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A Case for Hysterectomy ERAS

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Abstract

Phase II Site: Fort Belvoir Community Hospital (FBCH), Fort Belvoir, VA

Project Title: A Case for Hysterectomy ERAS

Authors: Benchich, J., Harps, K.

Background or Problem/Issue: Anesthesia providers at FBCH identified the lack of a standardized protocol for patients undergoing hysterectomy that may contribute to the inadvertent duplicate administration of medications during the perioperative period.

Clinical Question or Purpose: In adult women undergoing hysterectomy, how does a hysterectomy ERAS protocol, compared to current practice, affect average postoperative opioid requirement, average length of hospital stay, and frequency of inadvertent medication administration?

Project Design: This was a quality improvement initiative that implemented an ERAS protocol for patients undergoing a hysterectomy. This project utilized a pre- and post-implementation assessment of postoperative pain medication requirements, hospital length of stay, and frequency of inadvertent duplicate medication administration.

Analysis of the Results: 100 patients were included in the pre-implementation period and 38 patients were included in the post-implementation period. There were no statistically significant differences between the pre-implementation and post-implementation periods on any of the measured outcomes. The study lacked sufficient power, and compliance to select elements of the ERAS protocol was low. However, results showed there was no inadvertent duplicate administration of acetaminophen intraoperatively, therefore patient safety was improved through standardization of practice.

Organizational Impact/Implications for Practice: Implementation of a standardized protocol led to improved patient safety, but compliance with the protocol was a challenge. Higher rates of perioperative medication errors accompany a lack of standardization, which has the potential to cause financial detriment to the organization.

Introduction

Historically, the model of post-surgical management has been to "wait and see" how a patient responds to the stress of surgery, rather than employing standardized guidelines (Scheib et al., 2019). A maxim such as this is costly, as lack of standardization yields an average length of stay of three to five days for major gynecologic surgery (Modesitt et al., 2016). Prolonged hospital stays lead to a shortage of hospital beds and cancellation of urgent surgeries (Miller et al., 2015). This outdated approach was the current practice for hysterectomy procedures at Fort Belvoir Community Hospital (FBCH), warranting an initiative for change. Achieving better outcomes for hysterectomies will require consistent implementation of evidence-based practice (EBP) interventions derived from literature, also referred to as an enhanced recovery after surgery (ERAS) protocol.

Problem Synthesis

A hysterectomy is one of the most commonly performed gynecological surgeries in the United States (Yilmaz et al., 2018). As of 2020, FBCH averaged 220 hysterectomies per year (W. Sellers, personal communication, April 13, 2020). However, leaders within the anesthesia department suggested the presence of a significant process problem. There was an absence of an evidence-based standardized process for gynecological surgeries, specifically hysterectomies, which has contributed to practice errors. In one case, an excessive amount of acetaminophen was administered; and in another case, a patient received an extra dose of a nonsteroidal anti-inflammatory drug (NSAID). Both of these events carried the potential to leave patients with end-organ damage. There is an opportunity to mitigate this problem and limit unnecessary harm for future patients.

Lack of standardization within the healthcare system may prove detrimental to patients, especially when it occurs within the perioperative environment. In the absence of consistent implementation of evidence-based practices or overall best practices, patients may experience gaps in care, suboptimal outcomes, and unnecessary healthcare costs (Williams et al., 2020).

In the absence of standardized tools and resources, current challenges include patients receiving inconsistent information and clinicians lacking optimization strategies. Ideally, optimization should begin prior to surgery and continue throughout the entire perioperative environment. If patients are insufficiently prepared, their recovery is slowed, leading to poorer health outcomes (Scheib et al., 2019). For instance, there is increased risk for uncontrolled pain and post-operative nausea and vomiting (PONV) on arrival to the post-anesthesia care unit (PACU) following surgery without standardization. These two measures are positively correlated with a prolonged PACU length of stay (Ganter et al., 2014), which may lead to increased hospital costs. Additionally, there are several other undesirable outcomes that are likely to arise in the absence of standardization. These include increased risk for serious medical complications, medication errors, longer hospital stays, increased opioid use, and longer time to return of bowel function (Scheib et al., 2019).

Surgical stress can place additional stress on physiologic processes and warrants considerable effort to minimize this burden. Surgery can cause increased cardiac demands, insulin resistance, impaired coagulation, relative tissue hypoxia, and impaired pulmonary and gastrointestinal function (Scheib et al., 2019). Furthermore, there is an increased risk with unnecessarily placed invasive devices, as well as delayed removal of intraoperatively-placed catheters, tubes, and drains. This can lead to decreased wound healing and increased susceptibility to infection (Nilsson et al., 2012), factors which may increase morbidity and slow

recovery. To ensure best health outcomes and patient optimization, there needs to be a process in place which aims to mitigate these physiologic stressors and optimize recovery (Williams et al., 2020).

Implementing an evidence-based solution provides the hospital with opportunities to produce better patient outcomes (Grant et al., 2019). These outcomes include reduced hospital costs and increased access to care for other patients (Williams et al., 2020). Within the healthcare system as a whole, there has been little data to support the use of unstandardized processes and reactive patient management (Scheib et al., 2019). FBCH currently performs a relatively large number of hysterectomies in the absence of a uniform process. A lack of therapeutic standardization within the anesthesia department can, and has been shown to, contribute to errors in practice. Additional adverse events and negative patient outcomes will be the inevitable result if efforts are not taken to align anesthetic management with evidence-based best practices.

Relevance to Military Nursing

Taking measures to enforce standardization aligns with the Defense Health Agency's (DHA) mission to deliver Quadruple Aim (increased readiness, better health, better care, and lower cost). Implementing a hysterectomy ERAS protocol will benefit patients, the hospital, the military, and the DHA. Standardizing processes can decrease the amount of mistakes that are made, therefore decreasing adverse events. The result will be better and safer care for patients. Carrying out interventions that have been proven to shorten recovery times after surgery will allow patients to achieve better overall health. If patients are able to get discharged from the hospital earlier, they'll be able to resume their daily routines in a more timely manner. They'll return to work sooner, which will yield increased military readiness. There will be decreased burden on hospital staff, and military personnel will have more time to maintain readiness.

Improved outcomes also reduce cost. Spending less money on hospital readmissions and unexpected complications will allow for significant annual savings.

Clinical or System Question

In adult women undergoing hysterectomy (P), how does a hysterectomy enhanced recovery after surgery (ERAS) protocol (I) compared to current practice (C) affect postoperative opioid requirements, average length of hospital stay, and frequency of inadvertent medication administration? (O/T)

Literature Review of Solutions

Search Strategy and Results

The Cumulative Index to Nursing and Allied Health Literature (CINAHL) and PubMed databases were used to gather articles relevant to our PICOT question. The database searches were limited to articles published within the last 10 years and the keywords were limited to the title and abstract of the article. The database searches were conducted with the keywords "hysterectomy" OR "hysterectomies" AND "ERAS" OR "early recovery" OR "enhanced recovery." As of October 2020, CINAHL yielded 20 results and PubMed yielded 77 results. The database terms were then broadened to "gynecology" OR "gynecological" AND "ERAS" OR "early recovery" OR "enhanced recovery", in order to examine the results of ERAS interventions in gynecological surgeries which included, but were not limited to, hysterectomies. This produced 40 results in CINAHL and 399 results in PubMed. Seventy-nine duplicates were removed, leaving 455 studies to be screened by title and abstract. Three studies were added from selected study reference lists.

Inclusion screening criteria was focused on articles that evaluated implementation of ERAS protocols specific to hysterectomy, as well as gynecological surgeries that included

hysterectomy as a subset of surgeries performed. This was done because studies examining ERAS protocol implementation performed solely on hysterectomies were scant, and the ERAS interventions in the broader amount of gynecological surgeries supported the hysterectomy-specific investigations. Of the 455 studies screened by title and abstract, 422 were excluded and 36 were selected for full text review. Exclusion criteria included articles directed towards surgeons which described superior surgical procedures for enhanced recovery, those which tailored an ERAS protocol to a specific surgical technique, and protocols which were aimed at specific co-existing disease processes. We also excluded studies that only presented a case study, those which implemented only pre-, intra-, or postoperative interventions, those which were only surveys of current practice, and those which did not specify that hysterectomies were included in the surgeries performed. Of the initial 36 studies selected for review, 27 were excluded due to weak study strength and/or small sample size, resulting in nine studies selected for inclusion in the intervention synthesis (Appendix A).

The Johns Hopkins Nursing Quality of Evidence-Based Practice tool was used to assign a level of evidence and quality rating to the nine selected studies. One level IB study, one level IC study, and four level IIB studies were selected. The literature review failed to discover any large-scale randomized controlled trials, and the nature of implementation of ERAS interventions does not lend well to a double-blind study. However, we felt that the data obtained with these institutional-level studies provided solid evidence from which we could formulate our intervention recommendations. One level IIIB study was selected in order to give a wider range of intervention recommendations, as this systematic review examined the interventions and results of 50 different studies. Finally, two high-quality, level IVA studies were included, as each intervention was accompanied by an evidence level and recommendation grade, and there was a

great depth of references supporting the recommendations. An evidence table summarizing each selected study was created for ease of reference (Appendix B).

Solution Synthesis

In recent years, surgeons and anesthetists have focused on improving surgical outcomes in gynecology through ERAS protocols. An ERAS protocol is a standardized pathway composed of a surgery-specific compilation of perioperative guidelines. The protocol aims to minimize physiologic trauma and organ dysfunction caused by surgery (Yilmaz et al., 2018).

There is an abundance of ERAS literature for gynecologic surgeries, and a smaller subset that focuses on hysterectomies. Numerous studies have captured the effectiveness of utilizing ERAS protocols. In search of the best solution for FBCH, recent, high-quality evidence was compiled and reviewed. From that evidence, we identified the most commonly employed interventions, and used those to guide our recommendations. Across the literature, outcome measures include hospital length of stay, patient satisfaction, complication rate, readmission rate, pain score, opioid consumption, and fluid administration (Modesitt et al., 2016; Scheib et al., 2019; Yilmaz et al., 2018). Focusing on two of these outcomes, and an additional third outcome specific to our trigger, was the scope of our project. There is a strong body of evidence that suggests ERAS implementation leads to significantly shorter hospital stays (Miller et al., 2015; Modesitt et al., 2016; Wijk et al., 2014; Yilmaz et al., 2018), as well as reduced postoperative analgesic requirements (Carter-Brooks et al., 2018; Modesitt et al., 2016; Scheib et al., 2019). There is compelling evidence to display the superiority of ERAS protocols, although it is difficult to determine which, if any, interventions produce the greatest impact (Scheib et al., 2019).

Focus Areas

After review of the literature, we identified the dominant themes. We selected interventions based on strength of evidence, as well as feasibility of implementation. We recommended implementation of six preoperative interventions (see Table 1). The first one—education, counseling, and review of expectations prior to surgery—was included in all of the referenced protocols (Carter-Brooks et al., 2018; Johnson et al., 2019; Miller et al., 2015; Modesitt et al., 2016; Nelson et al., 2016a; Scheib et al., 2019; Wijik et al., 2014; Yilmaz et al., 2018). The remaining selected elements include carbohydrate loading (Carter-Brooks et al., 2018; Modesitt et al., 2016; Nelson et al., 2016a; Scheib et al., 2019; Wijik et al., 2014; Yilmaz et al., 2018); maintaining euvolemia (Carter-Brooks et al., 2018; Modesitt et al., 2016; Nelson et al., 2016a; Wijik et al., 2014; Yilmaz et al., 2018); avoidance of prolonged fasting (Carter-Brooks et al., 2018; Nelson et al., 2016a; Scheib et al., 2019; Yilmaz et al., 2018); and antibiotic administration prior to surgical incision (Carter-Brooks et al., 2018; Nelson et al., 2016a; Wijik et al., 2014; Yilmaz et al., 2018).

Notable discarded interventions included daily exercise leading up to surgery, and a preoperative phone call the day before surgery. In addition to questionable feasibility, these were eliminated due to limited evidence.

Table 1

Preoperative Recommendations for Hysterectomy Patients

Perioperative Period	Intervention	Reference
Pre-op	Preoperative education, counseling, and review of expectations	Carter-Brooks et al., 2018; Johnson et al., 2019; Miller et al., 2015; Modesitt et al., 2016; Nelson et al., 2016a; Scheib et al., 2019; Wijik et al., 2014; Yilmaz et al., 2018
Pre-op	Carbohydrate loading	Carter-Brooks et al., 2018; Modesitt et al., 2016; Nelson et al., 2016a; Scheib et al., 2019; Wijik et al., 2014; Yilmaz et al., 2018
Pre-op	Euvolemia	Carter-Brooks et al., 2018; Modesitt et al., 2016; Nelson et al., 2016a; Wijik et al., 2014; Yilmaz et al., 2018

Pre-op	Avoidance of prolonged fasting	Carter-Brooks et al., 2018; Nelson et al., 2016a; Scheib et al., 2019; Yilmaz et al., 2018
Pre-op	Antimicrobial prophylaxis	Carter-Brooks et al., 2018; Nelson et al., 2016a; Wijik et al., 2014; Yilmaz et al., 2018
Pre-op	Multimodal analgesia	Carter-Brooks et al., 2018; Miller et al., 2015; Modesitt et al., 2016; Nelson et al., 2016a; Nelson et al., 2016b; Scheib et al., 2019; Wijik et al., 2014; Yilmaz et al., 2018

Intraoperative management for the hysterectomy patient included slightly fewer, yet equally important interventions (see Table 2). Based on congruent favorability among numerous credible sources, we recommended thromboprophylaxis using heparin or low molecular weight heparin (LMWH), in combination with mechanical methods (Modesitt et al., 2016; Nelson et al., 2016a; Scheib et al., 2019; Wijik et al., 2014); multimodal antiemetic prophylaxis (Carter-Brooks et al., 2018; Nelson et al., 2016a; Scheib et al., 2019; Wijik et al., 2014; Yilmaz et al., 2018); and goal-directed intravenous (IV) fluid administration (Carter-Brooks et al., 2018; Modesitt et al., 2016; Nelson et al., 2016a; Nelson et al., 2016b; Scheib et al., 2019; Wijik et al., 2014; Yilmaz et al., 2018).

Two articles advocated for the routine use of total intravenous anesthetic (TIVA) for hysterectomies (Miller et al., 2015; Miralpeix et al., 2016). Additionally, there was a moderate level of evidence with a strong recommendation from the ERAS society for the avoidance of volatile anesthetics, and instead advocated for the use of a propofol-based TIVA as part of multimodal antiemetic prophylaxis. Therefore, we recommended anesthesia providers avoid volatile anesthetics and use propofol-based TIVA whenever possible (Nelson et al., 2016a).

