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Increasing Surgical Supply Cost Transparency Using a Balanced Scorecard

Mihye Kim, BSN, RN, CPT and Jesse Rivera-Rosario, BSN, RN, MAJ

Daniel K. Inouye Graduate School of Nursing

Uniformed Services University

Walter Reed National Military Medical Center

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Abstract

Background or Problem/Issue: Despite accounting for 50% of an operating room's budget, the Military Health System (MHS) lacks consistent processes to track surgical supply expenses accrued during surgery. Surgeons have control over 80% of surgical supply costs but correctly estimate pricing for routinely used items on less than 10% of occasions. The absence of benchmarks creates a gap in cost transparency required to assess financial performance and identify opportunities for improvement.

Clinical Question or Purpose: Among surgeons performing single-level Transforaminal Lumbar Interbody Fusion (TLIF), how does providing a weekly scorecard displaying median surgical supply costs per provider affect intraoperative surgical supply costs?

Project Design: The Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) model served as the organizational framework for this project. This model provides an evidence-based approach to solve organizational issues (Dearholt & Dang, 2018).

Analysis of Results: Surgeons (n = 6) from the orthopedic spine and neurosurgery specialties performed eight single-level TLIF procedures. The group's median surgical supply costs decreased by $2,767.73, representing a 9.8% reduction. A 7.75-minute decrease in surgical time from cut-to-close and a 0.57-day reduction in patient length of hospital stay was identified. There were no reports of 30-day readmissions. Sixty seven percent of participating surgeons completed pre- and post-intervention surveys. Survey results revealed that 83% of surgeons agreed the BSC has value in reducing surgical costs, and 100% agreed that lower-cost alternatives do not increase the risk for poor patient outcomes. Over 80% of surgeons were willing to support future BSC initiatives.

Organizational Impact/Implications for Practice: BSCs support the Defense Health Agency's Quadruple Aim and Ready Reliable Care framework by establishing benchmarks to monitor financial performance. Educating surgeons on cost-efficient alternatives can result in decreased surgical costs, positive patient outcomes from decreased surgical time, and increased readiness due to reduced hospital length of stay. Adopting a BSC initiative aligns with Section 808 of the NDAA promoting transparency when reporting dollar value estimates for defense acquisition programs.

Increasing Surgical Supply Cost Transparency Using a Balanced Scorecard

Accounting for over 40% of hospitalization costs (Zygourakis et al., 2017), the operating room (OR) is teeming with opportunities to decrease intraoperative spending. Surgeons directly influence over 80% of surgical supply expenses (Zygourakis et al., 2017), highlighting their potential as key drivers for cost savings initiatives. Over 50% of surgery costs are attributed to surgical supplies (Carducci et al., 2019); however, less than 10% of surgeons correctly estimate the price of frequently used items (Povey et al., 2019).

Waldrop et al. (2019) assert that value can be found during implant selection and argues that choosing generic implants can decrease costs and be equally effective to conventional alternatives. The balanced scorecard (BSC) is a value-based initiative offering an innovative approach to decrease intraoperative costs. The BSC aims to increase surgeon awareness of surgical supply expenses to reduce variance and decrease costs. The BSC offers substantial cost savings without compromising quality and safety.

Problem Synthesis

Approximately 56% of an OR's budget is allocated to surgical supply expenses, including implantable and disposable items (Babu et al., 2019). Surgeons have significant influence over surgical supply selection but are often unaware of costs hindering their ability to improve the value of care (Winegar et al., 2019). Povey et al. (2019) demonstrated that surgeons across all grades and specialties have poor knowledge on the cost of common surgical supplies, with only 9.6% providing an accurate appraisal.

The surgeon's potential to lower costs cannot be underestimated. A surgeon-driven initiative using cost-conscious alternatives in a general surgery service saved $138,000 with no changes to patient outcomes over 12 months (Byrge et al., 2017). A BSC initiative including

multiple surgical services at a large training facility decreased surgical supply spending by 5% totaling $836,147 in annual savings (Zygourakis et al., 2017). There is an opportunity for substantial cost savings by targeting spine procedures due to high-value instrumentation use and the prevalence of lower back pain affecting 35% of military members (Gun et al., 2021).

Approximately 82% of the 923,038 Lumbar Interbody Fusion (LIF) procedures completed in the United States between the years 2001 and 2010 were posterior Transforaminal Lumbar Interbody Fusions (TLIF) (Goz et al., 2014). Goz et al., (2014) estimate $65,894 in hospital charges for each patient undergoing a TLIF. Surgeons who are unaware of surgical supplies costs can contribute to higher costs without improved patient outcomes. The lack of surgical supply cost awareness must be addressed to develop a culture that prioritizes sustainability and supports value-based care.

Relevance to Military Nursing

Military Health System (MHS) spending accounts for 10% of the Department of Defense's (DoD) budget; an amount projected to reach $95B by the year 2030 and represents an astounding $76B increase over the last 19 years (Galvin et al., 2019). A sizeable portion of the MHS' budget is apportioned to the medical treatment of its beneficiaries. The physical demands of military operations place service members at increased risk for injury, with over a third of military members suffering from lower back pain (Gun et al., 2021); a figure that increases in significance considering that an estimated 835,000 are at greater risk for spine surgery (Department of Defense [DoD], 2019).

The Defense Health Agency (DHA) has charged the MHS to deliver the Quadruple Aim: better health, better care, increased readiness, and lower cost (DHA, 2020). The orthopedic spine and neurosurgery specialties are excellent candidates to lead a BSC initiative to support the

Quadruple Aim through cost-efficient surgical supply selection. Implementing the BSC addresses each component of the Quadruple Aim by increasing surgeon awareness to guide surgical supply selection, reduce costs, and increase service member readiness without compromising quality or safety. The BSC is a value-based initiative that can be adopted across the MHS regardless of surgical specialty or location.

PICOT Question

Among surgeons performing single-level Transforaminal Lumbar Interbody Fusion (TLIF), how does providing a weekly scorecard displaying median surgical supply costs per provider affect surgical supply costs?

Search Strategy and Results

The PICOT question led to a number of keywords used to search for evidence-based literature using the PubMed and the Cumulative Index to Nursing and Allied Health Literature (CINAHL) search engines. Search keywords used in CINAHL included "Surgeon*" OR "Surgical" OR "Surgery" OR "Operating Room*" AND "Scorecard*" OR "Score Card*" OR "Score-Card" OR "Feedback" AND "Costs and Cost Analysis" OR "Cost*" OR "Cost Savings." As of November 2020, there were 141 results. Results were limited to 2015-2020 and English language. Search keywords for PubMed included "Surgeon" AND "Scorecard" OR "Awareness" OR "Feedback" AND "Cost savings." As of November 2020, there were 164 results. Results were limited to 2015-2020 and the English language. A total of 383 total articles were retrieved from PubMed and CINAHL, eight duplicate articles were removed, and 12 articles were appraised for eligibility for the BSC proposal.

The Johns Hopkins Nursing Evidence-Based Practice: Evidence Level and Quality Guide was used to complete the evidence appraisal. Evidence levels were assigned to the articles

presented in Appendix B. There were zero level I articles, four level II articles, four level III articles, one level IV article, and three level V articles. Analysis of the literature revealed several methods for reducing surgical supply costs. Based on the literature review, running an "awareness campaign" through the utilization of a BSC initiative and surgeon preference card standardization were identified as effective models to decrease overall surgical supply costs.

Solution Synthesis

Surgeon preference card standardization and the BSC have proven successful in reducing intraoperative costs (Childers et al., 2018). Surgeon preference card standardization offered cost mitigation benefits related to decreased surgical supply variance and a reduction in wasted supplies (Gani et al., 2016; Rose et al., 2019). Cost savings were estimated between $145 and $574 per case, with the greatest benefits linked to more stringent standardization (Childers et al., 2018). While an effective approach, concerns exist due to a lack of surgeon flexibility and willingness to adjust their practice (Childers et al., 2018).

BSC initiatives have yielded promising results across the industry. Literature estimates support a 5.9% to 8.2% reduction in surgical supply costs, equivalent to $38 to $732 in savings per procedure (Gunaratne et al., 2016; Tabib et al., 2015). A drawback toward implementing a BSC initiative stemmed from the operational feasibility of routinely monitoring supplies used during surgery (Zhao et al., 2018). The military healthcare system is not a profit-driven organization and currently lacks a process to track surgical supply expenses accrued during surgery (F. D. Salazar, personal communication, September 30, 2020). Implementing a BSC would provide a method to develop surgical supply cost benchmarks to increase awareness, influence practice change, and decrease costs (F. D. Salazar, personal communication, September 30, 2020).

Focus Areas

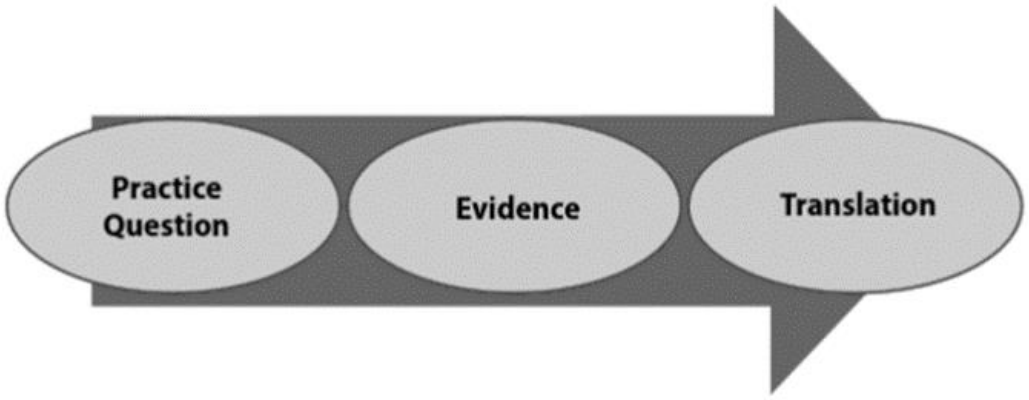
The approach to answering the clinical question began with establishing surgical supply cost benchmarks for participants from the orthopedic spine and neurosurgery specialties. Retrospective data was analyzed to determine median surgical supply cost baselines and patient outcomes measures for each surgeon performing single-level TLIF procedures at the facility. After implementation, continuous data collection on surgical supply use was documented to identify trends in median surgical supply costs for each participant.

Each participant received an individual performance report biweekly. The surgical department leadership and the participants received biweekly group reports on median surgical supply costs encouraging anonymous peer comparison to influence practice change. The BSC measured costs between providers performing similar procedure types to identify the cause of cost disparities and offer opportunities for improvement. Collective data was analyzed at the end of the project to determine overall cost avoidance benefits and the initiative's potential impact on patient outcomes.

Organizing Framework

The Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) model was the framework selected to guide this evidence-based practice (EBP) initiative. Nurses are expected to base their practice on policies and guidelines that align with research grounded in EBP (Dang & Dearholt, 2018). The JHNEBP model was developed to guide nurses to develop, implement, and sustain EBP initiatives through interprofessional collaboration and continuous process improvement (Melnyk & Fineout-Overholt, 2019). The first step in the inquiry was to identify best practices to reduce surgical costs in the OR. A PICOT question was created following the inquiry, which led to JHNEBP's three phases: practice question, evidence, and translation

containing a 19-step process (Dang & Dearholt, 2018). The JHNEBP model displayed in Figure 1 was used to direct the process to discover if a biweekly BSC can lower intraoperative surgical supply costs.



