Supply Chain Management in Hospital: A Case Study

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It is a common misunderstanding that hospital purchasing is just a functional part of operations rather than a strategic means to achieve financial cost savings. The supply chain process is the essential link for all programs and services offered by a hospital, and hence any improvement in managing the supply chain can positively impact bottom line profitability of any hospital's operations. This paper provides an overview of the current issues in supply chain management that today's hospitals face as well as a look at the measures that a case health organization has taken in managing this aspect of their supply chains.

I. INTRODUCTION

The growth of health care costs in United States has far outpaced the rate of inflation. Total health care spending in 2004 was $6280 per person, representing 16% of the US gross domestic product (NCHC, 2007). There is an ongoing debate between experts and policy makers that the health care system is burdened with inefficiencies, excessive administrative expenses, inflated prices, poor management, inappropriate care, waste, and fraud. In this paper, we will examine how efficiencies in supply chain management and effective use of sourcing and technology has reduced hospital costs. We will provide an inside look into Kaiser Permanente of Southern California in our analysis.

II. HEALTHCARE INDUSTRY AND SUPPLY CHAIN

The healthcare supply chain is composed of three major players at various stages: producers, purchasers, and healthcare providers. Producers include pharmaceutical companies, medical-surgical products companies, device manufacturers, and manufacturers of capital equipment and information systems. Purchasers include grouped purchasing organizations (GPOs), pharmaceutical wholesalers, medical-surgical distributors, independent contracted distributors, and product representatives from manufacturers. Providers include hospitals, systems of hospitals, integrated delivery networks (IDNs), and alternate site facilities (Burns, et al., 2002, pp. 11-12). At a broader level, healthcare supply chains are very fragmented. The three players are largely operating independently from one another and coordinated supply chain management hardly exists.

The Journal of the American Medical Association found that 85 – 90% of hospital cost structure is comprised of fixed costs (Roberts, 1999). This finding puts hospitals more in a league with transportation or heavy manufacturing than with most other service industries (Ward, 2006). Neumann indicates (2003) that supplies constitute 25% to 30% of a hospital's total operating expense. In addition, 25% of those expenses are tied to administration, overhead, and logistics.

The healthcare industry is slow to adopt the supply chain management techniques that have had proven success in other industries.

Several factors have been identified as contributing to the problems faced by hospitals in managing their supply chains. These factors include outdated IT systems and infrastructure, poor inventory and distribution management, ad-hoc procurement systems, lack of executive involvement, and no process improvement culture (Moon, 2004; Burns, et al., 2002).

We use a case organization-Kaiser Permanente of Southern California to discuss improvement opportunities in hospital supply chain in four areas: product management, sourcing and services, purchasing systems and technology, and inventory and distribution management.

III. BACKGROUND OF KAISER PERMANENTE

Founded in 1945 by Henry J. Kaiser and Sidney R. Garfield, Kaiser Permanente (KP) is a not-for-profit integrated medical care organization headquartered in Oakland, CA. There are three different entities that make up KP: the Kaiser Foundation Health Plan, the Kaiser Foundation Hospitals, and the Permanente Medical Groups. Located in nine states, KP currently is the largest not-for-profit medical care organization in the United States with approximately 8.7 million health plan members, 150,000 employees, 13,729 physicians, 32 medical centers, 416 medical offices, and $28 billion in annual operating revenue.

Kaiser Permanente is unique among health care providers and hospitals because it serves both as a health maintenance organization and as a group physicians practice provider. Its revenue model is not based by the number of cases or patients served each day, but rather by the number of members enrolled in their health care system. Hence, Kaiser Permanente tracks costs at the gross level view of average cost per nursing unit per patient day.

