Collaboration and the Quality of Health Care Delivery[*]

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Abstract

This paper develops evidence that the challenges facing modern medicine involve fundamental system capacities, centered on the ability of knowledge specialists to collaborate effectively on complex problems. Familiar models – the traditional craft approach based on professionals leading small groups with strong status hierarchies, and the bureaucratic approach centered on formal procedures and rules – are inadequate for the increasingly complex coordination issues. Piecemeal technical reforms are likely to generate resistance and unintended difficulties. Fieldwork in four hospital cardiac units found that the most positive cases were physician-led efforts to build collaborative communities in which providers from multiple specialties and levels could engage in successful problem-solving, and documented ways in which this coordination improved both care and efficiency. Even these successful instances, however, faced many resistances.

Introduction

It is generally recognized that health care delivery in advanced societies is under severe strain from multiple pressures, including accelerating and interrelated increases in technological sophistication, quantity and specialization of knowledge, patient awareness and assertiveness, cost pressures, and societal demands for accountability. Most proposals for reform address one or another piece of this complex technological fixes, improved protocols, efficiency increases, cost controls, patient information, pay for performance, and many more. But these piecemeal reforms have run into major obstacles. Doctors have often been reluctant to adopt new procedures, especially when standardized; cost control has been portrayed as compromising the quality of care; conflicts have grown between insurance companies and care providers. The outcomes have generally been poor on both quality and cost measures, with a failure to master the complexity of the conflicting demands, and growing dissatisfaction among almost all actors (Aiken, Clarke, and Sloane 2002; Flynn 2007; Weinstein and Wolfe 2007; Baerlocher 2006; Commonwealth Foundation 2008).

These interconnected problems can be viewed as classic symptoms of system breakdown which must be understood not separately but in terms of basic organizational principles. If this is correct we would expect that attempts to address any single area will be insufficient and are likely to create unanticipated consequences in others. Health care certainly has such interconnections: to take a single example, pressures to reduce costs may (and often do) disrupt traditional care patterns, resulting in poor coordination and communication and increased problems in “hand offs” of patients, which in turn interferes with cost reduction.

Our central hypothesis is that the demands on the health care delivery system cannot be met by specific technical reforms but must be addressed through an increase in organizational complexity, involving a difficult system transformation from one based on autonomous experts to one centered on collaborative relations. This involves shifts not only in "external" elements like incentives and control mechanisms, but also in "internal" elements like social values and patterns of affiliation. A collaborative system is one in which actors with diverse knowledge can be brought together flexibly as needed for effective problem-solving, across boundaries of function, occupation, and level. This is far more complex and difficult to organize than the traditional system, involving more interactions and balancing multiple values (Galbraith 2008; Heckscher 2007). Understanding its nature – how it works, what are the essential conditions for success, how transition can be managed – is a precondition for the success of more specific reforms.

This shift touches values and mindsets with roots in centuries-old definitions of professional identities. It is therefore inevitably a slow and difficult process involving much resistance and misalignment as various actors redefine their relationships. Currently the major driver of this change comes from external administrative institutions, in particular insurance company regulations and an increasingly powerful layer of hospital administration, generally not medical professionals. We will argue, based on our research, that a more effective change process is one led by physicians who embrace the values of collaborative systems.

We will examine the systemic nature of health care delivery through a lens which is limited, but which enables to see in considerable depth and detail. We focus on the *delivery* of care, excluding the policy arena which of course has an enormous impact. We conducted research on the treatment of congestive heart failure in four New Jersey hospitals, chosen to maximize variance on performance and wealth. We focused on congestive heart failure because it is a complex syndrome involving a delicate balance of diet, exercise, fluid retention, medication, and physical therapy both in the hospital and in outpatient care. This usually involves multiple hospital stays and many providers making complex judgments, from surgeons through general practitioners, pharmacists, nurses, respiratory therapists, and transport staff. It is also one of the major causes of mortality and one of the greatest costs in the US health system.[1]

This set of cases enables us to see, in some very different settings, how the collaborative systems affects the provision of care on multiple dimensions: quality, efficiency, patient satisfaction, and long-term impact. Such a study cannot fully test the complex hypothesis of system capacity, but it can verify whether these cases can be interpreted in a theoretically consistent framework, and it can explore the way in which collaboration and professional autonomy impact the provision of care in these settings (Miles and Huberman 1994; Yin 2003)

We first outline the current state of the healthcare system literature. Next, we ground our theory in a historical context to establish hypothesized organizational patterns, built around three types of work systems. We then present our methodological approach followed by four descriptive

cases. Finally, we compare our initial predictions with our fieldwork findings followed by a discussion.

The organization of health care systems

The extant literature on the organization of health care systems, as opposed to technical interventions, is surprisingly limited. (San Martín-Rodríguez et al. 2005:144) broad review concludes: "At this juncture the lack of investigation into the structural elements of organizations stand as an important hurdle, given the many re-organizations that have been carried out in attempts to replace traditional models of care with models based, fundamentally, on interprofessional collaboration. … The interactional determinants have received more attention than the organizational and systemic determinants, and the latter, in particular, have received very little attention."

A number of studies do provide some evidence that some forms of collaboration – especially interdisciplinary teaming – contributes to multiple positive outcomes. Gittell (2002) has found that mechanisms of "relational coordination" such as boundary spanners, team meetings, and informal cooperation, all have positive effects on patient satisfaction and length of stay. Estabrooks et al. (2005) found that higher nurse-reported levels of good MD/RN collaboration was associated with lower rates of risk-adjusted, 30-day patient mortality. Dennis Young et al. (1999) found that perceived high level of coordination by feedback for surgical staff leads to better quality care. Edmondson (2003) showed that boundary spanning and openness lead to better technology adoption in hospitals which presumably benefits patient care. Other studies

have found that multidisciplinary treatments produce better outcomes on length of stay, readmission, and satisfaction (Ducharme et al. 2005); mortality and hospitalization (McAlister et al. 2004); and efficiency and responsiveness in perinatal care (D'Amour et al. 2004).

At the same time, the extant literature highlights the professional obstacles and resistances to interdisciplinary collaboration. (Ramanujam and Rousseau 2006:824) see health care organizations as "the perfect storm of organizing difficulties… render[ing] leadership weak and vulnerable to demands of multiple professions seeking to assert control over their own professional practice." Sicotte, D'Amour, and Moreault (2002) show how intractable these problems can be: after 25 years of effort to develop an interdisciplinary culture in Quebec community health care centers, they found only modest changes in beliefs and values and continued tension with a "professional or disciplinary logic." Makary et al. (2006) found that doctors and nurses often view the need for and state of collaboration very differently, that status differentials persist, and that nurses are often reluctant to speak up. Others have documented lack of respect between professions (Daiski 2004), dominance of doctors (Street, Gordon, and Haidet 2007), differing values, work styles, & personality traits among professions (Liedtka and Whitten 1998) and the tendency of doctors and nurses to downplay the others' significance in the process for patient care (Gibbon 1999).

