

WHITE PAPER

Ochsner Health System Redesigns the Surgical Process and Transforms Orthopedic Surgery to Improve Efficiencies and Decrease Costs

Mark Growcott, PhD, MBA, LSSBB

Abstract

The healthcare industry in the United States is widely regarded as a challenging business. Healthcare reform has further complicated the industry and healthcare professionals are operating in an increasingly complex and rapidly changing environment. Medical device costs have long been a target for value creation. However, there has been little evolution in the current sales and delivery model to support reduction in cost and increase in efficiencies. To satisfy all stakeholders in the surgical delivery process, including vendors and technology providers, innovation was required to disintermediate the current model and reduce costs. Through a combination of innovative technology, collaboration with Physicians and strategic partners, Ochsner Health System (OHS) has realigned the hospital-Physician-vendor into a process that has seen significant savings without negatively impacting quality performance or readmissions. Specifically, automated technology and processes were developed to support the surgeon, hospital staff, and vendor to deliver total knee implants at significantly discounted costs resulting in millions of dollars of potential savings annually which should continue to decrease the total cost of care for our patients.

Introduction

The United States healthcare industry is imperfect. Healthcare reform has further complicated the industry in which healthcare professionals have already been operating in demanding and rapidly changing environments for decades¹. In recent years new challenges have surfaced and healthcare providers are struggling to manage the value driven changes that are required to operate successfully in the environment today.

The OHS mission is to serve, heal, lead, educate, and innovate. Guiding the work of OHS are six imperatives:

- People – Our most valuable asset
- Quality – Error-free care that’s affordable
- Loyalty – Patients, families & physicians

- Stability – Financially sustainable and growing
 - Academics – National leader with global impact
 - Community – Serving the greater need
- With the mission, imperatives, and the current healthcare environment and outlook in mind, OHS partnered with SIGHT Medical to develop an innovative technology that has redesigned the surgical process.

Total Knee Replacement (TKR)

Medical device costs have long been a target of value creation for healthcare providers, vendors, and payers. Beginning on April 1st, 2016, OHS became a participant in the Comprehensive Care for Joint Replacement (CJR) Model driven by the Innovation Center of the Centers for Medicare and Medicaid Services (CMS). CJR is a program expected to save CMS

hundreds of millions of dollars in joint replacement payments.

Total knee replacements are one of the most common and costly procedures in the U.S.² As a result, TKR is often the starting point for medical supply discussions and cost saving initiatives for healthcare providers. From 1999 to 2008, the incidence of TKR more than doubled from 263,000 to 616,000 in the U.S. with most of the growth seen in patients aged 65 years or older³. Conservative estimates project U.S. volume to grow by 143% from 2012 to 2050⁴. According to BCC Research, the global market for joint reconstruction and replacement is expected to reach \$16.2 Billion in 2018. The U.S. market represents \$10.3 Billion⁵. Total joint arthroplasty is a great success story for modern medicine, but has resulted in an unsustainable financial crisis for healthcare providers⁶. Consequently, TKR was selected as the initial focus of the project.

Method

Lean six sigma principles were used throughout the project. This included time observations of multiple surgeons, voice of the customer (VOC) with surgeons, VOC with surgical teams, VOC with leadership teams, current state and future state analysis, process maps, instrument tray usage analysis, surgery scheduling analysis, inventory handling and storage analysis, total direct cost and implant cost analysis, and tracking of quality metrics.

Internal analysis estimated that over 40% of the cost of an orthopedic implant is related to Selling, General, and Administrative (SG&A) expense, or simply put, the expense of using a sales representative. Therefore, with the intention of reducing and reallocating the sales representative's duties associated with the surgical processes the project aimed first to understand all aspects of the sales representative's role in a TKR procedure. Pre-

operatively, intra-operatively, and post-operatively, they were found to be involved in:

- Product training/education
- Scheduling coordination/communication
- Surgeon case review
- Instrument trays assembly
- Room/cart setup
- Guidance of OR staff
- Instrument cleanup coordination
- Reassembly of used/clean instruments
- Inventory management

Surgical technicians were selected at three locations and trained on the above functions to become "surgical specialists". With the assistance of the new automated process and technology, surgical specialists perform a significantly reduced amount of the perioperative tasks that were previously performed by sales representatives. For a TKR procedure today, the primary difference between a surgical specialist's perioperative responsibilities and those of a sales representative is that a surgical specialist can scrub into the case if required. Intraoperative management of the surgical technique was managed with the technology and a traditional scrub tech trained on the software utilization. It should also be noted that while the new surgical specialist role produced new responsibilities, it was not necessary to add additional full-time equivalents (FTEs).

