



Institutional Logics and Institutional Pluralism: The Contestation of Care and Science Logics in Medical Education, 1967–2005

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Institutional Logics and
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The Contestation of
Care and Science Logics
in Medical Education,
1967–2005

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Although most studies underscore institutional change as replacement of one dominant logic for another and assume that professions are guided by a single logic, professions that operate in multiple institutional spheres often have plural logics. We focus on medical education, the supplier of medical professionals, which resides at the interstices between academia and healthcare. Using archival sources from 1910 to 2005, we identify two logics central to the profession that persisted over time: care and science. We found that jurisdictional competition with rivals such as public health, contestation among physicians, the rise of managed care, and increasing numbers of women entering medical schools are associated with increased attention to the care logic. Differentiation in the missions of medical schools is associated with reduced attention to the science logic. Our study reveals that plural logics of care and science in medical education are supported by distinct groups and interests, fluctuate over time, and create dynamic tensions about how to educate future professionals. ●

Institutional logics are cultural beliefs and rules that shape the cognitions and behaviors of actors (Friedland and Alford, 1991; Thornton, 2004; Lounsbury, 2007). Logics are socially shared, deeply held assumptions and values that form a framework for reasoning, provide criteria for legitimacy, and help organize time and space (Friedland and Alford, 1991; Thornton, 2004; Thornton and Ocasio, 2008). Embodied in practices and ideas, institutional logics shape the rules of the game and provide “a stream of discourse that promulgates, however unwittingly, a set of assumptions” (Barley and Kunda, 1992: 363). Scholars conceptualize logics as originating within societal sectors—such as professions, corporations, the market, the state, the family, and religions—whereby individuals and organizations that regularly interact cohere on shared rules and beliefs (DiMaggio and Powell, 1983; Scott and Meyer, 1983; Friedland and Alford, 1991; Thornton, 2004). Thus professions, as a higher-order societal institution of “relative permanence” and a “distinctively social sort” (Hughes, 1936: 180), are often thought to have one dominant institutional logic that guides organizing and provides actors with vocabularies, identities, and rationales for action (Friedland and Alford, 1991; Thornton, 2004).

Scholars who have focused on changes in logics tend to conceptualize change as replacement, whereby a dominant logic that drives field-level practices is abandoned and another dominant logic takes its place. For example, in publishing, a market logic replaced a craft logic (Thornton, 2002), in finance, a regulatory logic replaced a thrift logic, and both were later replaced by a market logic (Haveman and Rao, 1997; Lounsbury, 2002), and in the culinary field, nouvelle cuisine replaced haute cuisine (Rao, Monin, and Durand, 2003). Similarly, scholars often examine change as a period effect, whereby a jolt or exogenous force ushers in a new dominant logic and effectively separates one relatively stable period of beliefs from another (e.g., Thornton and Ocasio, 1999; Scott et al., 2000; Nigam and Ocasio, 2009). Focusing on a

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dominant logic within a profession highlights social actors' attention to this logic and assumes consensus among professionals. But institutional environments are often fragmented, with conflicting demands (D'Aunno, Sutton, and Price, 1991) or multiple logics that may make agreement difficult and consensus impossible when different groups within the profession attempt to assert their interests and change the rules that govern the organizational field (Berman, 2006). Thus conflict and pluralism within the profession may be motivating forces for institutional change (Bucher and Strauss, 1961; Jones, 2001; Seo and Creed, 2002; Lounsbury, 2007). As Schneiberg and Clemens (2006: 210) argued, "an appreciation of heterogeneity and the relative *incoherence* of fields is crucial . . . for empirical explorations of institutional change."

Professions are often subject to multiple logics because they operate within multiple institutional spheres; they are "subject to multiple regulatory regimes, embedded within multiple normative orders, and/or constituted by more than one cultural logic" (Kraatz and Block, 2008: 243). The multiplicity of attention associated with institutional pluralism may result in open conflict, in which segments of the profession actively seek change (Bucher and Strauss, 1961; Washington and Ventresca, 2004; Lounsbury, 2007), in hybridization, whereby one aspect of a logic is incorporated with a related profession (Townley, 2002), or a shift to a dominant logic because tensions within a profession cannot be sustained over time (Suddaby and Greenwood, 2005). By paying attention to the multiple logics that guide professionals, in this paper, we "assess rather than assume coherence" to explain institutional reproduction and change (Schneiberg and Clemens, 2006: 196–197). We answer two related research questions: (1) When are plural logics maintained within a profession? And (2) What factors influence the relative balance (or imbalance) in plural logics?

We chose to study the multiple logics guiding professionals in medical schools because the medical profession has experienced profound changes over the last four decades. American medicine resides at a nexus of science and clinical practice as well as the social and economic relationship between patient and physician.¹ Further, curricula in professional schools are constrained by time and limits to attention; thus logics may compete for attention, and academics must make decisions about what is covered, which values are central, and what logics should be inculcated to guide future professionals. A fundamental pedagogical issue concerns how to balance the need to teach basic medical science with the need to train medical students in the skills needed to practice medicine (Bucher and Strauss, 1961). We examined the relationships between logics within medical education because medical schools reside at the interstices of two institutional spheres—academia, which comprises multiple professions, and healthcare, which includes professions and industry. Thus medical education faces institutional pluralism and also plays a critical gatekeeper function for the profession. It is the entry point for aspiring professionals and the supplier of medical personnel for organizations and the profession. Professional education is the key site for struggles that may reveal what

¹ We thank a reviewer for this language.

causes change in the broader profession because it shapes the values, assumptions, and identities of the next generation.

In the next section, we draw on multiple archival sources to develop an analytical narrative of the logics of science and care in medical education and examine the relationship between these logics over the past century. We follow previous scholars who have focused on vocabularies (Mills, 1940), specifically, the occurrence and co-occurrence of keywords (Ruef, 1999; Ghaziani and Ventresca, 2005; Ocasio and Joseph, 2005; Jones and Livne-Tarandach, 2008; Nigam and Ocasio, 2009), and have shown how shifts in the focus of attention alter practices and behavior (Ocasio, 1997; Thornton and Ocasio, 1999). Educational institutions are foci of exogenous forces and professional changes, highlighting the dual nature of professional schools. We use our narrative to generate hypotheses to predict which professional and exogenous forces influence the emphasis placed on science and care logics and the relationships between them as they compete for attention in medical schools. We then test the influence of professional and exogenous forces on logics using archival data from 1967 to 2005.

SCIENCE AND CARE LOGICS IN AMERICAN MEDICAL EDUCATION

The profession of medicine has experienced both profound changes (e.g., Abbott, 1988; Scott et al., 2000; Reay and Hinings, 2005) and stability, allowing us to gain insight into how a profession's logics and their relationships evolve over time. Throughout its history, the medical profession has had multiple logics, or multiple ways to define the means by which "quality care" is best accomplished. It is an empirical question whether a logic dominates professionals' attention or whether multiple logics receive relatively equal attention. Historically, the profession of medicine derives its authority and legitimacy from its scientific knowledge (Friedson, 1970; Starr, 1982), which provided a stable foundation for the profession and separated it from lay persons in the late nineteenth century (Rosenberg, 1987). Thus for a science logic, quality health care involves innovative diagnostic and therapeutic procedures to ameliorate human suffering and help eradicate disease. Abbott (1988), however, argued that the American public increasingly conceptualizes quality healthcare in terms of quality of life rather than innovative new treatments. This highlights another logic of care in the medical profession, which has been present since the early 1900s (Flexner, 1910; Peabody, 1927; Rosenberg, 1987) but is increasingly important, in which quality healthcare is seen as physicians who provide compassionate, preventive care to patients and treat them as whole people rather than simply diseases (Willard, 1966; Institute of Medicine, 1994, 2003). In short, a science logic focuses on knowledge of diseases built through research and innovative treatments, whereas a care logic highlights physicians' clinical skills used to treat patients and improve the health of the community. In table 1, we outline briefly the key historical events that highlight the logics of science and

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Table 1

Key Events and Their Influence on Logics in Medical Education

1910–1959: Institutionalization of plural logics

1910	Flexner Report published. Commissioned by Carnegie Foundation and backed by American Medical Association (AMA). Recommended standardized medical curriculum anchored in science within universities.	Institutionalizes plural logics of <i>science</i> and <i>care</i> in medical education. Developing scientific knowledge in skills in the <i>laboratory</i> is the standard for training but notes the necessity of developing <i>clinical</i> skills through <i>clerkships</i> . Importance of medical schools being attached to <i>hospitals</i> and universities.
1915–1916	National Board of Medical Examiners (NBME) is established and administers first test.	Institutionalizes <i>science</i> and <i>care</i> logics through licensing exams that test (1) <i>science</i> knowledge and skills and (2) <i>clinical</i> knowledge and skills.
1922	Licensing exam restructured by NBME.	
1927	Francis Peabody's famous lecture, "The care of the patient," published in the <i>Journal of the American Medical Association (JAMA)</i> .	Further evidence of the coexistence and supplementary nature of <i>science</i> and <i>care</i> logics in medical education.
1940	Only 10 public health schools are recognized by the American Public Health Association.	Public health not yet a viable rival to shape logics.
1944	Public Health Service Act gives the National Institutes of Health (NIH) the legislative basis, authority and budget to conduct research; 1944–1968 is "golden age" for NIH funding.	Expands the scientific approach to medicine and establishes <i>research</i> as mission in medical schools.

1960s–1970s: Increasing tensions between logics and growth in public health

1963	The Health Professions Educational Assistance Act promotes new medical schools and increases enrollments.	Institutionalizes community and preventive aspect of " <i>care</i> logic" by providing funding for new medical schools to serve patients in <i>communities</i> rather than conduct <i>research</i> and take a curative approach to medical care.
1964	NBME eliminates observed clinical examination because of high costs, logistical difficulties, and concerns about reliability and validity.	Care logic deemphasized in exams. <i>Clinical</i> skills deemed too difficult to measure and thus difficult to reliably develop in students. Exam assesses <i>science</i> and <i>clinical</i> knowledge through multiple choice questions.
1964	NIH starts Medical Science Training Program (MSTP) and offers MIT \$50 million to start science-oriented medical school. Instead, MIT creates joint medical school program with the Harvard Medical School, the Health Sciences Technology Division (HST).	Science logic seen as under threat. NIH funds programs to reinforce scientific basis of medicine.
1964–1966	NIH actively promotes scientific missions in medical schools; Lyndon Johnson creates President's Commission on Heart Disease, Cancer and Stroke.	Expansion of scientific logic; significant resources and public support for scientific <i>research</i> in medicine. Emphasizes research, eradication of diseases and a "curative" meaning of medical <i>care</i> .
1966	Millis and Willard Reports published (sponsored by AMA), leading to the American Board of Medical Specialties approving family practice as a new medical specialty in 1969.	Defines and promotes <i>care</i> logic by calling for a new type of <i>physician</i> who is concerned with preventing disease, serving the <i>community</i> health, and practicing <i>family</i> medicine.
1966–1970	Founding of Institute of Medicine (IOM). One of the founders has strong roots in public health.	Advances <i>science</i> logic as medicine; affiliated with National Academy of Sciences. Also, through first leader, infusion of <i>care</i> logic with the prevention of disease and community health in medicine.
1970	Dean Ebert at the Harvard Medical School founds Harvard Community Health Plan.	Promotes <i>care</i> logic as the prevention of disease and <i>community</i> health by physicians.
1973	Health Maintenance Organization (HMO) Act signed into law by President Nixon, using federal funds and policy to promote HMOs.	National emphasis on providing <i>care</i> to populations.
1974	Council on Education for Public Health (CEPH), the accreditation arm of the public health profession, is founded. At this time 22 public health schools exist.	Public health focuses on <i>care</i> as the prevention of disease and health of the <i>community</i> .

(continued)

Table 1 (continued)

Key Events and Their Influence on Logics in Medical Education**1980s–2006: Contestation between logics and calls for reform**

1984	AAMC publishes report on the general professional education of physicians.	Emphasizes <i>care</i> logic, gives <i>clinical</i> skills the same amount of attention as <i>science</i> knowledge in the curriculum. Calls for generalist training emphasizing <i>clinical</i> skills, values and attitudes as well as disease prevention to promote health in communities.
1988	IOM publishes report on the role of public health.	Medical profession criticizes public health schools and defends turf.
1992	The Harvard Medical School establishes a joint project with the Harvard Community Health Plan (now 23 years old).	Medical faculties resist managed care and HMOs; managed care not integrated with <i>care</i> logic in medical education.
2003	IOM publishes report on medical education, with "emphasis on the needs of patients and populations and a focus on improving health, using the best of science and the best of caring."	Reform is needed. Suggests a new relationship between <i>science</i> and <i>care</i> logics: <i>care</i> logic needs to come first, <i>science</i> logic is important but supplementary.
2004	NBME requires objective structured clinical exams (OSCE) for Step 2 of Medical Licensing Exams.	Emphasizes <i>care</i> logic in medical schools. Leads medical schools to focus on teaching communication skills and relational skills in <i>clinical clerkships</i> .
2005	98 schools of public health exist.	Public health is thriving and focusing on <i>community</i> health.
2006	<i>New England Journal of Medicine</i> begins a new series on medical education.	<i>Clinical clerkships</i> need the most reform.

care in medical education and allow us to understand when plural logics are likely to coexist. Keywords reflecting these logics are in italics.

