UNDERSTANDING HEALTHCARE COST DRIVERS: CONCEPTUAL DEVELOPMENT

Mark Vonderembse, College of Business Administration, The University of Toledo, 2801 W. Bancroft Street, Toledo, OH, 43606, 419-530-4319, mark.vonderembse@utoledo.edu

David Dobrzykowski, College of Business Administration, The University of Toledo, 2801 W. Bancroft Street, Toledo, OH, 43606, 419-297-6600, david.dobrzykowski@utoledo.edu

Thomas Gutteridge, College of Business Administration, The University of Toledo, 2801 W. Bancroft Street, Toledo, OH, 43606, 419-530-4612, thomas.gutteridge@utoledo.edu

ABSTRACT

The US healthcare system is plagued by high costs and concerns over access and quality. This paper explores the many challenges facing healthcare through a supply chain lens. It discusses how to: (1) improve facility and equipment utilization, (2) align incentives for doctors and patients for prevention and wellness, (3) design an insurance/administration system that eliminates bureaucracy, waste, and delays in decision making, (4) improve information sharing through the implementation of electronic medical records, (5) ease malpractice exposure by mitigating errors and rationalizing awards, and (6) stifle the rising costs of pharmaceuticals. The result is a useful framework for understanding and future scholarly investigation.

INTRODUCTION

Healthcare represents a greater portion of the economies of developed nations than any other industry. In the U.S., healthcare accounts for approximately $2 trillion or 16% of GDP, which makes healthcare the largest industry in the U.S. It is not only a large, but a growing portion of the economy. The Centers for Medicare and Medicaid Services (CMS) report that total health expenditures are estimated to surpass 20% of GDP or $4 trillion dollars by 2015. At an individual level, health spending is expected to increase from $7,110 per person in 2006 to $12,320 in 2015. [1] This phenomenon has translated into a 78% increase in health insurance premiums (between 2001 and 2007) [2], challenging U.S. firms’ (who provide health insurance benefits to employees) ability to compete.

In addition to rising costs, concerns for access and quality of care are increasing. A recent poll reported that approximately 67% of the respondents are concerned about their ability to access the best medical treatment. [3] High variation and challenges in coordinating healthcare delivery contribute to the legitimacy of this concern as HealthGrades (2004) points to a substantial number of deaths that result from preventable errors. A balanced focus on wellness that promotes health management and treatments that address identified problems is needed to enhance care and control costs.
A significant number of people have limited or no access to healthcare because they do not have the resources nor the insurance coverage to pay the escalating costs. The dilemma faced by the U.S. is: how to improve quality, extend coverage to all of its citizens, and control costs? What are the factors driving healthcare costs and what activities add value? If the waste in the system can be eliminated, will this free sufficient resources to cover all citizens without significant spending increases? To begin to address these questions, it is essential to identify areas for cost reduction that improve or at least do not reduce the quality of patient care. This paper identifies major cost drivers for health care and describes opportunities to eliminate waste in the system that frees resources for expanded care. The focus is on economic, business, or supply chain related concepts such as capacity utilization, customer and supplier relationship management, and incentives for behavior that optimizes systemic goals.

For the purposes of this paper, universal coverage is defined as access to affordable (or in some cases subsidized) insurance coverage for all citizens, while a single payer system is defined as one free of competition characterized by one organization negotiating fees with providers and administering claims for all citizens.

**CONCEPTUAL DEVELOPMENT**

**Healthcare Cost Drivers: A Systemic Problem**

As with any complex, systemic problem, the factors that drive healthcare costs and introduced inefficiencies and waste into the healthcare system come from many sources. The causes are rooted in premises and patterns of thinking that have developed over time and are endemic in the healthcare delivery system. These ideas and actions were appropriate and effective when developed and applied, but the environment has changed dramatically. There have been significant changes in the education and expectation levels of customer; the desire for access to medical information; sophistication and cost of medical technology; availability, power, and real time nature of information technology; and extent of competition locally, regionally, nationally, and even internationally. These environmental changes are making past practices dysfunctional and inefficient and have led to errors that are raising concern about the quality of care.

At a macro level these problems are similar to those faced by manufacturing firms that continued “industrial era” management polices and principles, organizing structures, and production practices (a mass production mentality) as their environment changed. Radical innovation such as just-in-time production and supply chain management, beginning in the 1970s and continuing today, are creating a need for dramatic change in how firms are managed and organized and what practices they embrace. As researchers and practitioners search for solutions to these complex problems in healthcare delivery and management, some value and insight may be gained by understanding how manufacturing firms have coped with these problems. Manufacturers are teaming with suppliers, embracing lean practices, implementing six sigma quality [4], introducing customer relationship management, and applying information technology to lower cost, improve quality, and reduce response time.

