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ORGANIZATIONAL FRAGMENTATION AND CARE QUALITY IN THE U.S.
HEALTH CARE SYSTEM

Randall D. Cebul
James B. Rebitzer
Lowell J. Taylor
Mark Votruba

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Organizational Fragmentation and Care Quality in the U.S. Health Care System
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ABSTRACT

Many goods and services can be readily provided through a series of unconnected transactions, but in health care close coordination over time and within care episodes improves both health outcomes and efficiency. Close coordination is problematic in the US health care system because the financing and delivery of care is distributed across a variety of distinct and often competing entities, each with its own objectives, obligations and capabilities. These fragmented organizational structures lead to disrupted relationships, poor information flows, and misaligned incentives that combine to degrade care quality and increase costs. We illustrate our argument with examples taken from the insurance and the hospital industries, and discuss possible responses to the problems resulting from organizational fragmentation.

Randall D. Cebul
Professor of Medicine, Epidemiology,
and Biostatistics
Director, Center for Health Care
Research & Policy
School of Medicine
Case Western Reserve University
rdc@case.edu

James B. Rebitzer
John R. Mannix Medical Mutual Professor
Weatherhead School of Management,
Case Western Reserve University
11119 Bellflower Rd
Peter B. Lewis Building, Room 274
Cleveland, OH 44106-7235
and NBER
james.rebitzer@case.edu

Lowell J. Taylor
The Heinz School
Carnegie Mellon University
5000 Forbes Avenue
Pittsburgh, PA 15213-3890
lt20@andrew.cmu.edu

Mark Votruba
Weatherhead School of Management
Case Western Reserve University
11119 Bellflower Road
Cleveland, OH 44106
mark.votruba@case.edu

The financing and provision of health care in the United States is distributed across a variety of distinct and often competing entities, each with its own objectives, obligations and capabilities. These fragmented organizational structures lead to disrupted relationships, poor information flows, and misaligned incentives that combine to degrade the quality of health care in important ways. Many goods and services can be readily financed and provided through a series of unconnected transactions, but in health care close coordination improves both health outcomes and the efficiency with which good outcomes are achieved.

In discussing the effect of organizational fragmentation on the quality of health care, it is helpful to separate the financing of health care from the provision of care. Medical expenditures over a lifetime are often large, lumpy, and uncertain, so health insurance plays a central role in financing care. Insurance for individuals under age 65 is provided largely through employers. The employer based system leads to high rates of turnover in the relationship between insurers and their policy holders. People change their health insurance company either when they move between jobs or when their employer changes insurance companies. For individuals aged 65 and older, insurance is available from a single, government-run insurance program, Medicare, so there is a near universal exit from commercial insurance policies around age 65. The first section of this paper investigates the consequences of our fragmented health insurance system. Given the high rates of turnover, we ask whether insurers have appropriate incentives to invest in the future health of their policy holders. We also consider the effect of insurance fragmentation on administrative costs.

The second part of the paper concerns the provision of health care, specifically hospitals. Hospitals have a fragmented structure because of the special role played by physicians.

Physicians are central to resource allocation and care processes in the hospital, yet they are typically independent of hospital management. The organizational independence and the clinical interdependence of physicians and hospitals inhibit key clinical process improvements.

Integrating physicians more tightly into process improvement efforts is made difficult by the sociology of the medical profession and also by legal doctrines that have historically supported arms-length physician-hospital relationships.

Any discussion of organizational fragmentation and care delivery must consider the role of modern information technologies that promise to enhance coordination over time and within care episodes. Unfortunately the current information infrastructure in health care does not allow for the seamless flow of information between hospitals, providers and insurers. As we discuss in section three, the absence of fully interoperable electronic medical records and personal health records is both a cause and consequence of organizational fragmentation. The absence of fully portable electronic medical records also creates opportunities for insurers to take on the role of information aggregators for their policy holders. The ability of insurers to serve this function is limited by the frequent disruption of their relationships with policy holders as well as the inherent limitations of the billing data they possess.

The paper concludes by considering responses to organizational fragmentation.

Fragmentation in Health Insurance

Disrupted Relationships

Individuals under age 65 largely rely on private insurance plans to finance healthcare. About 63 percent of the population under age 65 obtain health insurance through an employer

(DeNavas-Walt, Proctor, and Smith, 2007, Table C-3). More than 1.5 million employer groups purchase health insurance on behalf of their employees from over 1200 registered insurance companies (based on 2004 firm counts reported by the Census Bureau at <http://www.census.gov/csd/susb/susb04.htm>) and Employer Health Benefit Annual Survey, (2004). The relationship between employers and insurers can take several forms. Large employers often self-insure, meaning that the firm pays all health care costs each year and hire insurers only to administer plans. For “fully-insured” employer groups, the insurance company both administers the plan and bears the financial risk.

About a fifth of health insurance policyholders cancel their policy in any given year, (Cebul, Herschman, Rebitzer, Taylor and Votruba, 2007). When an employee leaves the employer group that purchased a policy on his or her behalf, the insurance relationship is typically severed. For employers offering multiple plan options, employees may opt out of one plan in favor of another, or employees may cancel their employer-based plan if they find more desirable insurance through a spouse’s job or in the direct purchase market. Finally, 38 percent of the turnover in health insurance coverage is the result of employer groups canceling their existing policies, often as a prelude to selecting another insurer. Turnover rates are considerably higher for fully insured employers, a group largely made up of small and mid-sized employers who are typically less sophisticated about health insurance. Cebul et. al., (2007) report annual exit rates above 30% in this market with roughly half the turnover due to employers exiting the insurance relationship.