The Institutionalization of Plural Logics, 1910–1959

The Flexner Report of 1910, commissioned by the Carnegie Foundation for the Advancement of Teaching in conjunction with the American Medical Association's Council on Medical Education to promote the restructuring of medical education, was highly influential in shaping medical education and professionalizing medicine, as it provided a foundation for medical education over the next seventy years (Beck, 2004). Abraham Flexner, an educational theorist who worked for the Carnegie Foundation, was asked to study the quality of medical programs. After visiting, examining, and finding significant variation among the population of 155 medical schools, Flexner called for the closure of schools that did not provide rigorous training based in science and laboratory work, were not associated with hospitals, and were not attached to universities. Flexner had significant backing in the medical profession, especially among the elite, who believed that the profession ought to be composed of more scientifically trained physicians (Rosenberg, 1987). In fact, scholars note that Flexner is the end, rather than the beginning, of a much older reform program (Rosenberg, 1987) that sought to consolidate medical schools, reduce the oversupply of doctors, and enhance the quality of medical training (Starr, 1982; Ludmerer, 1999; Ruef, 2002). Beck (2004) cited the editors of the *Journal of the American Medical Association (JAMA)* in 1901: "It is to be hoped that with higher standards universally applied their [medical schools] number will soon be adequately reduced, and that only the fittest will survive."

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Also, Flexner's recommendations to standardize medical education and anchor it in science helped consolidate the medical profession and fend off rivals, both those poorly trained and those in alternative professions such as public health.

Although the public health movement created many new preventive clinics and health centers from 1905 to the 1920s, such as those focused on tuberculosis, infant mortality, and school children, the medical profession vehemently opposed its role as belonging to medicine and successfully blocked public health professionals from assuming the higher-level functions of coordinating and directing medical care (Starr, 1982). In 1916, the Rockefeller Foundation supported the development of schools of public health separate from schools of medicine (White, 1991). Thus public health schools were clearly designated as distinct from medical schools and did not become a significant rival to medical schools until much later. As of 1940, only 10 public health schools were recognized by the American Public Health Association.

Science may have been a dominant focus of attention, but the Flexner Report institutionalized multiple logics of science and care in medical education. Flexner recommended a standard for medical education that still guides medical curricula 100 years later. The first two years of the four-year curriculum, the "pre-clinical years," were to be strictly devoted to basic scientific training in the laboratory and in the classroom. The last two years were reserved for hands-on experiences with patients in "clinical clerkships," in which students learned through apprenticeships with practicing physicians who applied the scientific method to provide care: efficacious and effective treatments based on scientific knowledge and clinical insights. Flexner (1910: 91) dismissed as absurd conflict between science and care; however, this indicates that science and care existed in an uneasy truce:

A somewhat absurd controversy has at times raged as to which is of the higher scientific quality or diagnostic value — the laboratory disclosures or the bedside observations. Occasionally champions of the laboratory prejudge the issue by calling pathology a real or pure or more or less accurate science, as against the presumably unreal or impure or inaccurate data secured from the patient himself. It becomes a serious question of professional etiquette, who should speak first or loudest, — the pathologist, armed with his microscope, or the clinician, brandishing his stethoscope.

The dual logics of science and care were reiterated in one of Francis Weld Peabody's (1927) lectures before students at the Harvard Medical School, "The care of the patient," which became a classic text for students learning to practice medicine (Ludmerer, 1999). Peabody (1927: 877) described the roles of patient care ("the art of medicine") and science ("the science of medicine") as "not antagonistic but supplementary to each other." Despite professionals' widespread belief that science and care are mutually constitutive and beneficial, Rosenberg (1987) noted how difficult it was to integrate science and care logics both intellectually and organizationally.

Through licensing exams, science and care logics were further institutionalized as foundational to medical education.

Medical professionals, including leaders in the Association of American Medical Colleges (AAMC), American Medical Association (AMA), the surgeon-generals of the armed forces (army and navy) and the Public Health Service, Federation of State Medical Boards (FSMB), the Mayo Foundation, and the American College of Surgeons, cooperated to make medicine more standardized and established the National Board of Medical Examiners (NBME) in 1915 as an independent entity to provide nationwide examination and a standard by which to judge candidates for medical licensure (Melnick, 2006). The early exams, which began in 1916, were week-long events that had essays, laboratory, oral, practical, and bedside components. In 1922, the NBME restructured the exam to comprise three sections. The first two parts used essay questions to test basic biomedical sciences and the fundamentals of clinical medicine. The final component consisted of observations of patient encounters and an oral examination. This structure of testing basic science, clinical knowledge, and skills persisted until the early 1950s (Melnick, Dillon, and Swanson, 2002).

After World War II, significant resources were freed up and allocated to improving human health and the quality of life in the United States. The Public Health Service Act of 1944 gave the National Institutes of Health (NIH) the legislative basis and general authority to conduct research. With the expanded role of the NIH and other shifts in medicine, the consensus behind the institutionalized balance between science and care started to shift.

Increasing Tensions between Logics and Growth in Public Health, 1960–1979

Science and care logics in medical education began to bifurcate in the 1960s with expansion, new voices, and legislation that attempted to reduce the shortage of physicians and increase access to primary care physicians, particularly in rural and underserved communities. The passage of Medicare and Medicaid legislation in 1965 sparked interest in “increasing equity of access to healthcare services for underserved citizens, [and] massive amounts of new funds flowed into the sector” (Scott et al., 2000: 134). In addition, in 1965 the Association of American Medical Colleges (AAMC) began to take an active interest in medical education to provide a voice for academic medicine amidst the changes in the environment. As a result of significant expansion in medical education, with new entrants and strengthened rivals, consensus about training in medical schools began to deteriorate.

The Health Professions Educational Assistance Act in 1963 significantly increased the number of medical schools and also provided loans to students to help increase enrollments in medical schools (MacBride, 1973). As a result, 21 new medical schools were founded between 1960 and 1979, as shown in the Appendix. Only four of these new schools appear to have emphasized science in their missions and medical training programs. The majority of new schools were public institutions created to serve rural or community areas that faced shortages of medical care (Ludmerer, 1999). These

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community-based institutions shifted the focus of attention from science to care in the traditional curriculum in three ways: (1) by emphasizing students' early experience in clinical medicine (*JAMA*, 1968: 2006), (2) by reducing the scientific portion of the curriculum, which replaced some basic science courses with social science and humanities courses (Rothstein, 1987), and (3) by questioning the taken-for-grantedness of scientific training in medical schools more generally (e.g., Kimberly, 1981). Unlike many of the established, scientifically oriented medical schools, these new schools often experimented with new ways to train physicians (Ludmerer, 1999). These legislative changes and broader social movements (civil and women's rights) also "created an atmosphere more conducive to women becoming physicians" (Wynn, 2000: 669). Thus in the 1970s, the composition of medical schools' students shifted: women enrolled in medical schools in record numbers and created the potential for greater liberalism within the medical profession (Colombotos and Kirchner, 1986; Wolfe, 1986). With the new entrants—both medical schools and the composition of aspiring physicians—and changes to the scientific approach in the curriculum, the perceived dominance of the science logic was challenged in medical education.

Also significant to understanding the relationships between science and care logics are three reports that were published in 1966 describing the severe shortage of primary care physicians in the United States. The Willard, Millis, and Folsom Reports, respectively, recommended that individuals have access to qualified physicians who would treat them as individuals rather than isolated diseases or organ system dysfunctions, called for a physician's scope of service to be broad enough to treat all members of a family, and recommended training new family physicians in the immediate future (Graham et al., 2002: 1097). Willard (1966: 1) argued for a "significant reorientation of medical education and change in the attitudes of the medical profession." As a result, in 1969, family medicine was approved as the first new specialty since 1940, with a chilly reception by academic medicine. These reports directly challenged the perceived dominance of science logic in training medical students and advocated for a new approach and a new breed of physician, namely, family physicians who would practice comprehensive medicine.

The Willard, Millis, and Folsom Reports have strong ties to public health, which at this time was gaining support within the medical community. The American Public Health Association and National Health Council also published reports in 1966 that Willard (1966: 3) noted were "quite similar in philosophy and detail" to his own report. Similarly, many "distinguished physicians" and decision makers in academic medicine increasingly focused attention on community health issues (White, 1991: 170). Despite some resistance from his colleagues at the Harvard Medical School, Dean Robert Ebert started the Harvard Community Health Plan in 1969, the first academic, non-profit health maintenance organization (HMO) (In Memoriam: Robert Ebert, A Lasting Legacy, HMS Focus,

http://focus.hms.harvard.edu/1996/Feb16_1996/In_Memori.html). Dr. Walsh McDermott, the first leader of the Institute of Medicine (IOM), which was founded in 1970 to give medicine an honorific and policy shaping society within the National Academy of Science, was an accomplished academic physician who specialized in public health and community medicine. In 1972, Dr. John Knowles was appointed as president of the Rockefeller Foundation, and created the Population and Health Division, which promoted a "not so hidden agenda" to change priorities in medical education to include population-based medicine and epidemiology as an integral part of medical school training (White, 1991: 167). In 1977, that division started a program targeting young clinical faculty, especially those in internal medicine departments, to increase the number of medical professionals with public health training and infuse the philosophy of public health into the medical profession. These professionals argued that epidemiological concepts and methods would help the day-to-day practice of medicine. "Clinical epidemiology offered the greatest promise for broadening the minds of contemporary medical faculty and their students" (White, 1991: 171).

Amidst these changes toward greater emphasis on patient care and community health, there was a parallel shift reemphasizing the necessity of a scientific foundation for medical education. The NIH and its budget expanded from \$8 million in 1947 to more than \$1 billion in 1966 (<http://history.nih.gov>). Furthermore, under Lyndon B. Johnson's presidency, reducing and eradicating diseases through significant research became a priority for the United States. The President's Commission on Heart Disease, Cancer and Stroke made its first recommendations in December 1964. Upon receiving the report, President Johnson noted, "We are going to not just establish a Commission on Heart Disease, Cancer and Stroke to recommend steps to reduce the incidence of these diseases; we are going to reduce them" (Johnson, 1964). Given the significance of scientific breakthroughs to eradicating diseases, science was seen as critical for training medical students (Beck, 2004); many medical schools began to adopt and pursue a mission for biomedical research.

Even with the significant resources, leaders in scientific medicine and key constituents at the NIH worried that a logic of care diminished the importance of science training and promoted the role of patient care (Johnson, 2004). In 1964, under the leadership of Dr. James Shannon, who championed scientific medicine (Abelmann, 2004), the NIH created the Medical Science Training Program (MSTP) to create a new breed of physician-scientists. The MSTP sought to preserve the rigor of scientific medicine in a changing educational environment, with challengers who advocated for schools to pay more attention to patient care in the medical curriculum (<http://www.nigms.nih.gov/training>). The scientifically oriented Albert Einstein College of Medicine, which was founded in 1945 and whose first class began in 1955, was one of the first MSTP schools (Jaffe, 1996). In 1966, the powerful NIH director, Dr. James Shannon offered MIT \$50 million to start a

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medical school. Then-president of MIT, Howard Johnson (2004: xx) noted:

Dr. Shannon turned to my colleagues and to me at MIT in 1966 because, as he said, NIH was convinced that mere expansion of the number of physicians would not suffice. A new kind of physician was needed who could integrate and exploit the full power of modern science and technology in the practice of medicine. Dr. Shannon was convinced that MIT was the right place to break with the past in the education of medical doctors.

NIH selected MIT because of its success in natural and physical sciences and as a direct attempt to preserve the scientific basis and rigor of medicine amidst changes in the educational environment. The central role of a science logic in medicine worldwide is seen in the Nobel Prize for Medicine, which has always honored basic scientists and physician-scientists rather than clinical-researchers, because clinical research is perceived as "less rigorous and fundamental" (Zuckerman, 1977: 196).

During this period, we see the rise of a public health perspective in medicine, with a heightened emphasis on prevention and community health and increased polarization between science and care logics. Advocates for each logic in medical education were becoming louder and more pronounced in their differences.

Contestation between Logics and Calls for Reform, 1980–2005

Although tensions between science and care logics have existed since the start of the twentieth century (Rosenberg, 1987) and accelerated in the period of the 1960s–1970s, several trends may have exacerbated this conflict. As public health became professionalized, expanded in number of practitioners, and asserted its influence, it increased its threat to the medical profession. Jurisdictional competition between medicine and public health is seen in 1988, when the Institute of Medicine (1988) criticized the substandard quality of public health schools and their programs, galvanizing curriculum revisions, resources, and enhanced standards in public health schools.² "Today the two cultures 'medicine' and 'public health' seem to live in different, often unfriendly, worlds" (White, 1991: xi).