With the ability to remove the sales representative from the process, OHS could leverage and negotiate a hospital direct price point for knee implants, resulting in significant savings for each case. Furthermore, OHS is able to see real time inventory and utilization of implants through the SIGHT Medical software.

Results

Results from 271 automated TKR encounters from four primary surgeons at three different hospitals using the new process and technology, and 4,230 traditional TKR encounters from 57 primary surgeons at ten different hospitals across OHS from the same period were collected for a sample size of 4,501. A total of 50 encounters were removed due to being outliers based on three standard deviations of total direct costs, one of which was an automated TKR case due to drug costs. Thus, the final sample for analysis contained 4,451 encounters.

The analysis was performed at a system level and a surgeon level. The surgeon level analysis included only encounters with the four surgeons performing automated cases. Additionally, only cases performed on or after the surgeon’s first automated case were used. This resulted in a comparison of the 270 automated cases to 503 traditional cases for total direct costs and length of stay. The results showed a reduction in direct costs of 22% and a reduction in length of stay of 4% when using the new process and automation (table 1).

Table 1. Automated vs. Traditional for surgeons performing automated cases

Automated vs Traditional	
Average Direct Costs	-22%
Average Length of Stay	-4%

Table 2 illustrates the financial impact of the automated cases and the savings that the project has realized thus far. (Note: the direct costs per case is the median national average reported by The Advisory Board⁷ for TKR and does not represent the OHS direct cost average).

Table 2. Automated financial illustration using surgeon averages

Automated Savings	
Average Direct Costs	\$12,700
Average Savings per Case	\$2761
Automated volume	270
Total Savings	\$745,381

A consideration that could understate the value and opportunity is that the surgeons who first adopted the automated model are also some of the lowest cost surgeons within OHS for traditional TKR cases. Consequently, perhaps a better analysis is to compare the automated direct costs to the rest of the system for the same period. The results of this analysis showed a 29% reduction in direct costs and a 39% reduction in length of stay (table 3).

Table 3. Automated vs. Traditional for all TKR cases

Automated vs Traditional	
Average Direct Costs	-29%
Average Length of Stay	-39%

Table 4 uses the same methodology as the analysis in table 2 but uses all TKR encounter in OHS for the same period (4,181). The results show additional reductions in direct costs at 29% and length of stay at 39%.

Table 4. Automated financial illustration using system averages

Automated Savings	
Average Direct Costs	\$12,700
Average Savings per Case	\$3696
Automated volume	270
Total Savings	\$998,025

The results from both analyses are similar: automated encounters showed a reduction in direct costs and length of stay. The direct cost reduction are hard dollar savings that go directly to the bottom line and easily quantifiable. However, another opportunity lies

with the length of stay reduction, which can increase capacity. For example, a 39% reduction for the national average of total knee and hip replacement of 2.65⁸, is just over a day. Using public financial statements from Tenet Health for the fiscal year of 2017 for this illustration, each inpatient day receives an average of over \$2,900 in revenue⁹. Thus, for every 1,000 encounters that reduce length of stay by 39% there is an opportunity of an additional \$2.9M in revenue. Clearly, there would be associated costs and an assumption that the demand is there for the free beds.

Statistical analysis was performed using Minitab[®] statistical software for quality measures of complication rates and readmission rate. The results showed that there was no significant difference in complication rate, which was .62% for the traditional cases and .74% for the automated cases ($p = .687$). Additionally, there was no significant difference found in the readmission rate of automated, which was 3.3%, and traditional cases, which was 2.4% ($p = .361$).

Moreover, with the reduction of length of stay within our system for our patients, this model aligns with Ochsner's mindset as a "Patient First" organization. In addition, Ochsner Health System continues to look at innovative ways to keep patients out of the hospital in hopes that other organizations will implement these processes to increase patient's experiences with health systems nationally.

Discussion

The automated program is a redesign of the surgical process for all stakeholders, within a new collaborative model. In the traditional model, vendors meet with surgeons and push for new and more expensive technologies, leaving supply chain to sometimes find out after the fact (figure 1). The new process promotes physician alignment with supply chain and

vendor management that prevents unapproved items from entering OHS facilities (figure 2).

