

[Promise and problems with supply chain management approaches to health care purchasing](#)

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Abstract:

Background: Double-digit health care inflation, coupled with widespread reports of poor care quality and deadly medical errors, has caused private sector employers to reevaluate their health benefits purchasing strategies, with a focus on supply chain management approaches. In other industries, this strategy has proven to be an effective method for simultaneously reducing costs and increasing quality.

Purpose: This article describes four current applications of supply chain management network methodologies to health care systems and identifies potential ways to improve purchasers' return on investment. In particular, information exchanges, purchase decision, and payment agreement components of integrated supply chains are described.

Approach: First, visual depictions of the health care supply chain are developed from a purchaser's perspective. Next, five nationwide programs designed to realign incentives and rewards across the health care supply chain are described.

Findings: Although several nationwide efforts are gaining traction in the marketplace, at this time, no cost reduction and quality improvement program initiative appears to systematically align the entire health care supply chain from providers to purchasers, raising doubt about the ability of supply chain management network techniques to significantly impact the health care marketplace in the short run.

Practice Implications: Current individual efforts to coordinate the health care supply chain do not act on all of the actors necessary to improve outcomes, promote safety, and control costs. Nevertheless, there are indications that several of the individual efforts are coming together. If national efforts touching on all critical elements can coordinate with purchasers, then the health care supply chain's performance may improve significantly.

Key words: diffusion of innovation, medical errors, quality control, supply chain management

Article:

The U.S. health care system faces many cost containment and quality improvement challenges. The significant and growing percentage of the gross domestic product spent on health care, new concerns over clinical quality and patient safety, a growing number of uninsured and underinsured, and diminished consumer confidence in the health care system's ability to meet fundamental delivery needs are major concerns facing health care managers (KaiserCommission on Medicaid and the Uninsured, 2002, 2003). By 2004, escalating costs and perceptions of poor quality were "nearing crisis levels" from employers' perspectives, according to the Wall Street Journal (Fuhrmans, 2004) and leading academics (e.g., Porter & Teisberg, 2004).

In *Crossing the Quality Chasm: A New Health System for the 21st Century* (Institute of Medicine, 2001), the responsibility for implementing market solutions to address quality problems is put squarely on health care purchasers—both public and private. The committee recommended that "Purchasers should identify ways to (1) recognize quality, (2) reward quality improvement, and (3) support quality improvement activities" (Institute of Medicine, 2001, p. 182). Recently, an influential Harvard economist, Michael Porter, has called on purchasers to "lead the transformation" and reshape the

health care system's competitive landscape to reward better quality and increased efficiency (Porter & Teisberg, 2004, p. 66). The Centers for Medicare and Medicaid Services (CMS), several national advocacy groups, and private sector purchasers have also heeded these calls and initiated new programs under the rubrics of pay for performance (P4P), value-based purchasing, and consumer-driven health care. In the manufacturing sector, supply chain management (SCM) efforts involve precise supplier measurement and improved purchasing strategies (Chan & Qi, 2003; Hervani, Helms, & Sarkis, 2005).

The purpose of this article is to discuss the utilization of SCM performance measurement and contracting principles in health care and to identify elements of the supply chain currently being targeted through purchasers' initiatives. In particular, the networked nature and nonfinancial outcomes being targeted in the SCM effort are discussed. In doing so, we first address a theoretical challenge by specifying a simple, but robust, model of a typical health care supply chain network. The model is then used to identify barriers to success that may be encountered by those attempting to increase supply chain efficiencies in health care supplier networks. The model is also used to assess five nationwide programs that have been implemented recently by large purchasers and to briefly describe the challenges they may encounter in the future under different market conditions.

Background

The United States spends a substantially larger portion of its gross domestic product on health care than most other industrialized nations without the universal coverage many of them provide. U.S. citizens with insurance also are finding their coverage eroding, as employers seek relief from rising health care costs by instituting higher co-insurance and copayment levels for their employees. At the same time, patient safety, care quality, and practice variance have emerged as major issues. A report from HealthGrades (2004) estimated that up to a 195,000 patients die in hospitals each year due to preventable medical errors. Efforts to reduce such health care errors have added an estimated \$19 billion to U.S. hospitalization costs annually (Zhan & Miller, 2003).

Consumers are concerned about these quality, safety, and cost trends. In a nationwide poll, 86% of respondents expressed alarm about their rising health care costs. Two thirds worried about their ability to obtain the best medical treatment, and 60% were worried that a major illness may lead to bankruptcy (Cogan, Hubbard, & Kessler, 2004). In short, consumers, employers, public payers, researchers, and policymakers are concerned that the U.S. health care system is failing to deliver services effectively and/or efficiently. In response, some large employers are reassessing their approaches to purchasing health insurance and health care for their employees (Milstein & Adler, 2003). They hope to transform health care purchasing and quality by selectively employing aspects of the SCM processes they use in other operational areas.