Also, there is increased segmentation among groups within the medical profession at multiple levels. First, the missions of medical schools are increasingly differentiated and specialized based on patient care and science, and the increased separation between clinical and scientific work makes it more difficult for medical schools to emphasize both science and care. Second, the increased specialization of scientific knowledge fueled the growth of medical specialization and subspecialization (Ludmerer, 1999) and made translations from the laboratory bench to the patient's bedside more challenging. Basic biomedical research emphasizes subcellular and molecular levels of analysis in which life processes are conceptualized in physical and chemical terms (Ludmerer, 1999). Thus research in medical schools became more similar to basic sciences in other parts of the university than to the clinical research conducted by medical school faculty who study human subjects. Clinical research has provided fewer career

² See the undated publication of the Association of Schools of Public Health (ASPH) "Strong Schools, Strong Partners: A Report on the Activities of Public Health." <http://www.asph.org/userfiles/strongschools.pdf>; downloaded September 22, 2008.

incentives (Zerhouni, 2005), leading some critics to claim that many medical schools have discarded the medical applications of their subjects to focus on the basic research necessary to attract funding from the NIH and advance researchers' careers (Rothstein, 1987). Recently, there was a new initiative to fund clinical science and translational science that bridges knowledge from the laboratory to patients at the bedside (Zerhouni, 2005). Third, even within clinical departments, there is also evidence of overt conflict and "turf battles" between family medicine practitioners and their specialist physician counterparts (Gutierrez and Scheid, 2002: 19).

In addition to the increasing fragmentation and division within the profession and medical schools, the conflict among academics over reform in medical education has reached new heights, with an increasing "ethos of reform" surrounding medical education (Christakis, 1995). Critics in the profession have noted that "medical schools have long taught the technical aspects of medicine, but a focus on teaching the professional and healing qualities has been more recent" (Shrank, Reed, and Jernstedt, 2004: 887). Professionals who pushed for more community and preventive focus in medical schools have argued that science dominated the curriculum for too long, resulting in "the narrowed mission of the medical school . . . the gradual abrogation of the social contract between the medical establishment, especially its academic component, and the public. . . . Medicine lost touch with the full array of the population's health problems and needs" (White, 1991: 3). Some critics outside of the profession have taken a more extreme position about the content of reform in medical schools. Samuel Bloom (1988: 294), a sociologist, argued that all of the reforms medical schools have made have actually changed very little because "medical education's manifest humanistic mission is little more than a screen for the research mission, which is the major concern of the institution's social structure."

Amidst calls for heightened attention to patient care, physician-scientists have defended science's role in the curriculum. As Gill (1984: 365–366) wrote, "The role model to emulate became more and more the family practitioner, not the academic scientist—that is, the deliverer of healthcare, not the dispassionate scholar. Medical students now spend summers in Appalachia, not in the lab." Elite medical schools, which saw their mission as producing scholars and specialists, have resisted curricular reforms of fewer science courses and students in the clinic before the third year (Ludmerer, 1999). Dr. Brieger (1999: 16), a professor at Johns Hopkins, noted that ". . . the basis for medical practice is firmly rooted in medical sciences."

Numerous professional reports have also called for change in medical education, "arguing that the profession must reform itself, lest outsiders take up the task" (Christakis, 1995: 707). In 1984, the Association of American Medical Colleges (AAMC) called for medical schools to give equal importance to developing clinical skills and scientific knowledge, advocating a balance between attention to science and care logics. By 2003, the Institute of Medicine (IOM) relegated science to secondary status, calling for medical education to emphasize

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clinical skills first, science second. In 2006, the editors of the *New England Journal of Medicine* started a special forum for reforming medical education and motivated it by citing the call for “substantial changes” to medical education in the 2003 report published by the IOM: “We regard education as one of the primary mechanisms for initiating a cultural shift toward an emphasis on the needs of patients and populations and a focus on improving health, using the best of science and the best of caring” (Cox and Irby, 2006: 1375). Although the Institute of Medicine called for using the best of, or balance between, science and care, medical professionals appear to have become fragmented and divided along the lines of science versus care logics. As a result of these tensions, Dr. Ronald Arky (2006, 2007) of the Harvard Medical School argued that medical education needs a modern-day reformer like Abe Flexner and exclaimed, “Abe Flexner, where are you? We need you!”

In the calls for reform, we see increased conflict among medical educators over which logic should gain greater attention and priority in medical schools. Until now, medical schools have engaged in a delicate balancing act of attention to both science and care logics. Shifts in attention toward care were institutionalized into the medical licensing exam. In June 2004, the United States Medical Licensing Exam (USMLE) again began to assess clinical skills, using actors who play the role of patients, which had not been assessed directly since the 1950s, when the USBME deemed these skills difficult to measure reliably. With the new licensure requirements, “medical schools now have an enhanced incentive to teach and test clinical skills in a standardized manner” (Barzansky and Etzel, 2004: 1029).

Finally, managed care became a topic of increasing importance in healthcare. Although the Health Maintenance Organization (HMO) Act was passed in 1973, and HMOs were widespread by the mid-1980s, medical schools were very slow to accept and affiliate with HMOs because their faculties opposed them (Rothstein, 1987), and they were not (and still are not) mandated to do so. For instance, although Dean Ebert of the Harvard Medical School established the Harvard Community Health Plan in 1969, it was not until 1992 that the Harvard Medical School engaged in a joint program. As late as 2002, some academics called for medical schools to teach students to resist and revolt against managed care because its focus on efficiency and profits went against the “non-commercial ethic of professionalism and service” advocated by Flexner (Wolfe, 2002: 5). Also, primary or preventive care had not been a dominant focus of research in medical schools, so managed care never became integrated with the research mission at medical schools (Rothstein, 1987). In contrast, managed care has focused on primary care physicians, the core advocates for a care logic, as gatekeepers for more specialized procedures.

INFLUENCES ON THE RELATIVE BALANCE AMONG PLURAL LOGICS

Professions are historically evolving institutions that are best understood in relation to the social context in which they

currently operate and from which they emerged (Fligstein, 1990; Friedland and Alford 1991; Powell, 1991; Davis and Greve, 1997; Meyer et al., 1997; Thornton and Ocasio, 1999). While professional work and the means by which it is accomplished may always have internal dialectical tensions, and jurisdictions are perpetually in dispute, the probability of such tensions erupting into contestation depends on history. Events that drive social and cultural changes can affect legitimating values and the opportunity for groups to make successful jurisdictional claims in a profession (Abbott, 1988). Suddaby and Greenwood (2005) argued that the apparent unity between contradictions in logics in a profession cannot be sustained over time. But it is not known why multiple logics within a profession will coexist in relative balance with each other at some points in time and why one may become dominant at another time.

Logics, as our analytic narrative demonstrates, are instantiated in specific contexts. Thus historical events are important to understanding why particular manifestations of logics occur at a point in time (Lounsbury, 2007). Logics, however, are a meta-theory (Thornton and Ocasio, 2008), and there has been relatively little theoretical or empirical work that adjudicates between different instantiations of and attention to logics. Thus we formulate hypotheses to establish a theoretical basis for why specific instantiations of and attention to a logic occur in professions.

Given the specifics of our historical narrative, we focus on the influence of interprofessional competition with rivals over jurisdictional control, intraprofessional differentiation, and intraprofessional contestation, all of which may be associated with disrupting the status quo and the relative balance of multiple logics in medical education. We also test whether an exogenous force—the rise of managerial logics for the delivery of healthcare—influences the attention placed on logics and affects the relative balance of logics in medical education.

Interprofessional Jurisdiction: Growth in Public Health

The rise of alternative professions whose jurisdiction is closely related to the established profession may trigger competition among professions for control of specialized knowledge and its application because “professions make up an interacting system, an ecology” that is best understood in relation to other professions vying for dominance (Abbott, 1988: 33). Jurisdictional boundaries are perpetually in dispute. Each profession makes jurisdictional claims about who should define problems, which solutions are appropriate for these problems, and what constitutes appropriate knowledge and training. When a profession forecloses alternative models and shuts down rival claims, such as medicine did for decades with alternative treatments (Scott et al., 2000; Galvin, 2002) and public health until the 1960s (Starr, 1982), its exposure to and threat from alternative models is lessened.

In contrast, when multiple professions structurally overlap in a field, their competing knowledge, jurisdictional claims, and logics create the dynamics of institutional pluralism. For

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example, institutional pluralism exists in relationships among doctors, lawyers, and social workers in neonatal intensive units (Heimer, 1999), accounting and law (Suddaby and Greenwood, 2005), or architects, engineers, and contractors in construction (Thornton, Jones, and Kury, 2005). When the philosophies, normative understandings, and values of logics complement each other or cohere, professionals can work with institutional pluralism even when there may be tensions and encroachments in jurisdictional domains. For instance, nurses and pharmacists have historically been subservient to the physicians who prescribe the treatments to patients that they carry out (Denzin and Mettlin, 1968; Goodrick and Reay, 2009). If the professions compete for resources and influence in defining quality care, they are more likely to differentiate their knowledge bases. For instance, medicine focuses on innovative and diagnostic treatments based on scientific research, whereas public health focuses on disease prevention and treatments based on epidemiology, or the statistical analyses of clinical outcomes. Given overlap between clinical medicine and epidemiology, and the potential for competition between the professions, professionals are less likely to reside easily in institutional pluralism (Ruef, 2000), thereby generating contention (Townley, 2002), dialectical tensions (Suddaby and Greenwood, 2005), or oscillations in the logics guiding the field where the respective professions overlap (Thornton, Jones, and Kury, 2005). "The ability of a profession to sustain its jurisdictions lies partly in the power and prestige of its academic knowledge" (Abbott, 1988: 53–54). Increasing numbers of professional schools by rivals whose knowledge base partially overlaps with one of the profession's logics will increase the profession's emphasis of that logic relative to its other logics. Thus we expect,

Hypothesis 1: Growth of public health schools is positively associated with an increased emphasis on the care logic relative to the science logic in medical education.

Intraprofessional Differentiation: New Medical Schools

Organizations are thought to reflect the social understandings, resources, and environmental dynamics of their time through an imprinting process (Stinchcombe, 1965); thus medical schools founded at different times may vary in their structures, goals, or missions. Fligstein (1987) showed that chief executive officers' basis for expertise in *Fortune* 100 firms has shifted over time, reflecting changes in these organizations' environments. DiMaggio (1991) noted that in the field of art museums, founders had goals of education that differed from professionals who emphasized a curatorial role, introducing a lack of consensus into the field. When new organizations advance missions, a key component of a logic (Thornton, 2004), that are different from the missions of organizations founded earlier, they can disrupt professionals' focus of attention and consensus. Thus increasing the size of the population, and the differentiation within it, increases the likelihood that alternate logics will compete for attention (Ocasio, 1997). When new entrants to a population reflect a shift in the values, missions, and purpose, then we expect a commensurate shift in attention to the logic most consonant with the new entrants' mission and purpose, which are

supported by changes in the institutional environment, such as state support, funding, or legislation. Thus,

Hypothesis 2: Growth in the number of medical schools is positively associated with increased emphasis on the care logic relative to the science logic in medical education.

Intraprofessional Contestation: Calls for Reform

Contestation by professionals who call for reform may increase opportunities for social construction whereby professionals advance alternative logics and meanings (Edelman, Uggen, and Erlanger, 1999). In contrast, silence or lack of attention to reform may reflect the taken-for-granted status of organizations' purposes at that time (Schneiberg and Clemens, 2006). Thus contestation indicates that there is less consensus about the logics in the profession (Edelman, Uggen, and Erlanger, 1999; Berman, 2006; Nigam and Ocasio, 2009). Suddaby and Greenwood (2005) examined conflicts between expertise and trustee logics in law and accounting professions and demonstrated that professionals themselves play an important role in debating and facilitating changes, as do professional associations (Greenwood, Suddaby, and Hinings, 2002). Competing logics are consequential because they generate variation in practices across organizations (Lounsbury, 2007). Similarly, in her study of the early medical profession in England, Berman (2006) found that the issue of "medical reform" came up over and over and was initiated by groups of professionals in the profession who were actively competing and contesting desired changes in the organization of the medical field.

When calls for reform come from members within the profession, these calls reflect a segment in the profession advocating for higher priority of their interests and values. Such calls for reform are likely to come from those who do not share the prevalent or taken-for-granted understandings in the profession (Leblebici et al., 1991; Suchman, 1995), reflecting diminished goal similarity, which is important for consensus on a single logic (D'Aunno, Sutton, and Price, 1991; Maguire, Hardy, and Lawrence, 2004; Purdy and Gray, 2009) and a harbinger of change (Alexander and D'Aunno, 1990; Greenwood and Hinings, 1996). Thus we expect a shift in attention to the logic most consonant with these calls for reform.