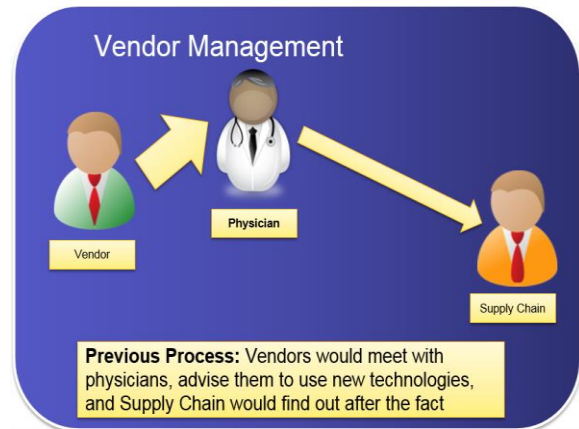


Figure 1. Traditional process of vendor management

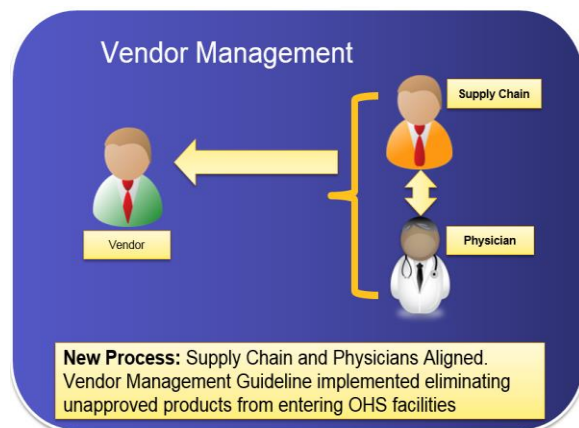


Figure 2. New process of vendor management

In addition to lessons learned, this project resulted in benefits and efficiencies that were not easy to quantify in terms of hard dollar savings. As previously discussed, the SIGHT Medical technology enables automation and efficiencies to be realized, which produces hard savings for OHS. Another benefit to the model is instrument tray reduction and enhanced inventory management. Through the collaboration of surgeons, OR staff, supply chain, and SIGHT Medical, OHS has been able to reduce the instrument trays required for a TKR from seven (figure 3) to two (figure 4). On a typical day, where three surgeons perform four

cases each, the new process will save central sterile 60 trays. Furthermore, the risk of loss and breakage is reduced. OHS avoids surgical case delays by owning and keeping instruments at the facility, whereas in the traditional model, instruments are often shipped overnight from all over the country to match schedules.



Figure 3. Traditional TKR tray utilization



Figure 4. Automated TKR tray utilization

Employee satisfaction is another notable benefit. Operating room staff across the system request to be considered for training and certification for the new model. Subsequently, surgeons report they now get requests from scrub technicians to cover TKR cases, which they did not previously experience. Furthermore, this model has provided OR staff

opportunities for advancement that otherwise may not exist. Lastly, surgeons have expressed benefits in time reduction within the OR while also noticing a decrease of potential issues related to instruments within the OR.

In summary, we are seeing a significant decrease in cost and increases in employee satisfaction from both staff and surgeons without seeing a significant difference in key quality outcomes.

Conclusion

Healthcare reform requires providers to deliver the best quality care at the lowest cost. Because orthopedics is one of the highest cost service lines for medical supplies and devices, this specialty is often the target for cost saving initiatives. However, simply negotiating a lower price per item is not a sustainable long-term strategy. Consequently, OHS entered into a partnership with SIGHT Medical to transform, redesign, and automate the surgical process. The results have been extremely positive with an average of 32% direct cost savings for TKR procedures using the new automated model compared to the traditional model. At the time of writing, OHS has scaled this model to four surgeons across three different hospitals, resulting in similar hard savings and efficiencies gained. Looking forward, OHS will continue to scale the process to other surgeons for TKR's, as well as extend the model to procedures within and beyond the orthopedic service line, which will result in millions of dollars in savings for the system.

OHS will continue to be an innovation leader within the Gulf Coast region to provide the best quality care for our patients. This model is an example on how OHS will continue to combat the total cost of care to provide our patients with an experience that is affordable while providing distinguished results. This model aligns with our mantra, "right **product**, right **time**, right **cost**". OHS

continues our journey of providing quality care at an affordable rate with our patients in the forefront of our decisions.

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About the Author

Mark J. Growcott, PhD, MBA, LSSBB

Mark Growcott is the Assistant Vice President of Finance and Strategy in Ochsner Health System’s supply chain department. In his current role, Mark is responsible for the financial reporting, analysis, budgets, and projections of supply chain and leads all aspects of the supply chain division’s medical supply metrics and variance analysis, the Ochsner Physician Partners (OPP) supply distribution program, and has P&L and strategic responsibilities for the Ochsner Center for Molecular Imaging (OCMI) LLC. Mark holds a PhD in Global Leadership – Organizational Management from Indiana Tech, an MBA and BA from Louisiana State University, is a certified Lean Six Sigma Black Belt (LSSBB), and a Healthcare Financial Management (HFMA) Certified Healthcare Financial Professional (CHFP).