Supply Chain Management

Supply chain management was developed initially in the context of manufacturing. It involves a purchasing philosophy that emphasizes the development and implementation of contracting techniques that increase operational effectiveness and efficiency throughout the product delivery channels. In doing so, SCM attempts to change the relationships among suppliers and purchasers to fairly share the risks and rewards that arise from such business transactions—referred to as “aligning incentives.” Furthermore, SCM attempts to realign incentives by focusing on the purchaser's desired product characteristics as the common evaluation metric. In the industrial sector, SCM addresses the process of how products are sourced, transformed, monitored, and delivered to improve quality and reduce costs. However, using SCM approaches in the health care sector has proven to be more complex. Supply chain management networks (SCMNs) in health care are built on the assumption that firms operate in a market through coordination of interdependencies (Morgan, 2004). Interfirm coordination typically does not occur through a central plan or a clearly defined organizational hierarchy or even

through traditional market pricing mechanisms. Networked supply chains arise when neither the market nor traditional hierarchies lead to proper coordination, because both neglect the social and human interaction processes that typify a network of health care providers. It is only by coordinating the cross-cutting chains of social, political, and economic relationships that constitute health care networks that improved SCM can be achieved (McNiven, 2006).

Health care delivery employs an SCM where added value can be created by improved linking of consumers with appropriate suppliers (Stabell & Fjeldstad, 1998). The activities used to manage the supply chain rely upon network enhancement, improved contract management, and more efficient service provision (Thompson, 1967). All of these activities are heavily reliant on information flows that are both timely and accurate.

Health care delivery is complex, and the information systems needed to capture data and render them usable for SCM analysis are not yet widespread or fully integrated. Under such conditions, information asymmetries arise (e.g., incomplete communication flows among physicians, patients, insurers, and payers) in the network, where some members have a distinct advantage over others in negotiations. Physicians and other providers (e.g., hospitals) typically have greater access to relevant information than the consumer, the payer, or insurance intermediaries do.

In health care settings, the physician plays a major role in ensuring both contract fulfillment and service delivery quality. In meeting these responsibilities, an agency conflict can arise between reducing costs, as a representative of the health plan (HP), and ensuring quality, as an agent for the patient. From a provider's perspective, delivering more services, often in the form of prescription drugs or state-of-the-art clinical tests, is one way to meet consumers' quality expectations. More testing also may serve to both increase provider income and possibly forestall the risk of medical malpractice costs. There is general agreement that the incentives in a fee-for-service environment are aligned to promote increased health services utilization (Ahwah & Karpel, 1997; Burt, 1998; Calise, 1994). Taken together, information asymmetries and poorly aligned incentives for providers can lead to suboptimal outcomes from a third-party purchaser's perspective.

A Purchaser's View of the Health System Supply Chain Network

Models of SCM for the health care sector are complex and do not readily lend themselves to graphic depictions. Therefore, we will begin by describing the macro-level system changes essential for SCM to be effective in terms of the health systems' flows of health information, delivery of clinical services, and reimbursements. Despite the model's simplified depiction, it is an accurate reflection of a significant portion of the current health care market. In particular, Medicare's current fee-for-service component is captured by the model depicted in Figure 1.

In the simplified model, reading from right to left in Figure 1, the following conditions apply and are indicated numerically:

- 1) The employer or public payer assigns an intermediary to manage beneficiary HPs. Health plans, as defined herein, can range from a no-risk-sharing position (e.g., some TPAs) to full-risk-bearing insurers (e.g., risk bearing HMOs).
- 2) The HP supplies a network of providers based on contracted discounts; the provider is the agent in the HP contractual relationship.
- 3) The beneficiary enrolls in an HP and receives the HP benefit.
- 4) The beneficiary engages a physician.

- 5) At the same time that the physician serves as the HP's agent, he or she assumes an agency role on behalf of the beneficiary, providing care, referring the beneficiary to specialists, prescribing drugs, and admitting the beneficiary to hospitals. Assuming these roles and responsibilities, the physician provides inputs to other physicians, pharmacies, and hospitals.
- 6) In turn, these organizations provide services and products to the beneficiary.
- 7) The HP is billed by these entities and reimburses them for goods and services at agreed upon rates.
- 8) The HP is reimbursed by the employer, including a fee for risk assumption, administrative services, or both, depending on the nature of the contract.
- 9) For a given level of health care expenditures, employers/public payers receive their return on investment in the form of a healthy and productive workforce or beneficiary population, lower costs associated with employee turnover, or a satisfied constituency for government programs.