In an employer-based health insurance system, labor market mobility is clearly a major determinant of exit from insurance relationships, but why do so many employer groups switch their insurance carriers? A likely answer involves search frictions. In a competitive insurance

market, the law of one price prevails and consequently there is little payoff for employer groups to switch insurers. In an insurance market with moderate search costs, however, insurers have some degree of market power and the law of one price does not hold. Instead equilibrium is characterized by a distribution of prices supported on the low end by the marginal cost of insurance and on the high end by the purchaser's maximum willingness to pay (Burdett and Mortensen, 1998; Mortensen, Mortensen, 2003; Lang and Majumdar, 2004; Montgomery, 1991; Butters, 1977; Manning, 2003). Purchasers who find themselves in the expensive part of the premium distribution will have incentives to change insurers when a better offer arrives. Thus, the frequent exit of employer groups from their insurance relationship is quite natural in a search model, provided that search frictions are not too severe.¹

Incentives to Invest in Future Health

Inadequate preventive care, especially for those with chronic disease, is one of the most important quality failures in the U.S. health care system (Institute Of Medicine Committee On Quality Of Health Care In America, 2001). McGlynn et al. (2003) estimate that only 55% of

¹ Cebul et al. (2007) provide estimates of the magnitude of search frictions in the US health insurance market. The health insurance market in Switzerland exhibits considerable price dispersion, despite competition among insurers and a regulatory structure that supports a high degree of product uniformity (Frank and Lamiraud, 2007). Switzerland requires all residents to purchase health insurance in a marketplace that features a large number of competing insurers. The government specifies a uniform basic insurance package. Premiums, which are risk adjusted by location, gender and age, can differ between health plans, but within health plans an insurer must offer the same premium for individuals having the same age, gender and region of residence. In addition to this community rating feature, health insurers must accept every applicant for basic insurance, and individuals can switch insurance providers every six months. The differences between the maximum and minimum monthly premiums were 65.36 Euros in 1997 and 88.01 in 2004 (p. 38). The primary deterrent to switching in the Swiss context appears to have been psychological—either decision overload, under which the psychological costs of processing information as choice increases overwhelms individual's decision making capacity, or status quo bias. Also, Dormont, Geoffard and Lamiraud (2007) suggest that the “inertia” in the Swiss market is affected by the presence of supplemental policies. Switching costs may be high for these policies and insurers may use these supplemental policies as “risk selection” devices.

adults receive recommended levels of preventive care, while adults with a chronic illness – such as diabetes, asthma, coronary artery disease, chronic obstructed pulmonary disorders (COPD), and hypertension – receive only 56% of the chronic care recommended by clinical guidelines. The care of patients with chronic diseases accounts for 75 percent of annual health care expenditures (National Center for Chronic Disease Prevention and Health Promotion 2005). The complications associated with these conditions accumulate over time, so early interventions can improve patient care and reduce medical costs. The short expected duration of insurance relationships undermines insurers' incentives to invest in preventative care and disease management. Deficient incentives resulting from short-term insurance relationships are, we argue, an important contributor to these gaps in care.

Diabetes disease management offers a useful illustration of the sort of quality problems we have in mind (for an analogous discussion of bariatric surgery see Avraham and Camara, 2007). Diabetes is a very important chronic disease. According to the Agency for Health Care Research and Quality (Shojania, Ranji, Shaw, Charo, Lai, Rushakoff, McDonald, and Owens, 2004) seventeen million Americans have diabetes and one in seven either has the disease or is at risk for developing it. Diabetes related complications account for more than 200,000 deaths annually, 82,000 amputations, 38,000 new cases of end stage renal disease and 12,000 cases of blindness. Although there is no cure for diabetes, effective treatment and screening strategies exist to control co-morbid conditions and to extend the quality and length of life. Yet diabetes care in the US has consistently failed to meet recommended quality standards and there are significant gaps in care (Shojania, et al., 2004) .

Diabetes disease management programs have emerged in the last decade as a strategy to slow the progression of the disease by aggressively monitoring and controlling blood levels of

glycated hemoglobin (HbA1c) and low density lipoprotein (LDL). Implementing these programs is challenging because they require a combination of education efforts (aimed at patients and primary care providers) and sophisticated monitoring systems to track patient progress, assess physician performance, and coordinate information flows between pharmacies, labs, and the offices of various specialists and primary care providers. Insurers can also improve the patient adherence to disease management protocols by reducing prices and co-pays to encourage compliance (Dor and Encinosa, 2004).

Clearly disease management involves up-front investments for payoffs later in time. Beaulieu et al. (2007) offer an analysis of the costs and benefits of diabetes disease management at a specific HMO, Health Partners . They estimate that the program generated a positive social return that grew over time. The net private return, however, was negative in the first years and zero over the course of a decade. Policyholder turnover played a significant role in reducing private returns (see also Gertler and Simcoe's, 2006; analysis of a different disease management program).