At a more material level, a number of authors have noted that incentives as generally structured lead to increased tensions. Wotton, Borbasi, and Redden (2005) document ongoing turf wars between functions for resources. San Martín-Rodríguez et al. (2005) observed the negative

effects of resource-driven rather than objective-driven funding and note the problems caused by fee-for-service compensation of physicians.

Many writers have suggested mechanisms that may improve the odds for collective collaboration. A particularly important mechanism that is the formation of multi-professional teams (Gittell 2000; Hyrkas and Appelqvist-Schmidlechner 2003; Spear 2005; San Martín-Rodríguez et al. 2005). Such teams can be an effective mechanism to spur discussions, decision making and in general integrate knowledge across disciples (Grant 1996; Heckscher 2007; Nonaka 2005). The Institute for Healthcare Improvement's use of multidisciplinary "breakthrough team" interventions have been shown to improve process measures in congestive heart failure treatment (Asch et al. 2005). The Mayo Clinic has proved over many years that this is very effective for premium care, though it has not been able to scale it to larger organizations or systems (Maccoby 2006).

However, existing studies have not shown that collaborative relations can be reliably created and sustained. They are also uncertain about the form of collaboration that is most effective, and particularly inconsistent on the key point of relative value of formal versus informal mechanisms. Some who have stressed the value of formal processes, including clinical pathways, include D'Amour, Sicotte, and Lévy (1999), who build a structuration model of collaboration emphasizing delegation and formalization (see also Alt-White, Charns, and Strayer 1983; Silén-Lipponen et al. 2002). On the other hand, G. J. Young et al. (1997) found that both formal and informal processes and procedures were important in surgical units, since patient care could not

be fully standardized, and Argote (1982) provided evidence that “non-programmed coordination" is more effective in uncertain conditions.

In sum, the extant healthcare literature indicates a complex mix of enabling mechanisms and barriers. On one hand, boundary spanners, teamwork structures and formalization of informal practices seem to offer important channels for knowledge integration needed for collaboration. On the other hand, professional resistance, rooted in occupation traditions and social and perceptual difference forms a formidable barrier. There is little consensus on how to effectively structure collaborative systems, and little evidence of sustained success.

The organization of the health care system: A historical interpretation

Though collaborative reforms receive some support in the literature, the overall lack of sustained success is consistent with our view that the problem is a systemic one, involving a mismatch between the traditional organization of medicine and professional practice and the increasingly complex demands caused by technological improvements and rising patient expectations.

To organize this systems level of analysis, we use ideal types drawn from classic sociological theories, distinguishing three broad types of organization with increasing capability.

1) “Craft” organization, dominant until the late 19th century, is structured in small units with strong status hierarchies reinforced by gender distinctions (Arndt and Bigelow 2005), defined by strong traditional values handed down through institutions of shared

socialization and training, and enforced by peer self-governance (Weber 1946:226; Kieser 1989; Adler, Kwon, and Heckscher 2008).[2]

2) The bureaucratic type, which grew throughout the 20th century, is organized in formally-defined jobs and offices with rule-based hierarchies of command (Chandler 1977), with values of rational action and individual performance (Merton 1940).
3) In the last 30 years a number of theorists have identified an emerging form which they have called by various names, including "network" and "collaborative," which focuses more on the creation of interaction and dialogue among actors with differing capabilities (Powell 1990; Heckscher 2007; Sabel 1991).

Health care, unlike most large firms, has never reached a full bureaucratic stage: relations in health care are still most deeply organized around a form of traditional or craft community – one in which doctors act as autonomous professionals at the top of a status hierarchy, preferring small practices focused on patient care as the sole legitimate value, linked through professional education and self-governance. In hospital settings, doctors are defined as the medical experts, while nurses are focused heavily on "caring" (Weinberg 2003) – an ancient division of labor found as far back as the pre-Christian era in India, and strongly institutionalized in medieval monasteries in the West (Risse 1999). Doctors most often remain independent practitioners with "visiting rights" at hospitals rather than employees accountable to the organization. Table 1 sketches the main characteristics of these three types of organization and their historical development in business and medicine.

Insert Table 1 About Here

The traditional health care model and its limits

The craft or autonomous-professional model, ancient as it is, has run aground on the interdependencies and complexities characteristic of modern medicine: the need for coordination of multiple physician specialists and a growing number of interdependent actors, from social workers to nutritionists to home care agencies. The lack of coordination among these providers has become a major cause of failure. The Agency for Healthcare Research and Quality concluded:

> *"Researchers now believe that most medical errors cannot be prevented by perfecting the technical work of individual doctors, nurses, or pharmacists. Improving patient safety often involves the coordinated efforts of multiple members of the health care team."(Wachter, Shojania, and Duncan 2001:13)*

The traditional pattern is at its best when structured in stable personal relations: if doctors have worked with particular nurses for years, they are more likely to be open to discussion. But in an environment of increasingly fast-paced change, this limitation becomes more onerous. New skills and actors need to be introduced relatively frequently, and traditional community is poor at such responsiveness.

These strains are further increased by the recent fragmentation of the field into multiple specialties. Specialist physicians now have higher status and pay than general practitioners, but

they lack the key legitimating quality of the old system: they do not care for the patient as a whole individual. Specialists are highly trained experts in particular diseases, and thus are increasingly interdependent with other physicians as well as with nurses and administrators; they are not "loved" by their patients in the same way as the traditional solo practitioner.

A final major strain is that the traditional value pattern, as defined by Hippocrates more than a millennium ago, has no place for cost considerations: the sole orienting value is patient care, and cost is seen as a conflicting, lower, "mercantile" consideration that should not affect care decisions. The acceleration of innovation and cost of care, however, means that this one-dimensional view is no longer tenable. The very successes of medicine mean that multiple values have to be combined: that physicians and other practitioners need to be able to balance care with cost, and to integrate efficiency considerations into their decision-making.

The bureaucratic alternative: promise and limitations

A characteristic of the hospital system that is different from most of the business world is that the effort to introduce consistent administrative rules and procedures is quite recent. The bureaucratic / administrative model promises significant improvements in scale, economy, efficiency, and consistency. In health care, this has generated an impetus to define standardized rules and procedures and to make doctors and other actors accountable for following them through mechanisms such as incentive pay. Spear (2005) bases this argument directly on the "operational excellence" of Toyota's auto production system.