Concurrent with each link in the supply chain are potential barriers or additional complexities to effective alignment of information exchange, service delivery, and payment flows across the network. In the model presented in Figure 1, the barriers and additional relationships necessary for effective and efficient supply chain operations are indicated alphabetically. These barriers and relationships are described in greater detail below and, later, in the context of discussing newly established SCM programs that are trying to overcome the following challenges:

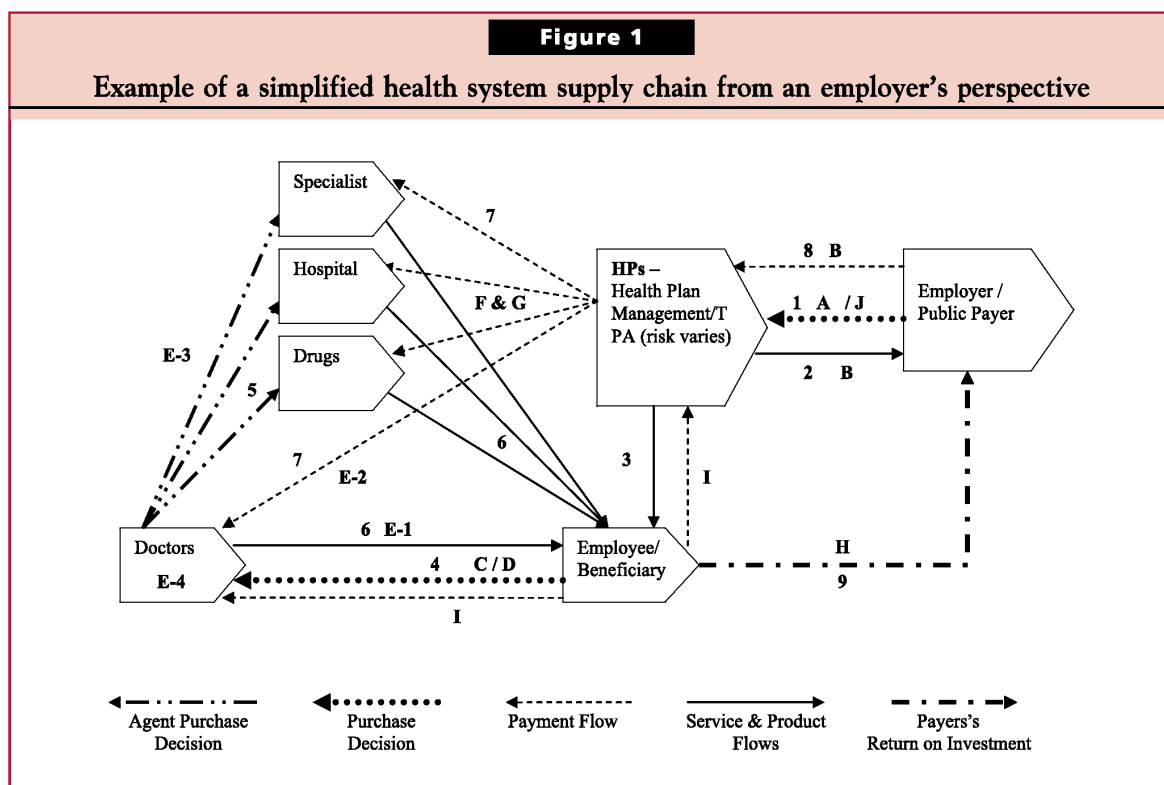
- A. Health care is not integral to most firms' core business lines (e.g., automobile manufacturers make cars rather than provide health care services). Therefore, most firms prefer to use agents to administer this function and often do not have, or are not willing to develop, the resources necessary to manage their health care supply chain internally (Brown et al., 1990). The addition of these intermediaries creates additional links in the supply chain network but may not simplify its management necessarily.
- B. Because the intermediary is often paid on a transaction basis, particularly in TPA and PPO models, motivations to reduce service intensity must be built into the agreements and some form of general clause contracting is needed (Cox, Chicksand, Ireland, & Davies, 2005) to enforce those agreements adding to the complexity of the relationship. The effectiveness of the outsourcing strategies as a mechanism to control health care inflation does not appear to have significance.
- C. The managed care backlash in the 1990s arose from consumers' preferences for broad provider net-works, allowing consumers to choose physicians who had no strong agency commitment to a particular HP.
- D. Consumers delegate a significant amount of decision-making authority to their physicians who act as their agents.
- E. Physician's agency dilemmas may lead to over-intensive diagnostic and treatment regimens. These supply chain misalignments arise because the physician is the agent for the beneficiary in matters of care (E1), for the HP (E2), and in matters of cost control (for other providers through referrals and prescriptions; E3) and as the principals in distributing of their own services (E4). The multiple agency and principal roles depicted by the "Es" surrounding the physician and one internal to their decision-making process constitute the agency dilemma.