Table 2

Intraoperative Recommendations for Hysterectomy Patients

Perioperative Period	Intervention	Reference
Intra-op	Thromboprophylaxis; medication and mechanical methods	Modesitt et al., 2016; Nelson et al., 2016b; Scheib et al., 2019; Wijik et al., 2014
Intra-op	Multimodal antiemetic prophylaxis	Carter-Brooks et al., 2018; Miller et al., 2015; Miralpeix et al., 2016; Nelson et al., 2016a; Scheib et al., 2019; Wijik et al., 2014; Yilmaz et al., 2018

Intra-op	Goal directed intravenous fluid administration	Carter-Brooks et al., 2018; Modesitt et al., 2016; Nelson et al., 2016a; Nelson et al., 2016b; Scheib et al., 2019; Wijik et al., 2014; Yilmaz et al., 2018
Intra-op	Multimodal analgesia	Carter-Brooks et al., 2018; Miller et al., 2015; Modesitt et al., 2016; Nelson et al., 2016a; Nelson et al., 2016b; Scheib et al., 2019; Wijik et al., 2014; Yilmaz et al., 2018
Intra-op	Avoidance of volatile anesthetics and use of propofol-based TIVA when possible	Nelson et al., 2016a; Miller et al., 2015; Miralpeix et al., 2016

There are several key components of enhanced recovery that were implemented during the postoperative period (see Table 3). The most current, best evidence suggests encouraging early oral intake, including solid foods and oral medications within 24 hours after surgery (Carter-Brooks et al., 2018; Johnson et al., 2019; Modesitt et al., 2016; Nelson et al., 2016b; Scheib et al., 2019; Wijik et al., 2014; Yilmaz et al., 2018); early mobilization and physical therapy (Johnson et al., 2019; Miller et al., 2015; Modesitt et al., 2016; Nelson et al., 2016b; Scheib et al., 2019; Wijik et al., 2014; Yilmaz et al., 2018); thromboprophylaxis via compression stockings and intermittent pneumatic compression (Modesitt et al., 2016; Nelson et al., 2016b; Scheib et al., 2019); termination of IV fluids within 24 hours after surgery (Miller et al., 2015; Modesitt et al., 2016; Nelson et al., 2016b; Wijik et al., 2014; Yilmaz et al., 2018); avoidance of nasogastric (NG) tubes (Nelson et al., 2016b; Scheib et al., 2019; Yilmaz et al., 2018); and early discontinuation of urinary catheters, preferably within 24 hours after surgery (Miller et al., 2015; Nelson et al., 2016b; Wijik et al., 2014; Yilmaz et al., 2018).

The avoidance of patient-controlled analgesia (PCA) use in the postoperative period (Carter-Brooks, 2018; Miller et al., 2015) was eliminated due to a lack of supporting evidence. Furthermore, avoidance of PCA was not addressed in the ERAS Society guidelines for postoperative care in gynecologic surgery. On that premise, a more comprehensive discussion regarding perioperative pain management is warranted.

Table 3

Postoperative Recommendations for Hysterectomy Patients

Perioperative Period	Intervention	Reference
Post-op	Early oral intake	Carter-Brooks et al., 2018; Johnson et al., 2019; Modesitt et al., 2016; Nelson et al., 2016b; Scheib et al., 2019; Wijik et al., 2014; Yilmaz et al., 2018
Post-op	Early mobilization	Johnson et al., 2019; Miller et al., 2015; Modesitt et al., 2016; Nelson et al., 2016b; Scheib et al., 2019; Wijik et al., 2014; Yilmaz et al., 2018
Post-op	Thromboprophylaxis; mechanical methods	Modesitt et al., 2016; Nelson et al., 2016b; Scheib et al., 2019
Post-op	Early termination of intravenous fluids	Miller et al., 2015; Modesitt et al., 2016; Nelson et al., 2016b; Wijik et al., 2014; Yilmaz et al., 2018
Post-op	Avoidance of nasogastric tubes	Nelson et al., 2016b; Scheib et al., 2019; Yilmaz et al., 2018
Post-op	Early discontinuation of urinary catheters	Miller et al., 2015; Nelson et al., 2016b; Wijik et al., 2014; Yilmaz et al., 2018
Post-op	Multimodal analgesia	Carter-Brooks et al., 2018; Miller et al., 2015; Modesitt et al., 2016; Nelson et al., 2016a; Nelson et al., 2016b; Scheib et al., 2019; Wijik et al., 2014; Yilmaz et al., 2018
Post-op	Thoracic epidural or spinal analgesia for open procedures	Miller et al., 2015; Nelson et al., 2016b; Scheib et al., 2019; Yilmaz et al., 2018

Patients experience pain throughout the perioperative environment, and it is well-known amongst healthcare providers that preemptive pain control is beneficial. Therefore, the approach to pain management in an enhanced recovery pathway is not restricted to just one phase of surgery. There is nearly unanimous agreement in current literature that advocates for the use of perioperative multimodal analgesia (Carter-Brooks et al., 2018; Miller et al., 2015; Modesitt et al., 2016; Nelson et al., 2016a; Nelson et al., 2016b; Scheib et al., 2019; Wijik et al., 2014; Yilmaz et al., 2018). Additionally, previous reports suggest the inclusion of thoracic epidural or spinal analgesia as beneficial, particularly for open gynecologic procedures (Miller et al., 2015; Nelson et al., 2016b; Scheib et al., 2019; Yilmaz et al., 2018). Although every study we examined advocated for the use of multimodal analgesia, there seemed to be no consensus within the literature as to the best approach. However, there was enough similarity between studies to

synthesize reasonable recommendations for a multimodal analgesic approach in the perioperative period.

Preoperatively, we recommended patients receive acetaminophen 975 mg PO, gabapentin 600 mg PO, and celecoxib 200 mg PO (Carter-Brooks et al., 2018; Miller et al. 2015; Modesitt et al. 2016). Intraoperatively, we recommended three medications: lidocaine, dexamethasone, and ketamine (Carter-Brooks et al., 2018). Patients received lidocaine 100-200 mg IV at induction, and 1 mg/kg boluses every hour thereafter. Alternatively, providers could administer a lidocaine infusion of 1mg/kg/hr following induction. (Carter-Brooks et al., 2018; Modesitt et al. 2016). Dexamethasone 4 mg IV was administered after induction, which covered both multimodal analgesia and multimodal antiemetic prophylaxis. Up to 0.5mg/kg of IV ketamine was administered on induction, followed by 10-20 mg IV boluses every hour thereafter, with avoidance in the final hour of surgery (Carter-Brooks et al., 2018; Modesitt et al. 2016). Postoperatively, we recommended five medications: ketorolac, celecoxib, acetaminophen, gabapentin, and oxycodone (Carter-Brooks et al., 2018; Modesitt et al. 2016; Nelson et al., 2016b). Ketorolac 30 mg IV was given q6h until the patient was tolerating PO, and then the order was changed to celecoxib 200 mg q12h PO. Acetaminophen one gram was given either IV or PO q6h, based on the patient's PO status. Gabapentin 300 mg PO q8h could be added to the regimen if an additional agent was needed. Finally, fentanyl 25-75 mcg IV and oxycodone 5-10 mg PO were ordered q4h for breakthrough pain. All of the recommended medications and doses were reviewed and adjusted based on patient-specific factors such as weight and comorbidities.

Some ERAS recommendations were intentionally broad in order to refrain from undermining the individual provider's autonomous role and practice, as well as allow for variations based on individual patient conditions. Ultimately, patient care will deviate from any

ERAS protocol in certain circumstances. Employing clinical judgment is essential in such instances, and interventions not included in the ERAS guidelines may be warranted.

In summary, current perioperative management of hysterectomies at FBCH can improve and become safer. The perioperative leadership at FBCH was seeking evidence-based practice changes to improve hysterectomy care. We identified an abundance of current, high-quality evidence, in conjunction with ERAS Society guidelines, that supports pre-, intra-, and postoperative recommendations for a hysterectomy ERAS pathway at FCBH. We anticipated this ERAS pathway would ultimately reduce PACU opioid requirements, reduce hospital length of stay, and decrease incidences of inadvertent medication administration.

Business Case Analysis

Implementing a hysterectomy ERAS protocol at FBCH could result in significantly reduced costs to the hospital. As laid out in our business case analysis (Appendix F), there is potential for an annual cost savings of over $800,000. The up-front costs are minuscule compared to the revenue that could be gained. With decreased readmission rates, decreased complication rates, and shorter lengths of stay, the facility would have less out of pocket costs. In addition, there may be incentive for improved patient satisfaction scores. There could also be significant value-based profit that cannot be measured monetarily. Patients would be more satisfied with their overall care when their pain is well managed and they are able to return to their daily routines more speedily.

Organizing Framework

We used the Iowa Model Revised (2017) to guide our project implementation (Appendix C). This framework was fitting because it is multidisciplinary team oriented, and provides guidance about clinical and administrative practices that affect outcomes. The model encourages

clinicians to identify questions, or triggers, as an opportunity to improve practice and healthcare. Our trigger arose from two instances of medication overdose in hysterectomy cases. Although these errors did not result in patient harm, they provided illumination of a process problem. They provided an indication for an examination of causal factors, and to identify an evidence-based solution. Following the Iowa Model, we used the synthesized evidence to gain approval from hospital and departmental leadership for ERAS implementation. We then provided protocol education to perioperative staff members. Our ultimate goal was to implement, solidify, and sustain evidence-based best practice, and then disseminate the results.

Project Design

General Approach

Our project was a quality improvement initiative aimed at improving outcomes and decreasing costs after hysterectomy surgery. Outcomes were measured by postoperative opioid requirement, hospital length of stay, and frequency of inadvertent medication administration.

We first presented our evidence and recommendations to anesthesia providers within the Department of Anesthesia and surgeons within the Department of Obstetrics and Gynecology to get buy-in. We educated the involved staff once we received stakeholder approval from all of the required parties. All departments involved in the practice change received education specific to their role in implementing the protocol. We also provided visual aids in each operating room for reference. Once that phase was complete, we implemented the change and collected data. Following that, we evaluated the results and disseminated our findings.

Setting and Population

Fort Belvoir Community Hospital is located in Fort Belvoir, Virginia, and is part of an integrated healthcare system under the National Capital Region Medical Directorate. It is a 120-

bed in-patient and out-patient facility, with over 20,000 beneficiaries. The hospital has 44 clinics, 430 exam rooms, and 10 operating rooms. They perform approximately 11,000 surgeries per year, with hysterectomies being one of the most frequent. The hospital staff includes Army and Navy medical personnel, and it was one of the first joint medical facilities within the Department of Defense. Civilian staff and volunteers are also employed there. FBCH serves the active duty population as well as dependents and retirees. Our target population was adult women undergoing hysterectomy surgery. We needed buy-in from department heads in gynecology, anesthesia, and preoperative and postoperative care units.

Procedural Steps

The project was carried out in five major phases, as displayed in our timeline (Appendix D). The first phase involved gathering and synthesizing relevant literature, creating an evidence table, and narrowing down a solution based on the evidence. From that, we drafted an ERAS protocol with preoperative, intraoperative, and postoperative interventions (Appendix G). Prior to any implementation, we gathered preliminary outcome data. In the second stage, we finalized our recommendations within the ERAS protocol and scheduled a meeting with the involved department heads (gynecology, anesthesia, preoperative, postoperative). We provided them with a presentation of our findings, and then laid out recommendations for the ERAS protocol. Once buy-in was achieved from the key players, phase two was complete. Next, we developed and conducted an educational program for the staff. Each department that was involved in implementing the protocol received education specific to their role. Phase three ended when all of the involved departments had received the in-service training. Phase four was the actual protocol implementation. We provided continual staff education on interventions and their importance in an attempt to optimize staff and provider buy-in. We monitored and encouraged

compliance and began to collect post-intervention data. We continued collecting data in the fifth and final stage of our project, and in that stage we evaluated our findings and prepared for dissemination.

Data Analysis Plan

Descriptive statistics were used to evaluate pre- and post-implementation outcomes (Appendix E). Levels of measurement included interval and ordinal data. The independent variable was percentage of ERAS protocol compliance. The dependent variables were postoperative opioid consumption, hospital length of stay, and frequency of inadvertent medication administration. A retrospective chart review was performed to gather baseline data on outcome measures. During and after implementation of the ERAS protocol, we collected post-implementation outcome data on the same measures. We only included data from cases where there was at least an 80 percent compliance rate with the protocol. Statistical analyses determined whether or not our ERAS interventions significantly improved measured outcomes.

Potential Barriers

We foresaw a few potential barriers that we could have encountered during our project. Provider and staff acceptance and adherence to the protocol was the most important one. A few staff members were resistant to change. To combat this, we emphasized that many of the recommended interventions were already being implemented, but perhaps just inconsistently. We also reinforced to them that the practice changes would be easy to implement, and that they were evidence-based best practices that patients deserved to receive. Another barrier was variable interpretation of interventions within the protocol. To ensure that the involved staff members fully understood each protocol intervention, we spent time educating each department on their specific role. The education took place prior to implementation, as well as periodically during

implementation. Fear of decreased autonomy was also a potential barrier. Providers may have felt like an ERAS protocol was dictating their plan of care. We emphasized that the interventions were best practice guidelines, but that they did not replace provider judgment. Patients should still receive individualized care.

Dissemination Plan

We wanted to ensure sustained practice change after project completion. We requested that each department appoint a hysterectomy ERAS champion so that all parties involved have a subject matter expert as a resource. The champion will educate new staff on the protocol, which will increase the likelihood of continued implementation and compliance. We also encouraged them to maintain a continuity binder that the rest of the staff can access in their absence. Dissemination of results will be in the form of posters and presentations. We will present our findings to other departments within the hospital and encourage them to adopt ERAS protocols as well. We will welcome feedback from staff members and leadership in order to improve and evolve the project.

HIPAA Concerns

The primary data points gathered during our project included ERAS protocol compliance, postoperative opioid consumption, hospital length of stay, and frequency of inadvertent medication administration (Appendix H). Department of Defense Identification Numbers were used for information tracking purposes and were the only protected health information (PHI) collected. Safeguarding this PHI was a top concern. The datasets were de-identified prior to dissemination to protect the privacy of the project participants. All collected information was managed by the project leader and was stored on a password-protected database within government common-access-card enabled computers.

Project Results

Pre-implementation and post-implementation data were collected from medical records. One hundred pre-implementation records were reviewed, and 51 post-implementation records were reviewed. Of those 51, 13 did not meet protocol compliance. Therefore, 38 post-implementation data points were included in the study. Data elements included date of surgery, type of procedure, doses of postoperative pain medications, hospital length of stay, and frequency of inadvertent medication administration. Postoperative pain medication requirement for pre- and post-implementation data, measured in morphine milligram equivalents, was 9.17 mg and 10.57 mg, respectively. Hospital length of stay was 26.77 hours pre-implementation, and 23.32 hours post-implementation. Six instances of inadvertent medication administration occurred in the 100 pre-implementation charts reviewed; three caused by duplication of acetaminophen administration, and three caused by duplication of NSAID administration. One near-miss was also discovered, as the surgeon verbally told the patient to take acetaminophen, celecoxib, and gabapentin before arriving to the hospital on the day of surgery, and these medications were also ordered in the electronic medical record to be administered preoperatively. This was identified during preoperative questioning and did not reach the patient. Post-implementation data showed three instances of patients receiving intraoperative NSAIDs after preoperative NSAID administration. This was classified in our data collection as an inadvertent medication administration. This scenario was one of the key triggers recognized as a practice error by the anesthesia department, ultimately leading to creation and implementation of our ERAS protocol. Of note, there were zero instances of inadvertent acetaminophen administration in the post-intervention data.