PRACTICE QUESTION

Step 1: Recruit interprofessional team.
Step 2: Define the problem.
Step 3: Develop and refine the EBP question.
Step 4: Identify stakeholders.
Step 5: Determine responsibility for project leadership.
Step 6: Schedule team meetings.

EVIDENCE

Step 7: Conduct internal and external search for evidence.
Step 8: Appraise the level and quality of each piece of evidence.
Step 9: Summarize the individual evidence.
Step 10: Synthesize overall strength and quality of evidence.
Step 11: Develop recommendations for change based on evidence synthesis.

- Strong, compelling evidence, consistent results.
- Good evidence, consistent results.
- Good evidence, conflicting results.
- Insufficient or absent evidence.

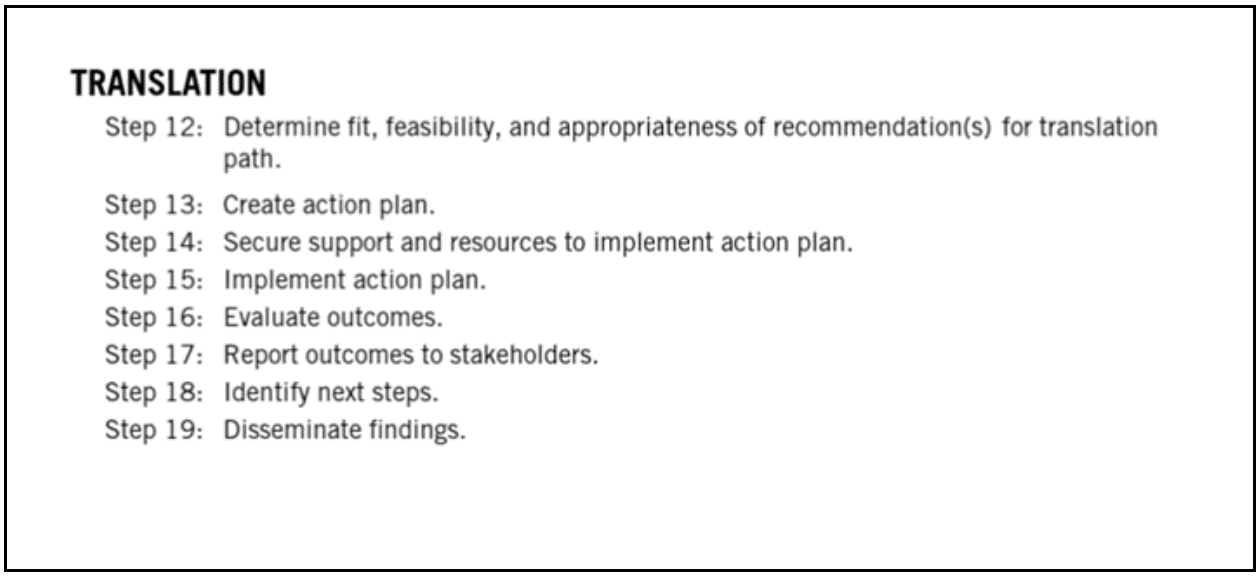


Figure 1. Johns Hopkins Nursing Process for Evidence-Based Practice from Dang, D., & Dearholt, S. L. (2018). *Johns Hopkins nursing evidence-based practice: Model and guidelines* (3rd ed.). Sigma Theta Tau International.

Project Design

General Approach

This project was a process improvement initiative that evaluated the implementation of a surgical supply cost feedback tool among surgeons performing single-level TLIF procedures to determine a correlation between increased surgical supply cost awareness and decreased intraoperative spending. The intervention provided a biweekly summary of median surgical costs to individual surgeons. In addition, biweekly group reports allowed peer comparison while maintaining anonymity. The project included a pre- and post-intervention assessment of surgeon surgical supply selection practices and their opinion on the value of the intervention. The main objective of the project is to decrease surgical supply costs. The secondary objective was to measure changes to patient outcomes that included hospital length of stay (LOS), surgical time from cut-to-close, and 30-day readmissions.

Setting and Population

The setting for this project is Walter Reed National Military Medical Center (WRNMMC), the world's largest joint military hospital. WRNMMC features 244 inpatient beds and employs 7,100 staff to serve over 1 million beneficiaries and care for 12,000 admissions each year (WRNMMC, 2020). The subjects for this project were nine surgeons from the orthopedic spine and neurosurgery specialties performing TLIFs at WRNMMC.

Procedural Steps

The project began following the Institutional Review Board/Performance Improvement (IRB/PI) approval. A letter of determination was obtained from the Office of Research at WRNMMC. The JHNEBP model provided step-by-step procedural guidance for each phase of the project's implementation.

Phase 1. Practice Question

1) STEP 1: Recruit an interprofessional team.
    a) Two active-duty U.S. Army graduate school of nursing students led the process with guidance from a senior mentor, clinical librarian, Clinical Nurse Specialist (CNS), and statistician at WRNMMC.
2) STEP 2: Define the problem.
    a) Identified the problem based on an assessment of the operating room's practice and culture to determine if there was enough data and resources available to contain the issue.
3) STEP 3: Develop and refine the EBP problem.

   a) The EBP question was refined to guide the literature search and define its scope. Considered the desired future state and what could be accomplished with the implementation.

4) STEP 4: Identify stakeholders.
   a) Engaged various departments at WRNMMC including orthopedic spine and neurosurgery surgeons who perform TLIFs, department of surgery leadership, OR leadership, perioperative nurses, surgical technicians, and logistics personnel to identify stakeholders.
5) STEP 5: Determine responsibility for project leadership.
   a) Each team member was assigned responsibility for designated portions of the project.
6) STEP 6: Schedule team meetings.
   a) Team meetings were scheduled weekly and on an as-needed basis to facilitate communication throughout the project progression and ensure compliance with predetermined deadlines.
   b) Stakeholders were engaged during team meetings to provide structural feedback.

Phase 2. Evidence

7) STEP 7: Conduct an internal and external search for evidence.
   a) An internal and external search for evidence was conducted using the PubMed and CINAHL search engines.
   b) Team members received copies of the journal articles selected.
8) STEP 8: Appraise the level and quality of each piece of evidence.
   a) A literature review was performed.

   b) The evidence appraisal process involved selecting the type of evidence, critiquing, and appraising its strength using a rating scale, and synthesizing findings.

9) STEP 9: Summarize the individual experience.
   a) An evidence synthesis table was created containing the journal articles selected based on the literature review.

10) STEP 10: Synthesize overall strength and quality of evidence.
   a) The evidence was appraised using the Johns Hopkins Nursing Evidence-Based Practice Appendix F: Non-Research Evidence Appraisal Tool.

11) STEP 11: Develop recommendations for change based on evidence synthesis.
   a) Completed a business case analysis to develop an evidenced-based recommendation.

Phase 3. Translation

12) STEP 12: Determine fit, feasibility, and appropriateness of recommendations.
   a) Discussed the feasibility and appropriateness of the project based on the current practice climate and value-added to the organization with the facility's OR leadership.
   b) Selected surgical specialties based on the predetermined criteria.
   c) Reflected on the recommendations to develop a pathway that is best suitable for translating evidence into practice.

13) STEP 13: Create an action plan.
   a) Created an action plan containing detailed descriptions of tasks, accountable personnel, required resources, expected outcomes, and deadlines.

b) A business case analysis and action plan were presented to the organization's leadership to introduce the project's purpose.

14) STEP 14: Secure support and resources to implement an action plan.

a) Received leadership approval to secure the support and resources needed to proceed with project implementation.

b) Obtained surgeon preference cards for participants included in the project.

c) Developed a spreadsheet to track intraoperative supply usage and costs for each participant.

d) Created a BSC to communicate median surgical supply costs for each project participant.

e) Developed pre- and post-intervention questionnaires to obtain participant feedback.

f) Performed a retrospective data review to develop surgical supply cost baselines for participants performing single-level TLIFs.

15) STEP 15: Implement an action plan.

a) Informed participants about the BSC data gathering process and project duration.

b) Project participants were provided with pre-intervention surveys at the beginning of the project.

c) Identified the total number of single-level TLIF procedures scheduled by each participant during the duration of the project using the Surgery Scheduling System (S3) software.

d) Assigned codes to each participating surgeon to maintain anonymity.

e) Accounted for all disposable supplies and implantable device usage during single-level TLIF procedures for each participant.

f) Provided biweekly updates to the Surgical Supply Cost Dashboard (SSCD) displayed in the OR nurses station exhibiting anonymous participant costs data for comparison.

16) STEP 16: Evaluate Outcomes.

a) Project participants were provided with post-intervention surveys at the conclusion of the project.

b) Conducted data analysis to identify changes in surgeon cost awareness, surgical supply utilization patterns, and cost savings for each participant.

17) STEP 17: Report outcomes to stakeholders.

a) Findings were reported to stakeholders at WRNMMC.

b) Offered evidence-based recommendations based on project findings.

18) STEP 18: Identify the next steps.

a) Considered the feasibility of project continuity to reduce healthcare costs at WRNMMC.

b) Reviewed the limitations of the implementation and offered recommendations for future study.

19) STEP 19: Disseminate findings.

a) Disseminated lessons learned during the Graduate School of Nursing (GSN) Research Translation Colloquium.

b) Future manuscript submission to peer-reviewed journals to share lessons learned and promote future research.

Data Analysis Plan

Six months of retrospective data was collected using the hospital's electronic health records (EHR) system and the surgical scheduling software to create surgical supply cost baselines for each surgeon performing single-level TLIFs. Surgical supply cost baselines were calculated by analyzing surgeon preference cards, the cost of implants recorded on the EHR for the patients who underwent surgery from May to October 2021, and patient outcome measures including average surgical time, 30-day readmission, and average hospital LOS. Surgical cases involving multiple procedures and vertebrae levels, revisions, tumors, or infections were excluded.

The main operating room (MOR) logistics staff obtained prime vendor pricing for each item on the surgical supply spreadsheet using the Defense Medical Logistics Standard Support (DMLSS) system. Post-intervention data were categorized into primary and secondary outcomes. Primary outcomes data measured the median cost of single-level TLIFs. Secondary outcomes data include patient outcomes and surgeon survey feedback. Pre- and post-intervention survey responses were graded using a 5-point Likert scale to capture changes in surgeon perceptions of their ability to decrease costs and the value of the intervention. The surveys contained questions to gather surgeon demographics data.

Potential Barriers

Surgeons played a critical role in the project's outcome but faced significant challenges adjusting their practice to achieve cost savings. The relationship between a surgeon and a surgical vendor contributed to surgeon resistance in selecting alternative options (Burns et al., 2018). The absence of incentives for surgical cost avoidance in military healthcare can present additional barriers. Tabib et al. (2015) argued that surgeons lack the motivation to reduce costs,

given that the OR generates high revenue despite avoidable waste. In a study conducted by Zygourakis et al. (2017), the author supports Tabib's argument on the benefits of offering incentives to participants that meet cost reduction goals and expressed concern that surgeons may have lacked interest had compensation not been offered.