Such standardization and unified accountability is both effective and essential for the majority, even the large majority, of health care procedures. But there are also major problems with the application of bureaucratic organization to health care. The “non-routine” aspect of medicine may be relatively small on a percentage basis, but it is absolutely crucial to successful care. An excessive focus on the standardizable parts of health care, especially for a complex syndrome like heart failure, is likely to reduce performance in the key areas of judgment that require multiple specialties and sources of information.

Medicine also differs from automobile production in other ways. The complexity of knowledge is far higher, and judgment remains a crucial element at every level. Hospitals remain very far from knowing what routines would work best across important ranges of problems, and are not even close to being able to create an “assembly line” with standardized jobs for the management of human health. Even more fundamentally, patients want, and the effectiveness of medicine may largely depend on, personal relations with their physician – a sense that they are being treated individually and with care (Wensing et al. 2002). Bureaucratization necessarily reduces that aspect of relations.

Finally, bureaucratic reforms involve an attack on the authority and status of physicians, and to some extent of nurses. Like other craft practitioners, physicians have fiercely protected their autonomy and status; and more than most, they have considerable resources for this fight.

In general, with only occasional exceptions, the health care system is currently marked by a deep split between the administrative view, embodying principles of bureaucracy, and the autonomous professional view which reflects the craft tradition. Administrators are seen as concerned about cost but not care, while doctors are the reverse; administrators seek to increase control over doctors, while the latter resist strongly; in most cases hospital CEOs are not medical professionals; and, as noted, before, doctors have largely maintained their independence from the administrative hierarchy. This gulf in perspective between the two groups was clearly visible in all of our research cases.

The collaborative model

The core of collaborative organization is the capability for creating effective problem-solving dialogues and temporary teams that cross boundaries of level and specialty (Galbraith 1994; Heckscher 2007; Nonaka 2005). A collaborative system may use clearly defined and repeatable processes, but it also *adds* the ability to coordinate effectively when routines are not enough (Feldman and Pentland 2003). For example, it is far better than the alternatives at dealing with errors. A collaborative system makes errors public and renders it both legitimate and efficient to draw together those who can resolve the problem, and to build the lessons into new routines (Edmondson 2004; Maccoby 2006). Similarly, collaborative systems improve responsiveness to the environment, because anyone who deals with patients or other stakeholders – not just the top of the hierarchy – has the ability to initiate learning and conversation.

There are is some evidence that interprofessional collaboration is relatively effective in organizing the complex knowledge of modern medicine. In a few cases, especially the Mayo Clinic system (Rosen 2007), physicians have led a movement towards the formation of interprofessional teams, with strong involvement of nurses as well as multiple medical specialists, and have demonstrated the considerable power of collaborative relations to improve problem-solving and patient relations. But these efforts have also had two important limitations: they are restricted in size, and they have not effectively incorporated the cost dimension. These are essentially "boutique" operations that are relatively expensive. There are not, to our knowledge, examples of a full-developed collaborative system which is both highly efficient and highly responsive, which integrates considerations of both cost and care (Maccoby 2006).

If the collaborative type is the most effective, it raises a difficult problem of change: *Is it possible to pass from the traditional craft / professional system to a collaborative one without passing through an extended period of bureaucracy?* A considerable amount of standardization and process consistency is absolutely essential for complex health management; historically, such standardization has been associated with bureaucratic control in contrast to professional autonomy. Effective collaboration *combines* standardization with the ability to adapt and customize when necessary, and to learn collectively from these experiences – a big leap from the traditional model.

There are few, if any, models of such a shift in any industry, and there are theoretical reasons for both doubt and hope. On the negative side, without a foundation of good bureaucracy –

routinized procedures and the management systems that support them – there is a danger that attempts to create collaboration may produce loose and *ad hoc* structures, with high cost and inconsistency. On the positive side, it is possible that the rich tradition of professional self-governance, which is in effect a weak and narrow form of collaboration, could be extended to support a more inclusive and organized system.

The research approach

Our research problem is to understand how different organizational systems function in facing the challenges of modern medicine, especially at the "leading edge" of complex syndromes like heart failure. We hypothesize that the more complex capabilities of collaborative systems will do better. In order to test this we use a multimodal, primarily qualitative approach that captures many dimensions of organization, including interactions and reactions to change by different groups in cardiac units.

Analytic method: Ideal types and configurations

Conceptually we start with "ideal types" based in the theoretical perspective on organization development sketched above. The simplest application of that framework would be to look for three health care patterns based on the organizational ideal types – craft / professional, bureaucratic, and collaborative – and to assess the functioning of each. In a period of dynamic change, however, we are not likely to see any of these pure forms in real life; we are more likely

to see transitional combinations. Thus we use a configurational approach (Meyer, Tsui, and Hinings 1993; Cardinal, Sitkin, and Long 2009) based on *combinations* of ideal types. Ideal types are drawn by interpreting patterns of meaning from observable actions; a configuration, by contrast, assumes not unified meaning patterns but rather an interplay of competing viewpoints, integrated dynamically through conflict and negotiated interaction.[3]

As described above, the health care world is currently marked predominantly by a competition between the traditional craft view and an emergent bureaucratic view. Doctors usually remain independent from the hospitals in which they practice, but are increasingly controlled by insurance company protocols. Cost considerations have been introduced largely from outside the system, primarily by non-physicians located in administrative units or insurance companies.

Thus rather than an integrated and balanced set of values, we have conflict among institutions representing differing values; and instead of pure types, we should empirically expect multiple combinations of conflicting forces that have been worked out in practice, even though they may not be logically optimal.

General observation of the field suggests that many health care organizations are characterized by conflictual or negotiated relations between traditional orientations, held by the medical care givers, and administrative orientations held by management. In some cases these are in open conflict; in many others they reach a kind of détente marked by considerable routinization and strong administrative control of certain basic procedures, but also a large area of continued

physician autonomy and mutual acceptance of the boundaries between the domains. Fully collaborative systems seem to be relatively rare.

Data Sources

Selection of Hospitals.

We chose research sites from all New Jersey hospitals based on two selection criteria: performance and payer mix. We excluded hospitals that had specialized transplant centers, after consulting a set of healthcare experts who judged that this would severely distort the results in those settings. Aside from this simple structural issue, we knew nothing about the organizational characteristics of our sample hospitals before we began our research.

