso-structure

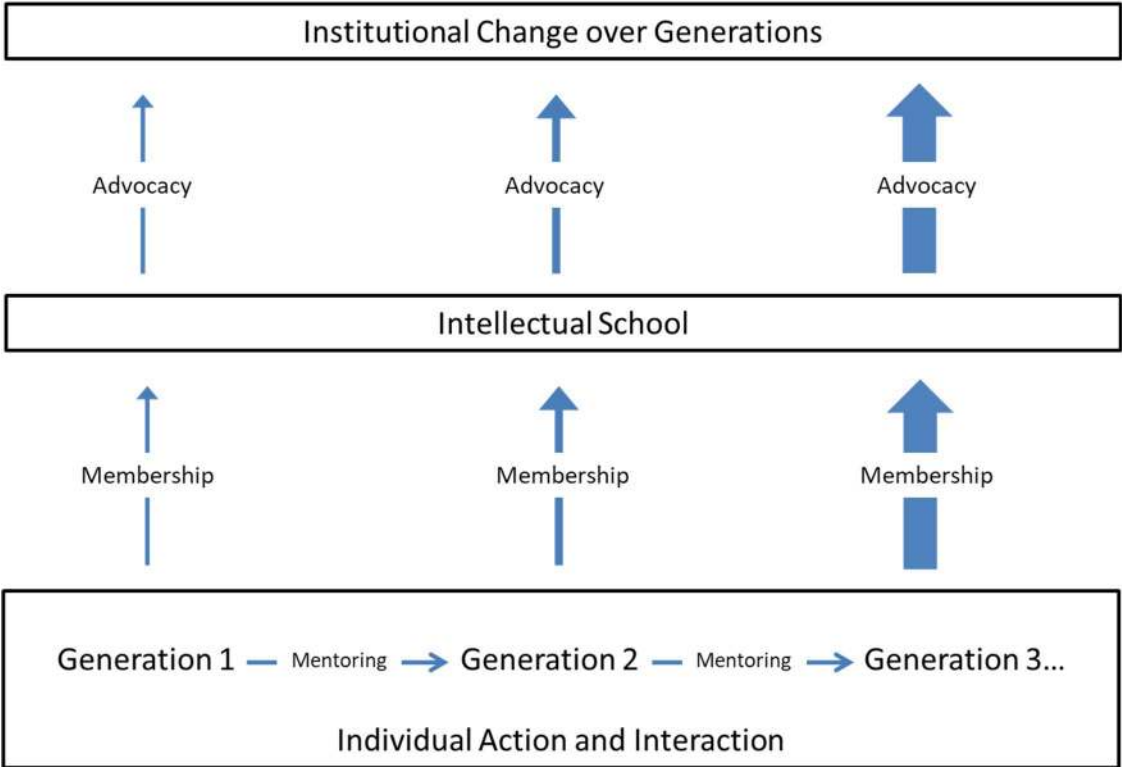


Figure 2: The Prolific Mentoring of Key Figures in Intellectual School of Evidence-Based Medicine