Several articles emphasized the importance of stakeholder support for the success of a BSC initiative. Departmental culture and leadership play a significant role in compliance; therefore, gaining their support was critical to project success (Zygourakis et al., 2017). The final barrier considered for BSC implementation was the potential for poor patient outcomes from providers that change their practice in response to pressures to improve financial performance. Researchers have reported positive patient outcomes in discharge status, 30-day readmission, and 30-day mortality rates following studies measuring decreased costs from value-based initiatives (Zygourakis et al., 2017). These are promising statistics that can decrease resistance and ameliorate concerns.

Overcoming barriers to project implementation required engagement and close collaboration with senior leadership in the department of surgery and operating room. Meetings were scheduled in advance to discuss expectations, requirements, and an opportunity to participate in a groundbreaking initiative that supports DHA's Quadruple Aim and a culture change to value-based purchasing (Oster & Braaten, 2016). Senior leadership buy-in was influential in generating interest and identifying a target population that could provide generalizable results. Engaging perioperative and logistics personnel assigned to the surgical specialties participating in the initiative improved BSC item selection to provide concise, timely, and meaningful feedback with actionable data. Concerns for patient outcomes were discussed to ensure that quality and patient safety were maintained throughout the project.

Sustainment and Dissemination Plan

Assessing the facility's strengths, weaknesses, opportunities, and threats can provide clues into the organization's disposition to sustain change. Change is constant in the OR and new technologies, services, and supplies are introduced regularly. The BSC will require routine updates to account for recent advances and provide accurate data that supports decision-making. The BSC reports could be completed monthly to decrease the responsibility burden on personnel tasked with its distribution. The sustained change will require surgeon engagement in decision making and a reliable means to present data at regular intervals (Tabib et al., 2015). Adoption of BSC at the DHA level can serve as a medium to standardize practice across the MHS enterprise.

Dissemination strategies will focus on the impact of the BSC in the reduction of supply costs while maintaining or improving patient outcomes. The target audience will include the facility's department of surgery and OR leadership, project participants, military services perioperative consultants, and the Surgical Services Clinical Community (S2C2) chief at DHA. Study results will be promulgated to a broader audience with poster presentations during research week, podium presentations at professional conferences, recorded podcasts, discussion panels, hospital and staff meetings, and publication. Military conferences or Army Nurse Corps perioperative town hall meetings can serve as additional platforms to disseminate findings.

HIPAA Concerns and Ethical Considerations

Efforts to safeguard patient personal health information (PHI) included administrative, technical, and physical measures. Handling PHI during data collection remained compliant with the institution, state, and federal policies and regulations. All members associated with the project maintained a current HIPAA certification, and the project's design did not require the handling of PHI. Ethical considerations for participating surgeons included the anonymity of

surgical supply cost data that were incorporated into the group reports used for peer comparison. To maintain anonymity, each participant received a unique alphanumeric designator.

Project Results

A total of 8 single-level TLIF procedures were performed during the intervention period. The BSC displayed tailored information on median surgical supply cost, median group surgical supply cost, the group best, accumulative individual and group median surgical supply costs for the period covered. The BSC also included a list of the five high-value items that mostly contributed to costs as seen in Figure 2. The SSCD in Figure 3 exhibited median surgical supply costs for each participant, encouraging anonymous peer comparison to stimulate practice change. Each surgeon was assigned an alphanumeric code for ease of identification, and markers were color-coded to assist with tracking trends.

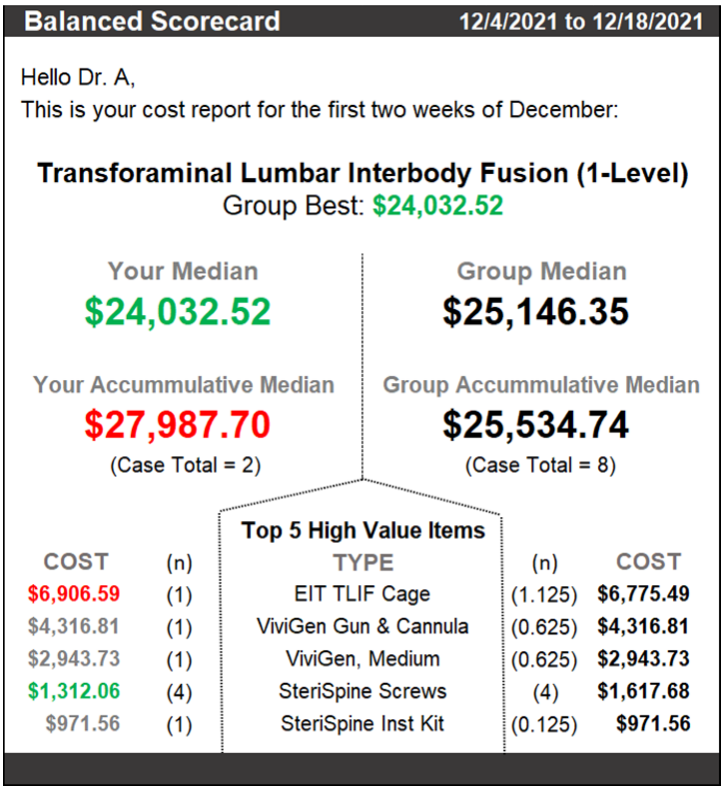


Figure 2. Example of a balanced scorecard

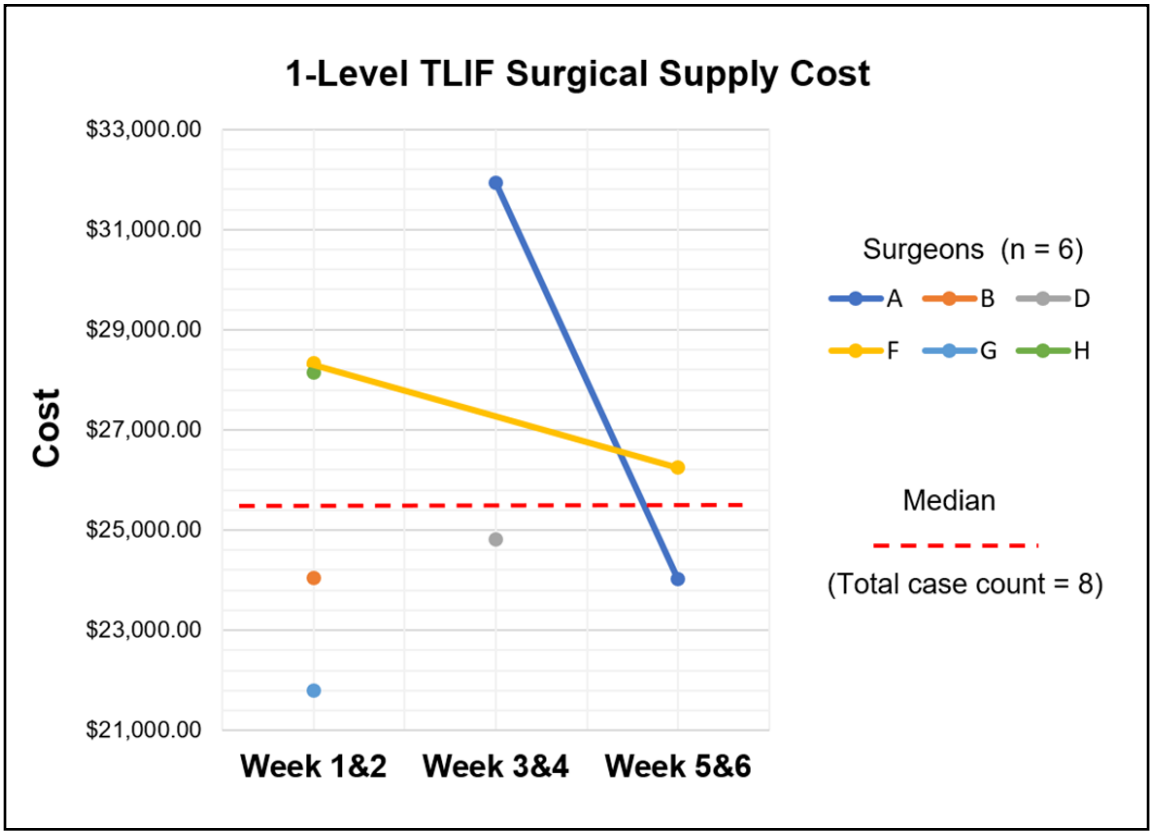


Figure 3. Surgical Supply Cost Dashboard at the completion of the BSC initiative

Surgical Supply Costs

Two of six surgeons performed two procedures, and four completed a single case. Surgical supply cost for Surgeon A decreased by $7,910.36 (24.8%), from $31,942.88 to $24,032.52. Surgeon F decreased surgical supply cost by $2,063.55 (7.3%), from $28,323.72 to $26,260.17. Surgical supply costs ranged from the group best of $21,807.48 to $28,143.55. The group median cost was $25,534.74, representing a $2,767.73 (-9.8%) decrease from the $28,302.47 baseline. At the conclusion of the initiative, three of seven surgeons experienced a decrease in median surgical supply cost, and two surgeons experienced an increase, as shown in Table 1.

Table 1. Comparison of pre- and post-intervention surgical supply median cost

Surgeons	Pre-Intervention Median Costs	Post-Intervention Median Costs	Outcome
A	$29,069.31	$27,987.70	-$1,081.61 (-3.7%)
B	$24,145.72	$24,034.56	-$111.16 (-0.5%)
D	$23,644.61	$24,809.31	$1,164.70 (+4.9%)
E	$30,526.38	N/A	N/A
F	$25,627.73	$27,291.95	$1,664.22 (+6.5%)
G	$31,637.01	$21,801.62	-$9,835.39 (-11%)
H	N/A	$28,137.69	N/A
Median	$28,302.47	$25,534.74	-$2,767.73 (-9.8%)

Patient Outcomes

Patient outcomes were measured to analyze if selecting lower-cost surgical supply alternatives impacts the safety and quality of care. Average surgical time from cut-to-close and hospital LOS decreased from pre-intervention baselines. Average surgical time from cut-to-close was reduced by 5%, from 154.5 minutes to 146.75 minutes. The average hospital LOS dropped by 26%, from 2.2 days to 1.63 days. No changes to 30-day readmissions were observed.

Survey Findings

Pre-intervention survey questions were included in the post-intervention version to analyze changes in surgeon feedback. The following data offers an analysis of post-intervention survey results compared to the pre-intervention baseline. Four surgeons (66.7% [4 of 6]) strongly agreed or agreed with the statement, “I know which items contribute the most to high costs,” indicating a 16.7% increase. Five surgeons (83.37% [5 of 6]) strongly agreed or agreed

with the statement, “I am aware of alternatives to lowering cost,” representing a 16.7% improvement. Most significantly, there was a 50% increase in surgeon disposition to explore cost-efficient alternatives, with five surgeons (83.37% [5 of 6]) replying strongly agreed or agreed to the statement, “I try to seek alternatives to lower costs whenever I can.”

