Building capacity for a transformation initiative: System redesign at Denver Health

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Background: This article examines the development of transformation initiatives—deliberate attempts to achieve systemic changes and rapid performance improvements. Accounts of transformation initiatives often reveal little about past organizational and contextual conditions that contributed to success. Instead, these accounts concentrate on change barriers.

Purpose: We seek to restore balance to this field by examining how antecedent system capacities contributed to a successful transformation initiative.

Methodology: This article presents a case study of the first 2 years of a system redesign initiative at an integrated safety-net health system and provides a historical analysis of developments during the decade preceding the redesign.

Findings: Beginning in the mid-1990s, Denver Health benefited from strong municipal support for its development and expansion. Gradually, it developed its financial and human resources, organizational structure, change strategy, change-management capabilities, information technology, and physical plant. These antecedent capacities all contributed to the implementation of the 2004 system redesign and helped Denver Health overcome several constraints.

Implications: Transformation initiatives may build on existing features and resources, even as they overcome or depart from others. The Denver Health case study helps researchers identify positive antecedents to transformation initiatives, assess the success of such initiatives in terms of implementation progress and outcomes, and recognize complementary contributions of incremental and episodic changes. The study alerts practitioners to the importance of assuring that change efforts rest on solid organizational foundations.

Key words: delivery systems, improvement, organizational change, redesign, transformation

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Institutional review board’s approval was requested but judged unnecessary by the institutional review board. Signed consent forms were obtained from participants in the telephone interviews.
It has become popular for policy makers and other health care stakeholders to call for transforming health care delivery systems and to celebrate the successes of systems that dramatically improve access, quality, and efficiency. Unfortunately, recounting these success stories risks overstating contributions of recent improvement drives and techniques while understating contributions of antecedent organizational features and external conditions. This trend is reinforced when research and practice-oriented reports on planned change treat an organization’s past mainly in negative terms—as a source of performance gaps and improvement barriers (e.g., Golden, 2006; Kotter, 1996; Tichy & Devanna, 1997).

To help restore balance to analysis of major change programs, this article examines positive contributions of antecedent conditions to a successful transformation initiative at Denver Health (DH), a large, integrated, urban, safety-net system. Transformation initiatives are deliberate efforts by delivery system leaders to implement changes aiming at rapid and dramatic performance improvement. Transformation initiatives should be distinguished from gradual, unplanned, or partly planned changes. The transformation initiative studied here, known as Getting it Right! Perfecting the Patient Experience, was explicitly designed and announced as a “radical redesign project,” aiming at “improved patient safety and satisfaction, efficiencies and cost reductions, and job satisfaction” (DH, 2003, p. 6).

After reviewing previous literature, we describe the development of Getting It Right between 2003 and 2005, with some updates for 2006–2008. There follows an analysis of antecedent factors which had the strongest effects on the initiative. Then, we discuss implications for research and practice.

## Theory and Research Background

System changes are defined as transformational when they produce fundamental, second-order change in multiple system elements, including strategy, structure, culture (or ideology), and power distribution (Bartunek & Lewis, 1988; Pettigrew, 1987). Practitioners (e.g., Hammer & Champy, 1993) expect such changes to yield radical improvements in system performance. Studies in health care and other industries show that transformation initiatives are hard to implement and that only a small proportion attain their goals (Beer, 2003; Buchanan, Fitzgerald, & Kerley, 2007; Kilmann & Covin, 1988; McNulty & Ferlie, 2004; Scott, Mannion, Davies, & Marshall, 2003; Walston, Lazes, & Sullivan, 2004).

To assess the success of transformation initiatives, investigators can apply criteria such as those used in innovation research (Real & Pool, 2005). These include the degree (i.e., depth and breadth) to which the components of an initiative are actually implemented, are supported by organizational members, progress through implementation stages, and improve performance outcomes. Like other types of planned change or innovation (Hernandez, Kaluzny, & Haddock, 2000), successful transformation initiatives move sequentially from awareness of performance gaps, to identification of solutions, implementation of selected solutions, and institutionalization (i.e., integration and routinization) of solutions.

We assess the success of DH’s redesign initiative in terms of progress through implementation stages because outcome data are still limited and it is hard to judge the degree and effects of changes in system components. Successful identification of solutions requires adequately framing challenges, searching for solutions, and specifying them in actionable ways. If there is sufficient agreement and support, the initiative then moves into an early implementation (or launch) stage, in which leaders must put their vision into effect, mobilize members’ support, recruit change agents, and execute the initial changes. Then, full implementation may be attempted, during which management modifies proposed practices in response to initial implementation experiences, extends change activities beyond early demonstrations or pilots, establishes structures and methods for overseeing and guiding the initiative, and develops human resources and organizational infrastructures capable of supporting the entire change program. Routinization only occurs if proposed changes (solutions) spread throughout the organization and early performance gains are sustained. Routinization further requires integration of new practices into organizational routines and integration of new working assumptions into organizational culture. Many change initiatives fail to progress to a higher stage or only partially implement identified solutions (Buchanan et al., 2007).