All statistical analyses were performed using STATA version 15 (StataCorp, College Station, TX). Continuous variables were summarized using measures of central tendency (mean, median) and dispersion (standard deviation, interquartile range), whereas categorical variables were summarized using frequencies and percentages. Differences between the pre- and post-implementation periods were examined using independent samples t-tests or Wilcoxon's rank sum tests, as appropriate, for continuous outcomes as well as Pearson's Chi-square test or Fisher's exact test for categorical outcomes. Two-sided statistical tests were performed at an alpha level of 0.05. At alpha = 0.05, there were no statistically significant differences between the pre- and post-implementation periods on dosage of postoperative pain medications, length of hospital stay, or frequency of inadvertent medication administration. Further research with a larger sample size is needed to confirm these results.

Analysis of the Results

Based on the results from the various statistical analyses, it appears that our hysterectomy ERAS protocol did not significantly improve the amount of postoperative opioid administration, hospital length of stay, or frequency of inadvertent medication administration. This differs from results found in current literature, which undoubtedly show that standardized protocols contribute to better outcomes. Our project did have several limitations which likely overshadowed potential significant findings.

We were unable to meet power due to time frame constraints for project completion, low frequency of hysterectomy cases during the months of data collection, a 74.5 percent protocol compliance rate, and delay in implementation of protocol from the original timeline. Securing buy-in and compliance from surgeons and anesthesia providers was a lengthy process which

required frequent follow-up and re-education. Our team consisted of only two people for the implementation of a multidisciplinary standardized protocol.

We did not include outcome data with less than an 80 percent protocol compliance rate, but we did observe a very high rate of inadvertent medication administration in the data sets that did not follow standardization. We found that 30.7 percent of the data points that were not compliant with the ERAS protocol involved instances of inadvertent medication administration, compared to 7.9 percent in the group that followed the standardized protocol. All of these instances were NSAID double doses. As previously stated, implementation of the protocol led to zero acetaminophen medication errors.

Prior to ERAS implementation it was discovered that obstetrician-gynecologists at FBCH were already implementing, although inconsistently, several pharmacological and non-pharmacological interventions consistent with our ERAS protocol. However, these interventions had not been formally standardized. Because of this, we did not expect to find drastic improvements in postoperative outcomes as they were already favorable. Our focus shifted to optimizing safety through standardization, a goal which we believe was achieved as evidenced by zero inadvertent doses of acetaminophen administered after protocol implementation.

Organizational Impact / Implications to Practice & Policy

Although it did not display statistical significance, the results of this project are promising. Ultimately, further research with a larger sample size is needed. The literature is clear that standardization improves patient safety. What is also clear is that FBCH could still benefit from initiatives that aim to decrease perioperative medication errors. Implementation of a standardized protocol was a step in the right direction, but results show that compliance was a challenge. Higher rates of perioperative medication errors accompany a lack of standardization

which has the potential to cause financial detriment to the organization. An effort to increase compliance with standardization is essential for patient safety. Future process improvement projects focused on standardizing perioperative handoff would complement our project and further contribute to improved patient safety.

Future Directions for Research and Practice

Further directions for research and practice include dissemination of project findings at the local level, including a presentation to key stakeholders and the departments directly involved in implementation. We will also provide an oral presentation and poster display during the Uniformed Service University Research Week. The presentation will highlight the importance of improving patient safety and how standardization with this ERAS protocol assists with that. Hysterectomy ERAS champions from OB-GYN and the anesthesia department will encourage continued protocol compliance and provide education to new staff members. There is potential for future implementation of ERAS protocols in other departments as well. We aspire to gain buy-in from a wide array of specialties with the dissemination of results.

We recommend future ERAS projects capture pre-implementation baseline data that includes measurement of all interventions to be incorporated in the proposed protocol. As previously mentioned, a number of interventions consistent with our protocol were already being implemented pre- and postoperatively by the surgical team, and this may be why our results were not as robust as the literature search suggested. This data can be used to demonstrate whether the ERAS interventions represent a significant a change from the standard of practice and may help support statistical findings of the project.

Conclusion

In this project, a standardized process in the form of a hysterectomy ERAS protocol was implemented. The major focus was to improve coordination and consistency in administration of analgesics over the course of care for patients undergoing hysterectomy surgery at FBCH. While the results were not statistically significant, the implementation of a standardized protocol did yield improved patient safety. The results also illuminated the alarming rate of errors that can occur when there is a lack of standardization. Based on these findings, overwhelming support of standardization in the literature, and the importance of patient safety, we recommend continued implementation and compliance with this ERAS protocol.

References

Carter-Brooks, C. M., Du, A. L., Ruppert, K. M., Romanova, A. L., & Zyczynski, H. M. (2018). Implementation of a urogynecology-specific enhanced recovery after surgery (ERAS) pathway. *American Journal of Obstetrics and Gynecology*, *219*(5), 495.e1-495.e10. https://doi.org/10.1016/j.ajog.2018.06.009

Fort Belvoir Community Hospital. (2020). Retrieved November 7, 2020, from https://www.fbch.capmed.mil/SitePages/Home.aspx

Ganter, M. T., Blumenthal, S., Dübendorfer, S., Brunnschweiler, S., Hofer, T., Klaghofer, R., Zollinger, A., & Hofer, C. K. (2014). The length of stay in the post-anaesthesia care unit correlates with pain intensity, nausea and vomiting on arrival. *Perioperative Medicine*, *3*(1), 1–9. https://doi.org/10.1186/s13741-014-0010-8

Grant, M. C., Gibbons, M. M., Ko, C. Y., Wick, E. C., Cannesson, M., Scott, M. J., & Wu, C. L. (2019). Evidence review conducted for the AHRQ Safety Program for Improving Surgical Care and Recovery: Focus on anesthesiology for gynecologic surgery. *Regional anesthesia and pain medicine*, rapm-2018-100071. Advance online publication. https://doi.org/10.1136/rapm-2018-100071

Iowa Model Collaborative. (2017). Iowa model of evidence-based practice: Revisions and validation. Worldviews on Evidence-Based Nursing, 14(3), 175-182. doi:10.1111/wvn.12223

Johnson, K., Razo, S., Smith, J., Cain, A., & Soper, K. (2019). Optimize patient outcomes among females undergoing gynecological surgery: A randomized controlled trial. *Applied nursing research : ANR*, *45*, 39–44. https://doi.org/10.1016/j.apnr.2018.12.005

Miller, E. C., McIsaac, D. I., Chaput, A., Antrobus, J., Shenassa, H., & Lui, A. (2015). Increased postoperative day one discharges after implementation of a hysterectomy enhanced recovery pathway: a retrospective cohort study. *Canadian Journal of Anesthesia*, *62*(5), 451–460. https://doi.org/10.1007/s12630-015-0347-6

Miralpeix, E., Nick, A. M., Meyer, L. A., Cata, J., Lasala, J., Mena, G. E., Gottumukkala, V., Iniesta-Donate, M., Salvo, G., & Ramirez, P. T. (2016). A call for new standard of care in perioperative gynecologic oncology practice: Impact of enhanced recovery after surgery (ERAS) programs. *Gynecologic Oncology*, *141*(2), 371–378. https://doi.org/10.1016/j.ygyno.2016.02.019

Modesitt, S. C., Sarosiek, B. M., Trowbridge, E. R., Redick, D. L., Shah, P. M., Thiele, R. H., Tiouririne, M., & Hedrick, T. L. (2016). Enhanced recovery implementation in major gynecologic surgeries: Effect of care standardization. *Obstetrics and gynecology, 128*(3), 457–466. https://doi.org/10.1097/AOG.0000000000001555

Nelson, G., Altman, A. D., Nick, A., Meyer, L. A., Ramirez, P. T., Achtari, C., Antrobus, J., Huang, J., Scott, M., Wijk, L., Acheson, N., Ljungqvist, O., & Dowdy, S. C. (2016a). Guidelines for pre- and intra-operative care in gynecologic/oncology surgery: Enhanced Recovery After Surgery (ERAS®) Society recommendations--Part I. *Gynecologic oncology*, *140*(2), 313–322. https://doi.org/10.1016/j.ygyno.2015.11.015

Nelson, G., Altman, A. D., Nick, A., Meyer, L. A., Ramirez, P. T., Achtari, C., Antrobus, J., Huang, J., Scott, M., Wijk, L., Acheson, N., Ljungqvist, O., & Dowdy, S. C. (2016b). Guidelines for postoperative care in gynecologic/oncology surgery: Enhanced Recovery After Surgery (ERAS®) Society recommendations--Part II. *Gynecologic oncology, 140*(2), 323–332. https://doi.org/10.1016/j.ygyno.2015.12.019

Nilsson, L., Wodlin, N. B., & Kjølhede, P. (2012). Risk factors for postoperative complications after fast-track abdominal hysterectomy. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, *52*(2), 113–120. https://doi.org/10.1111/j.1479-828X.2011.01395.x

Pache, B., Joliat, G. R., Hübner, M., Grass, F., Demartines, N., Mathevet, P., & Achtari, C. (2019). Cost-analysis of Enhanced Recovery After Surgery (ERAS) program in gynecologic surgery. Gynecologic Oncology, 154(2), 388–393. https://doi.org/10.1016/j.ygyno.2019.06.004Scheib, S. A., Thomassee, M., & Kenner, J. L. (2019). Enhanced recovery after surgery in gynecology: A review of the literature. Journal of minimally invasive gynecology, 26(2), 327–343. https://doi.org/10.1016/j.jmig.2018.12.010

Scheib, S. A., Thomassee, M., & Kenner, J. L. (2019). Enhanced recovery after surgery in gynecology: A review of the literature. *Journal of minimally invasive gynecology*, *26*(2), 327–343. https://doi.org/10.1016/j.jmig.2018.12.010

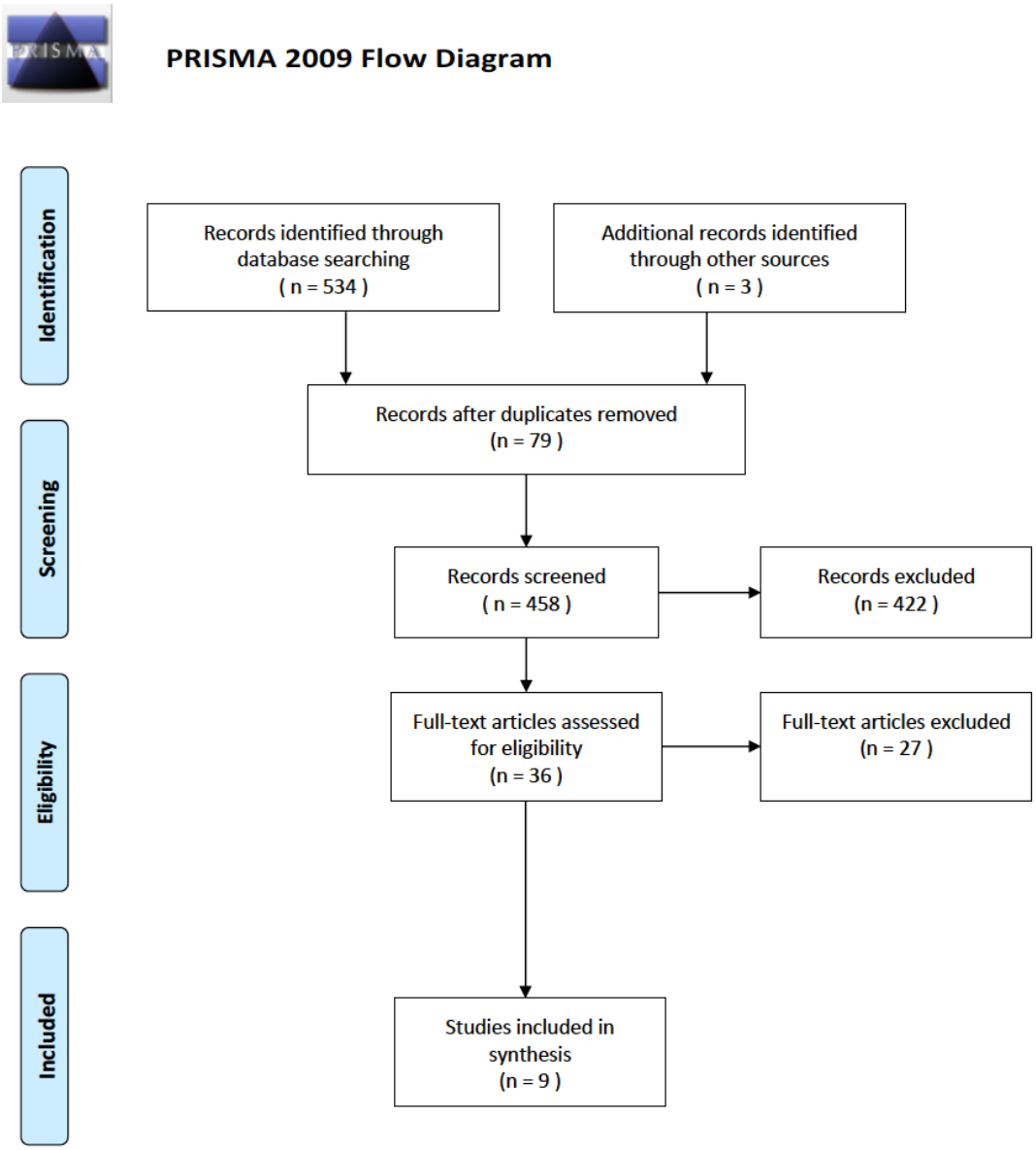
Wijk, L., Franzen, K., Ljungqvist, O., & Nilsson, K. (2014). Implementing a structured Enhanced Recovery after Surgery (ERAS) protocol reduces length of stay after abdominal hysterectomy. *Acta Obstetricia et Gynecologica Scandinavica*, *93*(8), 749–756. https://doi.org/10.1111/aogs.12423

Williams, C., Laflamme, C., & Penner, B. (2020). Accelerating post-surgical best practices using enhanced recovery after surgery. *Healthcare quarterly (Toronto, Ont.)*, *22*(SP), 72–81. https://doi.org/10.12927/hcq.2020.26045

Yilmaz, G., Akca, A., & Aydin, N. (2018). Enhanced recovery after surgery (ERAS) versus conventional postoperative care in patients undergoing abdominal hysterectomies. *Ginekologia Polska*, *89*(7), 351–356. https://doi.org/10.5603/GP.a2018.0060

Appendices

Appendix A: PRISMA Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). *P*referred *R*eporting *I*tems for *S*ystematic Reviews and *M*eta-*A*nalyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