Several indirect pieces of evidence also suggest that shortening the insurer-policy holder relationship may lead to fewer investments in future health. For example, one might expect that sectors of the labor market with high rates of job turnover should also have shorter insurer-policy holder relationships and therefore reduced incentives to invest in future health. Fang and Gavazza (2007) find that employees in industries with high turnover rates are less likely to be offered health insurance from their employer. Should health insurance be offered, employees in high turnover industries pay higher deductibles and a larger fraction of the insurance premium. As a result, these employees also spend less on health services and receive less preventative care. In retirement, however, employees who had worked in high turnover industries have higher

medical expenditures—suggesting that attention to some health problems was postponed. Along similar lines, Herring (2006) finds that in cities with a high degree of employer-induced insurance turnover, there is a reduction in preventative care visits, but no reduction in acute care visits.

If insurer-policy holder relationships are too short to sustain meaningful incentives for investments in disease management and preventative care, one might expect government mandates would help reduce the short-fall. Thus we find that 27 states currently mandate coverage for diabetes self-management and education programs, though disease management mandates for other conditions remain rare (Bunce, Wieske, and Vlasta Prikazsky, 2007). The absence of long-term insurance relationships may also help explain the limited effects on health care costs of the managed care revolution of the 1990s, although other economic factors may also have played a role (Cooper and Rebitzer, 2006).

Advocates for disease management often claim that the net savings from these programs generate a positive return for insurers who invest in them. If this “business case for quality” were to hold, then shouldn’t insurers have appropriate incentives to invest in at least some kinds of disease management or other proactive health care? The presence of adverse selection and search frictions in insurance markets suggest that the answer to this question may be no. An insurer who offers excellent disease management programs must be concerned about attracting potentially expensive patients (Beaulieu, et al., 2007). Search frictions create countervailing incentives for an insurance company. On one hand, imperfect competition allows insurers to capture a portion of the surplus generated by investments in future health (Cebul, et al., 2007),

which should encourage investment. On the other hand, search frictions discourage investment by increasing turnover – especially among fully insured employers.²

There is currently a heated debate about whether disease management programs yield monetary savings that more than offset their costs (Congressional Budget Office, 2004). This focus on the “business case for quality” is incomplete, however, because it fails to consider the value to patients of improvements in future health and well being that result from these programs. In principle, insurers could capture some of this value in the form of higher premiums if they could count on long-term relationships with employer groups or individual policy holders. For example, policyholders might pay more in the present for an insurance policy that credibly promises to deliver these chronic disease management services should they be required in the future. But insurance companies cannot count on such long-term relationships with many or most insured individuals.

The problem of short- term insurance relationships is compounded by the near universal movement of commercial insurance policy-holders onto Medicare at age 65. Many chronic diseases are not manifest until late middle age so the movement to Medicare shortens private insurer’s time horizon. For example, the lifetime risk of men developing diabetes in the US is 32.8%. By age 60, 18.09% of men will have developed the disease compared to 30.77% at age 80. (Narayan, Boyle, Thompson, Sorensen, and Williamson, 2003). The payoff to insurers for disease management of the many late developers of diabetes is obviously diminished when these policy holders switch to Medicare at 65.

² Search frictions also enable insurers to capture returns from investments in future health made by individual policy holders or employer groups. Cebul et. al. (2007); and Fang and Gavazza (2007) demonstrate that this will lead to additional under-investment. The depressing effect of insurance market search frictions on investments in future health is analogous to the effect of labor market frictions on investments in general human capital as described in Acemoglu (1997) and Acemoglu and Pischke (1999).

Administrative Costs

In his presidential address to the Econometric Society, Peter Diamond (1992, p. 1234) observed, “The administration of health insurance is expensive, and not adequately approached by a model of ideal insurance with no loading, i.e., with premiums equal to expected benefits.” Woolhandler, Campbell and Himmelstein (2003) calculated that the United States spends \$1,059 per capita on the administration of its health care system, which amounts to 31 percent of total health care expenditures. Canada, in contrast, spends \$307 per capita on health care, which is 16.7 percent of its total health care expenditures (p. 768). Much of this difference is due to the relatively heavy reliance in the U.S. on private insurers, whose underwriting, billing and marketing activities account for the bulk of overhead costs. If the complexity of insurance contracts and billing procedures cause hospitals, physicians and employers to build bureaucracies to negotiate relationships with insurers, then the indirect effects of private insurance on administrative costs may be a good deal larger than the direct effects. For example, Woolhandler et al. (2003) find that hospitals in the United States spend \$315 per capita on administration, compared with \$103 in Canada. Similarly, the administrative costs of practitioners are \$324 per capita in the U.S., versus \$107 in Canada, while employers spend \$57 per capita in the United States, compared to \$8 in Canada. Some have argued that these estimates may be too high, but even more modest alternative estimates yield substantial differences in administrative costs between Canada and the US (Aaron 2003). A recent Commonwealth Fund report found that if administrative expenditures in the United States were scaled back to the levels of Germany and Switzerland, the savings would be \$32 to \$46 billion a year (Davis, Schoen, Guterman, Shih, Schoenbaum, and Weinbaum, 2007, p. 4). Germany and Switzerland have mixed private and

public health insurance systems, so the implication is that substantial savings are possible even if the United States retained a mixed private and public system.

Fragmented insurance relationships contribute directly to high administrative costs because, as we learned from an insurance executive in charge of managing insurance payment centers, the rapid churn in insurer-policy holder relationships adds an important additional complexity to the already difficult process of paying claims. Search frictions, which contribute significantly to high levels of insurance turnover especially in the fully-insured segment of the insurance market, also require that insurers devote considerable resources to marketing their products.