Hypothesis 3: Contestation within the profession over medical education is positively associated with the increased emphasis on the care logic relative to the science logic.

Exogenous Force: The Public's Attention to Managed Care

Many scholars have argued that a managerial market logic has increasingly permeated the professions, shifting professionals' control over practices within their domain (e.g., Edelman, 1992; Edelman, Uggen, and Erlanger, 1999; Thornton and Ocasio, 1999, 2008; Edelman, Fuller, and Mara-Drita, 2001; Lounsbury, 2002; Meyer and Hammerschmid, 2004; Zajac and Westphal, 2004). Managed care represents the managerial market logic that some scholars argue now permeates healthcare (e.g., Scott et al., 2000). It arose from

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changing norms toward a technological imperative (Alexander and D'Aunno, 1990) that created pressures to control costs (Leicht and Fennell, 2008) and stressed efficiency in delivery as opposed to professional control, resulting in an era of market reforms (Ruef, 1999). But the extent to which professionals and organizations in a profession are influenced by managerial market logics may vary considerably. Market influences are likely to occur when external stakeholders control critical resources because, under such conditions, professionals are more likely to acquiesce or engage in symbolic management (Fiss and Zajac, 2006). While insurance companies and the government control critical resources for hospitals and practicing physicians through fee reimbursement schedules for patient services, medical schools have a more diverse set of stakeholders and funding sources, such as students and tuition, state legislators, or the NIH. Although there is debate about whether managerial market logics have prevailed to the extent predicted (Alexander and D'Aunno, 2003; Mick and Wyttenbach, 2003), under market-based arrangements such as managed care, insurers, managers, and consumers become prominent and threaten control over the profession's work (Friedson, 2001; Thornton, 2002).

Managed care became an issue that riveted the public's attention during the 1990s when Clinton's unsuccessful healthcare reform efforts (i.e., the Health Security Act of 1992) placed it in the media spotlight. Abbott (1988) argued that in the United States, public concern generally precedes legislative action and state involvement, but public attention needs to be sustained over time to prompt legislative action. Public debate and media attention to an issue tend to wax and wane, a phenomenon called the "attention-issue cycle" (Downs, 1972), and this logistic curve model has been verified across a range of issues from 1945 to 1980 (Neuman, 1990). In management, research on fashions shows an issue being supplanted by new issues and crises, generating a dynamic of fluctuating fashions (Abrahamson and Eisenman, 2008). When public attention waxes and wanes, and the stakeholders who advocate a managerial market logic do not control key resources, this reduces pressure on organizations and facilitates symbolical responses, depending on the phase of the attention cycle. Thus we expect that public discourse about managed care will influence attention to the logic most associated with patient care and that the public's attention will wax and wane, increasing and then decreasing attention to a care logic:

Hypothesis 4: Increasing public attention to managed care is quadratically related (in an inverted U-shape) to the increased emphasis on the care logic relative to the science logic in medical education.

RESEARCH METHODS

Data Collection and Sources

We collected data from numerous sources to construct an analytical narrative of the logics guiding medical education and performed multivariate analyses to test our hypotheses. First, we read broadly in the field of medical education and focused on publications by associations that were most interested in the process and outcomes of medical education. In particular,

the AMA and AAMC sponsor the Liaison Committee on Medical Education (LCME), which holds accreditation authority over the educational programs that medical schools in the U.S. and Canada provide. In addition to being part of the LCME, they each supported and funded reports on medical education. The NIH also has a great interest in the scientific education of medical professionals, as does the Institute of Medicine, which has served as a key voice for medical education. We read and searched the *New England Journal of Medicine*, the most widely read journal among medical professionals across specialty areas, for discussions of medical education; although the broader medical profession, and the *New England Journal of Medicine* in particular, did not focus attention on medical education until 2006.

Since its first report in the September 21, 1901 issue, the *Journal of the American Medical Association (JAMA)* has reported on the state of medical education in the United States. When the LCME became the sole accrediting source of medical programs in 1942, it became responsible for writing this report, discussing trends in medical education and presenting results from its annual accreditation survey. Sylvia Etzel has coordinated and compiled each of the yearly reports (by herself and with coauthors) since 1976, so there has been consistency in reporting. We used this annual report to study changes in the frequency of and balance among logics because it (1) provides an accurate and consistent reading over time of the issues, practices, and trends experienced by medical schools, rather than a roller coaster of fads and fashions highlighted in journals and by editors; (2) captures the population of medical schools, in contrast to other data sources, which tend to privilege the most prestigious or largest players; and (3) provides a broad indicator of the emergence and decline of logics across the entire population of medical schools (currently 125 schools).

We systematically collected the annual survey of medical schools in North America, 1967–2005, that were gathered and summarized by the LCME. The report was published in an issue in *JAMA* in each year except 1974. Thus we analyzed 39 years of data. In addition, most academic and government sources provide yearly data for the independent variables that we relate to annual changes in the logics in medical education.

Variables and Measures

Dependent variables. We used three dependent variables—the frequency of care logic, the frequency of science logic, and the relative balance between care and science logics—for each year in the *JAMA* annual issue on medical education. We assessed care logic and science logic through the vocabularies and language used by medical educators in *JAMA*'s annual issue on medical education. First, we systematically content analyzed the LCME's annual report on medical education in *JAMA*. Content analysis has been widely used to study institutional processes (Krippendorff, 2004). We examined key texts to capture institutional logics. We focused on the usage of two widely acknowledged keywords in medicine: care and science. We also focused on managed care

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and keywords related to a managerial market logic; however, these have not received much attention in the annual reports.

Next, we employed a two-step process similar to Jones and Livne-Tarandach (2008) and Jones, Livne-Tarandach, and Balachandra (2010). First, we identified the most frequently used words in two seminal texts, the Flexner and Willard Reports. Second, we extracted sentences in these texts and in *JAMA* that used the two keywords of care and science to identify and analyze the words used to modify them. We focused on the sentence to capture words that modified the keyword because “meanings do not reside in words but rather in how words relate to their linguistic environment—that is how words relate to other words” (Krippendorff, 2004: 290). The sentence is a keyword’s most immediate environment and captures social actors’ focus of attention (Burke, 1969, 1989). We standardized the usage of words across texts by dividing by the total number of words in each article to account for shifts in total word usage over time. In contrast to the prevalence of the words care and science in *JAMA*, managed care was not mentioned at all before 1994, only twice in 1994, 15 times in 1995, and then disappeared. The same is true for keywords such as cost or management. Thus we focused our analysis on changes in care and science logics over time.

Care logic. As our base text for the care logic, we used the Willard Report of 1966, which signaled a shift in medicine to community and patient-physician focus. We examined the most frequently occurring words in this text, eliminating generic words that modified many words in the text, such as health, and that were not explicitly related to the practice of medicine. The most frequently used words in the Willard Report were care, physician, and physicians. We then extracted sentences with the keyword “care” in the *JAMA* texts to see which words modified care, again eliminating generic words such as university, students, faculty, and health that modified most words in the *JAMA* texts. To ensure comparability between the emphases placed on care versus science over time, we needed an equal number of words. We used the six keywords that most frequently modified care if they occurred in 40 percent or more of the *JAMA* texts. These words were clinical, care, clerkships, family, community, and physicians. We summed the frequencies of these six words in each *JAMA* text to create a ratio measure. As a last step, we divided the sum frequencies for each year by the number of words in the yearly issue. Together, these words have an alpha reliability of .7759 (unstandardized). Standardizing by the number of words in each yearly issue, the scale has an alpha reliability of .7165. Because alpha coefficients greater than .70 indicate an acceptable level of scale reliability (DeVellis, 2003), it demonstrated the co-occurrence of keywords indicating a logic (Jones, Livne-Tarandach, and Balachandra, 2010).

Science logic. We replicated the process above to assess the science logic, using the Flexner Report of 1910 because it first advocated a scientific approach to medicine. Medical sciences encompass both basic and clinical sciences that have the potential to transform human health. Basic science

includes those areas that are applicable to many healthcare professionals because they examine underlying mechanisms for human health whereas clinical sciences are applied to human subjects and refer to those areas in which clerkships occur. The most frequently occurring words in the Flexner Report were hospital, laboratory, clinical, and principles. We then examined the keyword "science" in the *JAMA* texts to see which words consistently modified science, occurring in 40 percent or more of the texts across the years. The words were sciences, basic and clinical. In the text, little elaboration is provided for what basic science, clinical sciences, or medical sciences mean, which signals their taken-for-granted status (Colyvas and Powell, 2006; Schneiberg and Clemens, 2006). The word clinical is strongly associated with science in Flexner's vision of pre-clinical (science) and clinical (care) portions of the medical curriculum. By the 1960s, the term clinical reveals the plural logics and is mostly associated with the care logic; however, it is still used to modify science, indicating its original usage and how care and science are linked in practice through clinical education. We selected the six most frequent words that modified science to represent the science logic and calculated Cronbach's alpha to establish reliability for a single scale. The following six words provided a reliable scale: science, sciences, basic, research, hospital, laboratory, with an unstandardized alpha coefficient of .9410 and a standardized (by number of words in each yearly issue) alpha coefficient of .7199. Table 2 highlights the keywords and reliabilities of the care and science logics.

Independent variables. Our independent variables included interprofessional, intraprofessional, and exogenous forces that may shape attention to care and science logics in medical education. We lagged all of the independent variables by one year. To assess conflict over professional jurisdiction, we tracked the number of accredited public health schools in the United States for each year, 1966–2004. The *number of public*

Table 2

Keywords for Logics and Coding Examples

Logic and keywords	Examples from the <i>JAMA</i> text
Care logic: Clinical, care, clerkships, family, community, and physicians	1967: "A unique aspect of the teaching of <i>family</i> and <i>community</i> medicine is its integration into the practices of selected <i>family physicians</i> in the <i>community</i> who are full-time faculty members." 1983: " <i>Clinical clerkships</i> , that portion of the curriculum in which students participate in patient <i>care</i> in a supervised setting, compose an important portion of the curriculum." 1996: "Will <i>community</i> -based primary <i>care</i> sites be available to provide <i>clinical</i> experiences for medical students?"
Science logic: Sciences, basic, research, science, hospital, and laboratory	1968: "The <i>sciences basic</i> to medicine thus serve the teaching and <i>research</i> functions within the school of medicine and provide the bridge to related <i>basic sciences</i> throughout the university." 1973: "After three years of planning and consultation, the authority, in 1967, established the cardiovascular center at Norfolk General Hospital, the cardiopulmonary <i>laboratory</i> at Children's Hospital, and the <i>research</i> institute." 1999: "The <i>basic science</i> curriculum varied from out-of-date, mostly lecture-based teaching by busy practitioners to an emphasis on <i>laboratory</i> teaching by full-time faculty who engaged in <i>research</i> ."

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health schools is an indicator of (a) the relative size, in terms of new health policy professionals and physicians with public health training, and (b) the relative resources and influence of the rival profession. We gathered these data from the Council on the Education for Public Health (CEPH, <http://www.ceph.org>).

We assessed professional differentiation by counting the *number of medical schools* in the United States each year using archival data, especially the *JAMA* annual issue on medical education that lists the complete universe of medical schools in North America. During the growth of the population in the 1960s and 1970s, significant attention was focused on new medical schools and medical schools in development. We calculated the number of medical schools in the population for each year, 1966–2004.

To assess professional contestation reflected in calls to reform medical education, we examined, for each year, the number of calls for reform of medical education in North America in the primary journal for academic medicine, *Academic Medicine*, published by the Association of American Medical Colleges (AAMC). Prior to 1989, *Academic Medicine* was called the *Journal of Medical Education*. We performed two different searches in *Academic Medicine* and downloaded articles that included the keywords curriculum, curricula or curricular, or profession, and the keywords reform, revision, innovation, or change. First, we searched for keywords electronically. Second, the first author went through the archives of the journal from 1966 to 2004 and extracted articles that (1) called for reform of the medical curriculum or the medical profession or (2) discussed changes made in medical education or in the medical profession more broadly. For reliability purposes, we compared the two sets of articles yielded by the electronic and hands-on searches and found high consistency. These data were correlated at .81. Next, we combined both lists and excluded articles that discussed medical schools outside of North America or talked about residencies only. Finally, we assessed the journal for whether changes in editorship had any effect on our dependent variables. We found no effect (results available from the authors). Thus the final set of articles reflects calls for reform and discourse about change in medical education from within academic medicine. More than 25 percent of the calls for reform came from authors in family medicine departments. Another 20 percent came from authors who listed medical education as their department or title.

We also downloaded and read the calls for reform in the *New England Journal of Medicine* to capture the issues and vocabularies of the wider physicians' community, including practicing professionals as well as academic physicians, but did not include these data in our quantitative analyses because the *New England Journal of Medicine* was not a forum for discussing medical education until 2006.