The core hypothesis to be tested was that the poorer performers would be organized in variants of craft and bureaucratic ideal types , while the better performers would have added collaborative capacities.

Performance was important as an outcome measure because we hypothesize that certain of our types would yield better performance than others. We also wanted to control for payer mix because we were concerned that the many unmeasurable differences between “poor” hospitals, whose patients have difficulty in paying and who are generally highly cost constrained, and

"rich" ones with wealthier patients and higher budgets, might overwhelm the almost everything else – including the organizational factors we are studying.

Comparable performance data was scarce and difficult to obtain. First, we gathered in-hospital mortality data from the Centers for Medicare and Medicaid Services and adjusted it for risk using APR-DRG 3M software, Version 15. Second, we used measures of process consistency gathered by the State of New Jersey reflecting percentage of completion of four key processes in 2005. Of the 76 hospitals for which we obtained complete data on both dimensions, 11 hospitals scored in the top quarter on both dimensions, and 8 scored in the bottom quarter on both. For payer mix we used data on the percentage of Medicare and self-pay patients, using the top and bottom 25% on this dimension for our pool.

We were able to gain access to one hospital for each cell in our desired matrix. Thus we had one hospital with wealthy patients and poor results, and one with the opposite – poor patients and good results – as well as two that followed the more expected pattern.

Insert Table 2 About Here

Data Collection

Data were collected over 12 months in 2006-2007, by a research team including two professors of organization theory, a nurse, a physician, and two advanced doctoral students trained in qualitative method techniques. We used the following research methods:

Semi-structured interviews: 20-25 people in each organization, chosen to select a cross-section of the functions that affect the care of heart failure patients –physicians, nurses, pharmacists, housekeeping, telemetrists, case managers, lab technicians, and others.

Observations: In all cases we observed the flow of work in the main heart failure unit. In all but one we observed medical rounds (the fourth one did not hold predictable rounds). In one case we shadowed a doctor in the emergency room during an entire shift.

Network surveys: We asked each interviewee to fill out a survey about the people with whom they interacted on the previous day and the nature and quality of those interactions. In some cases we got further network surveys from others in the unit. We collected 95 surveys which recorded assessments of about 2800 relationships.

Analysis of Data

We interviewed a total of 85 people across the four hospitals. We coded the interviews in an iterative fashion following Miles and Huberman's (1994) approach of gradually refining large number of initial codes into more comprehensible groupings of categories that constitute themes (Straus and Corbin 1998).

The burden for the case-based researchers is to avoid "cherry picking," or highlighting data that supports the theory and predictions. Thus close attention to disconfirming data is critical. In order to strengthen the validity of our data and results, we used the constant comparison method

(Trochim 1989), where the working theory is rechecked against new evidence to detect potential disconfirming evidence. To further improve construct validity and reliability we adopted a triangulation strategy (Mathison 1988), relying on multiple informants for each event described, observations, and archival data.

Findings

The qualitative data showed that the four sites we studied could be summarized quite consistently in categories sketched in the theoretical section. The two hospitals that had been chosen for their poor performance on medical outcomes turned out to be ones with a sharp divide between administrative and caregiver cultures – caught between what we are calling the craft and bureaucratic ideal types.

- One case, “Riverside,” was a fairly traditional system with long-term employment and relationships, unquestioned doctor dominance of the status hierarchy, and very little administrative standardization. The administration had for several years tried to introduce more consistency, standardization, and cost control, but they had adopted a gradual, “educational” strategy. The result was that there had been very little change in actual care delivery, and the traditional system remained largely intact.

- A second case, “Lowell,” exemplified open conflict between administrative leaders and medical practitioners. Here the administration had tried to push aggressively towards more standardization and cost control, but the effort had run aground on fierce resistance. Here was severe conflict with nurses over attempts to control their work pace and cut

costs. Doctors had simply ignored attempts to standardize their procedures. The administrators voiced intense frustration.

The two hospitals that had been chosen for excellent medical outcomes – "Hightown" and "United" – both turned out to be pursuing deliberate collaborative efforts: They had developed mechanisms for discussion and learning among staff from different professions, units, and levels, and there was evidence that these mechanisms were working effectively for problem-solving. They were attempting, with partial though not total success, to build shared values and expectations of open dialogue, in contrast to the traditional pattern of status deference. Both efforts were driven by strong cardiac physician leaders.

This alignment of performance and structure fit with our theoretical expectation: collaborative organization comes closer than the others to matching the level of complexity required by heart failure care, and therefore is able to achieve better performance. Through our interviews and surveys we were able to further strengthen this connection by showing that many of the *reasons* for the performance differences were closely related to these differences in the way the different systems functioned and their capacity to manage the interdependence of different providers.

Case 1 – Riverside The persistence of traditional relations

At "Riverside" the traditional medical community remained largely intact, with long-term and stable relationships, despite gentle efforts by administrators to introduce modern management techniques.

This was a medium-sized community hospital with a relatively high-end patient population (few self-pay or Medicaid,) and therefore not under severe pressure for change. Nevertheless, like all hospitals, it was experiencing continual pressures for improved efficiency and cost control. It was in the lowest quarter of the state's hospitals on our measures of quality of cardiac care.

This case represents an inwardly focused traditional craft model with good cohesion within units derived from long employment tenure but weak multi-disciplinary communication and collaboration. It presented an interesting paradox. The care providers – both physicians and nurses – were generally quite happy with the standard of care and with the working environment, embracing the sense of "family" solidarity; but the objective measures of process and outcome were very poor. Our theoretical framework explains this paradox on the basis that the traditional set of relations were satisfying but too narrow and limiting to allow for flexible problem-solving and mobilization of knowledge.

We saw in the interviews that the informal sense of unity was indeed limited by strong professional boundaries. In the absence of long-stranding personal relations, physicians did not expect their medical orders to be questioned by the nurses, pharmacists, or other clinical staff. Similar professional defensiveness marked communication between nurses and different clinical staff including pharmacists, psychologists and rehabilitation. And even in the best circumstances there was considerable reluctance to violate the traditionally-defined status hierarchy.

We observed that some doctors were failing to keep up to date and insisted on maintaining their personally preferred procedures against evidence of better ways to do things. Many physicians were very resistant to proper documentation or using the computer systems; they wanted to be able to enter information in their own particular ways and without pausing to make sure their writing was legible. This sometimes led to errors of interpretation by other providers. Nurses and doctors who had worked together for a long time had worked out some of these problems, though not all; but those who were newer or more peripheral were unable to communicate effectively.