Search frictions may also increase administrative costs by increasing product variety and complexity. In a market with moderate frictions, insurers can benefit from complexity to the extent it limits product comparisons. Employer groups accept policies with high premiums and overly complex contracts, because the information about alternatives is sufficiently poor that the offer seems better than the available alternatives—at least for a time. There is considerable scope for product variety and complexity in insurance because of the large number of non-premium attributes of insurance policies. Products can have different co-pays, deductibles and caps for different types of services. The list of physicians in the network, the fees for out of network referrals, and the specific drugs in the formulary can vary as well. Hall (2000) describes how state insurance regulations for small employer groups further contribute to this complexity. Woolhandler et al. (2003) note that Seattle alone had 757 distinct health insurance products. Our own discussions with executives in the insurance industry suggest that this number is not atypical for metropolitan areas and may be conservative. To the extent that frictions lead to a

proliferation of insurance products, they will also increase the resources required for marketing, claims processing and administration.³

Fragmentation in Hospital Governance and Care

Medical care is delivered both in the hospital (in-patient care) and outside the hospital (out-patient or ambulatory care). Thirty eight percent of all U.S. health care expenditures in 2004 were for hospital care (Centers for Medicare and Medicaid Services, 2007). There are over 5700 hospitals (U.S. Centers for Disease Control and Prevention, 2006) and approximately 19,000 physician practices in the United States (American Medical Association, 2004). Some hospitals are not-for profit, others are for-profit; some hospitals have a research or teaching mission and close associations with research universities and medical schools, others focus on delivering care to particular communities, still others specialize in the treatment of specific diseases or conditions. The majority of physicians work in small single-specialty groups, although some large multi-specialty group practices do exist (Wilensky, Wolter, and Fischer, 2006). Some physicians may have “privileges” at more than one hospital and many more split their time and attention between hospital in-patient care and their office-based practices (Fisher, Staiger, Bynum, and Gottlieb, 2006).

³ The fact that search costs lead to an equilibrium distribution of premiums for identical policies, also promotes product variety because at each point on the price distribution, insurers will offer a different mix of non-price insurance attributes. This argument is made formally in the context of labor markets and non-wage job attributes by Lang and Majumdar (2004). Some economists have pointed to adverse selection, rather than search frictions, as the cause of the high degree of product variation found in insurance (Diamond, 1992). As Hall (2000) describes, even in states that attempt community rating, clever insurers do design policies and pricing strategies to deter bad risks. These stratagems introduce an excessive number of insurance products and price variation into the small group market that further compound search frictions. At a theoretical level, the distinction between adverse selection and search frictions may be more apparent than real (see Li, 2007).

Hospitals have a fragmented organizational structure because physicians are central to resource allocation and care processes in the hospital, yet they are largely independent of hospital management. The principle of physician autonomy is deeply embedded in the laws and regulations governing hospitals (Hall, 1988). The doctor-patient relationship and the doctor's medical practice are usually separate and legally distinct from the rest of the hospital. Reimbursement for care that happens within hospitals is made separately to physicians and hospitals. As Harris (1977, p. 468) put it in his seminal article on the internal organization of hospitals, "The net result is one organization split into two disjoint pieces, each with its own objectives, managers, pricing strategy and constraints."

We argue below that fragmented organizational structures inhibit process improvement in hospitals leading to waste and inefficiency. The scope for process improvements in hospitals is hard to measure, but Medicare data on geographic variation in expenditures and outcomes suggests that inefficiencies may be large. Numerous studies find that expenditures for individuals in high cost areas are as much as sixty percent higher than health expenditures for similar individuals in low spending areas. Most of this geographic variation is unexplained by prices, demographics, or health status. Some regions seem prone to adopt inexpensive but effective care while other regions are prone to adopt high cost care that offers little or no measurable benefit (Congressional Budget Office, 2008). For example in Knoxville, Tennessee, risk adjusted one year survival for a first heart-attack was 69.7 per 100 patients, with one-year spending of \$20,720 compared to 65.6 per 100 patients \$47,133 in New York (Skinner, Staiger, and Fisher, 2006, p.38). Hospital expenditures are a major contributor to these geographic variations (Congressional Budget Office, 2008).

Clinical Process Improvement and the Need for Close Coordination

The organizational independence and the clinical interdependence of physicians and hospitals can act as a drag on clinical process improvements. To illustrate this point, consider the process of sterilizing surgical instruments as described in a recent case study of the Stanford Hospital and Clinics (Zenios, Surman, and Pernas-Giz, 2004).⁴ Approximately 50,000 instruments flowed through Stanford Hospital's operating rooms in 2004. Each instrument needs to be sterilized, processed and delivered to the correct room at the correct time. As is typically the case, surgeons at Stanford Hospital were not hospital employees. Surgeons received a salary, as well as a fee for each surgery. In this case, they were members of Stanford Medical School faculty and they were free to practice at another facility should they choose to do so. If a surgeon chose to perform surgeries elsewhere, Stanford Hospital would lose that surgeon's expertise, patients, and revenues.