To assess the exogenous force of discourse about managed care, we collected articles and abstracts from the *New York Times* that discussed managed care from 1966 to 2004. These articles were extracted using the key terms manage*

AND care, resulting in 689 articles. The articles were read and coded by two research assistants who were not familiar with the goals of the study, to ensure that the content of the articles reflected aspects of managed care. The overall level of agreement among coders, using Brennan and Prediger's (1981) free-marginal kappa reliability coefficient, was 97.4 percent. We used the volume of discourse about managed care to capture public talk (Schneiberg and Clemens, 2006) and attention to managed care (Ocasio, 1997; Nigam and Ocasio, 2009). Visual inspection of the data confirmed a quadratic pattern—a rapid rise in attention in the early 1990s that peaked in 1997 and then rapidly declined.

Control variables. We controlled for both demographic changes in the medical student population and research funding from the NIH, both of which could influence logics in medical education. Given the dramatic increase in the number of women entering medical schools, and the potential for such a demographic shift to affect logics in medical schools, we tracked the *percentage of women entering medical school* from 1966 to 2004, which was included in *JAMA's* annual survey. We also tracked the absolute dollars and inflation-adjusted NIH budgets each year from 1966 to 2004. Although the entire NIH budget is not awarded to medical schools, it is an important indicator of financial support for medical research. We used inflation-adjusted figures in our regressions. Because these control variables were highly correlated with each other and with other independent variables, even though coming from separate data sources and tapping into distinct constructs, we were unable to run them in the same regression equation. Also, given independent variables' high correlations with time, we de-trended the independent variables and reran the regressions; however, the de-trended results did not differ from the results we report.

Quantitative Analyses

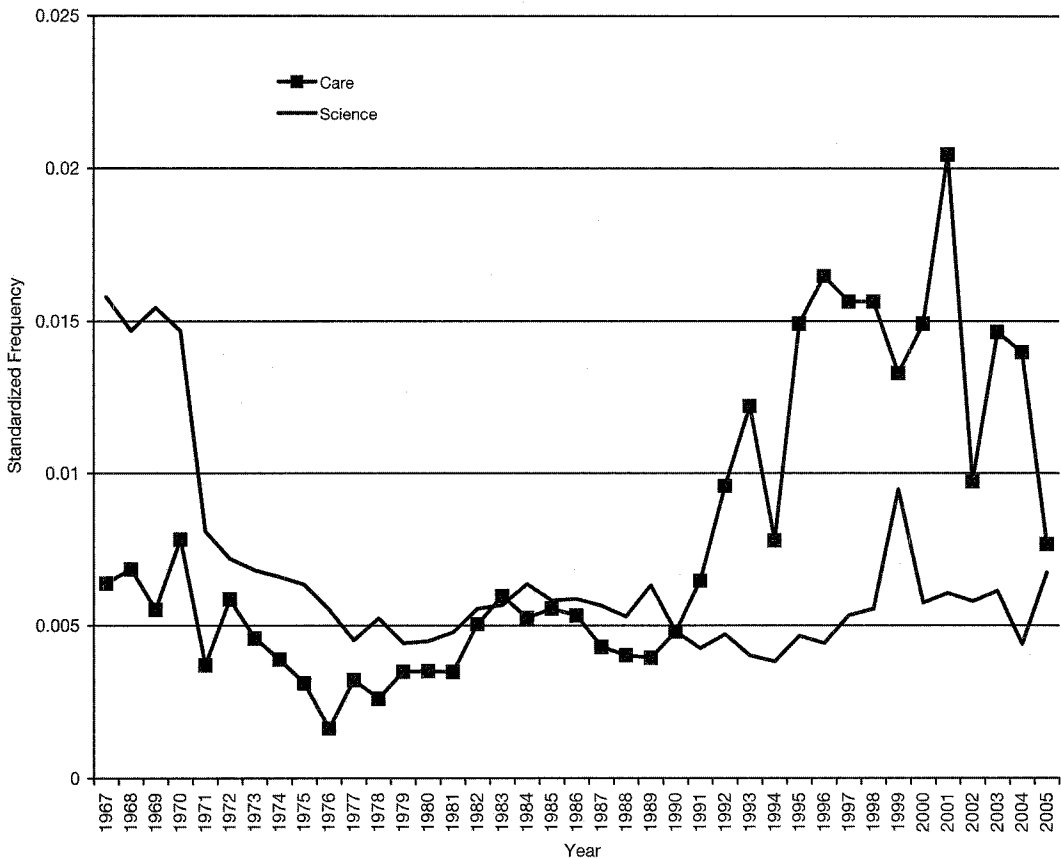
Because our data are longitudinal, they have high levels of correlation over time. We therefore used general estimating equations (GEE) regressions to test our hypotheses, which is an effective method for dealing with autocorrelation. A key advantage of GEE "resides in the unbiased estimation of population-averaged regression coefficients despite possible misspecification of the correlation structure" (Ghislotta and Spini, 2004: 421). Another advantage of GEE is the ability to specify the distribution that best fits the data when estimating the regression equations (Castilla, 2007). Although other time series methods (e.g., Prais-Winsten time series regressions) control for autocorrelation, they are not as robust and do not allow as much flexibility. We used a Gaussian distribution and controlled for one period of autocorrelation (AR 1) (Gujarati, 2006). We also ran Prais-Winsten time series regressions and obtained consistent results, so we do not report them in this paper. In all regressions, we used prior year values for the independent variables to predict the frequency and relative frequency of science and care logics for each focal year.

RESULTS

In this study, we sought to understand the conditions that promote the coexistence of plural logics in professions and

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Figure 1. Care and science logics in medical education, 1966–2005.



the factors that are associated with changing emphases between logics. In our qualitative case study, we identified plural logics of care and science coexisting within medical education. Figure 1 presents the dependent variable, frequency of care and science logics in medical education, over time. In 1969, the science logic falls rapidly, stabilizes in 1977, and remains consistent through 2005. The care logic becomes more frequent and variable in the 1990s and is emphasized over science logics from 1991 through 2005. The relative imbalance between the science and care logics reaches a high point in 1996, when the care logic is emphasized 3.73 times more than the science logic.

Our regression analyses relate changes in frequencies of logics over time with the professional and exogenous sources of change. Table 3 presents the descriptive statistics and pairwise correlations between all of the variables, including the control variables. Table 3 also indicates high correlations of over .90 between public health schools, medical schools, women entering, and the NIH budget. Given these high correlations, we assessed the control variables in separate regression equations.

Table 4 includes the results of GEE regression analysis, which we used for testing the hypotheses. We ran three sets of regressions to assess what predicts (1) the frequency of care logic, (2) the frequency of science logic, and (3) the relative

Table 3

Descriptive Statistics and Pairwise Correlations among Variables											
Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9
1. Ratio of care to science logic	1.37	1.02									
2. Frequency of care logic (x 1000)	7.77	4.86	.92***								
3. Frequency of science logic (x 1000)	6.58	3.14	-.40*	-.09							
4. Professional contestation	20.82	14.91	.68***	.76***	-.07						
5. Number of medical schools	117.13	11.36	.57***	.40*	-.77***	.28					
6. Public discourse about managed care	14.21	27.23	.62***	.72***	-.11	.78***	.35*				
7. Public discourse about managed care ²	924.21	2574.31	.38*	.51***	-.01	.61***	.24	.94***			
8. Number of public health schools	39.15	20.77	.77***	.71***	-.39*	.53***	.70***	.51***	.35*		
9. Percentage women entering medical school	0.311	0.129	.83***	.63***	-.61***	.48**	.90***	.52***	.36*	.90***	
10. NIH budget	7679128	7196474	.73***	.71***	-.30	.53***	.48***	.61***	.32*	.99***	.84***

* $p < .05$; ** $p < .01$; *** $p < .001$.

attention to care versus science each year. To capture the relative attention, we used a ratio of the frequencies of care to science. Positive numbers mean that care occurred more frequently, while negative numbers mean that science occurred more frequently. For each dependent variable, the first model tests professional sources of change, the second tests the exogenous source, the third model combines both professional and exogenous sources, and the fourth model combines exogenous sources with the first control variable, namely, the percentage of women entering medical schools. The fifth model combines exogenous sources with the second control variable, NIH budget. Tests of tolerance and variable inflation factors show that multicollinearity does not pose a problem in these models. Variable inflation factors (VIFs) were all at acceptable levels, with a mean VIF of 2.56 in the full model. In addition, as shown in table 4, the coefficients remain stable across multiple regression models and suggest that our final models are not compromised by collinearity.

Hypothesis 1 predicted that increasing competition from professional rivals, as seen in the number of accredited schools of public health, leads to greater attention to care logic in medical education and a greater emphasis on care logic relative to science logic in medical education. This hypothesis is supported. The number of public health schools is positively associated with the frequency of the care logic, as seen in models 1 and 3 in table 4 and with the relative emphasis of care over science logics in medical education, as seen in models 11 and 13 of table 4. Model 1 suggests that, controlling for other factors, an additional school of public health increases the care logic by .12, which constitutes

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Table 4

GEE Regression Analyses (N = 39)*

Variable	Frequency of Care Logic					Frequency of Science Logic				
	1	2	3	4	5	6	7	8	9	10
Number of public health schools	.12*** (.03)		.09*** (.03)			.02 (.03)		.03 (.04)		
Number of medical schools	-.04 (.05)		-.08* (.04)			-.25*** (.06)		-.24*** (.06)		
Contestation	.17*** (.03)		-.007 (.05)			.02 (.02)		.04 (.03)		
Discourse on managed care		.37*** (.05)	.31*** (.07)	.34*** (.06)	.30*** (.05)		-.09 (.07)	-.08 (.06)	-.05 (.06)	-.08 (.07)
Discourse on managed care ²		-.003*** (.001)	-.002*** (.001)	-.003*** (.001)	-.002*** (.001)		.001 (.001)	.001 (.0004)	.004 (.005)	.001 (.001)
<i>Controls</i>										
Women entering medical school				4.87 (4.58)					-14.97 (8.13)	
NIH budget (× 10 ⁻⁷)					1.9** (.61)					1.5 (1.6)
Wald chi square	88.47***	75.75***	194.08***	82.82***	159.17***	24.22***	1.58	25.58***	5.47	2.63
Variable	Ratio of Care to Science									
	11	12	13	14	15					
Number of public health schools	.02* (.007)		.01 (.004)							
Number of medical schools	.02 (.01)		.01 (.008)							
Contestation	.03*** (.008)		-.007 (.01)							
Discourse on managed care		.09*** (.01)	.08*** (.01)	.07*** (.01)	.07*** (.01)					
Discourse on managed care ²		-.001*** (.0001)	-.001*** (.0001)	-.001*** (.0001)	-.001*** (.0001)					
<i>Controls</i>										
Women entering medical school				2.37*** (.65)						
NIH budget (× 10 ⁻⁷)					.36** (.12)					
Wald chi square	59.46***	98.43***	221.60***	212.44***	177.44***					

* $p < .05$; ** $p < .01$; *** $p < .001$.
 * Standard errors are in parentheses.

approximately 1–7 percent of care logic, depending on the year. Model 11 suggests that each additional school of public health increases the ratio of care to science by 2 percent each year.

Hypothesis 2 predicted a positive, linear relationship between the number of medical schools and the attention to the care logic in medical education and the relative emphasis on the care logic over the science logic in medical education. There is no support for this hypothesis. Although the number of

medical schools is not associated with an increased frequency of care logic, it does negatively relate to the frequency of the science logic. Models 6 and 8 in table 4 demonstrate that for each new medical school that is founded, the attention placed on science in the annual report of medical education decreases by .00025 on average, which constitutes between 1.5 and nearly 7 percent of the science logic, depending on the year.

Hypothesis 3 predicted a positive, linear relationship between professional contestation and logics in medical education. There is partial support for this hypothesis. Models 1 and 11 of table 4 demonstrate that a significant, positive, linear relationship exists between professional contestation and attention to the care logic and the relative emphasis of the care logic over the science logic. There is no relationship between professional contestation and attention to the science logic. This suggests that the care logic is most contested, while the science logic is taken for granted and is buffered from the criticisms about medical education. Model 11 of table 4 demonstrates that each additional call for reform increases the average ratio of care to science by 3 percent. The linear effect of professional contestation remains significant in all models, predicting the relative emphasis of care logic except when entered with the quadratic term for public discourse about managed care (e.g., models 4 and 13 of table 4).