G. The lack of clinical outcome and cost information return mechanisms from providers to other stakeholders in the system perpetuates asymmetries of information, although this is gradually changing (e.g., note the absence of arrows from providers to payers). Health plan intermediaries often pay for transactions rather than outcomes, thereby creating provider incentives to engage in more, rather than fewer, procedures.

H. Most employers and their intermediaries have experienced limited success in their population or prevention-based approaches to improving their beneficiaries' health.

I. One mechanism that employers have used to control costs is to shift more care expenses to the employee in the form of increased co-insurance and copayments (note: only the copayments to physicians are depicted, but similar lines should extend to other goods and services, too). The barriers delineated thus far represent the major threats to effective implementation of SCM at the local, or micro, level, which is important because health care delivery typically occurs at the local level (i.e. patients receive care from local physicians and hospitals). This is in contrast to the supply chain illustrated in Figure 1, which can be implemented on a national or international scale, because it primarily involves the purchase of durable supplies rather than the local delivery of health services. The importance of the local market as the venue for many health purchasing activities should not be underestimated given the increasingly high level of hospital, HP, and physician practice consolidation over recent years (Miller, 2006). Nevertheless, many purchasers function across multiple markets (e.g., the Medicare program or the benefits programs of Fortune 500 employers), resulting in the following additional barrier:

J. Employers rarely have a large enough presence in any given market to influence the providers' clinical decision-making behaviors through their purchasing decisions through SCM at the local level. Previous efforts made to "straighten out" and align incentives along the health care supply chain include the managed care movement of the 1990s. However, these efforts met resistance from beneficiaries, providers, and, in the end, legislators. Contemporary efforts to realign the supply chain are designed with an eye toward rewarding desirable behaviors, rather than imposing inflexible rules, in the way managed care was alleged to have done.



The Health Care Supply Chain in the 21st Century

Escalating costs and concerns about health care quality and safety have given rise to several private and public sector initiatives designed to reduce information asymmetries, improve service delivery quality and safety, and link the consumers to the decision-making and payment paths linked to each other. As discussed above, many of these initiatives fall under the broad category of value-based purchasing or P4P initiatives (Saver, 2004). Five of the most notable national efforts are discussed below, with an emphasis on the portion of the health care supply chain that these efforts are trying to influence (see Table 1 for an overview of the programs and Figure 2 for the supply chain link targeted by each initiative).

Hedis/Cahps

The Health Employer Data and Information Set (HEDIS) and Consumer Assessment of Health Plans Survey (CAHPS) are two of the oldest health care purchasing assessment efforts. The HEDIS is a set of approximately 60 standardized measures for evaluating clinical care effectiveness, as well as the access to care and utilization by a HP's population. The HEDIS measures are derived from claims or administrative data or patient chart reviews. The CAHPS is a consumer survey that assesses the degree to which consumers are satisfied with the service of their HP and the health care received from contracted doctors and hospitals. Both HEDIS and CAHPS are linked to the "Managed Care" box directly to the left of the employer/payer in Figure 2. Thus, early measurement efforts were aimed directly at transparency in the portion of the supply chain immediately upstream from the payer, which is where purchasers believed that they had the most leverage and control, by virtue of having competing vendors available with which to contract.

The data sets were developed to help purchasers better understand the value that they were receiving for their health care expenditures (arrows 1 and 8 in Figure 1), and many private and public sector purchasers still require HPs to collect and report HEDIS/CAHPS data as a condition of contracting. The results of both the clinical process measures in HEDIS and the consumer satisfaction measures in CAHPS depend on the collective action of health care providers further upstream from the HP in the health care supply chain.

HEDIS/CAHPS only report results for HP members in aggregate; these data do not measure the performance of individual providers. Therefore, the utility of these data for comprehensive SCM efforts is limited. Some question whether HEDIS/CAHPS measure the degree to which care is provided in an appropriate and cost-effective manner (Mainous & Talbert, 1998).