The post-intervention survey included three additional questions aimed at gathering participants’ opinions on the value of the BSC to healthcare and their willingness to support future similar initiatives. Four surgeons (66.7% [4 of 6]) agreed with the statement, “the BSC project increased my awareness of surgical supply costs in the OR.” Five surgeons (88.3% [5 of 6]) agreed with the statement, “the BSC project has value in reducing surgical cost in the OR.” There was unanimous consensus among surgeons (100% [6 of 6]) agreeing with the statement, “lower-cost alternatives do not increase the likelihood of negative patient outcomes.”

Analysis of the Results

Several factors influenced surgical supply selection and costs. Implant vendor selection was the main contributor, with half of the participants choosing Medtronic and half selecting DePuy Synthes. The two participants that performed under the group average used Medtronic products which were priced lower than their competitor. Additional factors included the indiscriminate selection of allograft by perioperative staff, lack of team communication, and resistance to practice change. Sharing data on high-value items, their frequency of use, and how surgical supply selection influenced costs allowed surgeons to compare cost-efficient alternatives and consider them for future use.

The three patient outcomes measured were equivalent or improved after the intervention, suggesting that the initiative did not have a negative impact on the quality of patient care. Improved patient outcomes further support BSC implementation, increasing its potential for

greater cost savings. Surgical procedures with a 30-minute increase in mean operative time can double the risk of developing a surgical site infection (SSI) (Cheng et al., 2017). The 7.75-minute decrease in surgical time achieved can reduce the risk for SSIs, patient mortality, and save up to $20,000 in treatment costs. Lowering hospital LOS by 0.57 days can decrease the risk for hospital-acquired infections (HAI) and increase service member readiness.

There was a 9.8% decrease in the median surgical supply costs at the end of the intervention. We can project 40 single-level TLIF procedures offering $40,240 in annual surgical supply cost savings based on this case volume. These estimates are conservative considering decreased surgical volume due to COVID-19 pandemic restrictions and changes to military operations that led to case cancellations. The value of the BSC cannot be overstated, with most surgeons acknowledging its benefits in reducing surgical costs. Survey results reflected increased cost consciousness and a sense of personal responsibility, which aligned with the literature. The data collected supports the BSC's value in lowering surgical supply costs by increasing surgeon awareness to promote practice change that yields positive patient outcomes.

Organizational Impact / Implications to Practice & Policy

As previously discussed, the MHS lacks processes to track surgical supply costs accrued during surgery, creating a gap in transparency. This is a stark contrast to civilian practice, where healthcare facilities monitor surgery costs per provider and deliver periodic reports on financial performance. At the systems level, DHA's S2C2 can develop a standardized system for tracking data, maintaining surgical supply costs benchmarks, and reporting performance metrics to hospitals participating in the program. The S2C2 should conduct periodic internal and external benchmark comparisons to assess the program's effectiveness and identify opportunities for

improvement. Reporting metrics can help determine the best performers within the MHS with opportunities to analyze, identify, and establish best practices.

Most of the heavy lifting for BSC implementation will occur at the MTFs. Each organization is responsible for developing processes to track metrics and submit reports to the S2C2 and stakeholders within the organization. Data collection will present a significant obstacle due to the lack of electronic systems to track surgical supply use. Currently, dedicated staff is required to monitor each procedure and physically input data. This process can be time-consuming and potentially not a feasible option for understaffed units. MTFs should partner with DHA to consider purchasing automated systems to track surgical supply use and generate cost reports. Each MTF should assign a program manager to provide oversight and ensure that goals are met.

Military leaders are responsible for fostering financial stewardship. The CNS can play a pivotal role by applying the best evidence to develop strategies that support the organization's mission and empower staff to make informed decisions that promote value-based care. Implementing a BSC initiative could target achieving quality, cost-effective, patient-focused outcomes across the patient, staff and organization spheres of impact. Engaging surgeons and recruiting key allies during the early planning phase are necessary for success. Identifying a project champion that can influence stakeholders from senior leadership to the end-user level can increase compliance and sustain practice change with continuous process improvement.

Future Directions for Research and Practice

Military healthcare organizations constantly strive to meet DHA's Quadruple Aim and Ready, Reliable Care framework requirements to increase quality and efficiency. The rising cost of healthcare presents challenges that must be addressed to reach high reliability and maintain a

competitive edge. Future projections indicate that the MHS budget will continue to grow at an accelerated pace, placing a strain on Department of Defense funding. Half of a hospital's budget is dedicated to the operating room and perioperative leaders in a unique position to adopt innovative solutions that align with best practices to achieve significant cost savings.

Implementing a BSC initiative can yield benefits but requires careful planning to be successful. Increasing the length of a BSC initiative will strengthen its data to determine if the results can be generalized across additional surgical specialties and procedures. DHA's Surgical Services Clinical Community (S2C2) leadership, in coordination with perioperative consultants from each uniformed service, must coordinate with military hospitals to identify suitable markets to increase the effectiveness of BSC initiatives. The focus should be on markets with significant surgical volume, procedures performed by multiple providers with notable implantable device usage, and variance in surgical supply selection.

Surgeons are the main drivers, and their support is critical to the BSC's success. Engaging surgeons during the planning phase can help focus efforts and increase efficiency. Offering incentives for surgeons or surgical services that meet target surgical supply cost reductions is a strategy that can increase participation and compliance. Zygourakis et al. (2017) recommend that organizations offer financial incentives to surgical services that attain 5% cost savings. The incentives can be allotted to professional development, such as attending medical conferences.

BSC adoption can provide a format for internal and external benchmarking. Healthcare facilities could compare their organization with competing hospitals within the MHS and the civilian sector to gauge performance. S2C2 could standardize methods for widespread dissemination of benchmark data to increase visibility and decrease barriers that impede project

implementation. Surgeons rely on data to make informed decisions. Providing surgical supply costs performance falls in line with best practices in the civilian market, and its cost-savings benefits support NDAA 2017.

Conclusion

WRNMMC strives to be a global leader by providing excellent patient care, transforming military medicine through innovation, and attaining high reliability (Walter Reed National Military Medical Center [WRNMMC], n.d.). Quality, transparency, and stewardship of resources are listed under the facility's Foundations and Pillars (WRNMMC, n.d.). Decreased awareness of surgical supply costs can increase spending without improved patient outcomes. The lack of consistent processes to track surgical supply costs across the MHS strongly contributes to this gap in cost transparency. The BSC could increase surgeon cost awareness to decrease spending without sacrificing quality or safety. The BSC initiative aligns with WRNMMC's vision and mission, supporting DHA's Quadruple Aim and Ready, Reliable Care framework by advancing innovative solutions to create best practices that improve the value of care. In addition, perioperative leaders can promote financial stewardship by adopting a BSC initiative that aligns with Section 808 of NDAA 2017 mandating transparency.

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Appendix A: Prisma Table

Appendix B: Evidence Synthesis Table

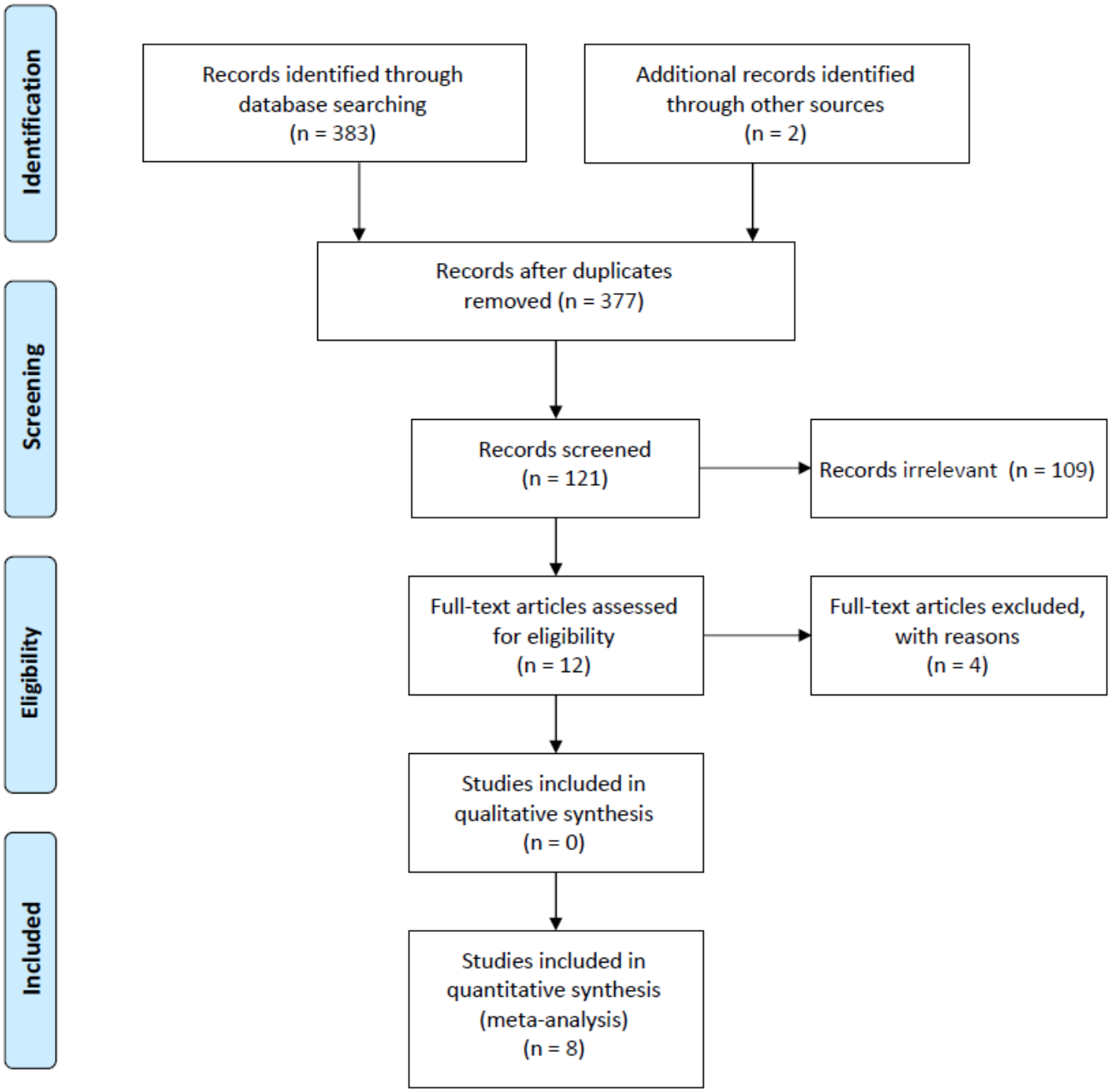
Appendix C: Business Case Analysis Worksheet

Appendix D: Project Timeline

Appendix E: Senior Mentor Approved Clinical Question and DNP Project Team Mentors (Committee Membership) Agreement Form

Appendix F: CITI Certificates

Appendix A: PRISMA Flow Diagram



(Moher et al., 2009)