Several streams of theory and research on major change efforts provide insights into conditions creating impetus for transformation initiatives. Drawing on open system and resource dependency theories, much practice-oriented literature assumes that top managers introduce strategic changes—involving major changes in one or more system components—when past problem-solving tactics fail to remedy internal weaknesses or are poorly aligned with task environments (i.e., markets and technologies; Kotter, 1996; Nadler & Tushman, 1989).

In contrast, neoinstitutional research (Scott, Reuf, Mendel, & Carona, 2000) directs attention to the influence on change initiatives of external cultural, cognitive, normative, and regulatory forces. As conditions shift in institutional environments, organizational and institutional actors (e.g., regulators, experts, and delivery system managers) encounter greater pressure for change. Institutional instability provides these actors...
with opportunities to invent organizational forms and practices or import them from other fields.

Since the 1980s, health care's institutional logics—assumptions about fundamental means/ends relations—have become highly contested. Governance patterns have shifted from professional control and governmental regulation toward market mechanisms and managerial control (Scott et al., 2000). These developments encourage health care managers and other change agents to introduce practices from other industries. Among these imports are process-based improvement approaches (Denison, 1997), including continuous quality improvement, Lean, reengineering, and treatment of patients as customers. DH's system redesign is a prominent example of such process-based changes.

Intraorganizational forces, including political dynamics, also shape transformation initiatives, much as they affect more modest change programs (Greenwood & Hinnings, 1996). The course of organizational change thus reflects the complex and dynamic mix of interpretations, resources, interests, and aims among key actors.

Transformation initiatives pose very heavy political, organizational, and technical demands and create daunting managerial challenges. Implementation requirements and tasks multiply, interact, and develop in ways that are hard to anticipate. Time and effort are needed to acquire or develop the resources and capabilities needed to meet these requirements and challenges (Pettigrew, Ferlie, & McKee, 1992). Deliberately changing organizational culture, often a condition for transformation, poses particularly difficult challenges and requires substantial time and effort (Scott et al., 2000). An organization's capacity for change therefore affects the likelihood of successfully implementing transformative changes. Capacity depends on understanding sought-for changes, ability to mobilize needed resources, and possession of needed management skills and capabilities (Greenwood & Hinnings, 1996).

The resource-based view of the firm provides evidence of the contribution of antecedent capacities to strategic change and advantage in private firms (Barney, 1991). This research stream also provides conceptual distinctions that can be applied to health care: Resources are defined as tangible or intangible assets or inputs to service delivery and other key processes, and capabilities are abilities to perform coordinated tasks (Helfat, 2003). In this article, we use capabilities to refer inclusively to system resources, capabilities, and external relations that can support a transformation initiative.

Recent studies in health care yield findings that appear broadly compatible with the literature just reviewed, however, the healthcare studies do not fully apply that literature. Four sets of factors contributing to successful transformation initiatives have been identified (Bate, Mendel, & Robert, 2008; Buchanan et al., 2007; Lukas et al., 2006; Oliver, 2007; Pettigrew et al., 1992; Young, 2000). First are external conditions (markets, technologies, and regulation) creating pressures for radical change. Support for transformational objectives and programs by powerful external stakeholders (e.g., owners and legislators) and supportive external networks are additional external facilitators. Second, transformation initiatives typically require a set of shared beliefs and values. These include a shared perceived need for change, a motivating vision for transformation, staff commitment to the core values of the initiative, and a culture of mutual trust. Third are organizational and leadership factors aiding change implementation, including clear change goals and priorities and a workable change strategy; management systems for coordinating change activities, measuring progress toward objectives, assuring accountability, and managing human resources; facilitative processes (e.g., multilevel leadership and change champions, rich communication, and teamwork); and an information system capable of sustaining quality improvement and learning. Fourth are change management processes capable of supporting implementation of organizational, technical, and cultural changes (e.g., training, user involvement in decisions, and follow-up and constructive feedback on improvement efforts).

There are strong theoretical and empirical grounds for expecting antecedent capacities to affect transformation initiatives in health care. Why, then, do research and practical advice about health care change often neglect positive antecedents? Perhaps these discussions of transformation too enthusiastically adopt an episodic view of change (Weick & Quinn, 1999), which assumes that past beliefs and practices must be “unfrozen” before new ones can be introduced and stabilized. This assumption sometimes leads to a heroic view of the role of top leaders as overcoming prior barriers to change and forging dramatically new organizational visions (Tichy & Devanna, 1997). The episodic approach risks overlooking the effects of continuous, incremental change and may divert attention from positive contributions of past organizational actions, capacities, and conditions.