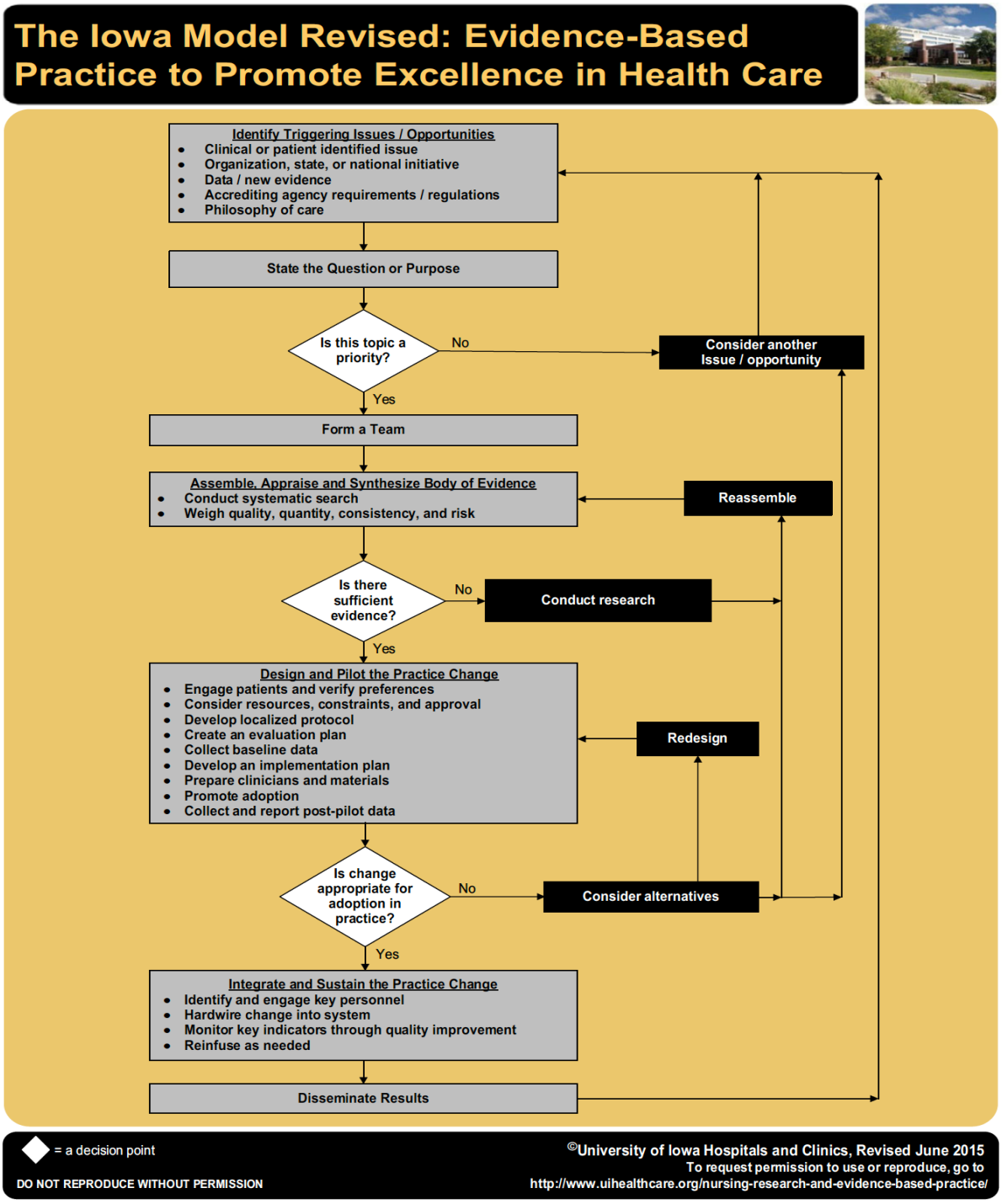
For more information, visit www.prisma-statement.org.

Appendix B: Evidence Table

1st Author Name (Publication Yr)	Study Purpose/Aims	Research Questions/Hypotheses (If different from/specifically described separately from study purpose	Study Design	Total Sample Size (How many initially, how many at final analysis?)	Sampling Plan	Independent Variables AND LEVEL OF MEASUREMENT	Dependent Variables AND LEVEL OF MEASUREMENT	Statistical Analyses - what tests were used for which research questions?	Results	Strengths (how promoted internal/external validity)	Weaknesses (biases; poorly controlled threats to internal/external validity)	LEVEL OF EVIDENCE - using JHNEBP tool (Strength and Quality)
Carter-Brooks, et al., 2018	To objective was to evaluate whether implementation of an urogyn enhanced recovery after surgery pathway would facilitate reduced length of admission and increased same-day discharge ialter pelvic floor reconstruction.	Adopting an ERAS protocol for the urogynecology service would lead to a reduced length of stay and ultimately increase day-of-surgery discharges.	Retrospective, observational cohort study	258 ERAS n=121 Control n=137	Retrospective analysis of all consecutive patients who had elective major procedures by 7 surgeons board certified in female pelvic medicine and reconstructive surgery from over a 6 month period, up to but not including the 8 months prior to ERAS implementation (this avoided cross-over influences due to ERAS planning meetings and the initiation of ERAS protocols for 2 other gynecological surgery services. Post-ERAS implementation included all consecutive patients who had elective major gynecological surgery by 1 of 5 female pelvic medicine and reconstructive surgery surgeons from a 5.5 month period. Other exclusion criteria were minor procedures, such as isolated anterior or posterior colporrhaphies, isolated incontinence procedures, or minor laparoscopic pro-edures such as salpingectomy or excl-ion of endometriosis.	Treatment (table 1) (nominal) Preop optimization: 17 Interventions covering assessment, education, exercise, diet, verification Preop day of: Multimodal PO pain medication, PONV, antibiotic prophylaxis, no routine fluid administration, no IV opioid premedication Intraop: Propofol, ketamine, lidocaine, dexamethasone, opioid-free induction; propofol/ketamine with lidocaine boluses maintenance; fluid management plan; emergence plan Postop: PO pain management, avoidance of PCA, IV fluids @ 40 ml/hr until tolerating sips/chips Specific same-day discharge checklist with POD 1 telephone follow-up Demographic data, to include surgery type (nominal/interval/ratio)	Length of admission (interval) Same-day discharge (interval) Total 30-day complications (with specific complications) (ratio) Satisfaction Pain control PONV	Continuous variables were analyzed using a Student t test for normally distributed data and Wilcox- on's rank sum test for nonparametric data. Categorical variables were analyzed using Chi-squared or Fisher exact test, as appropriate.	ERAS group had a higher proportion of same-day discharge and 13.8 hour shorter LOS. In the enhanced recovery after surgery group, patient satisfaction (n = 77 of 121) was reported as very good or excellent by 86. 7% for pain control, 89. 6% for surgery preparedness, and 93. 5% for overall surgical experience; 89. 6% did not recall any postoperative nausea during recovery. Conclusion: Enhanced recovery after surgery implementation in a urogynecology population resulted in a greater proportion of same-day discharge and high patient satisfaction but with slightly increased hospital readmissions within 30 days.	Strong goal of same-day discharge. Staged approach in implementation allowed for refinement of ERAS protocol.	Not randomized. Not powered to detect small differences in secondary outcomes such as adverse events or perioperative morbidity. Small data set precludes ability to assign attribution to specific components of ERAS, the abbreviated hospital admission, or other factors not accounted for.	II B
Johnson et al., 2018	Evaluate whether an ERAS bundle compared to standard education can affect length of stay, 30 day readmission, and patient satisfaction among patients undergoing gynecologic surgery.	N/A	Prospective, comparative, randomized design with two groups undergoing all hysterectomies (open, vaginal, or laparoscopic). Participants were randomly assigned 1:1 to receive a post-operative evidence-based bundle in addition to the standard education, or the standard education alone using a table of blocked (n=6, up to 48) random numbers generated from SPSS.	50 patients undergoing hysterectomy, 25 who received post-operative evidence based bundle/standard education, and 25 who received standard education packet.	Study was conducted in a 28 bed Medical Surgical Unit at a community hospital in Arizona. Recruitment included the first 50 patients undergoing hysterectomy from October 1, 2017 to March 1, 2018; 25 who received the post-operative evidence based bundle/standard education, and 25 who received the standard education packet. Inclusion criteria included able to speak and understand English, the same surgeon performing the surgery to minimize selection bias, and discharged home. The sample size was based on historical data of numbers of all hysterectomies performed at this hospital from October 1, through December 31, 2016. A sample size of n=25 per group yielded 80% power to identify a difference of effect size, d=0.80 two-tailed, in length of stay and satisfaction.	Post-operative evidence based bundle/standard education; bundle components included 1) early mobilization 2) early transition to oral pain medication 3) early feeding 4) chewing gum A follow-up phone call was made in two to three days following discharge for both groups utilizing teach-back. Level of measurement: NOMINAL	1) LOS – RATIO 2) Occurrence of readmission within 30 days- NOMINAL 3) Patient satisfaction utilizing a Likert scale from excellent to poor- ORDINAL	Summary statistics, including means (SD) and counts (percentages) were used to describe demographic characteristics and outcome data. Chi-square tests were conducted to determine if the two groups differed on key baseline demographic variable (age, race, tobacco use, and marital status). Analyses of variance (or covariance) were used to assess potential differences in continuous outcome variables (length of stay and patient satisfaction) across treatment groups. Rates of hospital readmission within 30 days for the two treatment groups, along with 95% confidence intervals, were reported, but the sample size did not allow an inferential test under reasonable assumptions. Significance was set at (p < 0.05, two-tailed). Analyses were performed using the IBM SPSS software package, version 23.	84% (n=21) patients in the bundle group were discharged in one day; 68% in the standard group. There were no 30 day readmissions for both groups. 22 (88%) participants met the bundle components 100% of the time. For the indicator "walking helped with recovery" 100% (n=25) responded "very good to excellent" for bundle group and 96% (n=24) responded "very good to excellent" for standard group. 23 (92%) of the bundle group felt that that overall nursing care received was very good to excellent and 24 (96%) of the general group felt that overall nursing care received was very good to excellent. Over all introduction and implementation of an ERAS intervention utilizing an all or nothing bundle concept resulted in outcome improvement.	Consort flowchart included. Power analysis and effect size was determined apriori. To maintain intervention fidelity the study was a standing agenda item at daily huddles on both shifts for intervention review and clarification. Confounding variables were acknowledged and discussed.	Sample size did not allow an inferential test under reasonable assumptions. Statistical significance was not discussed; p-values were not included. The number of patients that received the intervention was small, limiting the feasibility of the intervention and the need for further investigation. It is hard to say whether gum chewing alone promoted intestinal motility. The study was non-blinded where the researchers knew what interventions were being given to the two groups generating potential observer bias.	IC
Miller, et al., 2015	To examine the impact of a hysterectomy enhanced recovery pathway (ERAS, the authors refer to this as HER throughout the article) on POD 1 hospital discharge for open gynecological surgeries. The primary outcome was the percentage of POD 1 discharges before and after ERAS implementation. Secondary outcomes included return to hospital within 30 days of discharge, median length of stay (LOS), clinician compliance with HER, and an exploratory analysis with multivariable modelling to evaluate which aspects of the ERAS independently predicted POD 1 discharge.		Single-center, retrospective cohort study	223 ERAS n=123 Control n=100	All patients undergoing open abdominal hysterectomy for non-malignant hysterectory in a 1-year period both before and after implementation of an ERAS protocol Patients with chronic pain and emergent surgery were excluded	Treatment Preop: Patient identified by gynecology (all patients having planned benign open abdominal procedures); anesthesia consult & patient education; pre-emptive analgesia (acetaminophen 650 mg po and celecoxib 200 or 400 mg po) before the OR; Avoidance of preoperative sedatives; Plan for discharge on POD 1 Intraop: SAB with 0.75% hyperbaric bupivacaine (10- 12.5 mg) and intrathecal epimorph (100 lg); Ultrasound-guided TAP blocks administered by anesthesiology with 0.5% ropivacaine and 5 mcg/mL epinephrine; propofol infusion for general anesthesia; PONV prophylaxis (dexamethasone) Postop: Foundational analgesia (acetaminophen 650 mg po q4 h & celecoxib 200 or 400 mg po q12 h); Avoid IV PCA • Assistance with mobility once on the Ward: Remove Foley catheter and saline-lock IV once patient drinking well; Discharge home based on order from gynecology For independent prediction: ASA class (ordinal), prior abdominal surgery (nominal), BMI (interval), use of TAP blocks (nominal), anesthetic type (nominal) Demographical data: Age (interval), ASA class (ordinal), ever a smoker (nominal), prior abdominal surgery (nominal), preop SBP (ratio), surgery type (nominal), anesthetic (nominal)	POD 1 discharges (ratio), readmission or ER visit within 30 days (ratio), length of stay (interval)	The primary analysis consisted of a chi square test and multivariable logistic regression to determine if having surgery before or after HER pathway implementation was associated with discharge on POD 1. The multivariable model included ASA physical status (<= II vs >= III), BMI, age, and procedure type (as a three-level categorical variable). Covariates were chosen a priori based on identified predictors of extended hospital stay. The secondary analysis was conducted with a Chi square test and multivariate logistic regression, employing the covariates noted above. The unadjusted difference in the median LOS, reported as median (interquartile range), between groups was evaluated using a Wilcoxon test. Fisher's exact test or Student's t tests were used to assess the unadjusted strength of association between anesthesia type, provision of TAP block, surgical factors, demographical effects, temporal effects, and POD 1 discharge.	Significantly more POD 1 discharges occurred for post-HER compared to pre-HER patients (34% vs 7%, respectively; adjusted odds ratio [OR] = 7.33; 95% confidence interval [CI] = 3.05 to 17.62). Rates of return to hospital at 30 days were similar between the groups (10% post-HER and 13% pre-HER; adjusted OR = 0.74; 95% CI = 0.32 to 1.74). The median length of stay was two days in the post-HER group and three days in the pre-HER group (P\0.0001). Only inhalational general anesthesia was independently associated with decreased odds of POD 1 discharge (adjusted OR = 0.16, 95% CI = 0.04 to 0.65). Conclusion: For patients undergoing abdominal hysterectomy, implementation of a HER pathway is associated with a higher POD 1 discharge rate, with no increase in the early return to hospital rate.	Well-defined perceived barriers to discharge (pain, nausea and vomiting, ileus, inability to mobilize, and sedation). A second reviewer confirmed chart data to minimize bias with interpretable data. Demographic and anesthetic variables in computer charts left minimal room for interpretation.	Not possible to control for possible confounder of which surgeon performed the operations. Could not measure preop education. Could not measure spinal or TAP block dosing or success rates. Data extractor was not blinded. Return/readmission data was limited to patients presenting back to this hospital.	II B
Modesitt et al., 2016	To assess and to compare surgical outcomes, costs, and patient satisfaction before and after implementation of an ERAS protocol for patients undergoing major gynecologic surgery.	N/A	Quasi-experimental pretest and posttest design. Two ERAS protocols developed: a full pathway using regional anesthesia for open procedures and a light pathway without regional anesthesia for vaginal and minimally invasive procedures. ERAS pathways included extensive preoperative counseling, carbohydrate loading and oral fluids before surgery, multimodal analgesia with avoidance of intravenous opioids, intraoperative goal-directed fluid resuscitation, and immediate postoperative feeding and ambulation. A before-and after study design was used to compare clinical outcomes, costs, and patient satisfaction. Complications and risk adjusted length of stay were drawn from the American College of Surgeons' National Surgical Quality Improvement Program (NSQIP) database.	On the ERAS full protocol, 136 patients were compared with 211 historical controls. On the ERAS light protocol, 249 patients were compared with 324 historical controls.	All consecutive patients undergoing elective major gynecologic surgery with an overnight admission from January 2, 2014, to December 17, 2014 were included in the pre-ERAS control group. The post-ERAS group included all consecutive patients undergoing elective major gynecologic surgery during the timeframe from March 17, 2015, to October 31, 2015 after ERAS implementation; both groups also underwent American College of Surgeons' National Surgical Quality Improvement Program data abstraction. The 3-month period of time immediately before ERAS initiation was omitted from analysis to decrease the confounding effects of protocol development on clinical practice.	Full ERAS pathway (for open procedures with the use of a neuraxial analgesic adjuvant) and a light ERAS pathway (for minimally invasive procedures; identical except for no neuraxial analgesia). Level of measurement: NOMINAL	1a) LOS- RATIO 1b) NSQIP predicted risk-adjusted length of stay- RATIO 2) Opioid consumption in morphine equivalents- RATIO 3) Fluid administration (mL)- RATIO 4) Pain score (adult pain scale 1-10)- ORDINAL 5) Complications- NOMINAL 6) Patient satisfaction measured using the Press Ganey InfoEDGE database - ORDINAL 7) Costs (direct-indirect and fixed-variable costs) - RATIO	Univariate analysis compared baseline demographic and clinical variables between groups. Continuous variables were analyzed using Student t test for normally distributed data and Wilcoxon's rank sum as a nonparametric analog. Mean and standard deviations describe normally distributed data, and medians and interquartile ranges describe nonnormal data. Categorical variables were analyzed using Chi square or Fisher exact test, as appropriate, and are described as frequencies and percentages.	1) LOS: The median length of stay was significantly reduced after implementing ERAS in the ERAS full group (3.0 compared with 2.0 days; P=.007), despite increased NSQIP-predicted length of stay (pre–ERAS 2.0 compared with post–ERAS 2.5 days; P=.009); 1.5-day reduction in adjusted length of stay. LOS in the light pathway group was unchanged (1.0 compared with 1.0 days; P=.33), with a slight decrease in the median predicted LOS as evident by the smaller interquartile range (P<.001). 2) Opioid consumption in morphine equivalents: Substantial reductions in the ERAS full group were seen in median intraoperative morphine equivalents (12.7 compared with 0.3 mg; P<.001) but not in total morphine equivalents (25.2 mg pre-ERAS compared with 27.2 mg post–ERAS P=0.46). 3) Fluid administration: Median intraoperative net fluid was also less in the ERAS patients (1,250.0 compared with 285.0 mL; P<.001) along with total intravenous fluid balance (1,410.0 compared with 2917.5 mL; P<.001). 4) Pain score: The median pain scores were essentially identical on every day except on postoperative day 0, which was decreased in ERAS patients (5.0 compared with 3.7; P<.001) 5) Complications: Overall rate of complications decreased from 40% to 21% (P<.001) in full ERAS pathway group. There was an increase in total postoperative complications in the ERAS light groups (10.8% compared with 18.1%; P=.01) that was the result of an increase in urinary tract infection rates (1.9% compared with 5.2%; P=.03). 6) Patient satisfaction: marked improvement on the focus question regarding pain control in both groups; full ERAS group increased from 26th to 63rd percentile (P<.001); light ERAS group increased from 34th to 99th percentile; P<.001). 7) Costs: Median total 30-day hospital costs per patient were decreased in all groups. On the light ERAS pathway, the only differences were decreased median intraoperative morphine equivalents (13.0 compared with 0.0 mg; P<.001), decreased total morphine equivalents (23.6 compared with 15.0 mg; P=.002), intraoperative net fluid balance (932.5 compared with 250.0 mL; P<.001), and overall total net fluid (1,381.5 compared with 171.1 mL; P<.001).	P-values are shown for each outcome measurement. ERAS gynecologic protocol that was standardized and agreed on by anesthesia, nursing, and surgeon colleagues. Risk stratification was performed in an attempt to reduce biases, and confirmed that the groups were likely equivalent.	Study had relatively small numbers of patients with limited power to detect small differences in rare complications. Randomization was not feasible. Unclear exactly which statistical test was used for each variable; discussion regarding nonnormal data and abnormally distributed data was absent. Only a 24% response rate for patient satisfaction surveys. Unexplained increase in UTI rates in the ERAS light group.	IIB
Nelson et al., 2016; Guidelines for pre- and intra-operative care in gynecologic/oncology surgery: Enhanced Recovery After Surgery (ERAS®) Society recommendations — Part I	The goal of this article is to critically review existing evidence and make recommendations for elements of pre- and intraoperative care in gynecology. This effort forms the basis of the ERAS Guideline for pre- and intra-operative care in gynecologic/oncology surgery.	N/A	Clinical practice guidelines/ consensus panel. Systematic review of meta-analyses, systematic reviews, randomized controlled studies, nonrandomized controlled studies, reviews, and case series.	Not discussed; number of articles reviewed was not directly stated	The literature search (1966–2014) used Embase and PubMed to search medical subject headings including "gynecology", "gynecologic oncology" and all pre- and intra-operative ERAS items. Reference lists of all eligible articles were cross-checked for other relevant studies. Titles and abstracts were screened by individual reviewers to identify potentially relevant articles. Discrepancies in judgment Discrepancies in Judgment were resolved by the lead and senior authors. Meta-analyses, systematic reviews, randomized controlled studies, nonrandomized controlled studies, reviews, and case series were considered for each individual topic.	1) Preadmission information, education, and counseling 2) Preoperative optimization 3) Preoperative bowel preparation 4) Preoperative fasting and carbohydrate treatment 5) Preanesthetic medication 6) Thromboembolism prophylaxis 7) Antimicrobial prophylaxis and skin preparation 8) Standard anesthetic protocol 9) Prevention of postoperative nausea and vomiting 10) Minimally invasive surgery 11) Nasogastric Intubation 12) Preventing intraoperative hypothermia 13) Perioperative fluid management Level of measurement: NOMINAL	Postoperative morbidity and recovery; variables not specified any further; unable to determine level of measurement. Purpose of this article is to make recommendations for elements of pre- and intraoperative care.	The quality of evidence and recommendations were evaluated according to the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) system whereby recommendations are given as follows: Strong recommendations indicate that the panel is confident that the desirable effects of adherence to a recommendation outweigh the undesirable effects. Weak recommendations indicate that the desirable effects of adherence to a recommendation probably outweigh the undesirable effects, but the panel is less confident.	1) Patients should routinely receive dedicated preoperative counseling. 2) Smoking and alcohol are associated with increased postoperative morbidity and should be stopped at least 4 weeks before surgery; should be identified, investigated, and corrected preoperatively; iron therapy is the preferred first line treatment for the correction of iron deficiency anemia. 3) Routine oral mechanical bowel preparation should not be used in gynecologic/oncology surgery, including patients with a planned enteric resection. 4) Patients should be permitted to drink clear fluids until 2 h before anesthesia and surgery. Abstain from solids 6 h prior to induction of anesthesia. Oral carbohydrate loading reduces postoperative insulin resistance, improves preoperative wellbeing, and should be used routinely. Insufficient data is available for diabetic patients. 5) Routine administration of sedatives to reduce anxiety preoperatively should be avoided in order to hasten postoperative recovery 6) Patients at risk of VTE should receive prophylaxis with either LMWH or heparin, commenced preoperatively, combined with mechanical methods, and continued post-operatively. 7)IV antibiotics should be administered routinely within 60 min before skin incision. 8) Short acting anesthetic agents should be used to allow rapid awakening. The addition of regional anesthesia to general anesthesia is opioid sparing, helps reduce PONV, and allows more rapid awakening. A ventilation strategy using tidal volumes of 5–7 ml/kg with a PEEP of 4–6 cmH2O reduces postoperative pulmonary complications. 9) Patients should receive multimodal PONV prophylaxis using more than two antiemetic agents. The risk of PONV is reduced with increased utilization of regional anesthesia, decreasing or eliminating opioids, neostigmine, volatile anesthetics, and increasing propofol use. 10) Minimally invasive surgery (MIS), including vaginal surgery is preferred when feasible 11) Routine nasogastric intubation should be avoided. 12) Temperature monitoring is mandatory to titrate warming devices and avoid hypo- and hyperpyrexia. Maintenance of normothermia with suitable active warming devices should be used routinely. 13) Very restrictive or liberal fluid regimes should be avoided in favor of euvolemia. In major open surgery and for high-risk patients where there is large blood loss (>7 ml/kg) or a SIRS response, the use of advanced hemodynamic monitoring to facilitate individualized fluid therapy and optimize oxygen delivery through the perioperative period is recommended.	Provided evidence level and recommendation grade for all recommendations. 111 references were used to compile the data for these guidelines.	In instances where good quality data was not available, recommendations were made based on findings from other surgical disciplines in which major abdominal surgery is routinely utilized. There were a few conflicts of interest that were discussed in a conflict of interest statement.	IVa