The primary manner in which HEDIS/CAHPS have been used in purchasing decisions is in payer contract negotiations (Arrow 1 in Figure 2) and the development of consumer report cards based on these measures (Arrow 2 in Figure 2). However, the literature suggests that few employers are aware of HEDIS/CAHPS (Gabel, Whitmore, Rice, & LoSasso, 2004) and consumer report cards have had a limited impact on enrollment decisions (Landro, 2004), calling into question the effectiveness of these initiatives. Other SCM efforts have attempted more direct interventions to realign incentives in the supply chain.

National Business Coalition on Health's Evaluate8 Initiative

The Evaluate8 initiative is, in many ways, a hybrid of the HEDIS/CAHPS initiatives and is closer to being a "classic" SCM program than those efforts. Evaluate8 involves measurements at the HP level, using a standardized instrument gathered through a request for information (RFI; the request is depicted by Arrow 1 in Figure 2). Specifically, the Evaluate8 RFI asks HPs to detail their health promotion and disease management activities for chronic care illnesses such as asthma, depression, diabetes, and coronary artery disease (Beich, Scanlon, Ulbrecht, Ford, & Ibrahim, 2006).

In doing so, the Evaluate8 RFI goes beyond the HEDIS process measures and seeks to understand the specific processes, interventions, and activities that plans engage in or that are implemented on behalf of HPs by contracted parties, such as disease management vendors. The addition of outsourced disease management vendors is depicted in Figure 2, and Arrow 3 depicts the performance of these vendors. (Note: Many HPs also have extensive in-house disease management programs, but these do not typically engage in the direct provision of care. They are involved directly in calling chronically ill patients to remind them of appointments, providing “registries” to physicians, using claims data to identify possible negative drug interactions, etc.). One might argue that it is the clinical outcomes that ought to be measured, rather than organizational structures and programs. Nevertheless, many of the Evaluate8 purchasers believe that they are paying for the processes that are not typically performed by the HPs and that it is imperative to monitor it to assess effectiveness and compliance with recommended care guidelines. This would be equivalent to an automobile manufacturer inspecting the process of tire production in addition to simply measuring the quality of the tires produced.

Wagner et al., (2000) have argued that effective management of chronic illness requires productive interactions between patients and physicians and that disease management programs, including those sponsored by HPs, must ultimately influence the patient– physician interactions (hence the arrow pointing to that interaction in Figure 2). Outsourced disease management programs, as depicted in Figure 2, are one link removed from the disease management activity. The critical question is whether the HP effectively coordinates the chronic care management process, down-stream, so that productive interactions between the patient and provider occur (Beich et al., 2006).

The literature suggests that for these interactions to be productive, many steps are necessary, including the identification of the subset of the population with the chronic illness and those in the population at risk for the illness. Next, these identified members of the population must be stratified according to the severity of their disease or the risk for the disease. Then, patients must be taught self-management techniques, and providers must deliver effective care that meets established clinical guidelines for the illness. All of these are viewed by many as necessary conditions for well-organized and effective disease management programs that have been outsourced, and the Evaluate8 RFI seeks to measure the degree to which HPs are providing these processes. The goal of the Evaluate8 process is to reward the plans with the best processes through better contracted rates or an increased volume of patients, thus providing an incentive for other plans to improve.

Bridges to Excellence

The Bridges to Excellence (BTE) initiative is an attempt to influence the manner in which doctors produce care in the outpatient (i.e., office based) setting and to pro-mote compliance with expert-developed clinical guide-lines for the treatment of certain chronic illnesses, such as diabetes. Hence, BTE addresses Arrows 5 and 6 in Figure 1 and represents new internal processes in the practice setting (labeled “4” in Figure 2). For example, BTE’s “Diabetes Link” program is designed to reward physicians for achieving compliance with recommended diabetes care standards in their patient populations (the two-headed Arrow 4 in Figure 2 depicts the exchange of information on compliance and payment in return). Such standards include process measures recommended by the American Diabetes Association related to the frequency of hemoglobin A1c screenings, annual eye and foot exams, and lipid and nephropathy screenings. In addition, measurements examine intermediate outcome measures such as whether patients have hemoglobin A1c and lipid levels that are within a controlled range.