Thus the weaknesses of the professional / craft model were evident:

- Limitations on open dialogue about problems: such discussions were limited to informal networks and blocked for new people or those, like phlebotomists and case managers, who had not made their way into the family circle.
- Lack of ability to balance care with other priorities, especially cost. Everyone felt very focused on providing the best care, and felt good about this; they largely rejected competing concerns.
- Inconsistency of procedures and difficulty in introducing new approaches and techniques.
- Ineffectiveness of focused problem-solving processes, preference for informal and ad hoc communication.

Case 2 – Lowell: The failure of administrative reform

At "Lowell" a new administration, pursuing widely-recommended efforts at greater process standardization and accountability, aggressively confronted traditional medical communities, precipitating severe conflict that at times broke into open rebellion, with intense frustration on both sides.

This was a medium-sized (about 300 beds), short term community hospital with a good local reputation as a quality hospital, despite a low-income patient mix. However, in recent years, it had gone through several ownership changes and its performance had declined on a range of quality and efficiency measures. In the year before our research it fell into the lower quarter of results on both our mortality measure and the state-published process data. New administrators had felt as of two years before that there needed to be significant improvement to avoid a future crisis. Thus they had initiated a series of change efforts, an attempt to standardize physician protocols on a few key practices with strong evidence of their effectiveness; and seeking to reduce length of stay by hiring active case management consultants. Unlike at Lowell, the Riverside administration pushed hard to overcome resistance with a combination of thorough education and stronger accountability and incentives.

The result was a fine example of open conflict between the administrative and craft/professional orientations. Physicians were highly resistant to the new systems. For example, the administration had introduced interdisciplinary rounds led by case managers, but the physicians generally did not attend. Both nurses and doctors generally expressed hostility to the effort: “It's not about helping people, it's about making money!” The administrators themselves expressed intense frustration:

> *“Physicians are a major block for any change in this hospital. They don’t blame themselves for our bad reputation; they blame the nursing staff.”*

Doctors were not, however, the only focus of difficulty: nurses, and their union, had engaged in open conflict with the administration around cost-cutting moves and reassignments. The administrators insisted that cost reduction was essential and that the nurses had refused to negotiate around these issues.

The strong intervention of the administration to try to get control of a highly unsatisfactory situation had undermined the web of traditional relationships between physicians and nurses, but without replacing it with either bureaucratic accountability or reliable mechanisms of collaboration. The physicians' attitude of professional autonomy had remained intact, leading to open mutual hostility between the administration and the physicians. Nurses, caught in the middle, felt they had lost their traditional responsibility for patient care. Lack of coordination was a constant theme of the interviews. All objective measures, internal and external, showed very poor results in congestive heart failure treatment.

Case 3 – Hightown: Limited collaboration in a wealthy hospital

At "Hightown" a strong physician leader succeeded in building a set of collaborative mechanisms that led to markedly improved quality of care.

This was a large community hospital with a relatively wealthy payer population and little cost pressure. The health care outcomes were good: It was among the very best hospitals in the state on both mortality and process measures for heart failure.

Six years before it had imitated initiated a major program for cardiac care, with some government support, bringing in a strong doctor cardiologist who had formed a heart failure team with to lead it and two Advanced Practice Nurses (APNs) to support him. Key elements in this initiative included:

- Frequent and highly organized interdisciplinary rounds, including the physician leader, the APNs, a social worker, physical therapist, staff nurses, dietician and of the support staff.
- Formalized multidisciplinary problem-solving committees and processes, reviewing the quality of care and making suggestions for improvement and standardization. These were done within the framework of a "Strategic Mission" statement very similar to that at Riverside.
- The empowerment of nurses as key coordinators of care. They were able to access full information about the patients and were given support and training by the APNs so that they could have informed discussions with the community doctors: as one put it, "When you know what you're talking about, they do respond to that."

We observed in detail ways in which these collaborative mechanisms improved the quality of care. The interdisciplinary rounds were particularly effective. Although these rounds were formally the same as those at Lowell and Riverside, their actual operation was very different. Nurses from the floor came to present their set of patients; an APN was sitting at a computer with all the patient data in front of her; other specialists, including the cardiologist who led the heart failure team, sat around the room. Very frequently problems of coordination were uncovered and fixed, and in many cases efforts were made to diagnose the source of the problem and prevent a reoccurrence:

- A nurse said that her patient needed a change in medication; the physician said he had already done that; the nurse said No, it hasn't changed. After some discussion and checking the records they found that the Emergency Room had failed to transmit the order. They immediately fixed the issue for that patient, identified the ER physician responsible at that time, and assigned someone to speak to him.

- A nurse suggested that a patient could be sent home with Visiting Nurses, although he was still prone to falling. The social worker intervened: That won't work, his family is in upstate New York, he needs more support. A decision was made to keep him longer despite the length-of-stay guidelines.

Outpatient care was tightly integrated with the hospital staff. The two APNs had also established ongoing relations to homecare providers and offered advice and support to home care nurses without any direct reimbursement. This clearly had a major impact. Home care, according to the nurses, was ordinarily very poorly coordinated: nurses had very little information on the treatment history, doctors came very infrequently, and nurses were not expected to initiate calls to the doctors except under very clear circumstances, and never to suggest changes in treatment. We heard about the development of new processes to improve the information sheets passed from the hospital to the home care providers.

The cardiologist-APN team provided constant leadership for care and change, but in a way that was generally embraced by the nursing community rather than rejected like the hospitalists and case managers at Lowell.

In sum, this is a promising case of collaborative relations, bringing together differing specialties for effective patient-centered problem-solving. The medical outcomes, as we expect, are very positive, and our interviews uncovered considerable detail about the dynamics that lead to these positive results.

The pattern fits the ideal-type of collaboration in most, though not all, respects. It was confined to a relatively small and confined unit with strong protective boundaries. The central driver was a physician, drawing on the credibility and norms of professional collegiality while "extending" these to specialties and professions that are not usually treated as part of the professional medical dialogue, such as nurses and social workers. This extension was made possible in large part because of the expert team of APNs who functioned as boundary spanners – coordinating care across a variety of occupations and departments, and a continued focus on patient care which is part of the traditional ethos of all these specialties.

The continued strength of traditional relations did impose limitations on the collaborative effort: in particular, the "craft" identity of community physicians often led them to resist open dialogue with nurses and team efforts at process improvement. The growing pressure of bureaucratic rules was generally kept at bay by the power of the lead physician and the relative economic health of the hospital. Nevertheless, in some areas, such as relations with the nursing hierarchy, there was fairly open hostility; in others, unit members manipulated or ignored the rules to achieve their priorities.