Nelson et al., 2016; Guidelines for postoperative care in gynecologic/oncology surgery: Enhanced Recovery After Surgery (ERAS®) Society recommendations — Part II	The goal of this article is to critically review existing evidence and make recommendations for elements of postoperative care. This effort forms the basis of the ERAS® Guideline for postoperative care in gynecologic/oncology surgery.	N/A	Clinical practice guidelines/ consensus panel. Systematic review of meta-analyses, systematic reviews, randomized controlled studies, nonrandomized controlled studies, reviews, and case series.	Not discussed; number of articles reviewed was not directly stated	The authors convened in July 2014 to discuss topics for inclusion; the topic list was based on the ERAS® Colonic Surgery and Rectal/ Pelvic Guidelines which were used as templates. After the topics were agreed upon they were then allocated amongst the group according to expertise. The literature search (1966–2014) used Embase and PubMed to search medical subject headings including "gynecology", "gynecologic oncology" and all postoperative ERAS items. Reference lists of all eligible articles were crosschecked for other relevant studies. Titles and abstracts were screened by individual reviewers to identify potentially relevant articles. Discrepancies in judgment were resolved by the lead and senior authors. Meta-analyses, systematic reviews, randomized controlled studies, non-randomized controlled studies, reviews, and case series were considered for each individual topic.	1) Postoperative thromboembolism prophylaxis 2) Postoperative fluid therapy 3) Perioperative nutritional care 4) Prevention of postoperative ileus 5) Postoperative glucose control 6)Multimodal analgesia 7) Analgesia for vaginal hysterectomy 8) Analgesia for open general gynecologic surgery 9) Analgesia for laparoscopic gynecologic/oncologic surgery 10) Peritoneal drainage 11) Urinary drainage 12) Early mobilization Level of measurement: NOMINAL	Postoperative morbidity and recovery; variables not specified any further; unable to determine level of measurement. Purpose of this article is to make recommendations for elements of postoperative care.	The quality of evidence and recommendations were evaluated according to the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) system whereby recommendations are given as follows: Strong recommendations indicate that the panel is confident that the desirable effects of adherence to a recommendation outweigh the undesirable effects. Weak recommendations indicate that the desirable effects of adherence to a recommendation probably outweigh the undesirable effects, but the panel is less confident. Recommendations are based on quality of evidence: high, moderate, low and very low but also on the balance between desirable and undesirable effects; and on values and preferences.	1) Patients should wear well-fitting compression stockings and have intermittent pneumatic compression. Extended prophylaxis (28 days) should be given to patients after laparotomy for abdominal or pelvic malignancies. 2) Intravenous fluids should be terminated within 24 h after surgery. Balanced crystalloid solutions are preferred to 0.9% normal saline. 3) A regular diet within the first 24 hours after gynecologic/oncology surgery is recommended. 4) The use of postoperative laxatives and chewing gum should be considered. 5) ERAS elements that reduce metabolic stress should be employed to reduce insulin resistance and the development of hyperglycemia. Perioperative maintenance of blood glucose levels (<180–200 mg/dL) results in improved perioperative outcomes. Glucose levels above this range should be treated with insulin infusions and regular blood glucose monitoring to avoid the risk of hypoglycemia. 6) A multimodal analgesia strategy should be employed with the aim of reducing post-operative opioid requirement. Post-operatively, opioids should be given orally to patients who can tolerate diet. For patients unable to tolerate diet following surgery, then an opioid IV PCA can be used until resumption of GI function, but the oral route should be used as soon as possible. Acetaminophen and NSAIDs in combination should be administered regularly to all patients unless contraindication exists. Dexamethasone may be administered to prevent PONV and reduce pain, but should be used with caution in diabetic patients. Gabapentin may reduce pain and side effects and may be considered, although the optimal dose is not known. 7) Local anesthetic infiltration may be effective at reducing early postoperative pain and opioid consumption, and facilitating early mobilization. Either paracervical nerve block or intrathecal morphine may reduce pain and opioid consumption after vaginal hysterectomy. However, the effect is small. 8) For open surgery a multimodal, opiate sparing analgesic strategy should be utilized. Thoracic epidural analgesia (TEA) or spinal anesthesia with intrathecal morphine may improve recovery parameters and are recommended. However TEA may increase time to mobilization and removal of urinary catheter, and may potentially impact on hospital stay. Where patients have undergone general anesthesia without neuraxial blockade, a truncal block, such as TAP blocks, may reduce pain and opioid consumption for up to 24 hours and should be employed. 9) For laparoscopic gynecologic/oncology surgery, neither TAP blocks nor intraperitoneal instillation of local anesthetic are recommended on the current level of evidence. Multimodal analgesia should be employed, and post-operative opioids may be given either orally or by IV PCA depending on magnitude of surgery and predicted post-operative gut function. 10) Peritoneal drainage is not recommended routinely 11) Urinary catheters should be used for postoperative bladder drainage for a short period preferably <24 hours postoperatively. 12) Patients should be encouraged to mobilize within 24 hours of surgery.	Provided evidence level and recommendation grade for all recommendations. 141 references were used to compile the data for these guidelines.	In some instances good quality data was not available. This was particularly true for the evidence surrounding urinary drainage, early mobilization and postoperative analgesia in which the optimal analgesic regimen for vaginal surgery and open gynecologic surgery is currently a subject of debate. In some instances recommendations were made based on findings from other surgical disciplines in which major abdominal surgery is routinely utilized. There were a few conflicts of interest that were discussed in a conflict of interest statement.	IVa
Scheib, et al., 2019	To evaluate how an ERAS protocol impacts outcomes and to identify the key components for a successful ERAS protocol/	N/A	Systematic Review of a combination of RCT's, quasi-experimental, and nonexperimental studies	50 records included in the analysis	PUBMED, Embase, Medline, CINAHL, and the Cochrane Library were searched for studies that used the ERAS program in benign and malignant gynecologic surgeries from January 29, 2018 to May 15, 2018. The medical subject headings search terms "enhanced recovery", "ERAS", "gynecology", "gynecologic surgery", "fast track" and "same day surgery" were used in the search with Boolean operators ("OR" and "AND"). There were no restrictions on publication date or study design. Exclusion criteria included review articles, non-full text, and non-English language. Results of all searches were combined and duplicates removed. Reference lists of the review articles and included studies were reviewed and additional ERAS studies included. This review focused on women undergoing surgery for both benign and malignant diseases. .	Implementation of an enhanced recovery after surgery (ERAS) or "fast track" protocol for gynecologic surgeries; studies that contained at least 4 items from an ERAS pathway were included. Level of measurement: NOMINAL	1) Impact of ERAS on length of stay (LOS) in open hysterectomy, laparoscopic, and vaginal gynecologic surgeries (hours and days; INTERVAL/RATIO) 2) Postoperative pain and narcotic use (INTERVAL/RATIO) 3) Intravenous fluid intake (RATIO) 4) Postoperative nausea and vomiting (PONV) and the return to bowel function (INTERVAL/RATIO) 5) Impact of ERAS on time to ambulation (INTERVAL/RATIO) 6) ERAS complication rates (NOMINAL) 7) Readmission after ERAS (NOMINAL) 8) Urgent care or emergency room visits after ERAS (NOMINAL) 9) ERAS reoperation rates (NOMINAL) 10) Patient satisfaction with the ERAS protocol (NOMINAL) 11) Economics and cost analysis of using an ERAS protocol (RATIO) 12) ERAS with cancer patients- LOS, readmission rates, complications, and mortality (RATIO and NOMINAL) 13) Compliance with elements of the ERAS pathway (NOMINAL)	Not addressed. A combination of individual study data as well as aggregate data was presented based on the varying outcomes. Article did not include a description of how the studies were compared using statistical analysis. Validity of individual studies not discussed in narrative, but details regarding source, design, sample,inclusion criteria, exclusion criteria, and level of evidence were present in Table 2.	1) LOS was decreased for laparotmoy, laparoscopy, and vaginal surgery. 2) Studies found a 20.8%-97.4% drop in narcotic use in the ERAS group, but no impact on pain scores. A multimodal analgesia results in decreased narcotic use without increasing pain scores. 3) Significantly less intravenous fluids were used postoperatively. 4) PONV and return to bowel function aren't consistent; overall no affect on LOS. 5) Patients were more likely to be mobile on the day of surgery and upward of 75.6% ambulating within 3 hours of surgery, resulting in earlier discharge. 6) No significant differences in complication rates for open, minimally invasive, and vaginal surgery. There were no differences in surgical complications. Complication rates were found to be the same for ERAS and control groups. However,potentially serious medical complications are less in the ERAS group due to minimization of surgical stress response. 7) Readmission rates were no different for ERAS patients. 8) Rates of urgent care and emergency room visits in the first 72 hours were 0-4%. 9) There was no significant differences in reoperation, even in cancer cases. 10) Patients are overall satisfied with the ERAS protocol and had a positive experience in all studied aspects of perioperative care, including patient education, quality of care during hospitalization, pain management, coordination of care, and discharge process. 11) Total hospital costs at 30 days were significantly decreased with the ERAS pathway. There is a greater cost benefit with minimally invasive surgery. 12) ERAS was associated with shorter LOS, without a difference in readmission rates, complications, or mortality in cancer patients. 13) Limited data and varied compliance with each element of ERAS protocols. it is still unclear which elements of ERAS are critical for the protocol and the results found.	Varying levels and quality of evidence in individual studies; large amount of levels 2 and 3 included, and no level 5 studies included. Flow diagram included that showed number of studies eliminated and included. Large amount of studies (50) included in this systematic review. Includes a section regarding limitations witha discussion of potential explanations. 13 different outcomes were measured.	Does not discuss the methods used to appraise strength of evidence in the individual studies. There was no limitation on publication date for inclusion; outdated studies were included. More than two thirds of the studies were from outside of the United States, which brings into question the applicability. There is significant variation in the ERAS protocols used in the individual studies, making it difficult to perform a meta-analysis. The included studies had limited quantification of the rates of compliance with each of the key elements of the ERAS pathway to be able to quantify outcomes.	IIIB
Wijk, et al., 2014	To study the effects of introducing an ERAS protocol, modified for gynecological surgery, on length of stay and complications following abdominal hysterectomy. Main outcome measures were LOS and proportion of patients achieving target 2 days LOS.	N/A	Single-center prospective cohort, obervational study	205 ERAS n=85 Control n=120	The outcomes of 85 consecutive patients undergoing abdominal hysterectomy for benign or malignant indications, with or without salping- oopherectomy, were compared to the outcomes of 120 consecutive patients immediately prior to ERAS implementation Excluded women (n=55) enrolled at the same time in a study managed by the Dept of Anesthesiology	Treatment (Nominal) Preop: High-calorie high-protein daily for those deemed malnourished (length of time not specified); NPO @ midnight day before surgery with clears allowed until 2 hour before surgery at which time 400 mL of clear carbohydrate drink with 200 kcal was given; premedication 1g paracetamol (route not specified), 1.2g PO flagyl, 160/800 mg PO trimethoprim/sulfamethoxazole, and PO midazolam PRN, all 2 hours before surgery. Intraop: urinary catheter placed; warm IV fluids and hot air blanket; 2-4 ml/kg/hr lactated ringer's with 500-1000 ml Voluven PRN (hydroxyethyl starch, volume expander); GA with volatile anesthetics; PONV prophy with droperidol 0.625 mgIV and betamethasone 4 mg IV for high-risk pts; epidural analgesia given on individual basis; parecoxib 40 mg IV and 20 ml bupivicaine 0.25% locally at wound closure. Postop: PONV with ondansetron (1st) and metoclopramide (2nd) PRN; standard pain regimen oral paracetamol 1330 mg and diclofenac 50 mg TID measured with Visual Analogue Scale and placed on morphine PCA; PCA and urinary catheter removed @ 0800 POD 1; postop IV fluids limited to 500-1000 ml day of surgery (DOS), d/c'd if able to tolerate PO, and DC'd either way by morning POD 1; regular food offered 2 hr after surgery with nutritional drinks between meals; mobilization for 2 hr DOS and 8 hr/day for the rest of hospitalization; thromboprophylaxis for 7 days/20 days for malignant disease.	1) LOS - interval 2) Complications - ratio 3) Readmission - ratio 4) Re-operations - ratio	Data were analyzed with a two-sided chi-squared test, chi-test for trend or Fisher's exact test when appropriate, and continuous variables were analyzed using the Mann–Whitney U-test for two independent groups. A p-value <0.05 was considered significant.	Length of stay was significantly reduced in the study population after introducing the ERAS protocol from a mean of 2.6 (SD 1.1) days to a mean of 2.3 (SD 1.2) days (p = 0.011). The proportion of patients discharged at 2 days was significantly increased from 56% pre-ERAS to 73% after ERAS (p = 0.012). No differences were found in complications (5% vs. 3.5% in primary stay, 12% vs. 15% within 30 days after discharge), reoperations (2% vs. 1%) or readmission (4% vs. 4%)	No significant differences in patient demographics between the two periods were found, except for the use of neoadjuvant chemotherapy in 4 patients in the ERAS group. Despite exclusion criteria, the authors argue the completeness of the data makes the two groups comparable. For the subgroup with hysterectomy only, 90% of patients reached target LOS.	Not randomized (the researchers decided it was unethical due to existing evidence). Not blinded (but also not possible given the elements of care). Would have more complete control data if those women were not excluded. PONV remained a problem.	II B
Yilmaz, et al., 2018	To compare the postoperative compliance and complications between ERAS and conventional postoperative care in patients undergoing abdominal hysterectomies.	N/A	Prospective, RCT	62 / 62 ERAS n=30 Conventional care n=32	Not discussed	Treatment. Preop: counseling before hospital admission; fluid and carbohydrate loading; avoiding prolongation of fasting period; avoiding bowel preparation or its application only in selective cases; application of antibiotic prophylaxis; application of thromboprophylaxis; avoiding premedication. Periop: Use of short-acting anesthetic agents; application of midthoracal; epidural anesthesia/analgesia; refraining from using drains; refraining from salt, and water overload; maintenance of normothermia (heating the body, and use of warmed up intravenous fluids). Postop: Application of midthoracal, epidural anesthesia/analgesia; refraining from use of nasogastric tube; prevention of nausea, and vomiting; refraining from salt, and water overload; earlier removal of catheters; initiation of oral intake at an early period; use of nonopioid oral analgesics/NSAIDs; early mobilization; adherence to the protocol, and auditing results. Level of measurement: NOMINAL	1) Time to first flatus (hours) 2) Time to first defecation (hours) 3) Time to ambulation (days) 4) Time to eating solid food (days) 5) Postoperative intravenous fluids (first 3 days) (mL) 6) Postoperative hospital stay (days) Level of measurement: RATIO 7) Complications (8 listed -vaginitis, wound infection, chest pain/no infection, non-specific abdominal pain, perioperative bleeding, sub-ileus, total patients without complication, readmission to ER) Level of measurement: NOMINAL	To determine significant differences between the ERAS and control groups, statistical analysis was performed using a χ2 test. Continuous data are expressed as median (range) or as mean (± SD) and were analyzed using Mann-Whitney U test. BMI was converted to a categorical variable, representing certain risk groups. All categorical and dichotomous variables were analyzed using χ2 test.	ERAS group n=30, control group n=32, no statistically significant differences in demographics, age, ASA score, diagnosis, or surgery. Peri- and post-operative fluids were significantly lower in ERAS group (p <0.001 for both). Time to first flatus (p = 0.001), time to first defecation (p < 0.001), and time to eating solid food (p <0.001) were all significantly shorter in the ERAS group. Post-operative early mobilization on the first postoperative day was achieved in eight (26.7%) patients in the ERAS group while none of the control group patients mobilized on day 1. ERAS protocol led to a significantly shorter length of hospital stay (p = 0.010). There were no significant differences in complications. There were a total of 9 (30%) patients in the ERAS Group and 12 (37.5%) patients in the Conventional Group who suffered from a complication (p = 0.112) such as vaginitis, wound infection, chest pain, abdominal pain, perioperative bleeding, and sub-ileus One (3.3%) patient in the ERAS Group and 11 (34.4%) patients in the Conventional Group required hospital read- mission after discharge. Both groups differ significantly in terms of readmission (p = 0.002).	Surgical antibiotic was standardized. Standard IV fluids administered to all patients. Acetaminophen administered to all patients.	Not blinded, but authors explain that "it is impossible to blind elements of care such as mobilization, information, fluids given, etc." Many details of pre, peri, and postop protocol are not explained in detail. Sampling was not discussed. Sampling plan and power analysis were not discussed. Application of regional anesthetics were peri/postop elements of ERAS protocol but their percentage of use compared to general anesthetics was not discussed. Prevention of postop nausea/vomiting was an element of the ERAS protocol but is not an outcome measure. Adherence to ERAS protocol (assumedly by anesthesia provider, postop nursing, and patient) was an element of ERAS protocol but measurement or results were not measured or discussed.	IB