Technology development and application is another important element for success. Medical technology enhancements must continue and should be integrated into the healthcare delivery
system, and in developed countries this has and continues to happen. On the other hand, medical providers have been slow to adopt and integrate information technology into the healthcare delivery system. [5] This paper focuses on applying information technology to manage, organize, and deliver healthcare to the customer efficiently, effectively, and quickly.

**Identifying Healthcare Cost Drivers**

To estimate cost savings to determine if these savings can provide healthcare for the uninsured, it is essential to identify and understand the drivers of healthcare cost. Many of the problems faced by healthcare care providers relate to improving facility and equipment utilization by rationalizing capacity while replacing outdated and less efficient facilities and improving efficiency by effectively managing the healthcare delivery. It is also important to incentivize doctors and patients to focus on preventive and preemptive care (wellness) and to create insurance coverage that is consistent with these objectives. Insurance coverage should be designed to eliminate bureaucracy and waste, which delays decision making and consumes time and resources in paying medical providers. A system of integrated nation-wide electronic medical records should speed decision making, improve quality, and lower costs. Medical malpractice lawsuits should be reduced by eliminating errors and rationalizing the awards when errors occur. In addition, the cost of prescription drugs should be addressed. The following subsections identify some of these factors and briefly describe their impact.

**Facility and Equipment Utilization**

Currently, hospitals, equipment, and other healthcare facilities are underutilized. In most cases, the vast majority of the costs to operate these facilities are fixed, which means that the actual, out-of-pocket facility costs incurred by adding patients are small. It is likely that the additional patients covered under universal healthcare could be treated without increasing investments and with minimal out-of-pocket costs at these facilities. It is quite possible that excess capacity will remain after universal healthcare is implemented. As process improvement and advanced medical technologies are implemented and wellness efforts take effect, the need for facilities and equipment may remain constant or even decline. After universal coverage is implemented, it is possible that excess capacity would be addressed by closing facilities and further reducing costs. This discussion does not include the fees for healthcare providers and overall demand for their services, which are discussed later.

**Investment in Hospital Construction and Equipment**

Many people believe that a moratorium on new hospital construction is an effective way to cope with rising medical costs. While new capacity may not be needed to cope with the increased demand from universal healthcare, it is likely that additional investments in facilities and equipment will be needed to improve operating efficiency and lower costs. Many hospitals where built more than 50 years ago and their designs were optimized for the practice of medicine at that time, mostly inpatient with long stays. Overtime these hospitals have been expanded several times, and as a result, they have inherent inefficiencies including poor communication, decoupled systems, disrupted patient movements, separation of employees and supervision, etc., which decreased efficiency and increased costs. Replacing these hospitals should be based on
enhancing the quality of patient care and the ability of the savings to pay off the investment. Investment in new equipment should be justified in the same manner.

**Efficiency of Healthcare Delivery**

Substantial benefits can be achieved including cost reductions without lowering quality and in some case even increasing quality by carefully examining the healthcare delivery system. This includes working with suppliers, outsourcing non-strategic activities, process and quality improvement efforts, improving customer relationships, and creating, implementing, and integrating an operational strategy that is consistent with overall company strategy.

**Incoming supplies:** Hospital and other healthcare entities buy equipment, supplies, and incoming services that are a substantial part of the overall cost. Twenty-five percent of aggregate healthcare spend is supply chain related. [5] Focusing attention on building effective supplier relationships that lower costs and increase performance is vital. Supplier relationship management is a vital function of many private sector firms. “However, it seems that purchasing within healthcare providers is rather tactical and has not reached the strategic level that it has for many manufacturers.”(p. 2563). [6]

**Outsourcing:** Healthcare organizations should focus on core competences and outsource activities where they lack expertise, technology, or economies of scale. Healthcare organizations have expertise and technology in a variety of technical medical and science disciplines, but they do not have the expertise or a technology advantage in many other parts of their operations. From both a cost and quality perspective, it make sense to outsource activities that are not core competences. Activities where an organization does not have special knowledge or management skills or where it lacks the scale to achieve efficient operations are candidates for outsourcing. This has been a common practice in successful businesses for many years. In healthcare however, little is known about building and maintaining supplier-buyer alliances to achieve quality and cost improvements. [6]

**Process improvements:** Many of the activities within a healthcare organization could be improved by implementing lean systems and six-sigma quality such as, admission, patient registration, and equipment and facility utilization. For example, MD Anderson Cancer Center, the first hospital in the United States to implement six sigma (in 1998), realized a 28% increased inComputed Tomography (CT) patient throughput following implementation. [4] These efforts, which are common practice in private sector firms, clearly have the potential to lower cost, improve quality, and reduce the need for investment.