Case 4 – United: Limited collaboration in a cost-constrained hospital

"United" was a particularly interesting case because it had high quality outcomes, including significant improvement in recent years, despite a very low-income patient population and a constrained budget. It was pursuing a collaborative effort rather similar to that at Hightown, though at an earlier phase of development and with some modifications required by cost

considerations. Despite the difficult patient mix, the hospital fell into the top 25% on our measure of adjusted in-hospital mortality and on the state's assessment of process consistency for 2006 and 2007.

For three years before our research the hospital had undertaken a major initiative to improve cardiac care. Like Hightown, it hired a new cardiac physician leader of the cardiology unit, who integrated the Fellows into a strong and tight-knit leadership team similar to the heart failure team at Hightown. Two physician Fellows played a role somewhat similar to the Advanced Practice Nurses at Hightown, helping to educate and spread the principles of the change effort consistently through the unit.

This case represents the collaborative type in an early stage of development. The effort centered heavily on the strong leadership of a doctor cardiologist who emphasized a strong focus on patient care, the primary professional value shared across a wide range of levels and functions. Like Hightown, this unit relied on a set team of highly skilled practitioners working for the lead physician cardiologist who helped spread and reinforce the message; unlike Hightown, these key agents in this case were Fellows (physicians in undergoing specialized training in cardiology) rather than Advanced Practice Nurses.[4]

There were two interesting and potentially fruitful aspects of the United effort. The first ran directly counter to our expectations: although the role of the lead physician was (as predicted) very strong, he did not play the role of guardian and protector against other parts of the hospital,

as did his counterpart at Hightown. Rather than trying to seal off his unit as a special domain, he engaged in intensive networking with other areas and tried to draw them into his vision of cardiac care. There was some evidence that this approach was having good effects. Relations to other units were relatively cooperative, and there was a smoother relationship with the nursing hierarchy than at our other sites.

Second, this initiative focused at the start on standardization of a very clear set of procedures – the "8-scope" processes – rather than on a broader vision of relations. But this was driven by the doctor, rather than administrators, and engaged a wide variety of actors at all levels in the pursuit of this objective. There were strong interdisciplinary elements, including two formal committees and, according to our interviews, effective working relations among specialists. The United leaders framed this as just the first step in a longer-term effort to build a patient-centered focus, and felt that the quality improvements so far were just the beginning of the possibilities.

In broad outline this case represents a somewhat earlier version of the collaborative model seen at Hightown, with both its strengths (high quality of care, effective interdisciplinary problem-solving) and its weaknesses (tension with other parts of the hospital, reliance on the protection of a single leader, weak integration of cost values).

Discussion

Assessing the effectiveness of collaboration

This study adds to evidence that modern hospital care is best organized collaboratively rather than through either traditional professional institutions or administrative hierarchies, It also highlights the complex and systemic nature of the change by showing ways in which collaboration collides with and is resisted by alternative orientations and organizational systems. Practicing physicians appear to be more effective than administrators as leaders of the transformation process because their legitimacy as medical professionals enables them to build a bridge to more complex organization rather than aggravating the conflicts.

The two highly successful cardiac units turned out to be deliberately collaborative, reducing traditional status hierarchies and building structures and norms for continuous problem-solving among different occupations. The two unsuccessful hospitals, on the other hand, represented varying combinations of the traditional and administrative orientations, which remained in tension.

The traditional "craft" structure and values, by contrast, was most clearly seen at Riverside and was also still active though weakened at Lowell. This orientation, with strong norms of professional autonomy and deference to physicians, was clearly unable to master the complexity of interdependencies involved in the modern care of heart failure. There were many inconsistencies of process and miscommunications among caregivers that contributed heavily to

the poor medical results. They also failed to integrate values of cost control and efficiency into their daily operation and to balance them with medical quality.

Efforts by administrators to solve these problems through bureaucratic consistency were ineffective in these cases. Where the administrative effort was relatively low-key, at Riverside, it simply failed to penetrate the traditional relations and was seen as a kind of unnecessary annoyance. At Lowell, where it was forced more aggressively, it had sparked hostility, disrupting the previous set of craft-like relations without building a more positive culture. This case had the worst performance on medical care and had not reduced length of stay.

This connection of collaboration with good medical results is consistent with organization theory which sees this as the form of organization most able to deal with complex interdependent processes. The simple correlation is not definitive – this connection might have occurred by chance with a probability of 1 in 6; but the detailed information from interviews and observation added understanding of dynamics that further strengthen the evidence for the effectiveness of collaborative systems. We observed or heard rich stories about how quality was compromised by inadequate interdisciplinary relations in the first two hospitals, including traditional relations which were satisfying to the providers but not sufficient for dealing with the complexity of the problem; and we observed or heard stories about how effective, organized collaborative systems, including formal teams and processes, avoided or caught the same kind of errors.

Though confounding variables could explain some of these differences we saw, none seems sufficient to undermine the evidence for the effectiveness of collaboration. One that could seem significant is the fact the United was a teaching hospital, and the physicians were therefore not independent of the hospital. While it seems likely that this integration is helpful, its significance as a major explanatory variable is weakened by at least three considerations. First, the cardiac unit had had poor results a few years before despite this structure and had improved them dramatically without changing it. Second, and conversely, Hightown was equally successful with a collaborative effort even though most of its physicians were independent of the hospital. Finally, our observations and interviews brought out many reasons for the high quality at United that did not have to do with its teaching structure, but were more centered on relations among different care occupations.

We were concerned at the start that money – the wealth of the patients and the hospital – might overwhelm all other factors. We were interested to find that we were not only able to identify cases in both unexpected directions – wealthy and unsuccessful, poor and successful – but that the two such cases we studied did not have fundamentally different dynamics from their counterparts. This suggests that while money is certainly important, the dynamics of organization can have powerful independent effects: you can do well even with resource constraints, and vice-versa.

The systemic problem of change

The overall organizational configuration helped to explain the difficulties faced in implementing change. A particularly clear example concerns rounds. All four hospitals had introduced or strengthened multidisciplinary rounds within the previous few years, to bring together various specialists and roles around patient needs. Thus on the surface they all appeared to be developing collaborative mechanisms and patient-centered management. But a closer look uncovered sharp differences in their actual practice.