## Methods

We chose a longitudinal case study design for its ability to provide information on system interactions and dynamics (Van de Ven & Poole, 2002; Yin, 1984). In contrast, cross-sectional studies of organizational change in health care delivery (Bazzoli, Dynan, Burns, & Yap, 2004) are not well suited for obtaining information on antecedent developments and the dynamics of transformation initiatives.

Our study drew on multiple data sources. Documentary sources included DH’s annual reports and its report to the city of Denver from 1997 through 2006; all
articles providing organizational information about DH in two city newspapers from 1990 through 2004; two detailed reports by the DH staff on externally funded action research on the redesign (DH, 2005a, 2007); articles in peer-reviewed and trade journals—many of which were authored by, or featured, DH leaders; legal documents defining the status of the Denver Health and Hospital Authority; internal DH memoranda; and presentations for internal use and for conferences. We also examined published and unpublished statistical data on system metrics and trends.

The senior author visited DH early in 2006, attended briefings by rapid-cycle improvement teams, and conducted informal interviews with several DH senior leaders, managers, and staff members. In 2006, the authors conducted nine semistructured telephone interviews with DH leaders and with Wellington Webb, Denver’s mayor, from 1991 to 2003. The interviewees included Dr. Patricia Gabow, who has been DH’s chief executive officer (CEO) since 1992 and also served as chief medical officer (CMO) until 2008. Dr. Gabow was chief of the renal division beginning in 1973, director of medical services (1981–1989), and deputy manager of medical affairs (1989–1992). We also interviewed DH’s current lead executives in finance, nursing, operations, human resources, and current and past managers of clinical quality improvement. Several managers had served in DH’s leadership at least since the mid-1990s.

The DH interviews, which typically lasted approximately an hour, covered the background and first 2 years of implementation of DH’s redesign (2004–2005), along with any facets of the period from 1994 to 2003 with which the interviewee was familiar. Our questions reflected issues that emerged from the literature, along with questions about developments reported in documents. We sought information on changes in governance, leadership, strategy, quality assurance and improvement, finances, information systems, physical plant, human resource management, and external relations (markets, other providers, payers, the city of Denver, and the community).

We used complementary qualitative analysis techniques (Miles & Huberman, 1984; Robert Wood Johnson Foundation, 2008). These included content analysis using the constant comparative method; construction of a chronological summary of developments from the 1980s through 2005; and writing of analytic memos during data gathering and analysis. We used pattern matching (Yin, 1984) based on expectations from the literature but also actively sought contradictory evidence (Becker, 1958).

This combination of analytic techniques addressed several potential threats to the internal validity of the findings and analyses. To compensate for retrospective bias and problems of recall, we compared interviewee recollections to the chronological record, which derived from documentary analysis. Discrepancies were resolved in favor of documentary evidence that was contemporaneous with the event in question. To avoid uncritically accepting the distinctive perspectives of our interviewees, we compared interviews with one another and with our documents. We resolved empirical discrepancies among sources through triangulation. For system states, such as financial performance, we mainly used DH’s audited public financial reports; we used published reports about quality (e.g., Egger, 1999; Greene, 2006). Our inferences and conclusions are original and do not reflect the views of DH or any other agency or individual. On the contrary, many of DH’s official presentations on the redesign, and even some descriptions by outsiders, say little about antecedents.

## Analysis

### Denver Health’s Redesign Initiative

Denver Health’s leadership sought to drive system transformation by redesigning clinical and administrative processes. In 2003, DH’s CEO began meeting with leaders in service industries outside health care, improvement experts, and high-ranking federal health regulators in a search for “ideas for dramatically altering the way that hospitals carry out daily patient care operations” (DH, 2003, p. 6). Late in 2003, DH announced plans for its redesign project. At that time, DH included a 398-bed hospital and Level I trauma center, 20 community health centers and school-based clinics, a Medicaid and children’s health maintenance organization, the public health department for the city and county of Denver, the city’s 911 medical system, a call center including poison control, a detoxification center, correctional care facilities (for prisoners), and a regional emergency preparedness system. Full-time physicians were salaried employees and served as faculty at the University of Colorado School of Medicine. Residents rotated through DH clinics and hospitals.

In 2004, DH’s leadership selected Lean (Toyota Production Systems) as the core methodology for a “total redesign of hospital systems...incorporating industrial engineering principles to streamline processes and increase efficiencies” (DH, 2004, p. 2). Lean empowers frontline staff to apply continuous quality improvement methods to reduce waste and enhance value in work flows and operations (Spear, 2005). DH sought to use Lean to reduce waste affecting patients, staff, and DH as a system, with the primary focus on inpatient services.

Dr. Gabow gradually formalized DH’s system redesign vision as a “puzzle” containing five interlocking pieces: designing the physical environment, identifying and placing “the right people” through personnel selection techniques, enhancing communication and culture, creating rewards for individual and team contributions...
to the initiative, and redesigning processes through Lean (DH, 2007). Information technology (IT) was viewed as supporting the redesign but not driving it.