The process of providing instruments begins with a surgeon filling out a "preference card" that lists the supplies needed for a surgery. Technicians, who are hourly employees hired with only a few weeks of on-the-job training, then load the supplies onto a cart. Errors could occur for a variety of reasons: mistakes in filling out the preference card; technicians gathering incorrect instruments, perhaps because the bins in which the instruments sat were incorrectly labeled; or instruments that had not been reassembled properly after previous sterilization. The location of instruments in the hospital was supposed to be tracked by manual scanners, but employees frequently failed to scan. Emergencies and poor coordination meant that instruments were often needed again immediately after a previous use, making the preferred six-hour

⁴ We chose this study to illustrate the important role physicians play in process improvements in hospitals. The case, and our summary of it, is not intended to demonstrate either effective or ineffective handling of an administrative situation.

sterilization process impossible and forcing the use of less desirable “flash sterilization” with steam. Surgeons had no direct contact with the sterilization process or technicians, and held operating room nurses accountable for whether the desired instruments were available. Nurses were harshly blamed by surgeons for instrumentation failures, but nurses who delivered clean instruments on time achieved “star status” among surgeons. In this setting, some operating room staff shared instruments between surgical suites. Some nurses kept critical instruments in their personal lockers. Some surgeons also took instruments with them when they left the hospital.

Efficient use of surgical instruments requires coordination among a heterogeneous group that includes surgeons, nurses, anesthesiologists, sterilization technicians, and supply distribution staff. This sort of cross-functional coordination is generally accepted as crucial for providing high quality care in many areas. The Institute of Medicine’s comprehensive study of health care quality, Crossing the Quality Chasm (2001, p. 83), lists the creation of effective work teams as one of its ten rules to redesign and improve care: “In the current system, care is taken to protect professional prerogatives and separate roles. The current system shows too little cooperation and teamwork. Instead, each discipline and type of organization tends to defend its authority at the expense of the total system’s function.” The Institute of Medicine report (p. 83) also highlights surgical tray set-ups: “Suboptimization is seen, for example, in operating rooms that must maintain different surgical tray setups for different doctors performing the same procedure. Each doctor gets what he or she wants, but at the cost of introducing enormous complexity and possible error into the system. In the new system, people will understand the advantage of high levels of cooperation, coordination and standardization to guarantee excellence, continuity and reliability.” For studies of the effect of team coordination on clinical outcomes see Gittell, (2002) and Gittell et. al. (2000).

The Institute of Medicine (2001 p. 83) traces the difficulty in forming work teams to the sociology of health care professions which focuses on “role definition, certification and licensure, or doing one’s own work as the top priority. These attitudes are especially pronounced among physicians, and offer little training for work in collaborative settings”. Audet, Doty, Shamasdin, and Schoenbaum (2005, p. 847, Exhibit 2), using the 2003 Commonwealth Fund National Survey of Physicians and Quality of Care, find that only one-third of physicians report participating in redesign efforts to improve the performance of the system of care in which they practice.

Hospital Governance Structure

While these sociological issues may indeed be impediments to quality improvement efforts, the fragmented governance structure of hospitals makes the problem worse. Physicians, as independent contractors, have high-powered incentives for devoting time and attention to their private practice, to other hospitals where they may have admitting privileges, or to research and teaching. Getting high levels of physician cooperation for addressing hospital-specific issues like the sterilization of instruments requires that the hospital offer equally high powered, countervailing incentives. Monetary incentives linked to the output of a team have been shown in other settings to be effective motivators (Encinosa, Gaynor, and Rebitzer, 2007; Gaynor, Rebitzer, and Taylor, 2004), but these sorts of incentives are problematic in settings where the income and wealth of team members varies as dramatically as they do in a hospital setting.

If physicians were employed directly by hospitals, then hospitals could structure their job responsibilities to address these issues (Holmstrom and Milgrom, 1994; and Holmstrom, 1999; discuss these issues for employment relationships generally). A surgeon employed full time at a hospital would certainly need compensation sufficient to offset lost income from outside

activities, but once this participation constraint is achieved, then more subtle and finely tuned non-pecuniary motivators can sustain a high-commitment to broader hospital objectives. A substantial literature on high commitment human resource systems establishes that employees can work hard in the interests of the employer in exchange for a combination of good pay, empowerment, trust, and interesting and fulfilling work (Roberts, 2004, p. 175). In these human resource systems, employers do not provide high-powered monetary rewards for individual performance, but instead use a combination of screening, socialization, training in the objectives of the firm, and peer pressure to sustain high levels of motivation. Encinosa, Gaynor and Rebitzer (2007) offer evidence on the presence of sociological and economic incentives within medical groups.

Legal Doctrines Limiting Employment of Physicians by Hospitals

Given the advantages of close coordination, why don't hospitals evolve alternative governance structures that would integrate physicians more tightly? In many European health care systems—including Austria, Belgium, Denmark, Finland, France, Germany, Great Britain, Italy, the Netherlands, Norway, Spain and Sweden--in-patient care is predominately or entirely overseen by salaried physicians employed by their hospital (European Observatory on Health Systems and Policies, 2004). But in the United States, two long-standing legal doctrines have historically discouraged the employment of physicians by hospitals and tilted towards an independent contractor model: the “corporate practice of medicine doctrine” and the “doctrine of vicarious liability.”

The “corporate practice of medicine” legal doctrine has its roots in state laws that prevent unlicensed entities from providing medical services. These statutes, which trace back to rules

proposed by the American Medical Association in 1847, were motivated in part by a desire to protect the public from physicians with “divided loyalties,” and in part by a desire to protect the professional autonomy of medical doctors from encroachments by corporations and hospitals (Hall, 1988; Huberfeld, 2004; Yessian and Kvall, 1991). The statutes and associated case law vary from state to state. Historically, the doctrine has effectively prohibited the employment of physicians by hospitals and other non-physician entities, but the current force of this prohibition is unclear (Robinson, 1999; Huberfeld, 2004). Yessian and Kvell (1991) find that in 1991 only five states clearly prohibited hospitals from employing physicians, and even these states had exceptions for public hospitals, clinics operated by medical schools, and teaching hospitals. However, in many other states, some confusion still seems to exist about whether hospitals can employ physicians.