- At Riverside, dominated by the traditional craft / professional culture, Interdisciplinary rounds were very ineffective. Information presented at the rounds was incomplete and out of date; nurses did not have accurate knowledge of the patients under discussion. Rather than serving as forums for interdisciplinary problem-solving, these rounds centered on case managers and consultants who sought to identify people who had exceeded their length of stay and should be discharged, physicians were peripheral.
- At Lowell, where there was an open battle between the traditional and administrative orientations, the administration had hired case managers whose entire focus was on this issue. These case managers led the interdisciplinary rounds and steered the discussion for each patient to the question of whether they met the criteria for insurance reimbursement and, if not, how to move them out. The physicians were, again, peripheral to rounds, if they attended them at all. Despite this effort, length of stay had changed little in the previous year. Both nurses and doctors generally expressed hostility to the effort: “It's not about helping people, it's about making money!”

We have already described the relatively successful interdisciplinary rounds at Hightown. It is worth reemphasizing that these had taken a number of years to develop and were part of a broad effort at cultural change which included new problem-solving processes, information systems, and leadership. At United, which was in an earlier stage of a similar effort, the rounds were just beginning to function and were still facing many difficulties in bringing the various departments together. Thus, those units characterized by the typical administrative-craft tension were able to implement multidisciplinary groups in name only; this technique was actually operational only in units which had made a broader shift to collaborative systems.

The integration of cost / efficiency values with quality of care

We initially expected successful collaboration to be based on the single shared value of patient care which unites all the health professions, and for the most part to reject efficiency or cost values. But this turned out to be at least partially wrong. In fact we saw this one-dimensional focus most clearly in the two unsuccessful hospitals. Many of the care staff, like the nurse at Riverside quoted above ("My mission is caring for the patient, and get out of my way!"), expressed moral objections to taking costs into consideration. The administrators at Riverside, meanwhile, dodged the issue by arguing that if they focused on quality it would automatically lead to a reduction in costs. This avoids dealing with the very real tensions that often crop up between the two values; and indeed we did not see much active awareness of or attention to cost reduction.

But in Hightown's collaborative effort in particular there seemed to be substantial progress towards integrating the two priorities. Hightown cardiac practitioners sometimes resisted cost pressures which they saw as illegitimately compromising quality of care: but they also spoke of the other side of the equation, which we did not find elsewhere: they told other stories of active, committed efforts by teams of care providers to attack inefficiencies. This suggests that they were indeed operating in two dimensions – seeking to *balance* the values of quality and efficiency, and to work through the contradictions in the workplace as they arose.

We did not get enough evidence on this issue to fully understand how this had happened and how extensive these attitudes really were. The other collaborative effort, at United, had also succeeded in reducing costs, but our interviews turned up more mixed feelings, with some nurses following the traditional line that this is not something that caregivers should worry about. This is something worth focusing on in future investigations, since the long-term success of the health system almost certainly depends on building this balancing of competing priorities into daily decision-making at all levels. We have not come across, in our research, convincing evidence of this integration in other settings, though it is unlikely that we stumbled across the only such case.

The change process

At the start we raised the question: Can health care jump directly from a model of autonomous professionalism to a one of collaboration without first developing bureaucratic capabilities? It has often been shown that bureaucracy, compared to craft structures, can achieve greater

consistency and improved control of cost and quality; these are greatly needed today in health care as well.

In the business world, companies passed through a long and highly conflictual imposition of bureaucratic systems on the previous craft occupations, then stabilized that form for decades before the current widespread moves to collaborative teaming. Our two less successful cardiac units, Lowell and Riverside, echoed that history of conflict between the administrative and craft orientations. At Riverside professional autonomy had (so far) blocked efforts at needed standardization and control, while at Lowell there was open conflict.

But Hightown and United provided some evidence for another route: they achieved many benefits of bureaucracy through collaborative means. These were the units that achieved the best results on process consistency and the greatest improvements in length of stay. Rather than imposing standards from the top, or even through representative committees, they managed to engage people at all levels. At Hightown, as discussed above, there was considerable unity around balancing care with efficiency. At United, there was a clear understanding among many we interviewed that the improvement of process consistency was important for quality care, and that they could contribute actively as professionals to that improvement.

There are analogies in other companies. Total Quality programs, for instance, sometimes work in this way (though they are more often imposed from above). Toyota has come to exemplify this kind of highly participatory focus on process consistency – what Adler and Borys (1996) have

called an “enabling bureaucracy.” But these efforts have been built on an already-strong foundation of bureaucratic systems and values. When the Toyota approach is extended to hospitals, it tends to come into conflict with the mindset of professional autonomy (Gawande 2007).

The role of physicians as change agents

It seems significant that in both of the best cases the administrators played very much of a background role, and the chief cardiac physician took the active lead. This can be explained as an extension of the physicians’ traditional legitimacy in the medical status hierarchy, whereas administrators are a recent addition and have no clear role. But these particular physicians, rather than playing the traditional physician role, used their prestige to deliberately reconstruct relations.

They did not abdicate authority: both were very clear about the need for strong leadership.. At the same time, however, both leaders unusually and deliberately encouraged nurses to be active in problem-solving. The Hightown leader symbolized this most clearly: it was these Advanced Practice Nurses who were at the center of the interdisciplinary rounds, while the physician sat somewhat to the side – actively participating, but not the focus of attention. The APNs also offered advice to outpatient nurses and others who had contact with patients; they were able to integrate the lengthy course of heart failure treatment better than a physician could, and he recognized the value of this role.

Administrators, as noted before, were less visible. But their role were important: to start with, they hired the key physicians and they provided resources and space for them to operate. We did not focus on the administrative role in detail, but it is likely that there is much to be learned from cases like this about how administration can provide a framework for collaborative relations without creating the kind of conflict or rejection we saw at Riverside and Lowell.

Limitations and obstacles

Though the efforts at Hightown and United were largely successful and encouraging, they were very far from providing a complete model that could be transported to other locations. Just as the transition from craft organization to bureaucracy took many decades, the transition to full collaborative systems involves long-term problems that go well beyond the scope of what has been accomplished in these units. These cases represent indicators of potential, but it is important to emphasize also their limitations.

Some limitations were internal to the units. There was still some individual resistance, including nurses and sub-departments that did not "get it." There was some continuing tendency to be suspicious of efforts at standardization and cost control. These attitudes were more visible at United, which had only engaged in the collaborative course for three years, than at Hightown, where many of the internal issues had been worked out after six years.

But the more important and intractable problems by far were at the boundaries. These were in a sense hothouse experiments that did not fit comfortably with many other aspects of their environments:

- At Hightown most physicians were not employed by the hospital: it was clear that many were not integrated with the collaborative approach and often resented recommendations from the interdisciplinary teams. The lead cardiac doctor kept himself in the background in part to minimize the resistance of his fellow doctors, and the discussions in the rounds often concerned how to "bring around" community doctors who were not supporting the effort.