To introduce Lean, DH engaged the services of a consulting firm and hired two engineers. Together, they trained 50 Lean facilitators (“black belts”), including clinicians, midlevel managers, and senior managers. By November 2006, DH’s black belts had completed 205 projects and had led 59 rapid improvement events (RIEs), each of which lasted a week. During RIEs, supervisors and middle managers teamed up with frontline clinicians to develop work-flow improvements; physicians provided input as requested. DH also launched five overarching “value stream” analyses, which sought system-wide improvements in patient flow, billing, and care access. DH created management arrangements for coordinating improvement efforts and developed project and system performance metrics.

By the close of 2006, Lean had become the foundation of the redesign. During the first 18 months of the Lean initiative, hundreds of DH staff members participated in black-belt projects and RIEs. An employee survey found that more than 60% of respondents acknowledged Lean’s contribution to reducing waste and supporting DH’s mission. For the most part, managers and physicians cooperated in conducting the weeklong RIEs, and frontline employees enthusiastically embraced these opportunities to improve their own work environments. The RIEs led to reductions in operating room expenses, fewer dropped patient calls, and other process improvements. All told, DH attained $1.8 million in hard-dollar savings from the first 18 months of applying Lean (DH, 2007).

During 2007, Lean became much more widespread and established throughout DH (Goodman, 2008). In January 2008, DH reported over $5 million in cumulative savings from RIEs and efficiencies introduced by black belts (Goodman, 2008). By June, the savings reached $10.6 million (National Center for Healthcare Leadership, 2008). The redesign may also have helped DH’s efforts from late 2002 to recruit and retain registered nurses. From 2004 through mid-2006, turnover dropped by 22% (DH, 2007).

Denver Health quickly became a leader in applying Lean to improve health care efficiency (e.g., DH, 2005b) while maintaining its reputation for quality. In 2006, DH was ranked by Solucient as a top major teaching hospital for quality, patient-volume growth, and financial performance (Greene, 2006) and was profiled as a model system by the Commonwealth Fund (Nuzum, McCarthy, Gauthier, & Beck, 2007). Dr. Gabow received the National Center for Healthcare Leadership (2008), which cited DH’s “innovative and intensive transformational project” for its cash savings and praised DH’s attainment of “critical quality measures, including one of the lowest medical mortality rates among peers in the University Health Consortium.”

Positive Antecedents of the System Redesign Initiative

For more than a decade before 2004, DH underwent significant system changes, as depicted in Table 1. We begin by examining the most important positive antecedents, which facilitated implementation of the redesign. Our discussion follows an analytic logic, whereas Figure 1 presents these antecedents chronologically.

Articulation of New Vision and Change Strategy.
The redesign signaled a new emphasis on applying industrial process redesign to boost revenues and reduce waste. However, this vision contained ideas that were developed and tested through reengineering projects during the 1990s (see Table 1 for details). Moreover, process redesign figured prominently in the strategy that DH’s CEO articulated shortly after DH was converted from a municipal health department into a public authority in 1997. This strategy sought to preserve DH’s safety-net services by generating revenues from new markets and services in areas of current excellence. To attain organizational, clinical, and financial distinction, DH would “reengineer the clinical enterprise” and “the financial enterprise” (Gabow, 1998). The reengineering efforts of the 1990s paved the way for introduction of Lean in 2004. Grounding the redesign’s vision and change strategy in familiar ideas and activities reduced the likelihood of resistance by stakeholders loyal to DH’s past.

Emergence of Leadership Networks and Personal Resources.
In mobilizing and sustaining internal and external commitment to the redesign, the leaders of the transformation derived influence from their preexisting personal resources and network ties, as well as their formal authority. Their informal sources of influence included personal ties, status, knowledge, and past experience in improvement efforts. In particular, Dr. Gabow drew on her reputation as a clinician and a committed advocate for DH’s core values of providing the poor with access to excellent care. Her professional status and familiarity with clinical practice at DH made it hard for skeptical physicians to dismiss her insistence on the necessity of changing care practices, nor could they discount her justifications of applying industrial improvement techniques to clinical care. Her leadership in past improvement efforts and her results-oriented style also helped mobilize commitment to the redesign.