According to the “doctrine of vicarious liability,” principals are responsible for the consequences of actions taken by employees in the course of carrying out their duties. Thus, a hospital that hires physicians as employees accepts malpractice liability that the hospital wouldn’t otherwise have to bear. Abraham and Weiler (1994) discuss the historical evolution of hospital liability.⁵ Moreover, if the limits on malpractice insurance carried by physicians are lower than the limits for hospitals, and if the limit on the malpractice insurance acts as an effective cap on judgments—as Zeiler, Silver, Black, Hyman, and Sage (forthcoming) find in a study of malpractice payments in Texas from 1990 through 2003—then having physicians rather than hospitals responsible for malpractice can lower overall malpractice payments. Arlen and

⁵ In a world of Coasian bargaining, the equilibrium expected costs of malpractice (and hence incentives to avoid malpractice) are not influenced by who is held liable for malpractice damages. For example, a shift in liability from independent physicians with hospital privileges to hospitals would be compensated for by an offsetting reduction in the compensation of physician employees. Arlen and MacLeod (Arlen and MacLeod, 2003, Arlen and MacLeod, 2005a, Arlen and MacLeod, 2005b), make this point in the context of managed care organizations.

MacLeod (2005b) present a theoretical analysis of this issue in the context of managed care organizations.⁶ Abraham and Weiler (1994) argue that the current system of vicarious liability offers insufficient incentives for hospitals to undertake the systematic process analysis and improvements required to improve patient safety. For purposes of tort law, employment is defined by supervision and control. Thus, a hospital that relies largely on physicians as independent contractors would forgo some of the legal advantages of this set-up should it attempt to supervise, train and otherwise exercise authority over physicians under its administrative control.

If the doctrine of vicarious liability was a powerful enough legal force to inhibit the integration of physicians with hospital operations, why did it not also inhibit the efforts of managed care organizations to regulate physician practice patterns? Part of the answer is that managed care organizations are covered under the federal Employee Retirement Security Act (ERISA), that restricts damages to the cost of denied coverage (and thus disallows compensatory or punitive damages) and preempts malpractice suits under state law (Arlen and MacLeod, 2003). To be clear, ERISA does not preclude malpractice suits under state law for negligent care delivered by physicians employed by managed care organization. Managed care organizations may, however, escape liability under state law if their physicians are independent contractors (Arlen and MacLeod, 2003).

Although legal doctrines and associated case law have created a legal landscape that has historically discouraged hospitals from employing physicians, hospitals and physicians are testing the boundaries of these rules and developing new professional practices and

⁶ Outside of health care, Rebitzer (1995) found that safety problems at petrochemical plants were increased because of employers' attempts to evade vicarious liability through the use of independent contractors.

organizational forms that may integrate physicians more tightly into hospital operations and process improvement efforts.

Hospitalists

A particularly noteworthy innovation is the growing use of “hospitalists,” a new medical specialty in which physicians, often internists, specialize in caring for patients who are in the hospital. Although there were only a few hundred such specialists in 1996, their number had risen to 8000 hospitalists by 2004 and rapid growth seems likely to continue (Wachter, 2004). Sometimes hospitalists are members of medical groups or managed care organizations; sometimes they are hospital employees (Robinson, 1999). With the shortening length of hospital stays and the higher level of complexity of care for hospital patients, it makes sense for office-based physicians to hand off responsibility to a physician stationed in and specializing in hospital care (Meltzer, 2001).

Hospitalists would seem to be well-positioned to make investments in hospital specific human capital and also to participate in process improvements. However, evidence on the effects of hospitalists has been scarce. Meltzer (2001) discusses two studies that approximate a random design in that patients were allocated to a hospitalist or non-hospitalist based on who happened to be on call when the patient arrived. Both studies find that hospitalists modestly reduce length of stay and charges.

Hospitalists do create some additional coordination costs, because office-based physicians hand their patients off to hospitalists when patients enter the hospital (Meltzer, 2001; Wachter, 2004). Ultimately, the effect of the hospitalist model of in-patient care quality will depend on the benefits from specialization exceeding the heightened coordination costs.

Integrating Hospitals and Physician Practices

Coordination of in-patient with out-patient treatment might also be facilitated by having hospitals integrate with physician practices. In some cases hospitals have acquired physician practices and placed doctors on salary. The motive for these purchases seems largely to be to lock-in profitable referrals (Dranove, 2000, p. 130; Robinson, 1999; Casalino and Robinson, 2003) and also to enhance hospital bargaining power (Budetti, Shortell, Waters, Alexander, Burns, Gillies, and Zuckerman, 2002; Casalino and Robinson, 2003).