Appendix C: Iowa Model Revised



Appendix D: Timeline

Nov-Dec 2020	Jan-May 2021	Jun-Jul 2021	Aug 2021-Jan 2022	Feb 2022
1. Gather and synthesize literature 2. Narrow down recommendations for ERAS interventions 3. Gather pre-intervention data	1. Develop final ERAS protocol interventions 2. Present recommendations to involved department heads for approval and buy-in	1. Develop an educational program for staff 2. Provide 2 educational opportunities for involved staff. Educate preoperative staff, surgeons, anesthesia providers, and postoperative staff on practice changes and what their role will be	1. Implement ERAS protocol 2. Monitor and encourage compliance 3. Continual staff education on interventions and importance 4. Collect post-intervention data	1. Last month of implementation and data collection 2.Evaluate findings 3. Start preparations for dissemination

Appendix E: Data Analysis Table

		Variable Name	Variable Description and type of measure	Data Source	Possible rangeof values	Level of measurement	Time Frame for Collection	Statistical Test	Decision Rule
Population or Event	IV	ERAS protocol compliance	Percentage of ERAS standardized recovery interventions implemented by provider Process measure	EHR	0-100%	Ratio	Aug2021-Feb2022	N/A	≥ 80% of interventions implemented for case to count as ERAS compliance and inclusion in DV data
	DV	Length of hospital stay	Length of time from surgery to hospital discharge- outcome measure	EHR	0-96 hours	Interval	Aug2021-Feb2022	Independent T-Test and Wilcoxon's Rank Sum	N/A
		PACU opioid consumption	Total number of morphine equivalents required in PACU- outcome measure	EHR	0-50	Ratio	Aug2021-Feb2022	Independent T-test and Wilcoxon's Rank Sum	N/A
		Inadvertent medication administration	Frequency of acetaminophen or NSAID overdose or double dose- outcome measure	EHR	0-100%	Ratio	Aug2021-Feb2022	Chi-Square or Fisher's Exact	Perioperative acetaminophen administration of 975mg or 1000mg with less than 6h between doses; perioperative NSAID administration with less than 6h between doses

Appendix F: Business Case Analysis

NURS5220: Translation of Evidence for Health Care Practice, Policy, and Evaluation Module 5 Assignment: Business Case with Value Based Care

BUSINESS CASE with VALUE BASED CARE ASSESSMENT
Proposed Title for Project/Initiative/Opportunity to Improve *Proposed Title*
Implementation of an evidence-based enhanced recovery after surgery (ERAS) protocol to improve outcomes for hysterectomy patients.
Opportunity Statement *(Description of proposed project/initiative/opportunity to improve)* *Opportunity statement*
The implementation of current evidence-based practice can result in substantial cost savings and a decreased risk of adverse events. Development of a perioperative ERAS protocol for adult hysterectomy patients will reduce perioperative hospital costs, while simultaneously improving patient care and increasing access to care for patients within the military healthcare system.
Business Opportunity/Objectives *(Prioritize listing – macro and micro objectives)* *Business Opportunity*
Macro 1. Improved quality of care 2. Reduce hospital costs Micro 1. Reduce hospital length of stay 2. Increase patient satisfaction 3. Decrease complication rates i.e. infection, bleeding, VTE, GI/GU injury) 4. Reduce readmission rates 5. Decrease pain scores 6. Minimize perioperative opioid consumption
Potential Impact of the Initiative/Project *(Identify outcome metrics & benchmarks/and how objectives align with Quadruple Aim, Value Based Care, and HRO goals)* *Potential Impact*
1. Readiness: An ERAS protocol will decrease the burden on hospital staff, and allow soldiers more time to maintain readiness. 2. Better care: Patient experience will be enhanced, as evidence by improved patient satisfaction scores, due to adequate pain management, shorter length of stay, reduced readmissions, and reduced complications. 3.Better health: An ERAS protocol will improve the health of hysterectomy patients by improving patient safety, providing optimized pain management with decreased use of opioids, and reducing readmission rates and complications. Implementing a standardized protocol of evidence-based perioperative interventions minimizes the risk of medication errors, miscommunication, and mistakes.

4. Lower cost: Decreased length of stay enables the hospital to schedule more surgeries and admit more patients. When length of stay is not optimized, there is limited room for new admissions, and the hospital profit becomes lessened.

Alternatives (courses of action) chosen for Analysis *Alternatives*

1. Implement an evidence-based ERAS protocol for perioperative care of patients undergoing hysterectomy surgery.

2. Implement evidence based postoperative are interventions for patients undergoing hysterectomy surgery.

3. *"Status Quo"*: Manage each patient according to individual provider preference, with no standardization in the perioperative environment.

Analysis of Alternatives *Alternatives*

Alternative 1:	Implement an evidence-based ERAS protocol for perioperative care of patients undergoing hysterectomy surgery.