Political and Financial Support by the City.
Long-standing connections between DH’s leaders, the city...
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<th>System changes preceding DH’s redesign initiative</th>
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<tr>
<td>1.</td>
<td>Formation of the city’s health department (1916–1989)</td>
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<td><strong>Service consolidations.</strong> Denver Hospital and health departments merge under city and county governance (1916); city’s DOHH encompasses hospital, public, health, and visiting nurse services (1950).</td>
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<td><strong>Development of community care clinics.</strong> Federally supported Neighborhood Health Program (1966); community health centers and school clinics are developed.</td>
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<td><strong>Integration of city hospital and community clinics.</strong> DOHH oversight, patient flows, and rotation of residents between clinics and hospital create a coordinated comprehensive care system.</td>
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<td><strong>Financial crisis.</strong> DOHH accrues $34 million debt in 1989; manager is fired for fiscal improprieties and mismanagement.</td>
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<td><strong>Management reorganization.</strong> New DOHH manager (1990); Patricia Gabow, MD, is appointed DOHH Medical Director and Chief Executive Officer (1992).</td>
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<td><strong>Review of alternatives to public ownership and funding.</strong> Dr. Gabow and Mayor Webb champion independent health &amp; hospitals authority.</td>
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<td><strong>Fiscal reforms.</strong> $33.9 million balance (1993) reflects collection of previously unclaimed federal and state funding for indigent care and improved collections process.</td>
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<td></td>
<td><strong>Clinical information technology infrastructure.</strong> Medical records imaging system (nondigitalized records) and immunization registry throughout DH (1995–1996).</td>
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<td><strong>Quality improvement initiatives.</strong> Ambulatory and inpatient programs (from 1989); clinical pathways, reengineering, and patient-care redesign programs (mid-1990s).</td>
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<td><strong>Establishing foundations for the independent authority (DHHA).</strong> State approves enabling legislation for DHHA (1994); city council and public approve; mayor appoints governing board (1995).</td>
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<td><strong>Articulation of strategic vision.</strong> “Provider of choice” for traditional clientele; “provider of choice for all” in fields where DH excels; reengineer to attain efficiency, patient satisfaction, revenues, and government reimbursement; achieve national distinction in research and as a public-health system.</td>
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<td><strong>Modernization and expansion of physical infrastructure.</strong> New addition and operating rooms (opens 2003) are funded through revenue bonds; city-funded expansion is approved (opens 2006).</td>
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<td><strong>Redirecting human resource management.</strong> DH creates incentives for staff to relinquish civil-service status; flexible, at-will, agreements gradually replace the civil-service system; management training expands; some top and middle managers are replaced.</td>
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<td><strong>Nursing upgrading and development.</strong> More registered nurses are hired; training and new forums promote involvement in care process (starts late 2002).</td>
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<td><strong>Structural elaborations.</strong> Service lines and middle management are strengthened; new divisions and units support revenue-generating ventures and current services.</td>
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<td><strong>Strengthening of public relations, marketing, and fund-raising activities.</strong></td>
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<td><strong>Research and funding efforts.</strong> The DH foundation (reestablished 1997) grows to $5.3 million (2003).</td>
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<td><strong>Behavioral health restructuring.</strong> Integrated inpatient and outpatient care and substance abuse; case management for both physical and psychiatric problems.</td>
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<td><strong>Patient flow improvements in clinic.</strong> Interpreters, centralized electronic appointment center, and online access to eligibility and referral guidelines.</td>
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<td><strong>Reengineering outpatient pharmacies.</strong> Pharmacy management firm centralizes warehouse and restructures ordering and distribution.</td>
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<td><strong>Developing revenue-generating services.</strong> Expansion of correctional care, telemedicine, trauma, and emergency services; unsuccessful small-business HMO.</td>
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<td><strong>Budget and staffing cuts.</strong> Projected deficit lead to budget cut and freeze (2003); first staff layoffs since 1981; several clinics are closed.</td>
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*Note. DOHH = Department of Health & Hospitals; DH = Denver Health; DHHA = Denver Health & Hospital Authority.*
government, and members of the community helped assure external backing for the redesign initiative. To preserve health services for the poor, Denver’s Mayor Webb helped rally support within the city council, community, and state legislature for the conversion of DH from a municipal department into an independent public authority. Thereafter, he and other city council members provided consistent financial support to DH. Between 1997 and 2004, the city provided more than 10% of DH’s annual operating revenues. In 1998 and 2000, the city backed DH’s issuing $128 million in revenue bonds to support modernization and expansion. In 2003, despite an economic downturn, the city approved a $148 million bond issue for DH—a proposal subsequently ratified by 65% of Denver’s voters. Steady support from the city and prominent citizens also played an important symbolic role in legitimating DH’s initiatives, including the redesign. Had these external stakeholders been critical of DH, they might have defined DH’s capital expansion and its other bold moves as irresponsible and overly ambitious.