Appendix B: Evidence Synthesis Table

1st Author Name	Study Purpose/Aims	Research Questions/ Hypotheses	Study Design	Total Sample Size	Sampling Plan	Independent Variables & Level of Measurement	Dependent Variables & Level of Measurement	Statistical Analyses	Results	Strengths	Weaknesses	Level of Evidence
Austin et al., 2017	To investigate if cost disclosure influences surgeons to reduce operating room expenditures.	Public disclosure of surgical costs influence surgeons to reduce operating room expenditures.	Prospective controlled study	Intervention group included 11 private practice surgeons performing rotator cuff repairs.	Two hospitals within a regional healthcare system. Rotator cuff repair was the procedure selected for analysis due to the high volume and low case-to-case fluctuation in costs.	Intervention group received quarterly dissemination of surgeon scorecards that allowed for comparison of direct supply costs among providers.	Direct supply cost per case for a specific procedure. Costs per case for a particular surgeon were compared to others in the same subspecialty. Costs were determined and reported by an independent third party. Costs were calculated quarterly over a two year span.	Linear regression model	A total 423 rotator cuff repair procedures were performed during the length of this study. Average supply cost per case decreased by $269, totalling $39,831 in savings. 89% of participating surgeons reported moderate to extreme interest in the scorecard and 56% made changes to their practice based on scorecard dissemination.	Surgical procedure analyzed was high volume with low case-to-case fluctuation. No contract negotiations occured between the facilities and implant manufacturers during the period of the study.	Study limited to orthopedic surgeons working in two healthcare facilities. Lack of cost data prior to initiation of study.	III
Gitelis et al., 2015	This study aimed to examine the effect of surgeon education on disposable supply usage during laparoscopic cholecystectomy.	Can distributing a price list containing disposable supply used in lap chole affect cost savings in OR by surgeons?	Retrospective comparative study	15 Surgeons of general surgery and surgical oncology departments	Cost measured on those 15 surgeons performing laparoscopic cholecystectomy in 4 different hospitals.	Cost information given to surgeons	Surgical supply costs for laparoscopic cholecystectomy in fiscal year (FY) 2013 were compared with FY 2014.	Paired t-test	The average disposable supply cost per laparoscopic cholecystectomy was reduced from $589 in FY 2013 to $531 in FY 2014, representing a 10% reduction in supply cost reduction per case and an annual savings of $33,000.	Physicians don't have significant responsibility for cost containment and education of physicians regarding the costs of treatment may help them recognize the unique opportunity they possess to meaningfully impact the cost of health care.	Possibility of human error in financial data input system where all of the data came from. Retrospective data collection limits the accuracy. Role of nursing staff participation is helpful but difficult to quantify.	III
Gunaratne et.al., 2016	Examine the financial impact of increasing surgeons' awareness of surgical consumable costs.	Does providing surgeons with a continuous assessment of operating room expenditures lead to cost saving behavior changes?	Pilot	Four general surgeons	Evaluate cost of disposable medical supplies every three months for Roux-en-Y gastric bypass procedures performed at single hospital in one year.	1. Independent Variable: Bi-weekly surgical cost report, "Surgeon Cost Report Card". Card contains 1) Surgeon specific disposable medical supply amount consumed and the total cost average. 2) A total cost average of all participants for same procedure and time period.	1. Dependent Variable: 1) Surgeon behavior change with the goal of cost reduction. 2. Ordinal/Ratio level of measurement (cost).	Repeated measures ANOVA	Conducted 293 gastric bypass procedures in one year. Set potential yearly savings of up to $160,000 (18%) for Roux-en-Y gastric bypass procedures alone—an equivalent of 64 additional cases.	Pilot study - determined the feasibility of the intervention.	Limited to type of procedure and surgical specialty. Limited number of participants/sample (no power analysis). Degree of internal validity unknown/ no external validity avail.	V
Ibrahim, 2017	This is a commentary written on surgeon scorecard, not a	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Leyton-Mange et al., 2018	This is a column written on surgeon scorecard, not a study article.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Plank, 2019	The OR Cost Awareness (ORCA) team reviews compares supply cost per procedure and identify items that can be substituted without affecting the quality of patient care.	To evaluate how each ORCA team can get the most value for the products used for some procedures through cost sharing, recommendation, and adoption.	Not a research study.	Not described	Not described	OR Strategies Implemented: 1. Standardized implants 2. Cost sharing on supplies 3. Product review committee 4. Hold items unopened till needed 5. Recycling program 6. Using less expensive disposables to reusable 6. Streamline skits/packs	OR costs per case	Not a research study.	Maximum responders responded "yes" to OR strategies implemented have been affected in reducing costs according to a poll question.	Not described	Not described	V
Ross et al., 2019	The aim is to assess whether the cost-awareness campaign for revealing the price of reusable instruments influence the surgeon's choice of instruments and may reduce surgical costs.	Does a cost-awareness campaign lead to a change in use and costs of disposable surgical supplies for laparoscopic hysterectomy (LH) without increasing hospital utilisation measures (operating room (OR) time or hospital length of stay (LOS))?	Pre and post non-controlled study.	12 eligible surgeons; the pre cohort consisted of 201 cases and the post- cohort included 229 cases.	All surgery was performed in the OR suite. The eligibility criteria for cases included: females ≥18 years having a LH and all types of LH procedures. Only cases starting as LH were eligible, including total laparoscopic hysterectomy (TLH), subtotal laparoscopic hysterectomy and laparoscopic-assisted vaginal hysterectomy, as well as those procedures that were converted to a total abdominal hysterectomy.	The cost-awareness intervention for the surgeons included meetings and rounds that involved costs, education, and OR posters.	Disposable supplies costs per case based on 2016 prices.	χ2 tests and Fischer's e	There was a decrease in supply cost per case for LH between cases before and after the intervention: from $C1073, SD 281, to $C943 SD 209. Regression analysis found that the adjusted cost per case after the intervention was $C116.	The cost-awareness intervention was a strength—the intervention incorporated several strategies including a skills lab, and operating room (OR) posters and equipment demonstrations.	Limitations were lack of a control group of patients and data were available only for index admission— longer-term follow-up was not available.	III
Tabib et. al, 2015	The aim of this study was to increase physician awareness with cost in surgical procedures and develop protocol for cost-saving measures.	We hypothesize that this protocol will reduce costs without sacrificing quality of care.	Retrospective cost analysis	One surgeon on two low volume cases (N=20): laparoscopic robot assisted partial nephrectomies and Laparoscopic donor nephrectomies	IU-Health University Hospital	1. Item and cost data were gathered from SurgiNet and the Lawson Portal. These data were then compiled to analyze. A cost feedback report was created using the data from the cost spreadsheet.	Total cost for all cases before and after intervention for laparoscopic robot-assisted partial nephrectomy and laparoscopic donor nephrectomy .	Independent sample t test to compare the means of total costs and total modifiable items cost savings before and after feedback.	Robot-assisted partial nephrectomy before the washout period shows spending of $5243.04 per case. Ten items have a cost of $1229.33 which is 23.4% of the cost. A post washout period cost found the total cost lessen $899.67.	Surgical equipment price was a strength as is educated the surgeons the impact of cost.	This study does not address the underlying factors as to why waste occurs. Another limitation is the small sample size.	II
Winegar et al., 2019	Examine the effectiveness of an unblinded orthopaedic surgeon-specific value scorecard in improving patient outcomes and reducing hospital costs.	Decrease operating room supply costs by measuring and communicating procedure costs and clinical outcomes to surgeons.	Retrospective, cohort study	First cohort included 10 surgeons performing a mean of 37.9 arthroplasties. The second cohort included 9 surgeons performing a mean of 39.7 procedures.	Urban tertiary care center, Participants included orthopedic surgeons performing lower extremity arthroplasty.	Intervention group received unblinded monthly Surgeon Value Scorecard summarizing a rolling 6-month view of results by surgeon for patients receiving major lower extremity arthroplasty without comorbidity or complication.	1. Mean total costs for total joint arthroplasties. 2. Patient outcomes: postoperative length of stay; patients discharged to skilled nursing facility or inpatient rehabilitation; 30-day and 90-day readmissions.	Mann-Whitney tests, t tests, and chi-square tests, Levene test.	1. A total of 379 patients received total joint arthroplasty by the first cohort. The second cohort operated on 357 patients. Mean total costs decreased by 8.7% from $17,996 to $16,426. 2. Postoperative length of stay decreased by 0.23 days with 56% discharged on postoperative day 1; discharge to skilled nursing facility or inpatient rehabilitation decreased by 20%; 30-day readmission improved by 26% and 90-day readmission improved by 39%.	Participants were involved in metrics selection to be measured by surgeon scorecard. Results were achieved without the motivation of financial incentive.	Study limited to orthopaedic surgeons in a singel facility. Future studies should examine cost variation directly to determine which factors contribute most directly to cost variation in joint arthroplasty. Because of the retrospective nature of the study, it is difficutly to dedice whtether the measured impact on value was casued by the scorecard introdcution or by a	III
Zhao et al., 2018	This study is aimed at looking at the effects of surgical expenditures for five common surgical procedures.	An automated, surgeon-directed, cost feedback system can decrease supply expenditures for five common general surgery procedures.	Retrospective design	Lumpectomy (N=811), laparoscopic cholecystectomy (N=504), laparoscopic appendectomy (N= 439), thyroidectomy (N=448), and open inguinal hernia repair (N=342)	Study performed at a single-institution, multi-hospital. The five commonly performed general surgery procedures before and after the implementation of an institution wide surgical receipt program was observed.	Surgical receipts were provided to the primary surgeon of record for each surgical procedure. Information presented on these receipts included total case cost, a list of supplies and implants used during the case, associated per-unit cost and per-case sums for each supply item, and a comparison of the primary surgeon's case cost with an average of all other providers for the same procedure	1. Median case cost after surgical receipt intervention. 2. Median incision-to-closure times. 3. Patient length of stay. 4. Patient clinical outcomes. This was measured over an 18 month period of before and after separated by an unmeasured 1 month transition period.	1. Mann Whitney U test 2. Two-tailed significance thresholds were set at P < 0.05. Statistical analysis was performed using SPSS.	Median costs decreased significantly for open inguinal hernia ($433.45 to $385.49, P < 0.001), laparoscopic cholecystectomy ($886.77 to $816.13, P ¼ 0.002), and thyroidectomy ($861.21 to $825.90, P ¼ 0.034). Median costs were unchanged for laparoscopic appendectomy and increased significantly for lumpectomy ($325.67 to $420.53, P < 0.001). There was an increase in incision-to-closure minutes for open inguinal hernia (71 to 75 min, P < 0.001) and laparoscopic cholecystectomy (75 to 96 min, P < 0.001), but a decrease in thyroidectomy (79 to 73 min, P < 0.001). There were no differences in postoperative occurrence rates and length of stay duration.	The study used a technique that obtained more accurate prices for supply. To control the change in prices, a price adjustment technique was used. A master price list for each item was used.	1. Database did not include the cost of medications; medications have the potential to have a big cost to procedures. 2. The surgical procedures were selected after querying for the most common major procedures performed which is selection bias. 3. Surgical receipts were emailed and there is no way to tell if they were read.	II
Zygourakis et al., 2017	To examine the association between providing surgeons with individualized cost feedback and surgical supply costs in the operating room.	What is the association between providing surgeons with individualized cost feedback and surgical supply costs?	Prospective controlled study	Intervention group included 63 attending surgeons. Control group included 186 attending surgeons.	Single-health system, multihospital, multidepartmental in an urban academic setting. Intervention group included attending surgeons in orthopedic, otolaryngology, and neurological surgery. Control group included attending surgeons in cardiothoracic, general, vascular, pediatric, obstetrics/gynecology, ophthalmology, and urology surgery.	Intervention group received standardized monthly scorecards showing median surgical supply cost for each procedure type performed and compared with the surgeon's baseline. This information was then compared with all surgeons at the facility performing the same procedure at baseline.	1. Median surgical supply direct costs per case. 2. Patient outcomes: 30-day readmission, 30-day mortality, and discharge to a location other than home.	Timed series mixed model. Two sample t-tests.	1. The median surgical supply direct costs per case decreased 6.54% in the intervention group. In contrast, the median surgical supply direct cost increased 7.42%in the control group. The intervention group saved $836,147 on surgical supplies during the year of the study. 2. Patient outcomes were equivalent or improved in the intervention group.	Targeted surgeons across several specialists performing a broad range of surgical procedures. Fed into surgeon competitive nature by comparing amongst peers. Cost reduction associated with scorecard use persisted even after adjusting for surgeon , department, and patient demographics, and clinical indicators in the statistical model.	One study limitation is that they could not definitively say that the OR SCORE study feedback directly led to cost reduction but rather that there is a significant association between scorecard use and cost reduction in the intervention group that is not seen in the control group. Team was unsure if scorecard would be effective at reducing costs without the financial incentive offered to those that met a 5% cost reduction goal. Scorecards were only provided to attending surgeons; surgical residents, circulating nurses and scrub technicians are not included.	II