Hypothesis 4 predicted that the public's issue attention to managed care produces a curvilinear pattern, which is quadratically related (in an inverted U-shape) to the emphasis on care logic and to the relative emphasis of the care logic over the science logic in medical education. There is strong support for this hypothesis. Models 2–5 of table 4 demonstrate the significant and positive relationship between public discourse about managed care and an increased attention to care logic. Models 12–15 show an increased emphasis of care logic relative to science. The squared term is also significant in each of these models, with a negative sign, suggesting a significant curvilinear relationship, as predicted. Model 3 of table 4 suggests that each additional article focused on managed care increases the frequency of the care logic by .00031 on average, which ranges from 1 to 18 percent of the care logic, depending on the year. There is a turning point around 1998, however, when the average effect of each additional article begins decreasing the attention to the care logic in medical education. Model 13 of table 4 suggests that each additional article focused on managed care increases the ratio of care to science by 8 percent up to the turning point around 1992, when the average effect of the public's attention to managed care begins decreasing the ratio of care to science. As models 7–10 demonstrate, there is no relationship between public discourse and the attention to science logic.

Table 4 also presents the results of GEE regressions using alternate sources of change: percentage of women entering medical school and NIH budget. We ran separate equations for each control variable with each dependent variable and include the exogenous sources of change in the models

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presented in table 4. These results demonstrate the overwhelming forces affecting the care logic in medical education. Both the percentage of women entering medical school and the NIH budget are significantly related to an increased emphasis of the care logic relative to the science logic in medical education. Model 14 of table 4 indicates that for each 1-percent increase in women entering medical school, there is a 237-percent increase in the emphasis of care relative to science. Model 15 of table 4 shows a 36-percent increase in the care logic relative to the science logic for every one billion dollar increase in the prior year NIH budget (one billion dollars is approximately 3 percent of the current NIH budget). The NIH budget is also related to increased attention to care logic. The percentage of women is not a significant predictor of care logic, however, when entered with the exogenous source of change, managed care. Both are unrelated to the attention to the science logic in medical education. Although the magnitude of effects is greater for women entering, these findings are consistent with the original results that included the number of public health schools, the number of medical schools, and the level of contestation instead. In fact, the effects of these two control variables appear to be indistinguishable from the number of public health schools. The coefficients of the other variables entered in the regressions remain the same when the number of public health schools, percentage of women entering medical school, and the NIH budget are used in the equation.

DISCUSSION

Our qualitative and quantitative findings suggest that plural logics co-evolve within a profession over time. We found that care and science logics coexist, moving through periods of balance and imbalance and residing in perhaps an uneasy tension that is not easily resolved in medical education. Professional schools serve many interests and play a central role as both producers and protectors of a profession's knowledge base. Our study revealed contestation within and over medical education as different groups within the profession sought (and still seek) to shape future professionals in distinct ways. The imbalance of science and care was accelerated by the increased number of medical schools that focused on producing primary care physicians rather than physicians who take a scientific approach to medicine, decreasing the prevalence of the science logic in medical education. These new schools challenged the dominant scientific approach and dampened the frequency of science logic.

It is possible that the internal tensions over care, initially created by these new medical schools and seen in subsequent calls for reform by professionals, created the opportunity for exogenous sources to introduce new ways to interpret the care logic. In fact, the frequency of the care logic between 1967 and 2005 appears to fit with Abrahamson and Fairchild's (1999) description of the trajectory of a new logic: a latency period, followed by a sharp rise, then a gradual decline. In the case of medical education, however, the care logic is not new. The sharp rise in the care logic contains a heightened emphasis on care from a public health

perspective, a view that was promoted by distinguished academic physicians (White, 1991) but was not shared by all professionals in medical schools, especially those who advocated for a scientific approach. The science logic does not follow the same trend. Instead, it drops sharply and stays at that level for over twenty years, reflecting a taken-for-granted status that is unaffected by discourse about managed care, calls for reform by medical professionals, the number of women entering medicine, or NIH funding, which increased dramatically. These findings generate several contributions to understanding when plural logics coexist or are contested and allow us to track the process of change over time.

Our first contribution is that we paid attention to the heterogeneity and the relative incoherence of the field of medical education (Schneiberg and Clemens, 2006), which allowed us to understand when logics will coexist in a profession and what forces influence the balance among logics. Although attention to the care logic dramatically increases over time, managed care, public health, and new medical schools each offer conceptions of care that only partially overlap with each other and that may help dissociate the care logic from science. Managed care focuses on cost effectiveness and efficiency of medical coverage, whereas public health promotes prevention and community health based on statistical analyses of clinical outcomes. Medical schools emphasize care that is patient centered and based on basic scientific research. These conceptions of care do not necessarily align with one another to create coherence in what quality care means and how medical students are to be trained to provide care. The practice of medicine relies on both science and care, so it is unlikely that any one logic could dominate for very long. Perhaps all professions are likely to have a similar breakdown between a logic that guides their expert knowledge and a logic that guides their practice. When different groups of professionals are associated with these different roles, conflict can ensue, and the logics may become dissociated from each other. This suggests an important caveat to Suddaby and Greenwood's (2005) insight that unity among contradicting logics cannot be sustained within a profession: it may depend on how reliant the profession is on the skills and interest groups that advocate for these distinct logics. If distinct logics are needed but are advocated by different groups, then they may oscillate over time, as a group's power increases and decreases. Our findings of plural logics in medical education are consistent with work in managerial rhetorics (e.g., Barley and Kunda, 1992; Guillén, 1994) that suggests that rational and normative logics of control evolve and may oscillate over time. When logics of knowledge and practice become dissociated from one another, or out of balance, the profession may become more vulnerable to threats from interprofessional rivals, intraprofessional groups, and external invaders like managed care.

Our second contribution is that we focused on the independent variables or sources of change in logics rather than the consequences of logics for a profession. In contrast to other studies that highlight how shifts in logics create different outcomes, such as organizational structures (Thornton, 2002),

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CEO selection (Thornton and Ocasio, 1999), administrative regimes (Townley, 1999) or variation in practices (Reay and Hinings, 2005; Lounsbury, 2007), we sought to identify the forces that caused shifts in the attention to and emphasis on particular logics in a profession. Our qualitative analyses suggest that in the early years, although care and science logics coexisted in tension, they were integrated, coherent, and complementary in medical education. Like Abbott's (1988) work, our study revealed that a science logic governed the mastery of an abstract body of professional knowledge, while the care logic governed the application of professional knowledge to meeting public and patient needs. In the early years of our study, there was consensus in the profession about the value of both sets of tasks—and limited overt conflict about their relative prominence. Over time, the relative coexistence of logics shifted to conflict and differentiation. Our case study and our regression results suggest that the intraprofessional sources of change affected the attention to and relative balance of care and science logics: contestation among physicians highlighted the care logic, and the addition of new medical schools to the population of existing medical schools dampened the science logic. Thus we contribute to middle-range theory (Merton, 1968) by empirically assessing the professional logics of care and science in medical education. Given that most prior research focuses at the societal level when conceptualizing and measuring logics (e.g., Scott et al., 2000; Thornton, 2002; Reay and Hinings, 2009), few empirical studies have examined plural logics within a profession and shifts in attention within the profession to these logics.

A third contribution is the interplay between exogenous, intraprofessional differentiation, and interprofessional jurisdictional competitive forces to explain change in logics within a profession. Although the distinction between endogenous and exogenous sources of change may be somewhat artificial and imprecise to separate theoretically, both are useful for understanding changes in logics in a plural profession. As Edelman (1992), Edelman, Uggen, and Erlanger (1999), Edelman, Fuller, and Mara-Drita (2001), and Edelman and Stryker (2005) noted, exogenous forces, such as laws, are interpreted and enacted by professionals in organizations who promote their group's interests. Thus new logics are not simply imprinted literally into professions or organizations by external parties, such as the federal government, the public, or managed care corporations. Exogenous sources can provide rhetorical and symbolic resources for professionals rather than serve simply as an articulate mandate (Stryker, 1994). Professionals may actively resist competition from the public or rival professionals' conceptions or they may internalize and hybridize those conceptions into the profession, thereby giving them legitimacy. For instance, new medical schools and a new approach to training physicians to care were made possible by legislation and federal funding. The funding and legislation provided professionals with the opportunity to create new schools that emphasized care rather than science. Other legislation provided opportunities for women to enter medical schools in record numbers. Thus we contribute to the literature on the endogeneity of

change in professions (e.g., Edelman, 1992; Edelman, Uggen, and Erlanger, 1999; Edelman, Fuller, and Mara-Drita, 2001; Edelman and Stryker, 2005). Similarly, a public health conception of care was emphasized by an increasing number of medical professionals themselves and was likely increased further by the cross-training of medical doctors in public health. Abbott (1988) argued that professions rarely develop in isolation; they develop when jurisdictions become vacant. The rise of public health was likely made possible by medical schools' focus on biomedical science which opened the jurisdictional space for community health and clinical outcomes. Even so, the rise of public health did not affect the science logic. Ironically, it may be medical scientists and schools pursuing financial profits from their research that cause conflicts of interests and claims of unethical conduct in research to undermine science's legitimacy and taken-for-granted status. These conflicts are being reported by key people such as the former editor of the *New England Journal of Medicine* (see www.pbs.org/now/transcript/transcript_scienceforsale.html). Our study highlights the reflexivity of change in logics, whereby social actions are revised in light of prior actions by those within the profession and external to the profession.

A fourth contribution is that our study illuminates how managed care may be a key force in one arena of the profession, such as public debate, and influence professional journals that focus on practicing professionals (Nigam and Ocasio, 2009) or in hospitals (Scott et al., 2000) but have a limited effect on another arena, such as medical education. It may be that most medical schools, unlike practitioners or hospitals, do not largely depend on managed care for their revenue, which makes them substantially less dependent on the practices of insurance companies and thus less responsive to their needs. Funding for medical schools largely comes from NIH grants, tuition, and state and federal budget allocations, in addition to faculty practice. In fact, medical schools resisted bringing managed care into the curriculum because, as some academics argued, it contradicted Flexner's notion that medical education should be non-commercial; thus they found little need to educate students on this one, specific, and perhaps faddish, means of delivering and organizing care. Our regressions show that public discourse about managed care is related to the frequency of care logic in a curvilinear fashion. Public discourse about managed care rises sharply until 1997, when it decreases sharply. The care logic begins rising in 1988 and begins to decline in 2000. Thus the debate over care began before managed care made its mark; however, discourse about managed care served to intensify the focus on defining care in medical education. Debate over the costs of care has affected the practice of medicine, yet managed care itself was not integrated with the care logic in medical education. With managed care on the public agenda once again, it could be that medical schools will opt to thwart a public mandate for change in their professional domain by adopting ceremonial or symbolic compliance to managed care, such as increased rhetoric, or list course offerings but not staff them.

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Our study also has several limitations that offer directions for future research. One limitation is that, given the massive changes occurring in the medical profession and environment and the high correlations of these trends over time, we were unable to isolate specific influences on logics. It is possible that demographic shifts resulting from the increasing proportion of women entering medical school play a larger role in emphasizing the care logic than was evident in our results. The increasing demographic diversity within the medical profession may have facilitated the rise of managed care organizations rather than practice as independent professionals because women were drawn to enhanced work-life balance that managed care organizations can provide (Briscoe, 2007). Many professionals anticipated greater liberalism within the medical profession as a result of increasing numbers of women (Colombotos and Kirchner, 1986; Wolfe, 1986), but there are other factors at play. We found that the proportion of women entering medical schools was positively related to an increasing occurrence of the care logic and an increasing difference between science and care, but it was so highly correlated with other trends, such as the rise of public health and the NIH budget, that its role cannot be either established or ruled out. Future research could examine the role of changing demographic composition in individual organizations to better understand whether demography relates to how particular organizations enact logics. Comparative research would also be useful. Veterinary schools have experienced demographic shifts similar to medical schools, with women making up 5 percent of the incoming class in the 1960s and 79 percent currently. The veterinary profession has also experienced a shift in logic from the practical use of farm animals to one of care for family pets and is perceived as flexible in facilitating work-life balance (Schweitzer, 2007). The legal and accounting professions have also seen significant increases in women (Leicht and Fennell, 2008).

It would be useful to do comparative research of professional logics in medical education across nations. United States medical schools emulated the German model in the early twentieth century; however, interprofessional, intraprofessional, and market-based forces likely evolved differently and shaped the logics of medical education differently in the United States than in other countries. The schism between public health and medical schools is consequential in the United States. Different legislation, funding levels for education and research, and payment systems for healthcare services all may play key roles in shaping the balance between logics within medical education in other countries.

Another limitation is that, for practical purposes, we focused on public health, which is a limited segment of the system of professions of which medicine is a part. Future work should examine histories of jurisdictional boundaries between medical professionals and associated caring professions such as nurse practitioners, physician assistants, nurse midwives, and psychologists. In particular, primary care providers often include other professions outside of medicine and may provide additional opportunities for conflict over jurisdictional boundaries. The increased clinical authority within the field of

nursing is a challenge for primary care physicians (Mullan, 2002), building on nurses' historical authority (Goodrick and Reay, 2009). In some areas, nurse practitioners and physician assistants may directly compete with primary care physicians in the services they provide. Retailers such as Walgreens and CVS have started in-store clinics, staffed with nurse practitioners and physician assistants, to provide care for routine and chronic conditions. Recently, amidst poor revenues stemming from the public's reluctance to use these clinics, these stores have expanded their services to offer more family medical offerings in an attempt to compete more directly with doctors' groups and hospitals (Merritt, 2009; Galperin, 2010). Understanding better the role of nursing, emerging care professions, and external invaders such as corporations in the story of medicine's professional logics would help illuminate such issues and help us understand the corporatization of medicine.