Table 1

National initiatives to modify and improve the health care supply chain

| Initiatives | | Bridges to excellence | | The premier hospital quality incentive demonstration | | The leapfrog group | |
|---|--|--|--|---|---|--------------------|--|
| HEDIS/CAHPS | | eValue8 RFI | | | | | |
| Supply chain foci Principal sponsor | Health plans and consumers NCQA | Health plans National Business Coalition on Health | Physicians and their group practices Large employers, including GE and UPS. | Hospitals Centers for Medicare and Medicaid Services (CMS) | Hospitals and consumers Large employers and other payers | | |
| Mechanisms for changing the supply chain | Increased transparency for consumers and purchasers through the use of consumer report cards and selective contracting. | Increased transparency for purchasers. Program produces standardized health plan information using a common electronic RFI. Purchasers can use the comparative information in variety of ways (e.g., to select plans for inclusion in benefits, negotiate rates, or create consumer incentives). | Increased transparency for purchasers and financial incentives for physicians. Direct rewards to physicians for improving diabetes care and increasing safety mechanisms in their practices (e.g., adopting of clinical information systems, increased patient education, and disease management). | Increased transparency for purchasers and financial rewards and penalties for hospitals. Provides financial incentives to hospitals that demonstrate quality performance improvement in a number of areas related to acute inpatient care. Thus far, CMS has paid out more than \$8.9 million in bonuses. | Increased transparency for purchasers and incentives for hospitals. Partnering employers are asked to commit to three purchasing principals Create incentives to steer employees to use better scoring facilities Pay hospitals for improved performance | | |
| Scope of Initiative | Over 400 commercial HMOs, PPOs, and Medicare and Medicaid HMOs | Approximately 90 plans responded in 2004 | 16 States in a variety of partnership arrangements as of 2006 www.bridgestoexcellence.org | 225 Hospitals reporting as of 2006 www.cms.hhs.gov/quality/hospital/ | More than 1,200 hospitals have reported their progress. www.leapfroggroup.org | | |
| Web site | http://www.ncqa.org | http://www.nbch.org/ | | | | | |

Note: HEDIS/CAHPS = Health Employer Data and Information Set/Consumer Assessment of Health Plans Survey; RFI = request for information.

The BTE program can be viewed as a first-generation P4P program in that it has structured a payment system to provide physicians and physician practices with bonus payments for adhering to designated standards. Bridges to Excellence pays annual bonuses ranging from \$50 to \$80 per patient per year for physicians meeting the aggregate performance standards (Bridges to Excellence, 2006). Note that this program differs significantly from the HEDIS/ CAHPS initiative and the Leapfrog initiative in that the incentive is not based on potential market share or linked to the consumers' choice of a health care provider. Instead, the payment is based on physicians meeting standardized metrics for their existing patient base. Another important feature of the BTE program is that the reward is paid directly from employers to physicians, effectively bypassing the insurance plan (although BTE is now allowing HPs to license the program and administer multiple employer and public sector clients simultaneously).

CMS' Premier Hospital Demonstration

Beginning in 2003, the CMS began testing the effects of rewarding hospitals for providing better care. In conjunction with the Premier alliance of nonprofit hospitals, about 300 facilities across the country are submitting quality appraisals on five clinical areas for 3 years (Anonymous, 2005). The agency partnered with Premier because its prospective online performance tool offers more clinical measures than other databases currently available. Participation is voluntary, but hospitals with the best results receive an incentive from CMS (Becker, 2003). Early results indicate that the hospitals participating in the demonstration have experienced significant improvement in the quality of clinical process delivery and accelerated the adoption of evidence-based practices compared with a control group (Grossbart, 2006).

Similar to the BTE, the CMS/Premier demonstration primarily relies upon financial incentives to encourage improved quality. Hospitals performing in the top 10% in five clinical areas (coronary artery bypass graft, heart attack, heart failure, hip and knee replacement, and pneumonia) receive a 2% bonus payment through CMS. Hospitals in the second 10% are slated to receive a 1% bonus (Gebhart, 2003). The double-headed Arrow 5 in Figure 2 depicts the exchange of information and the payment made in return for superior performance.