The Utilization of the Surgeon Scorecard to Decrease Operating Room Cost by Increasing Awareness

Richard Anderson, Mihye Kim, Jesse Rivera-Rosario, and Christy Velasquez

Uniformed Services University

NURS 5220 Translation of Evidence

Dr. Jouhayna Bajjani-Gebara, CAPT Heather King, Dr. Khalilah McCants,

CDR Kennett Radford, and Dr. Jennifer Trautmann

November 29, 2020

BUSINESS CASE with VALUE BASED CARE ASSESSMENT

Proposed Title for Project/Initiative/Opportunity to Improve

Utilization of Clinical Nurse Specialist-Driven Awareness Campaign to Decrease Operating Room Expenses and Improve Patient Outcomes.

Opportunity Statement

Implementing a surgical supply costs feedback system will grant stakeholders critical information to guide supply selection, reduce variance, decrease costs, and improve quality and safety.

Business Opportunity/Objectives

Macro objectives: The primary objective of this business case is to decrease surgical supply costs at the medical treatment facility level.
Micro objectives: Achieving the main objective will require development of metrics to monitor spending and patient outcomes, and tools to communicate information to stakeholders to increase awareness.

Potential Impact of the Initiative/Project

Surgical supply selection varies amongst providers and has led to initiatives that focus on standardization. Higher costs to perform surgery does not always translate to better patient outcomes. In an effort to ameliorate the financial burden caused by the rising costs of surgical supplies, the American Association of Orthopaedic Surgeons (AAOSS) encourages surgeons to weigh the costs of implant selection with the potential for improved patient outcomes (Morellato et al., 2019). The military healthcare system is not a profit driven organization and currently lacks a process to track surgical supply expenses accrued during surgery (F. D. Salazar, personal communication, September 30, 2020). Without existing benchmarks there is a gap in transparency that is critical to an organization's ability to assess its financial performance and identify opportunities for improvement. Increasing awareness of surgical supply costs empowers surgeons to adjust their practice and exercise their influence to increase value and reduce costs (Zygourakis et al., 2017). Key metrics to measure include surgical supply expenses per procedure, patient discharge status, 30-day readmission, and 30-day mortality rates. This initiative supports the shift to value-based care and aligns with the Defense Health Agency's Quadruple Aim of Better Care, Better Health, Lower Cost, and Increased Readiness (Butler, 2018). Eliminating waste and decreasing variation can produce substantial cost savings. Improving the quality of services rendered leads to better health and increased warfighter readiness to support military operations.

Alternatives (courses of action) chosen for Analysis

1. Surgeon Scorecard (SSC): Data feedback of supplies utilized by individual surgeons per procedure. Data gathered tracked against types of procedure and against peers within specialty.

2. Surgeon Preference Card Standardization: Review, optimization, and standardization of surgeon preference cards. Procedural preference cards within surgical specialty standardized among all surgeons.

3. *"Status Quo"*: Currently, no budgetary system is in place at military treatment facilities (MTF's) for tracking surgical operation supply costs per surgeon. Facility Logics & Supply department provides facility gross data on departmental supply costs.

<table>
<tr><th colspan="2">Analysis of Alternatives</th></tr>
<tr><td>Alternative 1:</td><td>Surgeon Scorecard</td></tr>
<tr><td>Pros</td><td>Cons</td></tr>
<tr><td>Benefits: Effective at reducing intraoperative costs without risking patient safety (Childers et al., 2018). Maintains cost transparency and accountability at the individual physician (Gunaratne, Cleghorn & Jackson, 2016) and within the surgical specialty department. Able to be embedded into the culture of surgical cost metrics analysis.

Overall Outcome Impact on Cost: Savings ranged from $38 to $732 per operation and summed to nearly $1 million over the course of a year (Childers et al., 2018).

Expectations when costs will be realized: Timeline based on impact of scheduled reports following implementation. Data gathering increments set in collaboration with surgeons and operating room leadership.

Potential impact on other org. metrics: Implementation uses existing infrastructure requiring minimal added investment (Gunaratne, Cleghorn & Jackson, 2016).

Unquantifiable benefits impact: Allows surgeons the most flexibility for cost mitigation - most probable buy-in from surgeons (Childers et al., 2018). Competition among peers shown to improve cost mitigation practices. Objectively able to make decisions for change(s) based on data. Data develops individual and department cost benchmarks.</td><td>Cost saving/avoidance: Cost savings may be modest according to most studies, estimating savings of less than $100 per case (Childers et al., 2018).

Vulnerabilities related to Risk-Management: Awareness may impact to motivate individual surgeons differently to reduce supply expenditures.</td></tr>
<tr><td>Alternative 2:</td><td>Surgeon Preference Card Standardization</td></tr>
<tr><td>Pros</td><td>Cons</td></tr>
<tr><td>Benefits: Method of cost containment, reduces unwanted variations (Gani et al., 2016). Effective at reducing intraoperative costs without risking patient safety or affecting length of stay (Childers et al., 2018).

Cost saving/avoidance: Savings ranged from $145 to $575 per operation (Childers et al., 2018). Avoidance in wasted costs due to supplies opened in</td><td>Benefits: More stringent standardization appears to be related to the magnitude of cost savings (Childers et al., 2018). More cost savings leaves minimal flexibility for surgeon independence.

Overall Outcome Impact on Cost: Limited in flexibility to mitigate cost on continual basis.</td></tr>
</table>

error was $2446.20 over 6mo/30 cases (Rose et al., 2019). Savings of $893,865 in nine months by standardizing three different neurosurgical supplies (Ahmadi, et al., 2019). **Potential impact on other org. metrics:** Surgeon variances in procedures can contribute 8% in costs (Gani et al., 2016). **Potential impact on other org. metrics:** Facility supply chain maintain relative predictable quantity and cost variances (Huntley et al., 2018).	**Expectations when costs will be realized**: Studies report savings seen in increments between 3 to 6 mo. **Vulnerabilities related to Risk-Management:** Different patient acuity levels may require deviation from standardization; one type preference card does not apply to all (Gani et al., 2016). A more restrictive preference card was found to increase procedure time of 2 minutes, whereas a flexible card showed no difference (Childers et al., 2018). Likely push-back from surgeons - seen as infringing on producing unique individualistic surgical practices. Changes to cards may require collective agreement among surgeons/specialty departments.
Alternative 3:	***"Status Quo"***
Pros	**Cons**
Surgeons are not limited to lower budgeted supply items. Surgeons can utilize item quantity based on their discretion without impact of cost containment.	**Benefits:** There are none. Lack of surgical supply tracking provides no quantifiable benchmark data, and insight into areas for improvement and cost mitigation. **Cost:** Status Quo leads to a lack of quantifiable data regarding supply consumption, inventory levels, product duplication and procedure costs, key stakeholders of the financial, clinical, and operational departments will be impacted by supply chain issues. "You can't manage what you don't measure." Inventory costs are estimated to be between 10% and 18% of net revenues (Moons, Waeyenbergh & Pintelon, 2018). **Cost saving/avoidance:** Status Quo does not promote close surgical supply collaboration and could lead to a loss of savings of savings of $987,000 to $1.7 million (Ahmadi, et al., 2019). **Expectations when benefits will be realized**: Status Quo offers no timeline of quantifiable benefits since Status Quo will not conduct supply cost tracking. **Potential impact on other org. metrics:** Status Quo prevents the building a performance measurement framework to prioritize between

	multiple performance indicators (Moons, Waeyenbergh & Pintelon, 2018). **Unquantifiable benefits or costs/Business impact**: Mismanagement, accountabilities of supplies, may have unintended consequences (e.g. endanger patient's life) and/or lost revenue (Moons, Waeyenbergh & Pintelon, 2018).

Assumptions

Metric/benchmark

- Identify surgical procedure(s) with significant variance in surgical supply spending.
- Select orthopedic surgeons that perform the procedures selected for study.
- Develop surgical supply costs list for items used during the procedure(s) selected for study.
- Select metrics to evaluate safety and quality (i.e. patient discharge status, 30-day readmission, and hospital acquired infections).
- Develop a dashboard to display median surgical supply costs for each surgeon.
- Acquire preference cards for each surgeon, for procedure(s) type they perform included in the study.
- Compare pre-intervention baseline data with study results to determine effect.
- Conduct post-intervention surveys to evaluate surgeon perception on effectiveness.
- Providing weekly updates on costs that are comparable amongst surgeons will increase their awareness, appeal to their competitive nature, and reduce surgical supply expenditures.

Time Frame:

- One-month data collection period to determine baseline for surgical supply expenses with "status quo".
- Two-month implementation phase for data collection on surgical supply costs with selected alternative.

Recommendation and Rationale

Recommendation

Surgeon Scorecard (SSC)

Rationale

Based on the analysis of three alternatives, the most cost savings were observed with Alternative #1 and Alternative #2 throughout the literature review. Major factors for the final selection between two alternatives were elements of surgeon autonomy and flexibility. Alternative #2 leaves little room for individual surgeon procedural autonomy compared to Alternative #1. Furthermore, potential for continuing behavior changes from having cost awareness was also an important factor. Alternative #1 provides ongoing awareness of surgical supply costs and provides essential metrics - key for objective decision making (i.e. financial/procedural), individual surgeon and specialty department benchmarking, and ongoing performance evaluations.

Value Based Care

I. **Volume projection based on:** Case volume was determined by total caseloads completed over the length of the study period (Austin et al., 2017). Volume capture can be done through capturing case numbers in S3.