IV. PRODUCT MANAGEMENT

Healthcare industry is a cottage industry where clinicians are independent contractors with considerable clout and specific preferences for supplies and some variations in supplies and processes are accommodated to ensure patient safety (Scalise, 2005). These Physician Preference Items (PPIs) account for 40% of total medical supply spending for an average hospital (Volpe, 2007). However, hospitals are beginning to recognize the financial burden of allowing physicians the autonomy to order whatever supplies they choose. One of the opportunities for supply chain savings as identified from the 2005 survey by the Healthcare Financial Management Association is in the area of physician buy-in especially with respect to changes in purchase and use of high-cost clinical items (Mitchell, 2007).

It is commonly perceived that physicians are resistant to change. However, Neumann (2003) indicates that the exact opposite may be true. He points out the scientific background that physician's hold and the fact that the scientific method requires one to be open to new ideas. He points to the fact that data which supports the decision to use a particular supply can go a long way in convincing a physician to use a particular supply. Neumann (2004) recommends value-analysis committees or product evaluation and review committees to overcome the problem.

KP has successfully implemented similar approaches to encourage the buy-in from physicians. For example, the decision to purchase and universally adopt cost-effective items for use within all hospitals is by team consensus. Their level of compliance (over 90%) is achieved in part through their use of a process they call "Sourcing and Standards teams". KP Sourcing and Standards teams, consisting of clinical experts and sourcing personnel, evaluate and determine the best and most cost-effective products to implement.

The work of these groups usually takes place well before a team is considering a new purchase. In fact, the process of creating the

decision matrix used in the selection process can be more labor intensive than the actual product decision. Once the criteria have been identified and prioritized the actual product evaluation usually moves very quickly. Their meetings involve prioritizing the features that physicians prefer and utilize most of them. The procurement managers are allowed to educate physicians on the financial impact of various supplier options. Therefore, the use of consensus, instead of majority rule, in the decision making process minimizes any post-sourcing disagreement and results in the high compliance rate and buy-ins from all physicians.

Another example of the extent to which KP utilizes this approach is in their Sidney Garfield center in Oakland, CA where new surgical equipment is fully tested in a mock-style surgery room. Once a team has identified a product to evaluate, the product will be sent for testing. In the mock test, the effectiveness and efficiency of the new equipment is evaluated on how it fits with the existing KP surgery room layout. Only if the new equipment is deemed acceptable will it be deployed to all Kaiser hospitals. Otherwise, the team will agree that the product will not be released to the hospital. Hence, this team consensus approach to selecting products and agreement to the centralized testing rather than individual hospital product selection testing has allowed KP to consolidate supplies and save costs.

In their product cost assessment, Kaiser Permanente takes the global view of 'total cost' rather than just 'unit product cost' in determining the types of products to purchase. This evaluation process is nicknamed 'from cradle to grave' within KP. The cost of a product is evaluated from the types of raw materials used for the product and how this will impact the disposal cost associated with the product. For example, the use of a certain diagnostic tool may have a lower unit cost initially, but if the tool utilizes reagents that contain heavy metals, this may result in a significant disposal fee which needs to be calculated in the total cost. Hence, KP's product management approach to considering total cost has resulted in significant cost savings.

V. SOURCING AND SERVICES

Group purchasing organizations (GPO) have provided significant cost saving opportunities for hospitals by taking advantage of economies of scale in purchasing from select vendors for many hospitals at once. Kaiser Permanente has widely adopted the use of GPOs. KP has contracted with Broadlane, a GPO, to conduct all of the negotiations with its supplier vendors. Prior to GPO adoption ten years ago, the sourcing process was very fragmented at KP, each department or clinical group had their own sourcing department and procedures. One of the main reasons GPOs are advantageous is because they have a global network of suppliers. This gives KP the leverage to access more suppliers. Furthermore, KP and Broadlane work collaboratively with their suppliers, enabling KP access to the most beneficial equipment for their facilities and physicians.

The use of GPOs has helped KP streamline the purchasing process and provide cost savings. In fact, KP expects most of their supply chain savings to come from better contract terms. In 2004, it was reported that Broadlane delivered $100M in financial benefits to KP through savings from price improvements, rebates, administrative fees and overhead costs (Broadlane, 2004). In the future, KP expects savings of 70% to come from better contract terms through the GPOs and the remaining 30% to come from higher product utilization rates.