- The nursing hierarchy in both units was seen as causing problems through staff allocations that did not take account of the collaborative teams and relations.

- At United there were some mentions of union rules that defined nursing roles and responsibilities narrowly and did not support their involvement in problem-solving.

- Though administrators were generally supportive, they applied considerable pressure at Hightown to limit unreimbursed activities even when they clearly contributed to quality and perhaps also to long-term cost control. One extended discussion was about two staff members dedicated to telephone followup with patients to make sure they were receiving proper after care. Members of the cardiac unit were convinced that this activity had contributed to the lowering of readmission rates, but administrators wanted to see hard data that this cost was being recovered.

- In general, insurance regulations were totally external and seen as operating according to a foreign logic. The case manager at United and the Advanced Practice Nurses at Hightown tried to play the role of protector and buffer against these demands.

Given all these obstacles, it is not surprising that the collaborative efforts required unusual leadership, which cannot be counted on for a large-scale change strategy.

Both of the collaborative physician leaders advocated a strategy of building a highly autonomous cardiac unit, shielded from the rest of the hospital, in order to develop a new culture and the highest skills. This is typical of early phases in organization change efforts, and it is known to

create the danger that the innovation will become isolated and will eventually die of neglect even if it is successful on its own terms (Goodman 1980; Berg et al. 1996; Rubinstein and Kochan 2001; Heckscher 2007:213). In the hospital setting the strategy of autonomy creates other problems as well. The high incidence of co-morbidities – heart failure patients very often have other diseases as well – means that focusing on cardiac care may not maximize the effectiveness of total care. And this approach also increases costs because it reduces the ability to allocate beds flexibly – a constant source of tension with administrators.

It is worth noting therefore that at United, as noted above, the leader had been forced (against his preference) into a different strategy: he worked extremely hard at "networking" with other parts of the hospital who cared for cardiac patients, in order to create a uniform standard of care even in areas outside his direct domain. It is possible that this "networking" model of change might avoid some of the dangers of the "consolidating" model.

A further element to be worked out is the role of administration. Organization theory would suggest that this needs to be a clear role in managing large-scale systems. We did not see a good solution in any of our cases. In the worst cases administrators were seen as interfering with traditional relations; in the best ones they operated more quietly and supportively in the background. But in no instance was there a positive and shared understanding of the ways in which professional and administrative roles could work together and how each of them contributed to the overall picture.

Beyond this, for the collaborative approach to become widespread through the health care system would require large-scale changes in attitudes that do not happen easily. It would need to overcome resistance not only from traditions of professional autonomy, but also from the growing administrative pressure for tighter controls.

Conclusion: The long path forward

This study leads to two broad conclusions for practice. First, the frequent strategy of seeking greater administrative control over professional practice, in order to "force" attention to costs and reliability, may lead to a clash of orientations which produces worse results, especially in complex syndromes, like cardiac care, which are among the costliest and most difficult areas of medicine today.

Second, our findings offer optimism – but heavily qualified – about a change strategy of building collaboration through physician leadership, building a culture and mechanisms of shared problem-solving that cut across traditional status and organizational boundaries. This strategy, which we observed in two cases, was more promising than we expected in combining the values of quality care with improved cost and efficiency.

We could hypothesize based on our results is that the very best cardiac units will necessarily operate according to collaborative principles. That was true in our small sample, and we could see in detail dynamics that enabled our two collaborative cases to deal exceptionally effectively with the complexity of heart failure. Nevertheless, it would of course take a great deal more

research, including close study of possible exceptions, before this rule could be convincingly established.

The results also show the significance of a systems view of the problem: it involves far more than installing new mechanisms or changing attitudes of key practitioners; it requires reconfiguration of systems and orientations throughout the organization. Many of the changes affect basic approaches to medicine that date back more than a millennium and that permeate the entire medical complex.

Thus even if the claim about the power of collaboration is true, there are clearly many obstacles to generalizing it as a change strategy. Existing institutions – professional bodies and norms, other units of hospitals and the wider care system, and the insurance reimbursement system – create a large number of boundary problems that can easily lead to isolation and loss of momentum.

This analysis does not suggest actions that can easily or rapidly improve health care delivery. If anything, it underlines the magnitude of the challenge and implies that it will involve a long change process. The evolution of collaborative systems in private sector businesses has been going on for 20 to 30 years and is far from complete: it involves extensive changes not only in systems, which can be modified relatively easily, but also in mindsets and relationships, which are far more difficult. Health care, as we can see from the stories above, involves at least as difficult a transformation in attitudes.

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Table 1: three general models of organization

	Traditional craft / autonomous professional	Bureaucratic	Collaborative
Key characteristics	Norm of individual autonomy for lead practitioner Accountability to professional organization or guild Formal organization small or absent Strong status hierarchy (usually): Personal relation to clients	Strong hierarchical organization Strong boundaries Jobs defined in relation to organization structure Power based on position Resources linked directly to accountability	Two dimensions: hierarchical control & systematic processes Porous boundaries Rapid reconfiguration around problems / processes Influence based on knowledge / contribution rather than status or position Differentiation of resources from accountability
General business history	Dominant from medieval period through 19th century	Rise of large firms at end of 19th century, consolidated by mid-20th	Gradual emergence of complex teams and process organization from mid-1970s, still incomplete

Health care history	Dominant model until recently, now under pressure from specialization and cost increases	Rapid growth of administrative control mechanisms (insurance, HMOs, etc) from 1980s, has not displaced craft organization at patient interface	Much recent experimentation, little clarity of vision or practice

Table 2: Distribution of cases (pseudonyms are used throughout for the hospitals)

	"rich" payer mix	"poor" payer mix
High performing	Hightown	United
Low performing	Riverside	Lowell

[1] The American Heart Association reports that "coronary heart disease caused 451,326 deaths in 2004 and is the single leading cause of death in America today." (http://www.americanheart.org/presenter.jhtml?identifier=4478, 4/2/08). In that year heart failure was a contributing factor in over 284,000 deaths; "the estimated direct and indirect cost of HF in the United States for 2008 is $34.8 billion." (Galbraith 2008; Charles Heckscher 2007)

[2] For the purposes of this paper we are conflating the craft and professional types. They are similar on the essential organizational dimensions: the key unit is the independent holder of specialized knowledge; if others are involved, it is as strongly deferential subordinates with lower status (e.g., apprentices or helpers such as traditional nurses).

[3] This distinction between interpretive (meaning-based) and dynamic integration is developed by, among others, (Talcott Parsons 1968; T. Parsons 1971), in his distinction between integration and pattern-maintenance.