II. **Variable Costs**

Surgeon Scorecard Dashboard and brochure printouts	$70.00
Incentives (surgeon Rockstar trophy, Keurig coffee maker, Starbucks gift cards)	$134.00
Hospital Incentive (optional)	$500.00

TOTAL VARIABLE COST: $204.00

III. **Projected total savings**

Zygourakis et al., (2017) researched surgical supply costs prior and after surgical scorecard intervention. Orthopedic services were an intervention group that displayed significant total supply reduction.

Literature	Pre-Intervention Total Supply Cost, Median IQR (n=2288)	Post-Intervention Total Supply Cost, Median IQR (n=2546)	% Change	Cost Savings
Zygourakis et al., 2017	$2578 (IQR $1230 - $3550)	$2433 (IQR $948 - $3319)	-5.63	**$145 per case**

*IQR = Interquartile Range

ANNUAL PROJECTED TOTAL SAVINGS = $145 x (average # of cases) 9,668 cases = **$1,401,860.00**

Gill et al. (2020) assessed costs each week after SSC were given to the primary surgeon on a weekly basis.

Literature	Pre-Intervention Median Cost $, IQR (n=239)	Post-Intervention Week 1 Median Cost ($), IQR (n=106)	Post-Intervention Week 2 Median Cost ($), IQR (n= (106)	Cost Savings
Gill et al., 2020	$1229.64 ($875.81–$2003.23)	$1325.02 ($873.76–$2404.18)	$1097.22 ($777.46–$1499.09)	**$132.42 per case**

*IQR = Interquartile Range

ANNUAL PROJECTED TOTAL SAVINGS: $132.42 x (average # of cases) 7,904 = **$1,046,647.68**

Risks and Mitigation Plan	
Risks	**Plan**
1. Surgeons are reluctant to participate in project implementation.	1. Get buy-in and approval through Surgical Service leadership. Provide education to perioperative leadership and surgical staff on the problem, purpose, surgical scorecard intervention, and potential cost savings.
2. Surgeons are unaware of the variances on surgical supply selection amongst each other.	2. Provide a list of supply costs and utilization status to surgeons.
3. Surgeons misinterpret data on SSC.	3. Provide detailed information on how to read and interpret elements of SSC.
4. Staff nurses and surgical technicians do not account for all items such as items opened on the back table.	4. Study investigators will account for items for data collection and SSC.
5. SSC results no behavioral change among participants post-intervention.	5. Continue to reinforce and education project participants the benefit of SSC intervention. If there is a failure, return to the "status quo".

Implementation Plan		
Phase 1:	Literature search and gathering evidence	
Milestone Description:	Perform literature search and article reviews. Consult with experts to refine the research question and project plan. Gather institutional baseline data from designated MTF's operating room (OR).	
Deliverables	Due Date	Accountable Person
- Literature review and evidence appraisal of at least 15 peer reviewed articles - Institutional baseline data - Mapping of project plan	Two months	Principle POC/Investigator
Resources Needed		
Access to research databases. Time and privilege to access OR. Mitigate risks by collaborating with subject matter expert (SME) and Learning Resource Center (LRC) librarians. Involve the logistics officer to gather supply cost data and the orthopedic team leader to identify schedules of selected orthopedic procedures.		
Expected Level of Benefit		
The project is supported with the evidence-based peer-reviewed study findings. Baseline data from OR and logistics will provide data comparison to indicate whether the project is effective or not.		
Phase 2:	Business case presentation and leadership approval	
Milestone Description:	Business case presentation to key stakeholders. Introduce the purpose and plan for the SSC project. Gain buy-in at the highest level of organizational leadership and receive approval from leadership to proceed with the proposed project. Establish project champions.	
Deliverables	Due Dates	Accountable Person

- Professional PowerPoint presentation - Information flyers of supporting data from peer-reviewed articles to enhance project buy-in	One month after the completion of data collection (Total at 3 months)	Principle POC/Investigator
Resources Needed		
Time to generate a professional level PowerPoint presentation and information flyers. Access to professional technical support and color printer. Scheduling a meeting with all key stakeholders. Time and privilege to access the designated MTF. Mitigate risks by collaborating with colleagues and experts to ensure quality and accuracy of the presentation. Practice speech and slide transition prior to the presentation day.		
Expected Level of Benefit		
Buy-in from the highest level of leadership allows the project implementation and viability. Dissemination to all key stakeholders promote shared understanding and open communication. Leadership approval promotes surgical staff participation and compliance to the project plan. Gain authority access to restricted areas including the OR and the orthopedic clinic.		
Phase 3:	Pre-implementation preparation	
Milestone Description:	Business case presentation to surgical staff including orthopedic surgeons, perioperative nurses, surgical technicians, and anesthesia providers. Introduce the purpose and plan for the surgeon scorecard project and provide expectations for the data gathering process. Gain buy-in from surgical staff with the assistance of pre-designated project champions.	
Deliverables	Due Dates	Accountable Person
- Professional PowerPoint presentation - Information flyer with project timeline, what to expect during the data collection, and contact information	Two weeks after the leadership approval to proceed (Total at 3.5 months)	Principle POC/Investigator, department leadership, project champions
Resources Needed		
Time to generate a brochure specific for surgical staff. Access to professional technical support and color printer. Scheduling meetings with surgical staff. Mitigate risks by assessing and supporting project champions for enthusiasm and motivation toward implementing the project.		
Expected Level of Benefit		
All involved surgical staff have a collective understanding project plan and purpose.		
Phase 4:	Project implementation and data gathering	
Milestone Description:	Gather data and provide data feedback of supplies utilized by individual surgeons per procedure for 8 weeks. Gathered data are updated and presented weekly on a dashboard for comparison amongst peers within the orthopedic specialty. Weekly SSC email is also sent out to all participating orthopedic surgeons and Chief of Surgery.	
Deliverables	Due Dates	Accountable Person
- Supply utilization data collection and analyzation into tables and graphs - Weekly SSC feedback board - Weekly SSC emails	Two months after the pre-implementation presentation (Total at 5.5 months)	Principle POC/Investigator

Resources Needed		
Time to observe and record data from surgical procedures. Adequate personal protective equipment (PPE) in OR. Presentation dashboards. Mitigate risks for unaccounted supply items by collaborating with circulating nurses and surgical technicians. Continue to work with project champions to engage staff for compliance.		
Expected Level of Benefit		
Accurate data collection and distribution. Provide surgeons with quick and easy-to-access feedback data promoting cost consciousness and supply stewardship.		
Phase 5:	Post-intervention surgeon survey	
Milestone Description:	Disseminate post-intervention surveys to participating surgeons after the completion of the project. Analyze the returned survey results.	
Deliverables	Due Dates	Accountable Person
- Post-intervention surgeon survey	One month after the completion of the project implementation (Total at 6.5 months)	Principle POC/Investigator
Resources Needed		
Time to generate, distribute, and collect the post-intervention surgeon survey. Mitigate risks for data misinterpretation by collaborating with subject matter experts (SME). Collaborate with institutional leadership to promote survey return.		
Expected Level of Benefit		
Gain insight on elements leading to the SSC project outcome.		
Phase 6:	Data analysis and outcome presentation	
Milestone Description:	Conduct analysis of data comparisons on supply utilization and cost avoidance/savings per surgeons before and after the SSC project implementation. Observe measurable decrease in supply cost after the project implementation. Outcomes presentation to key stakeholders.	
Deliverables	Due	Accountable Person
- Data analysis and result presentation - Final SSC to participating surgeons	One month after the completion of the surgeon survey (Total at 7.5 months)	Principle POC/Investigator
Resources Needed		
Time to process data to accurately reflect the outcome. Time to generate a professional level PowerPoint presentation. Access to professional statistics support. Scheduling a meeting with all key stakeholders. Mitigate risks by collaborating with colleagues and subject matter experts to ensure quality of the presentation. Practice speech and slide transition prior to the presentation day.		
Expected Level of Benefit		
Deliver necessary information to determine the benefit of the SSC project in reducing variance and decreasing costs without sacrificing care quality and patient safety.		

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Appendix D: Project Timeline

	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY
Proposal approval	x										
Recruit interprofessional team	x										
Develop and refine EBP question	x										
Identify stakeholders	x										
Establish shared project leadership	x										
Schedule team meetings	x										
Literature review	x										
Appraise the evidence	x										
Summarize the evidence	x										
Synthesize quality of evidence	x										
Develop recommendations	x										
Create action plan		x									
Determine action plan feasibility		x									
IRB approval process		x	x								
Present business case analysis to stakeholders		x									
Gain organizational leadership approval and buy-in		x									
Secure resources and support		x									
Pre-implementation baseline data gathering			x	x							
Implement action plan				x	x						
Audit individual surgeon's supply usage for single-level TLIF procedures				x	x						
Provide weekly SSC to each surgeon via email				x	x						
Provide weekly anonymous comparison data to OR and Ortho clinic				x	x						
Conduct post-intervention surgeon survey					x	x					
Present audit results and surgeon performance to stakeholders							x				
Analyzed data and evaluate outcome							x	x			
Report outcome and evidence-based recommendations to stakeholders									x		
Identify next steps									x		
Disseminate findings										x	
Prepare presentation										x	
USUHS presentation											x

DOCTOR OF NURSING PRACTICE PROJECT
DNP Project Clinical Question and Team Mentor (Committee Membership) Agreement Form

Graduation Year: 2022

Name(s) of DNP Project Student Team:

1. Captain Richard Anderson	Phase II Site:	AGCNS	[x]	FNP	[ ]	PMHNP	[ ]	RNA	[ ]	WHNP [ ]
2. Captain Mihye Kim	Phase II Site:	AGCNS	[x]	FNP	[ ]	PMHNP	[ ]	RNA	[ ]	WHNP [ ]
3. Major Jesse Rivera-Rosario	Phase II Site:	AGCNS	[x]	FNP	[ ]	PMHNP	[ ]	RNA	[ ]	WHNP [ ]
4. Major Christy Anne R. Velasquez	Phase II Site:	AGCNS	[x]	FNP	[ ]	PMHNP	[ ]	RNA	[ ]	WHNP [ ]
5.	Phase II Site:	AGCNS	[ ]	FNP	[ ]	PMHNP	[ ]	RNA	[ ]	WHNP [ ]
6.	Phase II Site:	AGCNS	[ ]	FNP	[ ]	PMHNP	[ ]	RNA	[ ]	WHNP [ ]

The tentative title of the DNP Project Proposal for this student group is: The Surgical Scorecard: A Surgical Cost Feedback Tool

Committee Approved DNP Project Clinical Question: (P) Among orthopedic surgeons performing lower extremity total joint arthroplasties, (I) how does providing a weekly scorecard displaying surgical median costs per provider, (C) compared with no scorecard feedback, (O) affect intraoperative surgical costs?

Names of DNP Project Team Mentors

I agree to serve as a member of the DNP Project Team (Team Mentors) for the above DNP Student Project Team. As a Project Team Mentor, I agree to the duties and responsibilities outlined within the DNP Project Manual which include but are not limited to the provision of consultation and guidance supporting the entire DNP project journey and to ensure the DNP project is of sufficient rigor and demonstrates doctoral level scholarship to meet the requirements for USUHS GSN graduation.

NOTE: You may have 3-4 DNP Team Mentors [committee members including your DNP Senior Mentor (Chair)]. The Phase II Site Director may also be a member of the group, as well as other USUHS faculty or others who may serve as content experts. All non-USUHS faculty selected as a Team Mentor must be approved by the DNP Project Director.