**Developments in Organizational Structure.** Denver Health’s preexisting organizational structure made major contributions to the launch and implementation of the system redesign. Six structural features (which are shown separately in Figure 1) were particularly influential: conversion to a public authority, employment of physicians, a shift from civil service to at-will employment, appointment of the same person as CEO and CMO, and

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**Figure 1**

Positive antecedents of the system redesign initiative

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<tr>
<th>City Department</th>
<th>Public Authority</th>
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<tr>
<td>Formation</td>
<td>Development</td>
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<tr>
<td>1916</td>
<td>1997</td>
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<td>1960</td>
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<td>1990</td>
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Service consolidations under City and County

- Employment of physicians
- Horizontal integration
- Emergence of leadership networks and personal resources
- Development of learning and change capabilities
- Appointment of same person as CEO and CMO
- Expansion and enhancement of IT infrastructure
- Political and financial support by City
- Shift from civil service to at-will employment
- Management training and staffing
- Articulation of new vision and change strategy
- Modernization and expansion of physical infrastructure
- Nurse upgrading and development
- System redesign

*Note.* CEO = chief executive officer; CMO = chief medical officer; IT = information technology.
service consolidations under the city and county, and horizontal integration.

Conversion to a public authority in 1997 gave DH substantial autonomy over its operations and greatly enhanced its strategic and managerial flexibility. As an authority, DH was allowed to craft its own financial plans, strategic alliances, and human resource policies without city approval. This change helped DH’s executives move more quickly and decisively than they could when they were subject to direct political oversight.

A major consequence was that DH’s leadership could gradually shift from civil service to at-will employment and develop a more corporate approach to human resource management. By 2002, 82% of the staff were authority employees, whereas the rest retained civil-service status. This shift reduced the likelihood of organized resistance to staff replacements during the 1990s and provided more fertile ground for waste-reduction experiments before and during the 2004 redesign.

Denver Health’s structure also contained features that reduced opportunities for physician resistance to management initiatives, including the 2004 redesign. The long-standing practice of employment of physicians rendered most of DH’s physicians more dependent on management than attendings would have been and may have strengthened commitment to organizational renewal and institutional development. Furthermore, appointment of the same person as CEO and CMO avoided bifurcating leadership between management and medicine—a practice that can contribute to opposition between the two groups.

Finally, service consolidations and horizontal integration between DH’s inpatient and outpatient facilities created commonalities across operating platforms, an arrangement that facilitated implementation of the redesign. On the eve of the redesign, DH’s community clinics, pharmacies, emergency department, and inpatient facilities were financially integrated, shared a common information system, and benefited from resident rotations. These forms of horizontal integration, along with prior experience among managers and staff in cross-site improvements, made it easier for managers, trainers, and staff champions to spread Lean from one setting to another and apply it to system-level value streams.

Management Training and Staffing; Nurse Upgrading and Development. Denver Health’s redesign also benefited from human resource capacities that emerged during the previous decade. By 2004, DH’s CEO and several members of her executive team had gained substantial experience in managing DH’s strategic initiatives, finances, operations, and new ventures. They had already begun applying reengineering and related process improvement techniques to improving patient flow and pharmacy management. No less important than their management skills was their tacit knowledge of DH’s routines and culture. Similarly, prior training and skill upgrading of DH’s nurses, physicians, and middle managers helped them adopt and successfully apply the redesign’s Lean improvement techniques. After DH’s conversion to authority status in 1997, its middle and top managers received training in advanced management skills. Managers were replaced when the leadership judged them unwilling or unable to expand their skills and capabilities. In late 2002, DH began adding positions for registered nurses, enhancing nurses’ professional development, and providing greater opportunity for their voice in patient care issues. During the 1990s, DH also gradually built up its expertise in IT, at first by hiring on-site contractors.

Development of Learning and Change Capabilities. By 2004, DH had already developed capabilities in organizational learning and change management. The system had conducted many quality-improvement projects (see Table 1), including several ambitious projects targeting entire service sectors (e.g., behavioral health care) or cross-cutting functions (e.g., pharmaceuticals and patient records). Besides enhancing the skills of individual staff members, these projects helped convince senior leaders and project leads of the feasibility of system-wide change. The projects also showed that techniques and change methodologies from outside health care could successfully be applied to health service delivery.

Expansion and Enhancement of IT Infrastructure. Beginning in the mid-1990s, DH gradually built a sophisticated IT infrastructure, which helped support the redesign. DH first expanded its IT for billing and collections and then gradually moved into financial systems, patient management, and care coordination. It incrementally developed its clinical records systems and eventually established a fully integrated image-based clinical records system. By 2004, DH’s IT contributed to system operations, integration, and care quality.

Modernization and Expansion of Physical Infrastructure. Denver Health’s capital expansion program in the years preceding and after the redesign provided tangible evidence of the health system’s growth and progress, contributed to service capacity, and created opportunities to increase revenues. Although DH’s redesign might have been successfully launched without modernization and expansion of the physical infrastructure, these physical improvements created opportunities.

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for staff to plan spaces that would fit Lean principles and enhance patient safety.