Linking the findings from this study on the evolution of professional logics in medical education with actual changes in individual medical schools may be an appropriate direction for future research. The rhetoric in surveys may not capture the symbolic management of reform or decoupling of reform statements from actual practices. As Bloom (1988) suggested, the talk about reform may be merely window dressing. One caveat is that the Liaison Committee on Medical Education (LCME), which compiles the annual survey is also tasked with creating site visit committees to assess curricula changes and reform. In addition, medical schools, like all professional schools, have accreditation oversight that may reduce their capacity to manage symbolically or decouple stakeholders' concerns from reform practices too extensively. As D'Aunno, Sutton, and Price (1991) noted, the ability of organizations to engage in symbolic management or decoupling, particularly in fragmented environments, depends on the degree to which they are monitored. Understanding the extent of decoupling is a difficult but important issue for future research. Studying changes in professional logics over time may prove to be helpful for gauging the likelihood that organizations will decouple actual change from their rhetoric about change in their organizations.

Yet another important area for future research is the ecology of logics and the role of professional networks and complementary institutions that maintain the logics of science and care and also drive them further apart. For instance, a science logic may be maintained by scientific professionals who work and interact in networks closer to academe than to health-care, by clinical specialists such as surgeons, and by institutions such as the NIH, which funds research, and Nobel prizes, which reinforce the high status of science within medicine, whereas a care logic is likely to be maintained by primary care and public health professionals, managed care companies and government fee schedules that focus on clinical practice. These networks socialize professionals, directing their attention and professional practice (Dunn, 2006). The internal differentiation and division of labor in the profession can yield different statuses, different clients, and different types of work. Routine work can de-professionalize a

profession (Abbott, 1988) and make its domain more at risk of being influenced by external parties such as public health professionals or managed care corporations. In addition, most HMO plans require patients to obtain referrals to specialists from their primary care physician. Such rules can reconfigure professional networks and the role of brokers. These rules also can breed resentment among specialists and create a greater split between scientific medicine, which tends to be more specialized, and clinical medicine, which tends to comprise more primary care physicians. Although segmentation in medicine has long been noted (Bucher and Strauss, 1961), there has been little empirical work at the level of professionals' social networks, the institutions and rules that shape networks, and how they affect the profession and logics within a profession. The relative balance between a profession's plural logics may regulate conflicts over jurisdiction and strike at the core of what it means to be a professional and practice the profession's work.

REFERENCES

Abbott, A.
1988 *The System of Professions: An Essay on the Division of Expert Labor*. Chicago: University of Chicago Press.

Abelmann, W.
2004 *The Harvard-MIT Division of Health Sciences and Technology: The First Twenty Five Years 1970–1995*. Cambridge, MA: Harvard University Press.

Abrahamson, E., and M. Eisenman
2008 "Employee-management techniques: Transient fads or trending fashions?" *Administrative Science Quarterly*, 53: 719–744.

Abrahamson, E., and G. Fairchild
1999 "Management fashion: Life-cycles, triggers, and collective learning processes." *Administrative Science Quarterly*, 44: 708–740.

Alexander, J. A., and T. D. D'Aunno
1990 "Transformation of institutional environments: Perspectives on the corporatization of U.S. health care." In S. S. Mick (ed.), *Innovations in the Organization of Health Care: Insights into Organization Theory*: 53–85. San Francisco: Jossey-Bass.

2003 "Alternative perspectives on institutional and market dynamics in the U.S. health-care sector." In S. S. Mick and M. E. Wyttenbach (eds.), *Advances in Health Care Organizational Theory*: 45–77. San Francisco: Jossey-Bass.

Arky, R. A.
2006 "Shattuck Lecture: The family business: To educate." *New England Journal of Medicine*, 354: 1922–1926.

2007 "Abe Flexner, where are you? We need you!" *Transactions of the American Clinical and Climatological Association*, 118: 89–96.

Barley, S. R., and G. Kunda
1992 "Design and devotion: Surges of rational and normative ideologies of control in managerial discourse." *Administrative Science Quarterly*, 37: 363–399.

Barzansky, B., and S. Etzel
2004 "Educational programs in U.S. medical schools." *Journal of the American Medical Association*, 292: 1025–1031.

Beck, A.
2004 "The Flexner Report and the standardization of American medical education." *Journal of the American Medical Association*, 291: 2139–2140.

Berman, E. P.
2006 "Before the professional project: Success and failure at organizing English doctors 1812–1855." *Theory and Society*, 35: 157–191.

Bloom, S. W.
1988 "Structure and ideology in medical education: An analysis of resistance to change." *Journal of Health and Social Behavior*, 29: 294–306.

Brennan, R. L., and D. J. Prediger
1981 "Coefficient kappa: Some uses, misuses, and alternatives." *Educational and Psychological Measurement*, 41: 687–699.

Brieger, G.
1999 "A brief overview of the Johns Hopkins medical curriculum." In C. De Angelis (ed.), *The Johns Hopkins University School of Medicine Curriculum for the Twenty-first Century*: 1–20. Baltimore, MD: Johns Hopkins University Press.

Briscoe, F.
2007 "Demographic change and institutional transgression: A case study of doctors and the rise of HMOs." Paper presented at the 23rd Colloquium of the European Group for Organizational Studies, Vienna, Austria.

Bucher, R., and A. Strauss
1961 "Professions in process." *American Journal of Sociology*, 66: 325–334.

Burke, K.
1969 *A Rhetoric of Motives*. Berkeley: University of California Press.

1989 *On Symbols and Society*. Chicago: University of Chicago Press.

Castilla, E.
2007 *Dynamic Analysis in the Social Sciences*. London: Academic Press.

Christakis, N.
1995 "The similarity and frequency of proposals to reform U.S. medical education." *Journal of the American Medical Association*, 274: 706–711.

Colombotos, J., and C. Kirchner
1986 *Physicians and Social Change*. New York: Oxford University Press.

- Colyvas, J. A., and W. W. Powell**
2006 "Roads to institutionalization: The remaking of boundaries between public and private science." In B. M. Staw (ed.), *Research in Organizational Behavior*, 27: 315–363. New York: Elsevier/JAI.
- Cox, M., and D. M. Irby**
2006 "A new series on medical education." *New England Journal of Medicine*, 355: 1375–1376.
- D'Annunzio, T. D., R. I. Sutton, and R. H. Price**
1991 "Isomorphism and external support in conflicting institutional environments: A study of drug abuse treatment units." *Academy of Management Journal*, 34: 636–661.
- Davis, G. F., and H. R. Greve**
1997 "Corporate elite networks and governance changes in the 1980's." *American Journal of Sociology*, 103: 1–37.
- Denzin, N. K., and C. J. Mettlin**
1968 "Incomplete professionalization: The case of pharmacy." *Social Forces*, 46: 375–381.
- DeVellis, R. F.**
2003 *Scale Development: Theory and Applications*. Thousand Oaks, CA: Sage.
- DiMaggio, P. J.**
1991 "Constructing an organizational field as a professional project: U.S. art museums, 1920–1940." In W. W. Powell and P. J. DiMaggio (eds.), *The New Institutionalism in Organizational Analysis*: 267–292. Chicago: University of Chicago Press.
- DiMaggio, P. J., and W. W. Powell**
1983 "The iron cage revisited. Institutional isomorphism and collective rationality in organizational fields." *American Sociological Review*, 48: 147–160.
- Downs, A.**
1972 "Up and down with ecology—The issue attention cycle." *Public Interest*, 28: 38–50.
- Dunn, M. B.**
2006 "Socialization for innovation: The role of developmental networks." Unpublished doctoral dissertation, Organization Studies Department, Wallace E. Carroll School of Management, Boston College.
- Edelman, L. B.**
1992 "Legal ambiguity and symbolic structures: Organizational mediation of law." *American Journal of Sociology*, 97: 1531–1576.
- Edelman, L. B., S. R. Fuller, and I. Mara-Drita**
2001 "Diversity rhetoric and the managerialization of law." *American Journal of Sociology*, 106: 1589–1641.
- Edelman, L. B., and R. Stryker**
2005 "A sociological approach to law and the economy." In N. Smelser and R. Swedberg (eds.), *The Handbook of Economic Sociology*, 2d ed.: 527–551. Princeton: Princeton University Press.
- Edelman, L. B., C. Uggen, and H. Erlanger**
1999 "The endogeneity of legal regulation: Grievance procedures as rational myth." *American Journal of Sociology*, 105: 406–454.
- Fiss, P. C., and E. J. Zajac**
2006 "The symbolic management of strategic change: Sensegiving via framing and decoupling." *Academy of Management Journal*, 49: 1173–1193.
- Flexner, A.**
1910 *Medical Education in the United States and Canada*. New York: Carnegie Foundation for the Advancement of Teaching.
- Fligstein, N.**
1987 "The intraorganizational power struggle: Rise of finance personnel to top leadership in large corporations, 1919–1979." *American Sociological Review*, 52: 44–58.
1990 *The Transformation of Corporate Control*. Boston: Harvard University Press.
- Friedland, R., and R. Alford**
1991 "Bringing society back in: Symbols, practices and institutional contradictions." In W. W. Powell and P. J. DiMaggio (eds.), *The New Institutionalism in Organizational Analysis*: 232–263. Chicago: University of Chicago Press.
- Friedson, E.**
1970 *Professional Dominance: The Social Structure of Medical Care*. New York: Atherton Press.
2001 *Professionalism: The Third Logic*. Chicago: University of Chicago Press.
- Galperin, R. V.**
2010 "From context to agent: Organizational intervention and professional competition—The case of retail clinics." Working paper, Sloan School of Management, Massachusetts Institute of Technology.
- Galvin, T.**
2002 "Examining institutional change: Evidence from the founding dynamics of U.S. health care interest associations." *Academy of Management Journal*, 45: 673–696.
- Ghaziani, A., and M. J. Ventresca**
2005 "Keywords and cultural change: Frame analysis of *business model* public talk, 1975–2000." *Sociological Forum*, 20: 523–559.
- Ghisletta, P., and D. Spini**
2004 "An introduction to generalized estimating equations and an application to assess selectivity effects in a longitudinal study on very old individuals." *Journal of Educational and Behavioral Statistics*, 29: 421–437.
- Gill, G.**
1984 "The end of the physician-scientist?" *American Scholar*, 53: 353–369.
- Goodrick, E., and T. Reay**
2009 "Florence Nightingale endures: Legitimizing a new professional role identity." *Journal of Management Studies*, 47: 55–84.
- Graham, R., R. Roberts, D. Ostergaard, N. Kahn, P. Pugno, and L. Green**
2002 "Family practice in the United States: A status report." *Journal of the American Medical Association*, 288: 1097–1101.
- Greenwood, R., and C. R. Hinings**
1996 "Understanding radical organizational change: Bringing together the old and new institutionalism." *Academy of Management Review*, 21: 1022–1054.
- Greenwood, R., R. Suddaby, and C. R. Hinings**
2002 "Theorizing change: The role of professional associations in the transformation of institutionalized fields." *Academy of Management Journal*, 45: 58–80.
- Guillén, M. F.**
1994 *Models of Management: Work, Authority, and Organization in a Comparative Perspective*. Chicago: University of Chicago Press.
- Gujarati, D. N.**
2006 *Essentials of Econometrics*. Boston: McGraw Hill.