In compliance with federal regulations, KP does not accept free products for trial use from its GPO, and hence removes the potential conflict of interest. We find that contrary to what often are adversarial relationships between hospitals and the traditional GPO, KP's approach has shown that a successful partnership with a GPO can help realize significant procurement cost savings. For a successful

relationship, KP has shown that a clear and distinct delineation of responsibilities, where Kaiser provides the product selection and Broadlane negotiates the price, is critical to successful partnerships of hospital and GPO.

In addition to the use of Broadlane for GPO function, KP also utilizes integrated delivery networks (IDNs) to provide services to its in- and out-patients to help reduce its cost. Outpatients include those receiving care at their residence, as a follow-up after an in-patient episode or due to a chronic condition. Hence a clear distinction between outpatient and inpatient is often difficult to make. This challenge has also been noted by other researchers whereby they concluded that hospitals need to focus on a range of costs from hospital stay to an at-home episode in evaluating the cost function (Lave and Lave, 1984). For example, to reduce the overall outpatient cost, KP has standardized the equipment used by inpatients and outpatients, as well as created an outsourcing program with the company Apria, an IDN, to provide outpatient supplies. The standardization of equipment such as the feeding pump used in the hospital and in the home requires less time for the clinicians to change feeding amounts and cycles when the patient leaves the hospital.

KP also closely monitors the service levels to their patients. For example, Apria is monitored on its delivery times of materials such as the milk for the feeding pump. If Apria is outside the window of delivery time for supplies to the patient, Apria is required to re-pay KP. This has resulted in an overall good quality of service nationally; however, sometimes variations in local service are still encountered.

VI. PURCHASING SYSTEMS AND TECHNOLOGY

Hospitals tend to have outdated IT systems to manage their supply chains effectively, and investment in IT often takes a back seat (Moon, 2004). One identified area in supply chain structure that KP could further improve on is in the area of purchasing systems and technology. Their purchasing, materials management, and payment systems from the 1960's were slowly combined and deemed integrated in 1985. These outdated data management systems do not have the capacity to meet the changes and needs today. The challenge faced by KP is how to seamlessly transition the wealth of data without disrupting the existing purchasing system and inter-departmental integration.

A developing trend in the healthcare industry is the outsourcing of supply data management to professional supply data service providers. KP can explore new technologies and leverage on what has been successfully done in other hospitals. One area is in the outsourcing of their data management such as through the use of virtual item files, which have already been deployed in other industries. With this virtual item files system, third party data management providers can help KP integrate their existing data repository with the purchasing/requisition systems to manage the complex supply ordering process. Thus staffs may have faster, more valuable and easier access to necessary supply information when ordering (Polte, 2007). By outsourcing this complex and burdensome task, hospitals can more effectively focus their resources on patient care.

Another technology that is worth evaluating for KP's use is the Global Data Synchronization Network (GDSN) developed by Department of Defense to improve data management. The GDSN is a non-profit global platform for the secure exchange of product information, as part of its data synchronization program to improve efficiencies throughout the $200 billion healthcare supply chain. Hospitals spend significant resources to reconcile purchase orders and invoices due to mismatched item numbers and units of measure. "A proven, industry-sanctioned methodology for defining, coding and identifying an item in our purchasing systems, distributor files and group purchasing

contracts would remove supply chain confusion and lower the costs." (DoD, 2007)

Another challenge that KP faces is in identifying personnel capable of understanding the old technology used by the existing IT systems to effectively move it to a newer platform. Although this is not a unique problem faced by KP, there is no industry standard that can easily help provide a cost- and time-effective solution. Hence, the technology upgrade for KP's purchasing system remains an area to be addressed and recognized by the management. Once improved, the flexibility of the system will allow KP a more detailed view of its purchasing process and use of products, which will in turn provide better insight into creating a more effective cost structure.