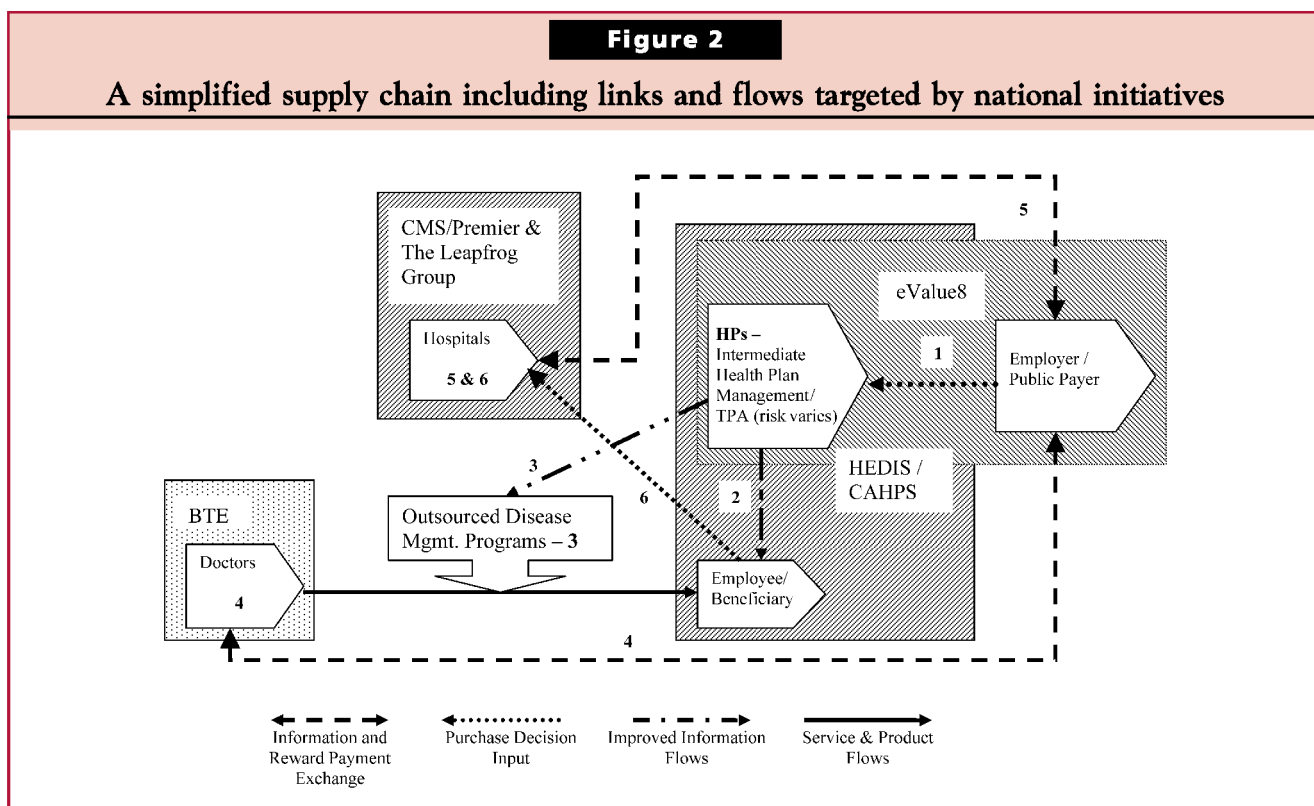
Institutions that have not improved during the course of the 3-year demonstration could lose 1% of their Medicare funding, which is a nontrivial amount for most general acute care hospitals. Due to its large market share, CMS has the potential to drive change; however, the long-term effectiveness of incentives on generating a change of this magnitude remains to be seen.

The Leapfrog Group

The Leapfrog Group also advocates for fundamental change in hospitals. The efforts and activities of the Leapfrog Group are a response to the Institute of Medicine's 2001 report entitled *To Err Is Human*. With more than 150 private and public sector purchaser members, Leapfrog has called on hospitals to meet four patient safety "leaps." In an SCM sense, these leaps represent a realignment of the hospital's internal processes to more effectively integrate with upstream suppliers and the preferences of the downstream consumers or purchasers (this realignment is labeled "6" in Figure 2). These leaps include implementing computer-assisted drug order entry systems, staffing of intensive care units (ICUs) with doctors trained in critical care medicine (i.e., intensivists and hospitalists), setting requirements for specific surgery and neonatal care volumes and care protocols, and adopting organizational safety practices designed to promote patient safety (NQF safe practices survey— www.leapfroggroup.org).

In a supply chain framework, the Leapfrog Group's efforts attempt to go beyond the HP intermediary and focus on hospitals directly, including the internal decision making of hospitals' leadership. For example, by promoting the adoption of computer-assisted drug order entry systems, which has been estimated to cost between \$200,000 and \$2 million per year for U.S. hospitals (Birkmeyer, Lee, Bates,

& Birkmeyer, 2002), the Leapfrog group is effectively trying to influence the capital budget expenditures and strategic plans of U.S. hospitals. However, this approach is common to SCM programs in other manufacturing settings.



Another example of Leapfrog’s attempt to influence the supply chain upstream is its intensivist leap. Most patients in ICUs are managed by physicians who lack specialist training in critical care medicine. Leapfrog is effectively demanding that hospitals change their clinical care and human resources policies so that physicians with expertise in critical care medicine are treating patients in ICUs. Hence, this leap is an attempt to influence not only hospitals but also those providing care to patients in hospitals (physicians). By virtue of this leap, the Leapfrog Group is attempting to change the current requirements for physicians treating patients in ICUs and for changing the rules and processes under which hospitals have historically operated.