**Customer Relationships Management:** Patient care requires closer and more effective contact with engaged and well informed patients. [7] In a redesigned system, customers are more involved and make more decisions. Providing them with useful information, rapid response, and high quality service leads to satisfaction and return business. Customer relationship management, and the satisfaction that it brings, is at the heart of successful businesses.

**Operations Strategy:** Healthcare organizations should initiate operations strategy as part of it planning process and should integrate it with strategy plans in marketing, financial, and human
resource to achieve a coordinated business strategy and plan. Business strategy is the mechanism by which private sector firm coordinate activities.

**Emphasizing and Incentivizing a Practitioner/Patient Relationship**

Patients without insurance usually do not build a relationship with a medical professional. In some cases, insurance plans discourage or even prohibit this type of relationship. When this relationship can be built, the quality of care should increase while the cost should decrease. Familiarity leads to trust and the willingness of practitioner to listen and patients to accept advice. It also enables the medical professional to come to a better decision more quickly. Costs are reduced because less time is needed for the medical professional to collect and understand the patient’s medical history and life style and because patients and staff understand administrative systems and can quickly and easily comply with reporting requirements.

**Emergency Room Use**

Universal coverage should address problems that occur when patients without healthcare use emergency room for treatment that should take place in an office or medical clinic. Emergency room care is several times more expensive than standard treatment. Shifting these healthcare incidents should lower costs without negatively impacting patient care. It may even increase the quality of care when medical assistance is provide early by a medical professional with an established relationship with patient.

**Preventive and Preemptive Care**

Patients without healthcare coverage do not have the resources to get regular healthcare screening or have treatment early in the stage of a disease. They often wait until the problem is critical, which increases the treatment cost and acuity and reduces their long term health outlook. In the meantime, they continue the behavior that most likely contributed to the condition. Future coverage should encourage and possibly even require building a strong relationship between the medical provider and the patient to address those problems before they become critical.

**Health Insurance**

The current health insurance system is on the verge of being dysfunctional as described in the following points.

**Bureaucratic:** The system is cumbersome and difficult to use. The reimbursement system is fraught with errors. It is biased in favor of not paying claims promptly or, in some cases, not paying them at all again. This often leaves the consumer trapped between a medical entity that demands payment or will take the patient to collections and an unresponsive insurer.

**High Costs:** In response to rising costs, checks and balances were put in place by insurers to control costs. When this decision is examined from a historical perspective, this approach has not worked because medical costs have continued to rise at an alarming rate. In the process of trying to control medical costs, it has added a layer of administrative cost that provides no value,
neither healthcare quality nor cost control. In addition, it has delayed payment and frustrated patients and medical providers who need that reimbursement to pay employees and suppliers. These delays only add to the working capital needed by these organizations.

Patients are not Consumers: While first dollar coverage insurance is being replaced with co-pays and co-insurance, many patients still have insurance that covers nearly all of the expense of medical treatment. This leads to distorted decision making as patients chose treatment without regard to costs. The check and balances put in place by health insurers proved to be a poor substitute for informed and effective consumer choice. From an examination of what works in the private sector, costs are effectively controlled by competition and recombining the decision maker with the payer, i.e., putting this back in the hands of the patient who is advised by a medical professional. This has been supported in the literature as Dixon et. al., (2008) suggest that even those individuals enrolled in lower deductible consumer directed health plans were more likely than enrollees in the traditional plans to start using information in accessing healthcare. [9]

A solution must be found that protects all consumers against catastrophic health problems while giving them decision making power. In addition, patients would have a pool of funds that employers and patients can contribute to on a tax free basis. Medical bills that are not covered by catastrophic insurance would be paid from this account. This system would allow patients the choice to pay for healthcare screenings that in some circumstances are currently not reimbursed. It would provide incentives to seek quality care at the best price. Patients who were successful in managing their health status through participation in wellness programs would accumulate money in these accounts, which could be used for other activities once the account reached a certain level. Further, it is unlikely that a single payer system is the best approach.

Wellness Incentives: Current systems do not provide the consumer with incentives for wellness nor the healthcare provider with payment for doing what is best for the patient and for cost containment, i.e., keeping the patient well. Systems can be designed so that patients benefit financially if they stay well, and medical professionals can be reimbursed for screening, preventive treatment, and wellness programs.

National-wide, Integrate Electronic Medical Records

The advantages of Electronic Medical Records (EMR) in a hospital setting both in terms of quality of care and cost reduction are substantial. While it is widely accepted that adoption of EMR will lead to quality improvements and a concomitant reduction in medical errors, enhanced cost effectiveness, and greater consumer engagement in decision making [9] only 18% of physicians use EMR in their offices. [10] [11] These systems, will not achieve their full potential until they spread to healthcare providers, who see these patients on a regular basis, and are tightly coupled with the systems in hospitals. The ability to quickly and efficiently transmit medical records improves patient care and lowers cost by eliminating elaborate procedures to store and transport information and by avoiding unproductive visits because records are not available.
Wellness Education

Wellness education should be expanded among adults but more importantly, it must become extensive and mandatory in K-12 education. This must be supported by efforts to improve nutrition in schools. Also, wellness must be fully integrated into the healthcare system by offering financial incentives for both patients and healthcare providers.