VII. INVENTORY AND DISTRIBUTION MANAGEMENT

Unlike other industries where an inventory stock out results in lost revenue, the ramifications of a stock out in a hospital setting are far more severe. It is critical for hospitals to maintain a sufficient level of inventory at all times to ensure the needs of their patients are always met. Failure to do so could result in the loss of life. To this end, many hospitals are beginning to abandon the just-in-time methodology in favor of using remote warehouses and managing their own inventory distribution. The result has been significant cost savings for hospitals who implement this type of system. "Those that have done it have seen high single- to low double-digit impacts on their hospitals bottom lines." (Haugh, 2004)

KP maintains a system of both centralized and regional warehouses in its inventory and distribution management system. The central warehouse is located in Livermore, California. The Livermore warehouse serves not only as a national warehouse, but it also works closely with the nearby facility to conduct product testing and standardization before deployment to all KP hospitals.

The regional warehouses at KP also play a significant role in the reduction of inventory costs. Unlike the national warehouse's role in providing supplies that are commonly needed across all hospitals, the regional warehouses hold inventory of products that are more applicable to regional demand. For example, the hospitals in the Southern California region may serve more burn victims compared to hospitals located in other areas of the nation. Hence, the Southern California regional warehouse would carry inventory with more products focused on burn wound care.

KP has also been a pioneer in the testing and adoption of new technology. A few years ago, KP tested the incorporation of radio frequency identification technology (RFID) into its inventory management system. RFID systems have a broad range of potential benefits for the health care industry. These include medical device and asset tracking, improved visibility of inventory and supply chain management, and improved patient safety by preventing drug counterfeiting (Scalise, 2005). While the RFID has great promise in helping manage the inventory system, KP's team identified the execution flaw in the technology. The test team found that the use of RFID exposes KP's confidential records to potential external intruders and makes them susceptible to hacking. The flaws within the RFID system were identified and hence management decided not to pursue adoption of the technology.

Although some medical care organizations have more advanced information systems that track each SKU via bar-coding to its location within the hospital facility, KP has argued that such a system is not necessary in their organization. KP believes that their current high-level tracking system, despite the fact that it dates back to the 1960's, allows them to effectively manage their supply costs while also keeping a healthy safety stock on all critical SKUs used in operations. In addition, KP believes that such an advanced information system would be too complex within their

medical organization. While cost is a factor, tracking each SKU could be potentially the biggest problem. SKUs can be casually used by a physician. For example, they may give items to patients leaving the hospital or use consumable items with a short shelf-life. In addition, some items are hard to track since they are transferred to other buildings within the facility. KP believes their current, while archaic, system of tracking inventory is sufficient.

An advantage of the current high-level tracking system is the cost savings provided from low administrative overhead. Compared to other hospitals, with typical administrative costs between 20-30%, Kaiser Permanente boasts a very low administrative cost of 6% by only tracking the gross level details. The management at KP believes that the significant gain in administrative cost savings far outweighs the potential benefits from detailed enforcement tracking of patient costs. The patients also benefit from KP's approach to gross-level cost analysis. Clinicians are more apt to provide the necessary supplies to patients in order improve their conditions at home. While this may cost KP more in the short term, the benefits are improved patient at-home compliance to suggested care and reduced future complications or need for follow-up care in the long term. The result is cost benefits for Kaiser Permanente and for the patients it serves. Nevertheless, Kaiser Permanente management also believes in the need to have a more detailed understanding of patient costs and resources utilization. In this respect, a task force investigation team has been created to investigate new measures the hospital can undertake to be fiscally responsible in their use of supplies.

VIII. CONCLUSIONS

With the supply chain costing as much as 40 percent of the typical hospital's budget, the strategic importance of hospital supply chain is evident (McKone-Sweet, et al., 2005). Healthcare organizations must overcome years of adversarial supplier relationships and dramatic internal and external inefficiencies to reengineer their supply chain. This paper, through a comprehensive case study, has addressed some issues in hospital supply chains and provided suggestions to overcome the challenges.

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