The other three leaps also are attempts to influence aspects of hospitals’ supply chain for purposes of improving the safety of inpatient health care delivery and, ultimately, the reduction of medical errors. In fact, if one wanted to increase the complexity of the graphical illustration in Figures 2 and 3, one could enlarge the hospital box in each figure to diagram the entirety of the supply chain for hospital care, including each type of service the hospital provides. By doing this, one could trace out the details of how Leapfrog is attempting to influence the hospital supply chain, based on the belief that adoption of the recommended safety leaps will result in error reduction and improved safety, which the purchaser values as service attributes.

Conclusions

Both the health care industry and the field of SCM have changed significantly over the last 20 years. During this time, SCM principles have evolved to include both service sector and network configurations. Although it can be argued that the application of SCMN to health care is more

complex than to other industries and faces numerous barriers to success, employers continue to pursue attempts to influence the supply chain, including the five national efforts highlighted in this article.

Each of these initiatives has tried to overcome one or more of the fundamental challenges presented by the U.S. health care system, including (a) transparency of outcomes, (b) the local nature of care delivery that gives many payers little leverage with providers, (c) complex networks of providers and intermediaries, (d) conflicting incentives created by multiple principal– agency relationships occurring among providers, and (e) historical payment systems that do not incentivize desirable behavior changes among the consumer.

For example, all of the initiatives described above incorporate a social component related to health “outcomes” measurement. However, many of these outcomes are merely care-process- or structural-oriented measures, rather than patient outcomes related to health. Despite this limitation, the advancement in the field of measure development in health care has been impressive, although much more work needs to be done to reduce information asymmetries and to make the outcomes of care more transparent to patients and purchasers. Where measures have been developed, a minority of purchasers and insurers have attempted to adjust payments or change benefits to encourage the use of physicians who or facilities that provide the better outcomes. These efforts have proved challenging, however, as consumers and physicians have not been receptive to constraints on choices. Perhaps more importantly, the number of “higher valued” providers (i.e., lower cost and higher quality) may be limited in a given geographic area, making the operation of these programs challenging in practice. Furthermore, because no existing program addresses the SCM in a holistic way, improvements in one segment of network might be offset in another area as suppliers rearrange their relationships to maintain profit margins.

Another challenge for SCM approaches in health care is the asymmetry of information between the supply and demand sides of the health care marketplace. The asymmetry arises because of the difficulty in gathering and processing health care data into actionable information. The difficulty in promoting electronic medical record adoption is indicative of this challenge (Ford, Menachemi, & Phillips, 2006). In many U.S. markets, there has been significant consolidation in recent years in the hospital (Cuellar & Gertler, 2005), physician, and insurance markets, resulting in less negotiating leverage for purchasers (Robinson, 2004). For example, a large Fortune 100 company purchasing health benefits in a small to mid-size city for thousands of workers and retirees typically represents a small fraction of the market share of a large hospital or physician group practice. Furthermore, because most corporations operate in numerous locales, they are effectively building a networked supply chain. In contrast, the traditional SCM models used in manufacturing sectors often span national or international markets where the purchaser can represent a significant share of suppliers’ volume, and there are often multiple input suppliers to choose from, thus providing the purchaser with significant leverage in contract negotiations. Whether or not SCM efforts in health care can be effective given this fundamental difference in market characteristics remains to be seen.

Practice Implications

Current individual efforts to coordinate the health care supply chain networks do not address all of the actors necessary to improve outcomes, promote safety, and control costs holistically. However, alliances that cut across ideological and other traditional boundaries are forming. For example, a new alliance of a liberal advocacy group (The Center for American Progress), a conservative group (The AARP), an employer organization (The Business Roundtable, which sponsors The Leapfrog Group), a union (The Service Workers Union), and a major purchaser (Wal-Mart) has formed to address health care policy, insurance, cost, and quality issues (Wal-Mart Union Leaders Collaborate on Health Care, 2007).

In addition, some of the SCM efforts identified in this analysis have benefited from each other. For example, the Evaluate8 RFI now asks insurers to include the Leapfrog and HEDIS/CAHPS metrics in their responses. Individual employers also are beginning to apply both Leapfrog and BTE programs in their benefits management. However, benefits managers and other health care purchasers have yet to apply SCM techniques in an integrated way that recognizes the networked nature of the industry, addresses the information asymmetries through better contracting, and increases consumer involvement. Developing an integrated SCM strategy continues to be a daunting challenge in health care.

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