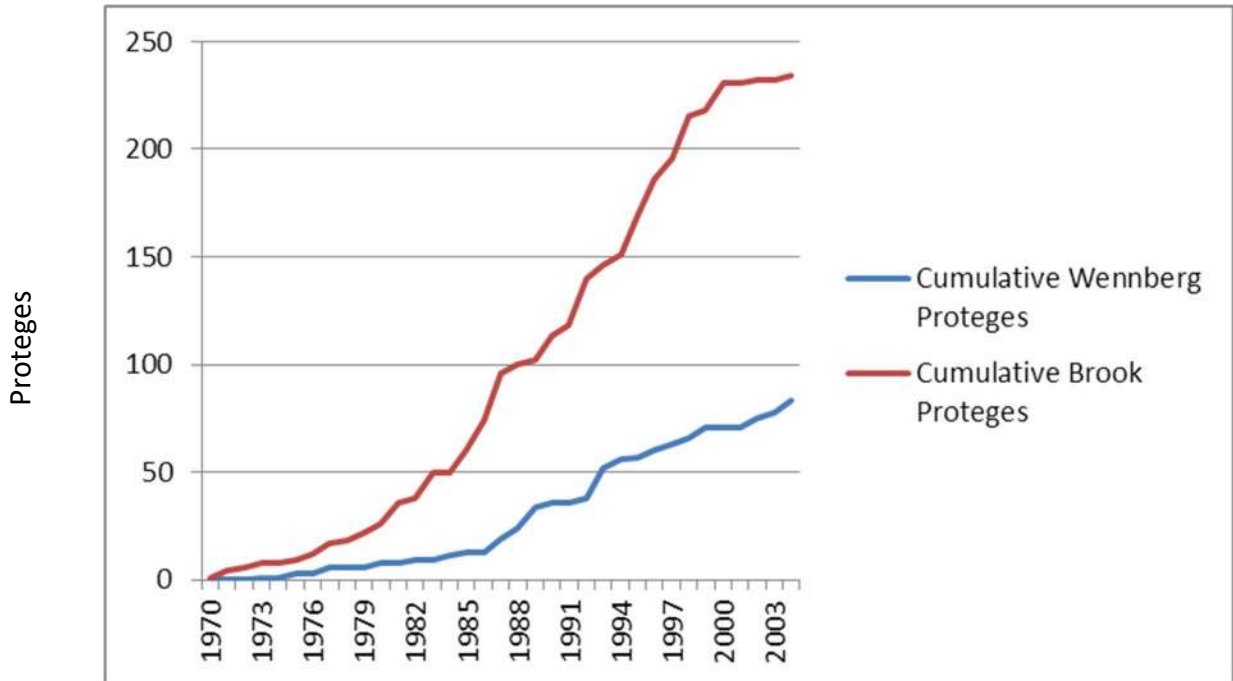


Table 1: Changing Profession-Level Logics in American Medicine

	Logic of Individual Professionalism	Logic of Evidence-Based Medicine
Congruence with system-level institutions	Professional dominance	Professional accountability to state and markets
Beliefs about the complexity of medical work	Medical work is complex and depends upon individual judgment.	Medical work can be codified and measured.
Approaches to achieving quality	Physician education and training are the principal means of ensuring quality care.	Clinical guidelines and quality measures are important means for ensuring quality.
Abstract body of knowledge	Professional knowledge focuses on the mechanisms of disease. Case reports outline the progression of a disease for specific patients.	Professional knowledge is grounded in the findings of clinical trials.
Legitimacy of clinical research	Moderate concerns about ethical issues in clinical research.	Strong concern about both ethical and methodological issues in clinical research, especially clinical trials and their reporting in the medical literature.

Table 2: Key Individuals Who Advanced Evidence-Based Medicine

Researcher	Role in advancing evidence-based medicine
Generation 1	
Kerr White, <i>M.D.</i>	Physician-researcher who did early research using epidemiological methods to study patterns of medical care. Early member and later chair of the health services research study section in the National Institutes of Health. Played a role in the creation of the National Center for Health Services Research (NCHSR), the first unit within the federal government dedicated to funding health services research.
Cecil Sheps, <i>M.D., M.P.H.</i>	Public health researcher and physician who was in the first cohort of faculty members at the University of North Carolina, Chapel Hill school of public health, Director of the Beth Israel Medical Centers in both Boston and New York, and founder of the health services research center at the University of North Carolina, Chapel Hill.
Generation 2	
Robert (Bob) Brook, <i>M.D. Sc.D.</i>	Physician-researcher and protégé of Kerr White who did work documenting the prevalence of inappropriate care in medicine. Played an important role in mentoring a multi-professional team of researchers involved with the Health Insurance Experiment. Also played a key role in creating the Association for Health Services Research (AHSR).
John (Jack) Wennberg, <i>M.D.</i>	Physician-researcher and protégé of Kerr White who did work documenting geographic variation in the use of medical treatments. Played a critical role in lobbying for the creation of the Agency for Health Care Policy and Research (AHCPR) in 1989 with a mandate to fund health services research and for increased health services research funding.
Barbara Starfield, <i>M.D. M.P.H.</i>	Physician-researcher and protégé of Kerr White who pioneered the area of pediatric health services research.
Clif Gaus, <i>Ph.D. in public health</i>	Public health researcher and protégé of Kerr White who created a health services research department in the Health Care Financing Administration, was a founding member and officer of AHSR, and an early director of the AHCPR.
Generation 3	
Kathleen Lohr, <i>Ph.D. in public policy (KL)</i>	Health services researcher and protégé of Robert Brook. Worked as a researcher on the RAND Health Insurance Experiment. Later moved to the Institute of Medicine. Served as president of the AHSR.
John Ware, <i>Ph.D. in educational measurement and statistics</i>	Health services researcher and protégé of Robert Brook with a Ph.D. in Educational Measurement and Statistics, with an emphasis on psychometrics. Pioneered survey methods for measuring patient health status.