In other cases, hospitals construct alliances with physicians by forming “physician hospital organizations” or “management service organizations.” A physician hospital organization is a joint venture between a hospital and physicians that serves as a single agent for managed care contracting and provides administrative services and utilization review; however, both the physicians and the hospital retain their identity as separate lines of business. A management service organization is a free-standing corporation. It provides services to medical practices, it may be the employer of the non-medical staff, and it may help coordinate planning and decision making (Burns, 1995). These attempts at vertical integration have generally produced disappointing results. As Burns and Pauly (2002 , p. 134) put it, “The structures that were put in place to integrate hospitals, primary care providers, and specialists often failed to fundamentally alter the manner in which physicians practiced medicine and collaborated with other health care professionals (that is, ‘clinical integration’). As a result, integrated structures rarely integrated the actual delivery of patient care.” Vertical integration between hospitals and physicians also poses practical difficulties. The arrangement is almost never exclusive, doctors and patients are constantly moving in and out of the system due to personal preferences and geographic convenience (Robinson 1999, p. 192). Indeed, the fraction of hospitals with

physician hospital organizations and management service organizations peaked in 1996 and has been declining since (Burns and Pauly, 2002).

To compensate for the lack of clinical integration, health care organizations have introduced a variety of clever incentive systems to motivate the physicians in the practices they acquire. These incentive experiments, however, have not met with much success, in part because many aspects of care integration are non-contractible and in part because incentive pay is too crude an instrument to achieve the multiple goals of efficiency in production, appropriate utilization and referrals, and delivery of high quality care (Dranove, 2000, p. 135; Robinson, 1999). Beaulieu and Barro (2003) offer a case study of one hospital system's attempt to introduce incentives into physician practices they purchased. The primary effect of increased incentive pay was to cause low performing physicians to leave the practices purchased by the hospital.

Organizational Fragmentation and Information Technology

In a fragmented health care delivery system, high quality care requires the smooth flow of information across diverse providers working within various organizations in both in-patient and out-patient settings. Pham, Schrag, O'Malley, Wu and Bach (2007) provide some evidence on the scale of coordination required. They studied Medicare patients whose physicians were included in the Community Tracking Study physician survey. They report that patients with diabetes see a median of eight physicians in five distinct medical practices. Patients with coronary artery diseases see a median of ten physicians in six distinct practices. Moreover, the physician providing the most care is not constant from one year to the next (Pham, et al., 2007).

The large number of physicians and organizations involved in treatment clearly creates coordination challenges. There is some evidence suggesting that these challenges influence care

outcomes. Skinner et. al. (2006) report an analysis of regional, risk- adjusted, one year survival rates for Medicare patients following a first heart attack. After controlling for other aspects of the quality of care, the average number of different physicians involved in post episode treatment in a hospital referral region was negatively associated with gains in regional one year survival rates and positively associated with cost increases. In other words, regions that relied more heavily on coordination across more physicians were less adept at improving post heart attack care efficacy and efficiency.

Modern information technology offers many tools to facilitate coordination and information flows, but the information technology revolution has been slow in coming to health care. Survey data collected in 2007-2008 reveals that only four percent of physicians have a fully functional electronic medical record system in their office and only thirteen percent have a basic system (DesRoches, Campbell, Rao, Donelan, Ferris, Jha, Kaushal, Levy, Rosenbaum, Shields, and Blumenthal, 2008). Similarly low rates of IT adoption are reported for electronic medical records in hospital emergency rooms and outpatient departments (Burt and Hing (2005) and physician order entry systems in hospitals (Cutler, Feldman, and Horwitz, 2005).

Part of the explanation for the slow implementation of modern information technology is the fragmented nature of the health care delivery system. As President Bush's Information Technology Advisory Committee (2004, p. 7) concluded: "Unlike the nationalized health systems of many countries, however, the U.S. health care system is deliberately composed of private, independent hospitals, ambulatory care and long term care facilities, and private individual and group provider practices. While this arrangement has stimulated competition, maximized consumer choice, and provided ongoing incentives to excel and to innovate, the free market system does not inherently generate practical mechanisms for sharing information critical

to patient care.” A report from the Institute Of Medicine Committee On Quality Of Health Care In America, 2001, p. 154) makes a similar point about the dearth of clinical decision support systems designed to help physicians avoid errors and implement evidence based treatment guidelines. “To be effective, CDSS [clinical decision support systems] diagnostic systems require detailed, patient-specific clinical information (history, physical results, medications, laboratory test results), which in most health care settings resides in a variety of paper and automated datasets that cannot easily be integrated. Past efforts to develop automated medical record systems have not been very successful because of the lack of common standards for coding data, the absence of a data network connecting the many health care organizations and clinicians involved in patient care, and a number of other factors.”

The obvious clinical value of sharing information across providers and the absence of standards for interoperable electronic medical records creates opportunities for insurers to act as information aggregators for their policy holders. Insurers can do this because all visits and procedures that require billing are coded into the records of the insurer. If the billing information is sufficiently complete, timely and accurate, and if it can be integrated with pharmacy and laboratory information, it is possible to assemble something approximating a comprehensive electronic medical record. Insurers are using such ersatz medical records to build clinical decision support systems to identify gaps in care. Javitt , Rebitzer and Reisman (2008) report the results of a randomized trial of one such system. Patients of physicians exposed to the system had reduced resource utilization (measured by total charges) and fewer unresolved gaps in care. Insurance based systems are also being used to adjust co-pays and deductibles to encourage patient adherence to chronic disease treatment protocols (Chernew, Rosen and Fendrick, 2007).

Insurance records, however, have important limitations as a source of clinical information. Claims data typically arrive slowly and contain far less clinical detail than true electronic medical records. Insurance-based records also do not follow employees when they change insurance companies. One insurance industry veteran with whom we spoke said it takes about a year for an insurance company to collect enough information about a patient to even know if they are eligible for a disease management program.