Pros	**Cons**
Evidence-based best practice Minimal up-front cost for implementation Overall cost savings Reduced hospital length of stay Increased patient satisfaction Decreased complication rates Reduced readmission rates Improved pain scores	Requires buy-in from multiple departments and providers Need to implement practice changes which requires time, planning, and education

Alternative 2:	Implementing evidence based postoperative care interventions for patients undergoing hysterectomy surgery.

Pros	**Cons**
More buy-in from providers due to the small amount of interventions Requires minimal change from current standard of practice Minimal up-front costs for implementation Easy to implement and monitor	Pre- and intra-operative care remains unstandardized Risk of long-term higher hospital costs Risk of longer hospital stays Risk of suboptimal patient satisfaction scores Risk of higher readmission rates Risk of higher rate of complications Possibility of higher pain scores compared to a more robust perioperative ERAS protocol

Alternative 3:	*"Status Quo"*: Managing each patient according to individual provider preference, with no standardization in the perioperative environment.

Pros	**Cons**
Requires zero buy-in because this is the current practice Already the standard of care No need to change the current practice No up-front costs	Risk of long-term higher hospital costs Risk of longer hospital stays Risk of suboptimal patient satisfaction scores Risk of higher readmission rates Risk of higher rate of complications

	Risk of higher pain scores

Assumptions *Assumptions*

-Average length of stay is 4.4 days for an open hysterectomy without implementation of standardized practices (Miller et al., 2015)
-Prolonged hospital stays lead to a shortage of hospital beds and cancellation of urgent surgeries (Miller et al., 2015)
-Prolonged hospital stays increase patient susceptibility to nosocomial infections and prolonged immobility
-In the absence of ERAS, there is overwhelming potential for gaps in care that lead to unnecessary costs (Williams et al., 2020)
-Without standardization, patients may be unprepared for surgery (Scheib et al., 2019)
-If patients are insufficiently prepared, their recovery may be slowed, leading to poorer health outcomes (Scheib et al., 2019)
-Without standardization, there's risk for uncontrolled pain and postoperative nausea and vomiting (PONV) (Ganter et al., 2014)
-Uncontrolled pain and PONV are positively correlated with a prolonged post-anesthesia unit length of stay (Ganter et al., 2014)
-Mean length of stay following one ERAS protocol for gynecologic surgeries was reduced from 3.0 to 2.0 days (Modesitt et al., 2016)

Recommendation and Rationale *Make a choice*

Recommendation *Make a choice*

Proposal to recommend alternative #1: Implement an evidence-based ERAS protocol for perioperative care of patients undergoing hysterectomy surgery.

Rationale *Make a choice*

Numerous studies have clearly displayed the benefits of ERAS protocols. Overlapping outcomes include hospital length of stay, patient satisfaction, complication rate, readmission, pain score, opioid consumption, and fluid administration (Modesitt et al., 2016; Scheib et al., 2019; Yilmaz et al., 2018). There is a strong body of evidence that suggests implementation leads to significantly shorter hospital stays (Miller et al., 2015; Modesitt et al., 2016; Wijk et al., 2014; Yilmaz et al., 2018), as well as improved patient satisfaction (Carter-Brooks et al., 2018; Modesitt et al., 2016; Scheib et al., 2019).

Value Based Care - Investment Required by the Organization and the Associated "VALUE" or $ GAINED.

Below represents two ways to present this information. Depending on the initiative, you may need to alter this outline. Please adjust as appropriate and if need be ... do not hesitate to create this portion on a separate document and then attach to this assignment. *Outline the Value Based Care*

I. *Volume projection based on:*

Number of hysterectomies performed each year at FBCH (including vaginal, open, and laparoscopic assisted)	220
Total	**220**

Clinical outcomes are the most important metric to patients and providers, but cost-savings have become increasingly important to administrators and insurance companies in the face of rising healthcare costs.

II. *Reimbursement calculated for:*

ERAS vs non-ERAS cost savings (Pache et al., 2019)	$3,694 per surgery
Total	**$812,680 (calculated for 220 surgeries)**

III. *Costs:*

Variable Costs:

Supplies (paper, poster, misc.)	$1000 (estimated)
Educating staff on practice changes MD $112/hr, CRNA $90/hr, RN $43/hr via salary.com Estimate: 20 MDs, 12 CRNAs, 30 RNs @ 1 hour training each	$4610
Total	**$5,610**

Fixed Costs:

Labor	$ n/a
Overhead	$ n/a
Total	**$0**

IV. *Forecasted P&L statement:*

Revenues:

Improved patient satisfaction scores	5% improvement (conservative estimate)
Decreased readmission rates	5% decrease (conservative estimate)
Decreased complication rates	5% decrease (conservative estimate)
Decreased hospital length of stay	1 day LOS
Cost savings	$812,680
Total revenues	**$812,680**

Costs:

Variable costs	$5,610
Fixed costs	$0
Total costs	**$5,610**

PROJECTED PROFIT ***$807,070***

Risks and Mitigation Plan *Consider the risks:*

Risks	**Plan**
1. Provider acceptance	1. Educate providers that the ERAS protocol contains many interventions that are already being implemented.
2. Provider adherence with ERAS protocol	2. Show providers the evidence that ERAS protocols are best practice.
3. Variable interpretation of interventions within protocol	3. Educate all staff involved, and discuss the details of each intervention.
4. Resistance to change	4. The practice change will not be extreme, as many interventions included in the ERAS protocol are already being practiced.
5. Fear of decreased autonomy	5. Reinforce that ERAS protocols do not diminish provider autonomy, and that each patient should still receive individualized care.

Implementation Plan *Implementation plan*

Phase 1:	Gather the evidence
Milestone Description:	Search the literature and collaborate with the anesthesia department to support claims the alternative is necessary. Also, must gather institutional baseline data for comparison.

Deliverables	Due Date	Accountable Person
Measurable Goal: Organization, categorization, and critique of at least 10 systematic reviews, meta-analyses, and/or appropriate well-designed studies. Obtain relevant literature and evidence	Two months	Project lead

to support project, and display in evidence table and synthesis table.		

Resources Needed
Access to research databases and time to perform tasks. Mitigate risks by collaborating with the perioperative staff (preop, PACU, and Anesthesia Services) and the Women's Health department, as well as utilizing Learning Resource Center staff to ensure adequate database searches.

Expected Level of Benefit
Findings from the literature provide the foundation for this evidence-based project. Our aim is to synthesize an ERAS protocol focused for the multiple methods of hysterectomy at FBCH (abdominal, laparoscopic, vaginal, and robotic) by selecting interventions from the literature that are well-supported and easy to implement. Baseline data (current average hysterectomy length of stay, patient satisfaction scores, complication rates, readmission rates) will be gathered that will allow comparison pre- and post-ERAS implementation to evaluate program effectiveness.

Phase 2:	Develop final ERAS protocol interventions and present to involved department heads
Milestone Description:	Conduct meetings with perioperative and Women's Health departmental leadership regarding research findings with the specific interventions to be implemented. Measurable Goal: verbal buy-in from each department.

Deliverables	Due Dates	Accountable Person
Measurable Goal: Finalize the perioperative ERAS guidelines in written form and produce a professional presentation using PowerPoint slides and handouts	One month after data collection has been completed	Project lead

Resources Needed
The primary required resources will be the time necessary to finalize ERAS protocol and produce the presentation materials and conduct meetings with leadership from the involved departments. Scheduling the presentations will be based on departmental leadership availability and advanced coordination is necessary. Collaborate with colleagues to ensure quality and accuracy prior to presentations. Several iterations of the ERAS protocol may be needed before departmental leaderships indicates buy-in.

Expected Level of Benefit
Dissemination of findings to departmental leadership allows assessment of current best evidence-based practices. Additionally, it prompts practitioners to examine the current practice and spot areas of weakness that can be improved with ERAS implementation.

Phase 3:	Conduct an educational program with staff on the ERAS protocol.
Milestone Description:	This milestone will be achieved when leadership and staff from all involved departments have been trained on the elements of care within the ERAS protocol their section will be responsible for providing. As necessary, work with the departments to change the protocol, while remaining within current best evidence-based practice, to secure departmental buy-in.

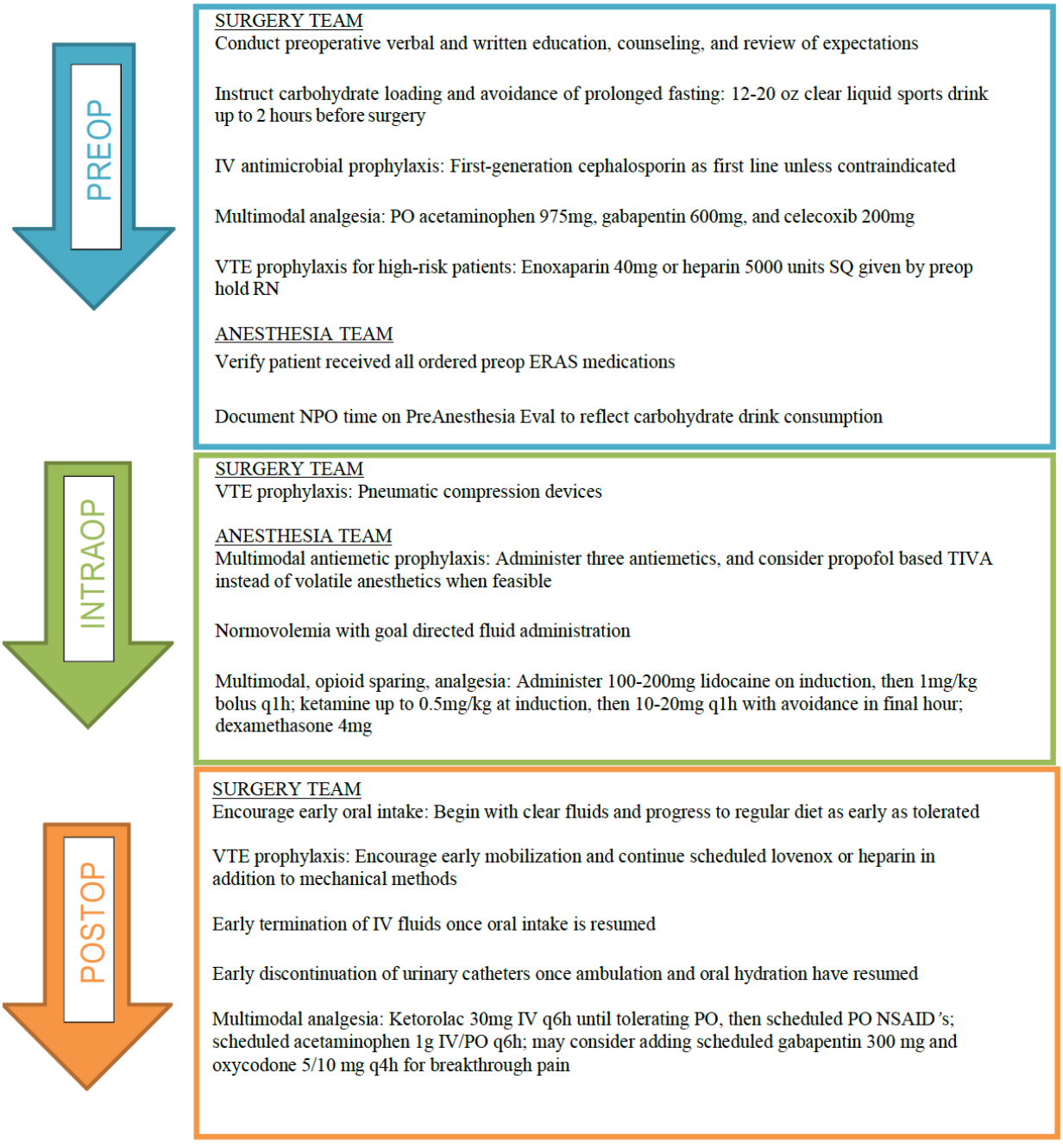
Deliverables	Due Dates	Accountable Person
Measurable Goals: Receive approval from all involved departments	One month after receiving buy-in from departmental leadership	Project lead
Resources Needed		
Time to prepare handouts for staff to follow during implementation. Mitigate risks by collaborating with colleagues to ensure clarity of the protocol and handouts before the final handouts are distributed.		
Expected Level of Benefit		
A comprehensive and easy to understand protocol that is based on current best evidenced-based practice will ensure high compliance rates among providers and departments.		
Phase 4:	Provide education and training to all staff that will be affected or involved with the ERAS protocol	
Milestone Description:	Implementation of the policy among the multiple departments will require educating the staff on the ERAS guidelines, as well as why the changes are important. At this milestone we aim to secure staff buy-in, which can be accomplished with careful planning to ensure a smooth policy rollout.	
Deliverables	Due Dates	Accountable Person
Measurable Goal: 100% staff exposure to educational material	Two months after receiving approval of final ERAS policy	Principle Investigator
Resources Needed		
We anticipate at least two training sessions with each department will be required in order to capture 100% of personnel have been trained. We understand these departments may not be able to halt patient operations while staff training is occurring, so multiple visits may be necessary.		
Expected Level of Benefit		
Understanding the interventions in the protocol and the way it benefits their patients will motivate staff and increase ERAS compliance.		
Phase 5:	Program evaluation	
Milestone Description:	The realization of reduced length of hospital stay and increased patient satisfaction will signify a successful ERAS implementation at a six month evaluation. Additionally, we will evaluate provider adherence to protocol.	
Deliverables	Due Dates	Accountable Person
Evaluation at three months and six months reported to departmental leadership. The three month evaluation will allow opportunity to adjust protocol interventions based on data trends and provider input.	Three months and six months after implementation, then yearly afterwards. The ERAS protocol will be a “living protocol” in that new evidence-based practice can modify the protocol after the project is completed.	Project lead

Resources Needed
Access to patient medical records for data collection, which will require institutional review board to approve the collection and storage of data.
Expected Level of Benefit
Data analysis will reveal if the protocol benefits patients and the military healthcare system.

NOTE: Modified from Harvard Business Review Press. (2011). *Pocket mentor: Developing a business case.* Boston: Author (pp 82-85).

Appendix G: ERAS Protocol

Hysterectomy ERAS Protocol



Appendix H: Data Collection Form

Date_of_Surgery	Case_Number	Procedure	Avoidance_of_prolonged_fasting	IV_antibiotics	PO_multimodal_analgesics_ordered	Multimodal_antiemetics	Multimodal_analgesics_admin	Pneumatic_compression	Early_oral_intake	Early_mobilization	Urinary_catheters_discontinued	Multimodal_analgesia_ordered_adm_comp	ERAS_protocol_comp	Fentanyl_mcg	Hydromorphone_mg	Morphine_mg	Oxycodone_mg	Total_morphine_mg_eq	Length_of_hospital_stay_hrs	Inadvertent_med_admin_fmeq

Appendix I: Team Mentor Agreement Form

Appendix C: Daniel K. Inouye Graduate School of Nursing
DNP Project Team Mentor (Committee Membership) Agreement Form

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

Graduation Year: 2022 **Phase 2 Site(s) Name:** Fort Belvoir Community Hospital

Name(s) of DNP Project Student Team:

1. Capt Jason Benchich	AGCNS ☐	FNP ☐	PMHNP ☐	RNA ■	WHNP ☐
2. CPT Kristal Harps	AGCNS ☐	FNP ☐	PMHNP ☐	RNA ■	WHNP ☐
3.	AGCNS ☐	FNP ☐	PMHNP ☐	RNA ☐	WHNP ☐
4.	AGCNS ☐	FNP ☐	PMHNP ☐	RNA ☐	WHNP ☐
5.	AGCNS ☐	FNP ☐	PMHNP ☐	RNA ☐	WHNP ☐
6.	AGCNS ☐	FNP ☐	PMHNP ☐	RNA ☐	WHNP ☐

The tentative title of the DNP Project Proposal for this student group is:

A Case for Hysterectomy ERAS

Committee Approved DNP Project Clinical Question:

In adult women undergoing hysterectomy, how does a hysterectomy ERAS protocol compared to current practice change postoperative opioid consumption, hospital length of stay, and frequency of inadvertent medication administration?