### Negative Antecedents of the System Redesign Initiative

Although there were major positive antecedents to the redesign initiative, there were also preexisting conditions that constrained its implementation and created challenges for it. DH’s continuing safety-net obligations and a worsening financial environment in the late 1990s created a heavy and increasing burden of uncompensated care. These burdens may have made it harder for DH to mobilize the resources needed for the 2004 initiative. Nonetheless, these same financial challenges provided impetus for DH’s search for ways to boost revenues and reduce costs and thus provided impetus for the redesign. In the late 1990s, changes in federal funding policies and competition from managed care organizations added to DH’s burden of care for the uninsured. Worsening operating conditions created strong motivation for the improvement projects and for new ventures in the late 1990s and early 2000s (see Table 1). It was not until 2003, when DH faced a $24 million operating loss, that pressure mounted for dramatic action. DH cut its budget and made the first staff layoffs since 1981. These cutbacks and a drive to maximize revenues from federal reimbursements and patient services produced a financial turnaround by the end of 2003 and contributed to rising operating income in both 2004 and 2005. DH’s financial crisis probably intensified its leaders’ search for ways to radically reduce costs and may have triggered the decision to launch the system redesign.

Some structural features also impeded the transformation initiative. Horizontal communication across occupations, units, and sites fell short of the levels required for system-wide transformation. In addition, in 2004, DH lacked sufficient arrangements for monitoring, assessing, and redirecting activities within the unfolding transformation effort. Despite progress in human resource management, DH still suffered from nursing shortfalls and from limited involvement of nurses in articulating operational and management concerns and actively promoting process improvements. The leadership began addressing these issues in late 2002 when it hired a new chief nursing officer, who took steps to reduce the shortage of skilled nurses and to reduce nurse turnover and dissatisfaction.

Denver Health’s academic medical culture also posed challenges to the transformation initiative. Until the launch of the redesign, leadership in clinical quality improvement had primarily been assigned to physicians. There were limited precedents for physician collaboration with other occupations in problem solving and quality improvement. Despite early experimentation, most physicians had little experience in applying industrial techniques to clinical work, and some continued to express concerns about the appropriateness of these techniques. In addition, DH had not yet developed a common methodology for implementing change, processes for providing rich feedback to participants in improvement efforts, routines for monitoring the results of improvement efforts, or procedures for spreading improvements throughout the DH system.

Although DH had a strong IT infrastructure, it faced challenges in using IT to support the system redesign. During the first 2 years of the redesign, IT was not routinely used to provide data for REIs or to give participants feedback about the effects of their improvement activities. In late 2005 and 2006, the IT platform was mobilized in support of the redesign as DH’s leaders focused more on cross-cutting value stream projects and developed metrics for tracking system-wide outcomes.

### Discussion

Analysis of the background to DH’s 2004 transformation initiative illustrates the value of examining major planned change efforts within the context of the organization’s historical development. The historical analysis revealed that this initiative owed much to a positive antecedents, which emerged during more than a decade before 2004. In that period, DH developed supportive external relations, structural features, physical and IT infrastructures, financial and human resources, and organizational capabilities. These antecedent capacities helped DH overcome barriers to transformational change.

At present, it is difficult to assess the long-term effects of the 2004 redesign initiative. Major changes seem to be occurring in multiple system areas—including staffing, physical environment, processes, and culture—and Lean process redesign is spreading into many operational and some clinical processes. Unfortunately, the available data on the extent of change in particular functional areas and on the initiative’s outcomes are limited. DH reported dramatic cost savings from the Lean redesign; however, it is unclear whether these savings resulted from a few successful Lean improvements projects or reflected widespread efficiency gains. Just a few improvements in quality have been directly attributed to the redesign. There are no data available on attainment of other sought-for objectives. In a few years, it may be possible to cul and analyze retrospective data on the spread, routinization, and outcomes of the redesign.
So far, it is clear that DH’s redesign initiative has successfully progressed through several implementation stages but is not yet fully routinized. In 2003, DH’s leaders successfully concluded the identification stage of its initiative—crystallizing their views on the challenges and problems facing DH and developing a coherent vision, strategy, and set of proposed responses to challenges. Early implementation of the redesign followed shortly thereafter in 2004 and early 2005. This stage included formal announcement of the redesign plan, hiring of an industrial engineer, engagement of a Lean consulting firm, training of staff change agents, and conducting the first Lean RIEs. DH undertook full implementation in late 2005 and in 2006 as it rapidly expanded the number of RIEs and launched system-wide value stream projects. Indications of success in full implementation include staff support for the initiative, expansion of DH’s internal Lean Systems Improvement team, and assignment of additional staff to support and monitor performance. DH also created new management roles and reporting procedures to guide and oversee the redesign; project and system performance metrics were developed and used to assess the system impact of the Lean improvement projects. Further evidence of successful full implementation came in 2006 and 2007, with rapid growth in the number and breadth of improvement events, transfer of responsibility for monitoring the redesign from the research division to a senior team within line management, and continuing executive-level attention to performance on system metrics. DH’s Lean redesign projects have not yet undergone routinization. Instead, Lean projects still receive special attention and support from top leadership and continue to be presented as innovative. Moreover, neither Lean nor the other elements in the system redesign have yet proven their ability to endure after the departure of their original champions.