Care and Science Logics

- Gutierrez, C., and P. Scheid**
2002 "The history of family medicine and its impact in US health care delivery." Paper presented at Primary Care Symposium, University of California, San Diego, CA, May 29.
- Haveman, H., and H. Rao**
1997 "Structuring a theory of moral sentiments: Institutional and organizational coevolution in the early thrift industry." *American Journal of Sociology*, 102: 1606–1651.
- Heimer, C. A.**
1999 "Competing institutions: Law, medicine, and family in neonatal intensive care." *Law and Society Review*, 33: 17–66.
- Hughes, E. C.**
1936 "The ecological aspect of institutions." *American Sociological Review*, 1: 180–189.
- Institute of Medicine**
1988 *The Future of Public Health*. Washington, DC: National Academy Press.
1994 *America's Health in Transition: Protecting and Improving Quality*. Washington, DC: National Academy Press.
2003 *Health Professions Education: A Bridge to Quality*. A. C. Greiner and E. Knebel (eds.), Committee on the Health Professions Education Summit. Washington, DC: National Academy Press.
- Jaffe, E.**
1996 "The early history of the Albert Einstein College of Medicine: Special article commemorating the fortieth anniversary of Albert Einstein College of Medicine." *Einstein Quarterly Journal of Biology and Medicine*, 13: 1.
- Johnson, H.**
2004 "Introduction." In W. Abelmann (ed.), *The Harvard-MIT Division of Health Sciences and Technology: The first twenty five years 1970–1995: xix–xxii*. Cambridge, MA: Harvard University Press.
- Johnson, L. B.**
1964 "Remarks upon receiving report of the President's Commission on Heart Disease, Cancer and Stroke." Lyndon B. Johnson Presidential Archives. Retrieved from <http://www.presidency.ucsb.edu/ws/index.php?pid=26751>.
- Jones, C.**
2001 "Coevolution of entrepreneurial careers, institutional rules and competitive dynamics in American film, 1895–1920." *Organization Studies*, 6: 911–944.
- Jones, C., and R. Livne-Tarandach**
2008 "Designing a frame: Rhetorical strategies of architects." *Journal of Organizational Behavior*, 29: 1–25.
- Jones, C., R. Livne-Tarandach, and L. Balachandra**
2010 "Rhetoric that wins clients: Entrepreneurial firms' use of institutional logics when competing for resources." In W. Sine and R. David (eds.), *Research in the Sociology of Work*. Amsterdam: Elsevier (forthcoming).
- Journal of the American Medical Association (JAMA)**
1968 "Medical education in the United States." *Journal of the American Medical Association*, 206: 1988–2022.
- Kimberly, J. R.**
1981 "Managerial innovation." In P. C. Nystrom and W. H. Starbuck (eds.), *Handbook of Organizational Design*, 1: 84–104. New York: Oxford University Press.
- Kraatz, M., and E. Block**
2008 "Organizational implications of institutional pluralism." In R. Greenwood, C. Oliver, K. Sahlin-Andersson, and R. Suddaby (eds.), *The Sage Handbook of Organizational Institutionalism*: 243–275. London: Sage.
- Krippendorff, K.**
2004 *Content Analysis: An Introduction to Its Methodology*, 2d ed. Beverly Hills, CA: Sage.
- Leblebici, H., G. R. Salancik, A. Copay, and T. King**
1991 "Institutional change and the transformation of interorganizational fields: An organizational history of the U.S. radio broadcasting industry." *Administrative Science Quarterly*, 35: 333–363.
- Leicht, K., and M. L. Fennell**
2008 "Institutionalism and the professions." In R. Greenwood, C. Oliver, K. Sahlin-Andersson, and R. Suddaby (eds.), *The Sage Handbook of Organizational Institutionalism*: 431–438. London: Sage.
- Lounsbury, M.**
2002 "Institutional transformation and status mobility: The professionalization of the field of finance." *Academy of Management Journal*, 45: 255–266.
2007 "A tale of two cities: Competing logics and practice variation in the professionalizing of mutual funds." *Academy of Management Journal*, 50: 289–307.
- Ludmerer, K.**
1999 *Time to Heal: American Medical Education from the Turn of the Century to the Era of Managed Care*. New York: Oxford University Press.
- MacBride, O.**
1973 *An Overview of the Health Professions Educational Assistance Act, 1963–1971*. Report No. A1. New Brunswick, NJ: Robert Wood Johnson Foundation.
- Maguire, S., C. Hardy, and T. Lawrence**
2004 "Institutional entrepreneurship in emerging fields: HIV/AIDS treatment advocacy in Canada." *Academy of Management Journal*, 47: 657–680.
- Melnick, D.**
2006 "From defending the walls to improving global medical education: Fifty years of collaboration between the ECFMG and the NBME." *Academic Medicine*, 81: s30–s35.
- Melnick, D. E., G. F. Dillon, and D. B. Swanson**
2002 "Medical licensing examinations in the United States." *Journal of Dental Education*, 66: 595–599.
- Merritt, A.**
2009 "Retail health clinics move to treat complex illnesses, rankling doctors." *Wall Street Journal*, September 10, Health Edition, B1.
- Merton, R. W.**
1968 *Social Theory and Social Structure*. New York: Free Press.
- Meyer, J. W., J. Boli, G. M. Thomas, and F. O. Ramirez**
1997 "World society and the nation-state." *American Journal of Sociology*, 103: 144–181.
- Meyer, R. E., and G. Hammerschmid**
2006 "Changing institutional logics and executive identities: A managerial challenge to public administration in Austria." *American Behavioral Scientist*, 49: 1000–1014.

- Mick, S. S., and M. E. Wyttenbach**
2003 "Themes, discovery and rediscovery." In S. S. Mick and M. E. Wyttenbach (eds.), *Advances in Health Care Organization Theory*: 1–22. San Francisco: Jossey-Bass.
- Mills, C. W.**
1940 "Situated actions and vocabularies of motive." *American Sociological Review*, 5: 904–913.
- Mullan, F.**
2002 *Big Doctoring in America: Profiles in Primary Care*. Berkeley: University of California Press.
- Neuman, W. R.**
1990 "The threshold of public attention." *Public Opinion Quarterly*, 54: 159–176.
- Nigam, A., and W. Ocasio**
2009 "Event attention, environmental sensemaking, and change in institutional logics: An inductive analysis of the effects of public attention to Clinton's health care reform initiative." *Organization Science*, published online before print December 30, 2009, DOI:10.1287/orsc.1090.0490.
- Ocasio, W.**
1997 "Toward an attention-based view of the firm." *Strategic Management Journal*, 18: 187–206.
- Ocasio, W., and J. Joseph**
2005 "Cultural adaptation and institutional change: The evolution of vocabularies of corporate governance, 1972–2003." *Poetics*, 33: 163–178.
- Peabody, F. W.**
1927 "The care of the patient." *Journal of the American Medical Association*, 88: 877–882.
- Powell, W. W.**
1991 "Expanding the scope of institutional analysis." In W. W. Powell and P. J. DiMaggio (eds.), *The New Institutionalism in Organizational Analysis*: 183–203. Chicago: University of Chicago Press.
- Purdy, J. M., and B. Gray**
2009 "Conflicting logics, mechanisms of diffusion, and multilevel dynamics in emerging institutional fields." *Academy of Management Journal*, 52: 355–380.
- Rao, H., P. Monin, and R. Durand**
2003 "Institutional change in Toque Ville: Nouvelle cuisine as an identity movement in French gastronomy." *American Journal of Sociology*, 108: 795–843.
- Reay, T., and C. R. Hinings**
2005 "The recomposition of an organizational field: Health care in Alberta." *Organization Studies*, 26: 351–384.
2009 "Managing the rivalry of competing institutional logics." *Organization Studies*, 30: 629–653.
- Rosenberg, C. E.**
1987 *The Care of Strangers: The Rise of America's Hospital System*. New York: Basic Books.
- Rothstein, W. G.**
1987 *American Medical Schools and the Practice of Medicine, a History*. New York: Oxford University Press.
- Ruef, M.**
1999 "Social ontology and the dynamics of organizational forms: Creating market actors in the healthcare field 1966–1994." *Social Forces*, 77: 1403–1432.
2000 "The emergence of organizational forms: A community ecology approach." *American Journal of Sociology*, 106: 658–714.
2002 "For whom the bell tolls: Ecological perspectives on industrial decline and resurgence." *Industrial and Corporate Change*, 13 (1): 61–89.
- Schneiberg, M., and E. S. Clemens**
2006 "The typical tools for the job: Research strategies in institutional analysis." *Sociological Theory*, 24: 195–227.
- Schweitzer, S.**
2007 "Veterinary schools turn increasingly female: Surge tied to flexibility, attractiveness of field." *Boston Globe*, August 22.
- Scott, W. R., and J. Meyer**
1983 *Organizational Environments: Ritual and Rationality*. Beverly Hills, CA: Sage.
- Scott, W. R., M. Ruef, P. Mendel, and C. Coronna**
2000 *Institutional Change and Healthcare Organizations: From Professional Dominance to Managed Care*. Chicago: University of Chicago Press.
- Seo, M. G., and W. E. D. Creed**
2002 "Institutional contradictions, praxis, and institutional change." *Academy of Management Review*, 27: 222–247.
- Shrank, W. H., V. A. Reed, and G. C. Jernstedt**
2004 "Fostering professionalism in medical education: A call for improved assessment and meaningful incentives." *Journal of General Internal Medicine*, 19: 887–892.
- Starr, P.**
1982 *The Social Transformation of American Medicine*. New York: Basic Books.
- Stinchcombe, A. L.**
1965 "Social structure and organizations." In J. G. March (ed.), *Handbook of Organizations*: 144–193. Chicago: Rand-McNally.
- Stryker, R.**
1994 "Rules, resources, and legitimacy processes: Some implications for social conflict, order, and change." *American Journal of Sociology*, 99: 847–910.
- Suchman, M.**
1995 "Managing legitimacy: Strategic and institutional approaches." *Academy of Management Review*, 20: 571–610.
- Suddaby, R., and R. Greenwood**
2005 "Rhetorical strategies of legitimacy." *Administrative Science Quarterly*, 50: 35–67.
- Thornton, P. H.**
2002 "The rise of the corporation in a craft industry: Conflict and conformity in institutional logics." *Academy of Management Journal*, 45: 81–101.
2004 *Markets from Culture: Institutional Logics and Organizational Decisions in Higher Education Publishing*. Stanford, CA: Stanford University Press.
- Thornton, P. H., C. Jones, and K. Kury**
2005 "Institutional logics and institutional change in organizations: Transformations in accounting, architecture and publishing." In C. Jones and P. Thornton (eds.), *Research in the Sociology of Organizations*, 23: 127–172. New York: Elsevier/JAI.
- Thornton P. H., and W. Ocasio**
1999 "Institutional logics and the historical contingency of power in organizations: Executive succession in the higher education publishing industry, 1958–1990." *American Journal of Sociology*, 105: 801–843.
2008 "Institutional logics." In R. Greenwood, C. Oliver, K. Sahlin-Andersson, and R. Suddaby (eds.), *The Sage Handbook of Organizational Institutionalism*: 99–129. London: Sage.

Care and Science Logics

Townley, B.

1999 "Practical reason and performance appraisal." *Journal of Management Studies*, 36: 287–306.

2002 "The role of competing rationalities in institutional change." *Academy of Management Journal*, 45: 163–179.

Washington, M., and M. J. Ventresca

2004 "How organizations change: The role of institutional support mechanisms in the incorporation of higher education visibility strategies, 1874–1995." *Organization Science*, 15: 82–96.

White, K. L.

1991 *Healing the Schism: Epidemiology, Medicine, and the Public's Health*. New York: Springer-Verlag.

Willard, W. R.

1966 *Meeting the Challenge of Family Practice*. Report of the Ad Hoc Committee on Education for Family Practice of the AMA Council on Medical Education. Chicago: American Medical Association.

Wolfe, S.

1986 "Professional dominance and the medical profession." *American Journal of Public Health*, 76: 11–12.

Wolfe, S. M.

2002 "The destruction of medicine by market forces: Teaching acquiescence or resistance and change?" *Academic Medicine*, 77: 5–7.

Wynn, R.

2000 "Saints and sinners: Women and the practice of medicine throughout the ages." *Journal of the American Medical Association*, 283: 668–669.

Zajac, E. J., and J. D. Westphal

2004 "The social construction of market value: Institutionalization and learning perspectives on stock market reactions." *American Sociological Review*, 69: 433–458.

Zerhouni, E. A.

2005 "Translational and clinical science—Time for a new vision." *New England Journal of Medicine*, 353: 1621–1623.

Zuckerman, H.

1977 *Scientific Elite: Nobel Laureates in the United States*. New York: Free Press.

APPENDIX: Medical Schools Founded between 1960 and 1979

1. University of New Mexico School of Medicine, Albuquerque	1960
2. University of Arizona College of Medicine, Tucson	1961
3. University of California, Irvine California College of Medicine, <i>Science and Care Mission</i>	1962
4. Mount Sinai School of Medicine of the City University of New York, <i>Science and Care Mission</i>	1963
5. Medical College of Ohio at Toledo	1964
6. Rutgers State University	1965
7. State University of New York School of Medicine, Stony Brook, <i>Science and Care Mission</i>	1967
8. The University of Texas Medical School at Houston, <i>Science and Care Mission</i>	1969
9. Texas Tech University School of Medicine, Lubbock	1969
10. Rush Medical College, Chicago	1969
11. University of South Dakota School of Medicine	1970
12. University of North Dakota School of Medicine and Health Sciences	1970
13. Mercer University School of Medicine, Macon, GA	1975
14. Texas A&M University/Baylor College of Medicine, College Station, TX	1975
15. East Carolina University School of Medicine, Greenville, NC	1975
16. East Tennessee State University School of Medicine, Johnson City, TN	1975
17. Marshall University School of Medicine, Huntington, WV	1975
18. Northeastern Ohio Universities College of Medicine, Kent, OH	1975
19. University of South Carolina Medical School, Columbia, SC	1975
20. Medical School of the University of Health Sciences of the Uniformed Services, Bethesda, MD	1975
21. Wright State University School of Medicine, Dayton, OH	1975