Senior Mentor (Chair):	Dr. Jose A. Rodriguez	Signature:	Date:
Team Mentor (Committee):	Dr. Laura Taylor	Signature:	Date:
Team Mentor (Committee):	Dr. David Bradley	Signature:	Date:
Team Mentor (Committee):	Dr. Khalilah Mccants	Signature:	Date:

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Mihye Kim ([redacted])
- **Institution Affiliation:** Office of the Under Secretary of Defense (Personnel and Readiness) (ID: 603)
- **Institution Email:** mihye.kim@usuhs.edu
- **Phone:** 6099709240

- **Curriculum Group:** OUSD P&R Human Research
- **Course Learner Group:** Biomed Research Coordinators, Clinical Coordinators, Study Coordinators & Research Administrators
- **Stage:** Stage 1 - Basic Course

- **Record ID:** [redacted]
- **Completion Date:** 31-Mar-2020
- **Expiration Date:** 31-Mar-2023
- **Minimum Passing:** 80
- **Reported Score*:** 92

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Module for Non-DoD Personnel Conducting Research Involving Human Subjects Supported by the DoD (ID: 16769)	29-Mar-2020	No Quiz
Belmont Report and Its Principles (ID: 1127)	29-Mar-2020	3/3 (100%)
History and Ethics of Human Subjects Research (ID: 498)	31-Mar-2020	5/5 (100%)
Informed Consent (ID: 3)	31-Mar-2020	5/5 (100%)
Social and Behavioral Research (SBR) for Biomedical Researchers (ID: 4)	31-Mar-2020	3/4 (75%)
Records-Based Research (ID: 5)	29-Mar-2020	3/3 (100%)
Genetic Research in Human Populations (ID: 6)	29-Mar-2020	4/5 (80%)
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	29-Mar-2020	5/5 (100%)
Research Involving Prisoners (ID: 8)	31-Mar-2020	4/4 (100%)
Research Involving Children (ID: 9)	31-Mar-2020	3/3 (100%)
Research Involving Pregnant Women, Fetuses, and Neonates (ID: 10)	29-Mar-2020	3/3 (100%)
FDA-Regulated Research (ID: 12)	29-Mar-2020	4/5 (80%)
Research and HIPAA Privacy Protections (ID: 14)	29-Mar-2020	4/5 (80%)
Conflicts of Interest in Human Subjects Research (ID: 17464)	29-Mar-2020	5/5 (100%)
Defining Research with Human Subjects - SBE (ID: 491)	29-Mar-2020	5/5 (100%)
The Federal Regulations - SBE (ID: 502)	29-Mar-2020	4/5 (80%)
Assessing Risk - SBE (ID: 503)	29-Mar-2020	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	29-Mar-2020	5/5 (100%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	29-Mar-2020	5/5 (100%)
Internet-Based Research - SBE (ID: 510)	29-Mar-2020	3/5 (60%)
International Studies (ID: 971)	31-Mar-2020	3/3 (100%)
The IRB Member Module - 'What Every New IRB Member Needs to Know' (ID: 816)	29-Mar-2020	5/5 (100%)
Office of the Under Secretary of Defense (Personnel and Readiness) (ID: 912)	29-Mar-2020	No Quiz

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COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Mihye Kim [redacted])
- **Institution Affiliation:** Office of the Under Secretary of Defense (Personnel and Readiness) (ID: 603)
- **Institution Email:** mihye.kim@usuhs.edu
- **Phone:** 6099709240

- **Curriculum Group:** OUSD P&R Human Research
- **Course Learner Group:** Biomed Research Coordinators, Clinical Coordinators, Study Coordinators & Research Administrators
- **Stage:** Stage 1 - Basic Course

- **Record ID:** [redacted]
- **Report Date:** 01-Nov-2020
- **Current Score**:** 92

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
Informed Consent (ID: 3)	31-Mar-2020	5/5 (100%)
Defining Research with Human Subjects - SBE (ID: 491)	29-Mar-2020	5/5 (100%)
The Federal Regulations - SBE (ID: 502)	29-Mar-2020	4/5 (80%)
Social and Behavioral Research (SBR) for Biomedical Researchers (ID: 4)	31-Mar-2020	3/4 (75%)
Belmont Report and Its Principles (ID: 1127)	29-Mar-2020	3/3 (100%)
Records-Based Research (ID: 5)	29-Mar-2020	3/3 (100%)
Assessing Risk - SBE (ID: 503)	29-Mar-2020	5/5 (100%)
Genetic Research in Human Populations (ID: 6)	29-Mar-2020	4/5 (80%)
Research Involving Prisoners (ID: 8)	31-Mar-2020	4/4 (100%)
Privacy and Confidentiality - SBE (ID: 505)	29-Mar-2020	5/5 (100%)
Research Involving Children (ID: 9)	31-Mar-2020	3/3 (100%)
Research Involving Pregnant Women, Fetuses, and Neonates (ID: 10)	29-Mar-2020	3/3 (100%)
FDA-Regulated Research (ID: 12)	29-Mar-2020	4/5 (80%)
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	29-Mar-2020	5/5 (100%)
Research and HIPAA Privacy Protections (ID: 14)	29-Mar-2020	4/5 (80%)
Internet-Based Research - SBE (ID: 510)	29-Mar-2020	3/5 (60%)
History and Ethics of Human Subjects Research (ID: 498)	31-Mar-2020	5/5 (100%)
Office of the Under Secretary of Defense (Personnel and Readiness) (ID: 912)	29-Mar-2020	No Quiz
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	29-Mar-2020	5/5 (100%)
International Studies (ID: 971)	31-Mar-2020	3/3 (100%)
The IRB Member Module - 'What Every New IRB Member Needs to Know' (ID: 816)	29-Mar-2020	5/5 (100%)
Conflicts of Interest in Human Subjects Research (ID: 17464)	29-Mar-2020	5/5 (100%)
Module for Non-DoD Personnel Conducting Research Involving Human Subjects Supported by the DoD (ID: 16769)	29-Mar-2020	No Quiz

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COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Jesse Rivera-Rosario [redacted])
- **Institution Affiliation:** FDA (ID: 2617)
- **Institution Email:** jesse.rivera-rosario@usuhs.edu
- **Institution Unit:** Uniformed Services University
- **Phone:** 3017425070

- **Curriculum Group:** Good Clinical Practice (U.S. FDA Focus)
- **Course Learner Group:** GCP for Clinical Trials with Investigational Drugs and Medical Devices (U.S. FDA Focus)
- **Stage:** Stage 1 - GCP

- **Record ID:** [redacted]
- **Completion Date:** 29-Mar-2020
- **Expiration Date:** 29-Mar-2023
- **Minimum Passing:** 80
- **Reported Score*:** 100

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
The CITI Good Clinical Practice Course for Clinical Trials Involving Drugs and Devices (ID: 1350)	29-Mar-2020	3/3 (100%)
Informed Consent in Clinical Trials of Drugs, Biologics, and Devices (ID: 1359)	29-Mar-2020	4/4 (100%)
Overview of New Drug Development (ID: 1351)	29-Mar-2020	5/5 (100%)
Overview of ICH GCP (ID: 1352)	29-Mar-2020	4/4 (100%)
ICH - Comparison Between ICH GCP E6 and U.S. FDA Regulations (ID: 1354)	29-Mar-2020	5/5 (100%)
Conducting Investigator-Initiated Studies According to FDA Regulations and GCP (ID: 1355)	29-Mar-2020	3/3 (100%)
Investigator Obligations in FDA-Regulated Research (ID: 1356)	29-Mar-2020	5/5 (100%)
Managing Investigational Agents According to GCP Requirements (ID: 1357)	29-Mar-2020	5/5 (100%)
Overview of U.S. FDA Regulations for Medical Devices (ID: 1358)	29-Mar-2020	3/3 (100%)
Detecting and Evaluating Adverse Events (ID: 1360)	29-Mar-2020	4/4 (100%)
Reporting Serious Adverse Events (ID: 1361)	29-Mar-2020	4/4 (100%)
Audits and Inspections of Clinical Trials (ID: 1363)	29-Mar-2020	5/5 (100%)
Monitoring of Clinical Trials by Industry Sponsors (ID: 1362)	29-Mar-2020	5/5 (100%)
Completing the CITI GCP Course (ID: 1364)	29-Mar-2020	No Quiz

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COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Jesse Rivera-Rosario ([redacted])
- **Institution Affiliation:** FDA (ID: 2617)
- **Institution Email:** jesse.rivera-rosario@usuhs.edu
- **Institution Unit:** Uniformed Services University
- **Phone:** 3017425070

- **Curriculum Group:** Good Clinical Practice (U.S. FDA Focus)
- **Course Learner Group:** GCP for Clinical Trials with Investigational Drugs and Medical Devices (U.S. FDA Focus)
- **Stage:** Stage 1 - GCP
- **Description:** This GCP training contains all of the attested CITI Program modules from the **GCP for Clinical Trials with Investigational Drugs and Medical Devices (U.S. FDA Focus) Version 2**. This ICH E6 GCP Investigator Site Training meets the Minimum Criteria for ICH GCP Investigator Site Personnel Training identified by TransCelerate BioPharma as necessary to enable mutual recognition of GCP training among trial sponsors.

- **Record ID:** [redacted]
- **Report Date:** 01-Nov-2020
- **Current Score**:** 100

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
The CITI Good Clinical Practice Course for Clinical Trials Involving Drugs and Devices (ID: 1350)	29-Mar-2020	3/3 (100%)
Overview of New Drug Development (ID: 1351)	29-Mar-2020	5/5 (100%)
Overview of ICH GCP (ID: 1352)	29-Mar-2020	4/4 (100%)
ICH - Comparison Between ICH GCP E6 and U.S. FDA Regulations (ID: 1354)	29-Mar-2020	5/5 (100%)
Conducting Investigator-Initiated Studies According to FDA Regulations and GCP (ID: 1355)	29-Mar-2020	3/3 (100%)
Investigator Obligations in FDA-Regulated Research (ID: 1356)	29-Mar-2020	5/5 (100%)
Managing Investigational Agents According to GCP Requirements (ID: 1357)	29-Mar-2020	5/5 (100%)
Overview of U.S. FDA Regulations for Medical Devices (ID: 1358)	29-Mar-2020	3/3 (100%)
Informed Consent in Clinical Trials of Drugs, Biologics, and Devices (ID: 1359)	29-Mar-2020	4/4 (100%)
Detecting and Evaluating Adverse Events (ID: 1360)	29-Mar-2020	4/4 (100%)
Reporting Serious Adverse Events (ID: 1361)	29-Mar-2020	4/4 (100%)
Monitoring of Clinical Trials by Industry Sponsors (ID: 1362)	29-Mar-2020	5/5 (100%)
Audits and Inspections of Clinical Trials (ID: 1363)	29-Mar-2020	5/5 (100%)
Completing the CITI GCP Course (ID: 1364)	29-Mar-2020	No Quiz

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

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Collaborative Institutional Training Initiative (CITI Program)
Email: support@citiprogram.org
Phone: 888-529-5929
Web: https://www.citiprogram.org