Some of the limitations of insurance based data systems might be mitigated by a system of personal medical records that are the property of the individual. Companies such as WebMD work with employers and insurers to feed billing information, as well as pharmacy and lab data, into each individual's record. This information belongs to the individuals and stays with them. If, however, an individual's next job does not have a contract with WebMD, the flow of information from the insurer stops. Individuals can continue to add information to their personal medical record on their own, but this increases the likelihood of gaps and errors.

Responses To Fragmentation

The organizational fragmentation of the U.S. health care system has its roots in important market forces (and failures), legal doctrine, government policy and the state of information technology. Our analysis of fragmentation in insurance relationships suggests that disrupted insurer-policy holder relationships are likely to lead to insufficient investments in future health such as preventative care or disease management programs for chronic diseases. Our analysis of fragmented hospital governance emphasizes the difficulty of implementing important process improvements.

Some gains may result from changed government policy, but a good deal will depend on the development of improved organizational practices, legal doctrine and information

technology. In principle, policymakers could address short-falls in investments in future health by mandating that insurers deliver the under-provided programs. Attempting to mandate precisely what care should be delivered is, however, unlikely to achieve fully satisfactory results. Unless the mandates are compatible with the incentives inherent in short insurer-policyholder relationships, they are likely to lead to insufficient investments in perfunctory programs, which in extreme cases may become wasteful sham efforts. Mandates are further complicated by legal doctrines that dramatically limit the reach of any insurance mandate passed by an individual state (Avraham and Camara, 2007).

Policymakers could create incentives for process improvement by linking payments and care quality. Medicare will be attempting an approach along these lines when it introduces a policy in fiscal year 2009 that refuses additional payments to hospitals for preventable inpatient complications, errors, injuries, and infections that could have reasonably been prevented by good quality assurance processes (Kurtzman, 2007). But in clinical settings, performance measures are often imperfect. Linking high-powered incentives to these performance measures distorts incentives in ways leading to “cream skimming” and other undesirable provider behaviors (Dranove, Kessler, McClellan, and Satterthwaite, 2003). Another important issue with pay-for-performance is that in a fragmented health care system, it is often unclear which provider should be held accountable for which outcomes. Pham, *et al.* (2007) investigated the ability of Medicare to “assign” a primary physician to a particular patient for the purpose of implementing pay for performance incentive systems. They conclude that it is often not possible to identify a single physician primarily responsible for care.

An intriguing alternative approach put forward by Fischer et al., (2006) is to create “accountable care organizations” composed of hospitals and the physicians who treat or admit

patients there. Linking pay to the performance of these artificial entities would create incentives for improving the many clinical processes that span in-patient and out-patient settings, but implementing such a system will be tricky. Free-riding issues will likely make it difficult to provide high-powered incentives across a large group of heterogeneous and loosely affiliated provider organizations (Gaynor, et al., 2004; Encinosa, et al., 2007). Inducing physicians to form employment-like relationships with accountable care organizations may not be easier than employing them in hospitals. Introducing gain-sharing among participants in these organizations will also require modification of federal laws. For example, Social Security Act Civil Monetary Penalties Law prohibits hospitals from making a payment to a physician as an inducement to limit services to Medicare or Medicaid patients under the physician's care. Similarly, an anti-kickback statute prohibits payments to reward referrals of patients participating in federal health care programs. The Stark laws prevent physicians from referring Medicare and Medicaid patients for health services from entities in which physicians have a financial relationship (Wilensky, et al., 2006).

If mandates and pay-for-performance are overly blunt policy instruments, perhaps more can be accomplished by reforming insurance markets (Avraham and Camara, 2007). Churn in insurance relationships results from labor market mobility, the switch to Medicare insurance at 65, and search frictions- with the latter being particularly important for the small employers in the fully-insured market segment. The easiest of these three causes to address are search frictions. Introducing a simple, extensively marketed, default insurance policy that employers could choose if no superior policy is offered will truncate the wide distribution of premiums and thus reduce turnover.

Our analysis of fragmentation in hospitals emphasized the legal barriers that discouraged the tight integration of physicians into quality improvement initiatives in hospitals. The legal system itself seems to be moving towards removing one of these obstacles—the corporate practice of medicine doctrine. Additional legal reforms, such as replacing the doctrine of vicarious liability with an enterprise liability rule under which hospital malpractice exposure extends to physicians working as independent contractors, could eliminate other obstacles. New managerial innovations along the lines of the hospitalist approach to in-patient care might also help to better integrate physicians into hospital care improvement initiatives.

A final aspect of organizational fragmentation is the balkanized information technology infrastructure in the health care system. A first step in fixing the system would be the adoption of common electronic and linguistic communication standards (Swartz, 2006). These standards will lead to interoperable electronic medical records that should improve coordination among providers and reduce gaps in care. Analysis of the data in these electronic records will also help refine evidence-based treatment protocols and complementary clinical decision support tools will help disseminate best practice. In this way electronic medical records will allow health care to resemble other industries where continuous experimenting with standardized products and services are an important driver of efficiency gains (Ramanujam and Rousseau, 2006).

In the current fragmented system, patients must coordinate their own care across various providers. Coordination will be made easier by the development of portable patient health record systems. These records, although less detailed than electronic medical records, will help patients better manage their own medical affairs – especially when combined with electronic decision support tools. Many challenging care decisions, however, must be made when individuals are sick, anxious, financially taxed and otherwise unable to act as effective decision

makers. This fact will limit the degree to which coordination of care by patients can be an effective response to the organizational fragmentation of the US health care system

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