### Implications for Research

Although many features of DH’s history and its redesign initiative are distinctive and even unique, this case study contains several implications for future research. First, it suggests the value of assessing transformation initiatives in terms of their implementation and not just their outcomes. It is important to investigate an initiative’s objectives, degree of internal and external support, actual practices implemented, and movement through developmental implementation stages—including acknowledgement, identification, early implementation, full implementation, and routinization.

Second, the DH case shows how institutional and task environments combine to create pressure and opportunities for transformation. DH was subject to severe market and financial pressure. Instability in its institutional field created opportunities for organizational innovation in response to this pressure. Innovation involved importing and adapting techniques and ideas from other fields (Scott et al., 2000). DH’s conversion to a public authority was part of a widespread trend among safety-net hospitals toward independence from government control and greater exposure to market forces (Singer, Fagnani, & Kuzner, 2001). DH’s attempts to streamline services and attract insured patients, while maintaining safety-net services, paralleled the responses of many other safety nets (Felland, Lesser, Staiti, Katz, & Lichiello, 2003). However, DH showed greater initiative in importing techniques for process redesign and personnel selection from outside of health care than did most safety nets.

Third, our study points to the value of examining both incremental and episodic processes when investigating transformation initiatives, as well as when studying long-term patterns of system change. DH’s transformation from a municipal department to a high-performance, semiautonomous delivery system began with a brief formative episode—conversion to public authority in 1995–1997. This episode was followed by a longer period of incremental adjustment (1997–2003), as shown in Figure 1. The 2004 redesign initiative was shaped by developments that emerged from both the conversion episode and the subsequent period of incremental change. At the moment, the 2004 redesign initiative looks like another episodic change—which is being followed by a new period of incremental change. The DH case shows how transformation initiatives such as the 2004 redesign can benefit from past incremental developments, as well as from prior episodic changes. Moreover, DH’s history since the mid-1990s shows how both incremental and episodic changes contribute to long-term system transformation. These findings suggest that it may be more fruitful to treat the episodic and incremental models as complementary metaphors, rather than testable hypotheses. Each model focuses attention on certain phenomena and certain periods in an organization’s history while reducing attention and sensitivity to others. Some treatments of transformation initiatives as episodic neglect the contributions of continuous change. Our study may help restore balance between approaches.

Fourth, our study suggests that future research on transformation initiatives and other organizational changes might profitably examine effects of variation in antecedents. Research might explore, for example, whether organizations enjoying stronger antecedent capacities are more likely to succeed in implementing transformation initiatives and other strategic changes.
Consider the recent history of safety-net hospitals. Most faced similar service burdens and financial challenges in the second half of the late 1990s, but only a small subset achieved economic viability and investment in needed capital improvements (Lewin & Baxter, 2007). Perhaps these successful systems benefited, as did DH, from early development of supportive political environments, organizational resources, and system capabilities. It would also be worth investigating whether transformation initiatives that draw on strong antecedent capacities follow different developmental paths than initiatives facing powerful negative antecedents. For example, initiatives enjoying stronger external support and beginning with greater organizational resources and capabilities may proceed more incrementally than initiatives that must overcome major obstacles to launch and implementation.

### Implications for Practice

The DH case may hold important lessons for managers and policy makers. Development of transformative capacities takes more time and persistence than many transformation initiatives allow. Before launching transformations, managers need to carefully assess organizational readiness for transformation and develop resources, system capabilities, and external relations capable of supporting proposed changes.

Managers also need to attend to sequential development of system resources and capabilities. Redesign of certain fundamental system features may only be possible after other features have been reorganized. Reliable systems for managing finance, operations, administrative information, and clinical records may be prerequisites for the successful launch of complex and risky transformation programs. In addition, DH underwent major changes in governance, employee relations, and human resource management before launching its redesign initiative. It seems unlikely that DH’s leaders would have had sufficient flexibility to carry out the redesign initiative had DH not previously broken free of the constraints of municipal government.

Finally, system changes are more likely to succeed when they are mutually reinforcing and well aligned with preexisting system features. Innovations and improvement methodologies, such as Lean, are far more likely to promote durable improvements when they fit with existing strategies, infrastructures, management systems, structures, and cultures than when these methodologies are used as standard tools without regard to organizational context.

In summary, the DH case study helps researchers identify antecedent factors supporting planned transformations and suggests directions for future studies of transformation initiatives. In addition, the case analysis alerts managers to the benefits of gradually developing system capacities and the need to assure that ambitious change efforts rest on solid organizational foundations.

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