Malpractice Lawsuits

The impacts of lawsuits on medical malpractice insurance and on medical test that are conducted only to protect practitioner from lawsuits are substantial. It appears as time, effort, and cost to defend those lawsuits, the cost of damages, and the cost of unneeded medical test that creep into standard medical procedures. Efforts should be made so medical professionals carefully and effectively “police” the profession to ensure the highest standard and provide continuing education and training to upgrade skills. In addition, legislation is needed to reduce unwarranted lawsuits and to place some perspective on the magnitude of the awards.

Cost of Prescription Drugs

The cost of drugs in the U.S. is substantial and continues to increase at an alarming rate. It is vital to lower the cost of these drugs while maintaining investment in drug research that provides the next generation because drugs are often an effective and low cost alternative to surgical procedures. The way that drugs are currently marketed worldwide have consumers in the U.S. pay substantially more for them than consumers in other parts of the world. This has been illustrated by efforts to “re-import” drugs to the U.S. from Canada. Much of the cost of producing a drug is the cost to research and design the drug and take it through clinical trials. In nearly every case, these costs are far larger than the cost to actually manufacture the drug. The market strategy of drug companies has been to sell the drugs in the U.S. at a price that will cover not only the cost of production but cover all or at least a disproportionately large share of the cost of drug development. The price also enables a profit on U.S. sales. This allows the companies to sell the drug in other countries at a much lower price and still profit from those sales. This is especially valuable in countries with socialized medicine, which demand low cost drugs, and in developing countries where living standards are low and the ability to pay is also low. If drug companies would charge a similar price in all countries in the world, the cost in the U.S. would decline while the cost in other countries would increase. One possible way to accomplish this is to allow re-importation of drugs to the U.S.

The pharmaceutical value chain is also worthy of investigation. At present, the pharmaceutical supply chain is highly complex comprised of pharmaceutical manufacturers, pharmaceutical benefit managers (PBM), specialty drug managers, as well as chain and independent pharmacists. In addition to complexity, the present system is characterized by a lack of transparency of formulary pricing, financial, and other information. Such information asymmetries have frustrated employers who in large part finance the system as well as many other stakeholders, including patients. [13] System reconfigurations focused on improving supply chain relationships and the creation of efficiencies have proven successful in other countries. For example, Normann and Ramirez (1993) found that greater efficiency and
enhanced supplier network relationships transformed the Danish Pharmacy Association into one of the strongest in the world with more than $200 million in assets, excluding the value of the independent pharmacies themselves. At the same time, such reconfigurations saved Danish taxpayers more than $16 million in the first year. [12]

Fees for Healthcare Providers

The impact of these changes on fees for healthcare providers is effected by opposing elements. On one hand, universal coverage will place greater demand on the system with more office visits and treatment. On the other, as the systemic changes reduce time and money spent on non-value added activities, administration, and paperwork, medical providers may find the time to treat additional patients. Wellness programs that begin in elementary school should improve the health of the next generation and reduce the demand for expensive treatments. EMR should increase productivity of healthcare providers and their staffs. If, on balance, there is a net increase in demand for healthcare providers, it may be necessary to increase the capacity to produce graduates in these fields.

CONCLUSION AND FUTURE RESEARCH

The primary purpose of this paper is to outline and describe briefly the drivers of costs in the healthcare delivery system. Each of these areas for improvement is a significant research area that requires multiple projects and cross-disciplinary research teams. This research overview is essential to set system level goals and policies that guide and coordinate research in each of the areas. It is critical to build support for this among healthcare providers, private sectors suppliers, insurance companies, and government. It is important to bring expertise to bear on these problems from medicine, finance, operations and supply chain management, marketing, systems engineering, law, and management. It is necessary to use ideas from many disciplines and to evaluate solutions implemented by other industries to address these problems as quickly and as well as possible.

The next steps in this research are to:
1. Describe each of these drivers in depth including specific research questions
2. Estimate the magnitude of their impact on healthcare costs to assess the value of each area for problem solving
3. Create a National Task Force that includes a variety of discipline to identify and prioritize actions
4. Identify funding sources to support research in these areas
5. Develop solutions for these problems that are integrated and system wide
6. Implement the solutions and evaluate outcomes.

On-going research in each of these areas is vital if we are to have a significant impact on healthcare costs.
References