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):	MAJ Keith Lathrop, CRNA	Signature:	LATHROP.KEITH.MICHAEL.1140909641 Digitally signed by LATHROP.KEITH.MICHAEL.1140909641 Date: 2021.01.22 10:10:38 -05'00'	Date: 1/22/21
Team Mentor (Member):	Dr. Sandra Bruner, CRNA	Signature:	BRUNER.SANDRA.SUE.1102080803 Digitally signed by BRUNER.SANDRA.SUE.1102080803 Date: 2021.01.22 11:19:11 -05'00'	Date: 1/22/21
Team Mentor (Member):		Signature:		Date:
Team Mentor (Member):		Signature:		Date:

Form Version: 4 December 2020

Appendix J: Citi Certifications

CITI PROGRAM

Completion Date 31-Mar-2020
Expiration Date 31-Mar-2023
Record ID 36115149

This is to certify that:

Jason Benchich

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

Responsible Conduct of Research (RCR)
(Curriculum Group)
Responsible Conduct of Research (RCR)
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

Office of the Under Secretary of Defense (Personnel and Readiness)

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?wfcfefaea-0429-4852-a851-f2baade693c1-36115149

CITI PROGRAM

Completion Date 31-Mar-2020
Expiration Date 31-Mar-2023
Record ID 36113252

This is to certify that:

Kristal Harps

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

Responsible Conduct of Research (RCR)
(Curriculum Group)
Responsible Conduct of Research (RCR)
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

Office of the Under Secretary of Defense (Personnel and Readiness)

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w30d9d2e1-b1e8-4ade-94de-cace275c5273-36113252

Appendix K: USU Form 3202N

USU
Uniformed Services University

OFFICE OF RESEARCH
4301 JONES BRIDGE ROAD
BETHESDA, MAYLAND 20814
PHONE: (301) 295-3303; FAX: (301) 295-6771

NOTICE OF PROJECT APPROVAL

Change Number: Original

VPR Site Number:	GSN-61-11741
Principal Investigator:	Benchich, Jason
Department:	Graduate School of Nursing
Project Type:	Student
Project Title:	A Case for Hysterectomy ERAS
Project Period:	2/9/2021 to 2/9/2022

Assurance and Progress Report Information:

Name	Sup	Approval Type	Status	Approved On	Forms Received
Progress Report	0			To be Submitted	N/A

Remarks:
This Notice Of Project Approval has been reviewed and approved. Please remember that you must submit a final Progress Report (Form 3210) upon completion of this project.

Questions regarding this approval should be directed to the following person in the Office of Research:
Sharon McIver, (301) 295-9814.

RANDOLPH.TOYA.V.1242107698 Digitally signed by RANDOLPH.TOYA.V.1242107698 Date: 2021.02.09 16:03:15 -05'00'

Mark G. Kortepeter, MD, MPH Date
FACP, FIDSA, FASTMH
COL (R) MC US Army
Vice President for Research
Uniformed Services University of the Health Sciences

cc: File
Dr. Kennett Radford
Laura Taylor

Appendix L: IRB Letter of Determination

DEFENSE HEALTH AGENCY
FORT BELVOIR COMMUNITY HOSPITAL
9300 DEWITT LOOP
FORT BELVOIR, VIRGINIA 22060-5901

DATE: 22 June 2021

FROM: Fort Belvoir Community Hospital (FBCH) Department of Research Programs (DRP) Determinations

TO: Capt Jason Benchich, Fort Belvoir Community Hospital

SUBJECT: FBCH DRP Determination of Project #936312; Reference #936312

PROJECT TITLE: A Case for Hysterectomy ERAS

SUBMISSION TYPE: New Project

ACTION: Determination of "Not-Research" – Evidence Based Practice (EBP) Project

DECISION DATE: 22 June 2021

The FBCH DRP Determinations Official has determined the activity described in the above referenced submission does not meet the full definition of research as defined in 32 Code of Federal Regulations 219.102(l). Rather, the purpose of the project is to improve clinical practice through evidence-based practice activities. The outcome of this project is not intended to develop or contribute to "generalizable" knowledge as in the case of research, and does not involve randomization of individuals. The findings may directly affect local institutional practice, and may identify corrective action(s).

This project is a Post-Anesthesia Care Unit initiative to implement an enhanced recovery after surgery (ERAS) protocol for hysterectomy, which will encourage compliance with the existing standard of care through implementation of a standardized protocol. The project is aimed at improving local post-surgical outcomes and patient safety.

Please register your project with the FBCH Department of Quality Management at https://fbchintranet.departments.med.ds.osd.mil/qualitymgt/SitePages/Home.aspx

If there are any changes in personnel or project procedures as outlined in the original submission, a Modification to the original project must be submitted in EIRB and a Determinations Official will review the project again to ensure that the proposed changes do not affect the original determination of "Not-Research".

This is not an approval to receive extramural resources (i.e. personnel, drugs, supplies, equipment, money, and gifts from any source outside of FBCH). You must coordinate extramural resource approvals with the NCR Business Office at (301) 295-8248. If any

extramural resources are received without DOD or MEDCOM approval, the individual who receives them may be found in ethics violation and prosecuted for criminal misconduct.

You may begin work pursuant to any additional required approvals and/or agreements.

Once project activities cease, within 30 days you are required to submit a Closure Form in EIRB, explaining any non-initiation, partial completion, full completion, or any other type of closure, stoppage, or termination of the project. Project data remains the property of FBCH and may not be removed without prior command authorization. Your department at FBCH must retain the project records for at least two years after Closure.

Any publications, posters, presentations, or manuscripts arising from this work presented outside our institution must be submitted and cleared through the publication clearance process. Many journals are interested in publishing Quality Management projects. If you do decide to disseminate your findings, please use paragraph headings such as "issue", "procedures for collecting and evaluating information", "information found", "lessons learned", etc. and avoid using headings such as "research questions", "methods", "results", "study limitations", etc.

Contact the FBCH Department of Research Programs staff if you have any questions or concerns. Please include your project number (936312) in all correspondence with this office.

REID.ERICA.MICHELLE.1388056149 Digitally signed by REID.ERICA.MICHELLE.1388056149 Date: 2021.06.22 15:39:29 -04'00'

Erica Reid, MS, CIP
FBCH Acting Human Protections Director
FBCH Determinations Official
WRNMMC IRB Chairperson

Appendix M: FBCH PAO Clearance

REQUEST FOR PUBLIC RELEASE

(This form is to be used at Fort Belvoir Community Hospital in requesting review and clearance of DoD information for public release in accordance with DoDD 5230.09)

1. DOCUMENT DESCRIPTION

a. TYPE	b. TITLE	
EVIDENCE BASED PRACTICE PROJECT	A CASE FOR HYSTERECTOMY ERAS	
c. DATE OF SUBMISSION 12 MARCH 2022	d. PAGE COUNT 53	e. RESEARCH OR PUBLIC CLEARANCE? PUBLIC
f. CLEARANCE REQUESTED BY *(YYYYMMDD) (All submissions require a minimum of 10 days for review)* 20220401		

2. AUTHOR/SPEAKER *(If more than one author, include names of additional authors on separate sheet.)*

a. NAME *(Last, First, Middle Initial)*	b. AFFILIATION *(Armed service, civilian, contractor)*	c. RANK
BENCHICH, JASON, C	USAF	Maj
d. DEPARTMENT/CLINIC DEPARTMENT OF ANESTHESIA		

3. PRESENTATION/PUBLICATION DATA *(Date, Place, Event)*

PROJECT ABSTRACT, MANUSCRIPT, POSTER, PODIUM PRESENTATION
USU RESEARCH DAYS - 16-20 MAY 2022, UNIFORMED SERVICES UNIVERSITY, BETHESDA, MD; USU ARCHIVES
"The USU Archives preserves and provides access to the USU theses, dissertations, and Doctor of Nurse Practice (DNP) projects on its web site. The public can discover these full text materials through search engines like Google or by visiting the web site directly at: http://cdm16005.contentdm.oclc.org/cdm/landingpage/collection/p15459coll1. Questions about this collection can be sent directly to the University Archives at lrc.archives@usuhs.edu."

4. POINT OF CONTACT

a. NAME *(Last, First, Middle Initial)*	b. EMAIL	c. TELEPHONE NO.
BENCHICH, JASON, C	jason.benchich@usuhs.edu	(602) 363-3003

5. STAFF JUDGE ADVOCATE (SJA) COORDINATION

a. NAME *(Last, First, Middle Initial)*: NASH, Pamela M.

b. REMARKS

c. SUBMISSION IS: ◉ APPROVED ○ APPROVED WITH QUALIFICATIONS *(See REMARKS, block 5b)* ○ NOT APPROVED

d. SIGNATURE: NASH.PAMELA.M.1028659365 Digitally signed by NASH.PAMELA.M.1028659365 Date: 2022.03.22 16:49:08 -04'00'

e. DATE SIGNED *(YYYYMMDD)*: 20220322

6. PUBLIC AFFAIRS OFFICER (PAO) COORDINATION

a. NAME *(Last, First, Middle Initial)*: Brown, R. P.

b. REMARKS

Clearance granted for documents and presentations as written and designed.

c. SUBMISSION IS: ○ APPROVED ◉ APPROVED WITH QUALIFICATIONS *(See REMARKS, block 6b)* ○ NOT APPROVED

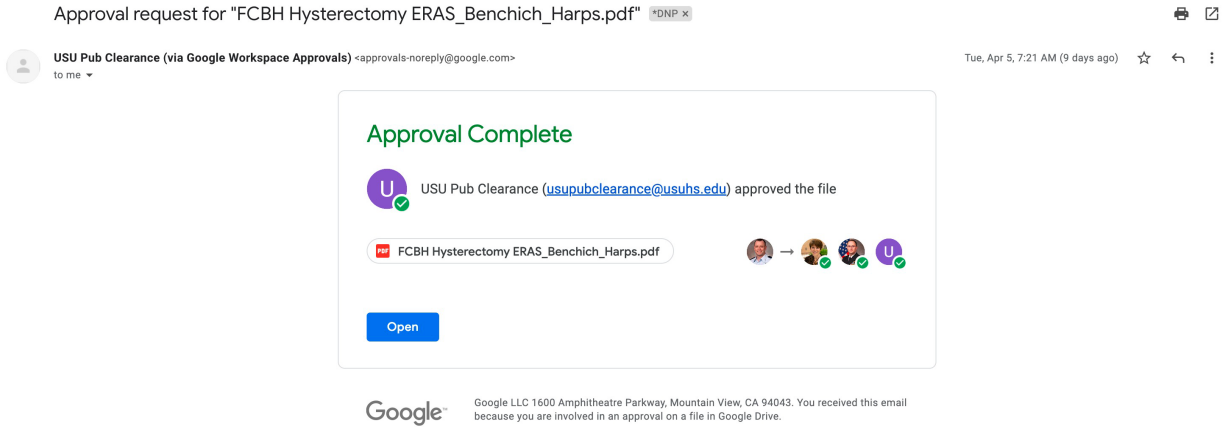
d. SIGNATURE: BROWN.R.PARRISH.1047605780 Digitally signed by BROWN.R.PARRISH.1047605780 Date: 2022.03.23 14:34:37 -04'00'

e. DATE SIGNED *(YYYYMMDD)*: 20220323

Submitted documents require both Staff Judge Advocate (SJA) and Public Affairs Officer (PAO) approval in blocks 5c and 6c above before public release. Please note any qualifications for approval, which will be included in the REMARKS block (if applicable). If approved by both SJA and PAO, the material is approved for public release and clearance for open publication is recommended under the provisions of DoDD 5230.09

FBCH STRATCOM FORM 1910. OCT 2015

Appendix N: USUHS PAO Clearance (TO BE ADDED)



Approval request for "FCBH Hysterectomy ERAS_Benchich_Harps.pdf" *DNP ×

USU Pub Clearance (via Google Workspace Approvals) <approvals-noreply@google.com>
to me

Tue, Apr 5, 7:21 AM (9 days ago)

Approval Complete

USU Pub Clearance (usupubclearance@usuhs.edu) approved the file

FCBH Hysterectomy ERAS_Benchich_Harps.pdf

Open

Google

Google LLC 1600 Amphitheatre Parkway, Mountain View, CA 94043. You received this email because you are involved in an approval on a file in Google Drive.

Appendix O: DNP Project Completion Verification Form

Appendix G: Daniel K. Inouye Graduate School of Nursing
DNP Project Completion Verification Form

DOCTOR OF NURSING PRACTICE PROJECT
Completion Verification Form

The DNP Project titled: A Case for Hysterectomy ERAS

was completed at Fort Belvoir Community Hospital by the following student(s):

(Student Name)	*(Digital Signature)*
Maj Jason Benchich	BENCHICH.JASON.CHARLES.1261620720 Digitally signed by BENCHICH.JASON.CHARLES.1261620720 Date: 2022.03.05 13:44:12 -05'00'
CPT Kristal Harps	HARPS.KRISTAL.DIANNA.1011558948 Digitally signed by HARPS.KRISTAL.DIANNA.1011558948 Date: 2022.03.09 12:59:32 -05'00'

The DNP Practice Project Team verifies that the following components of the DNP project, accomplished by the above students, is of sufficient rigor and demonstrates doctoral level scholarship to meet the requirements for USUHS GSN graduation:

- Presentation of DNP project to the leadership/stakeholders at the Phase II Site,
- Abstract/Impact Statement (*Appendix F*), and
- DNP Project written report (*Appendix E*).

Verified by:

(type name)	*(Digital Signature)*	
MAJ Keith Lathrop	LATHROP.KEITH.MICHAEL.1140909641 Digitally signed by LATHROP.KEITH.MICHAEL.1140909641 Date: 2022.03.14 11:05:33 -04'00'	Senior Mentor & Phase II Site Director
LTC (ret) Sandra Bruner	BRUNER.SANDRA.SUE.1102080803 Digitally signed by BRUNER.SANDRA.SUE.1102080803 Date: 2022.03.14 11:09:02 -04'00'	Team Mentor

For RNA Students only *- add the following additional signature for final verification of project completion:*

LCDR Kenneth Barber	BARBER.KENNETH.DOUGLAS.1177263644 Digitally signed by BARBER.KENNETH.DOUGLAS.1177263644 Date: 2022.03.20 08:02:25 -04'00'
RNA Project Director *(type name)*	*(Digital Signature)*

Form Version: 4 December 2020