

IMPROVING PRESURGICAL PAIN MANAGEMENT OF THE HIP FRACTURE  
PATIENT VIA ADOPTION OF AN EVIDENCE-BASED RECOMMENDATION FOR  
ULTRASOUND-GUIDED FASCIA ILIACA BLOCK

by

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As members of the DNP Project Committee, we certify that we have read the DNP project prepared by *Joshua B. Zack*, titled *Improving Presurgical Pain Management of the Hip Fracture Patient via Adoption of an Evidence-Based Recommendation for Ultrasound-Guided Fascia Iliaca Block* and recommend that it be accepted as fulfilling the DNP project requirement for the Degree of Doctor of Nursing Practice.

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## ABSTRACT

Hip fracture patients traditionally have had their pain managed using parenteral medications such as opioids, which inadequately manage pain and lead to inferior outcomes (Cowan, Lim, Ong, Kumar, & Sahota, 2017). Ultrasound-guided regional anesthesia has emerged as an evidence-based therapy that improves the care of patients experiencing a hip fracture. This project sought to update a clinical practice guideline (CPG) by the American Academy of Orthopaedic Surgeons (AAOS) that strongly recommends the use of preoperative regional anesthesia to manage hip fracture pain. The updates to the CPG were obtained using a literature review and stakeholder interviews. The revisions included which type of block (the fascia iliaca compartment block), how to administer the block (under ultrasound guidance,) and other smaller details surrounding regional anesthesia in the hip fracture patient. Following the expansion to the CPG, anesthesia providers evaluated the quality of this new guideline using a validated tool, the Appraisal of Guidelines Research & Evaluation (AGREE) II instrument. The reviewers found the revised CPG from the author to be an appropriate recommendation and ready for implementation into practice.

## **INTRODUCTION**

### **Background Knowledge**

Each year, over 300,000 patients age 65 years and older are admitted for inpatient care from a hip fracture (Centers for Disease Control and Prevention, 2016). In 2011, over 41 million Americans were 65 years old or older with almost half of this population having osteoarthritis (CDC, 2016). In 20 years, the number of Americans 65 years of age and older is expected to double (Urban, 2015), thus, the number of procedures associated with osteoporosis will likely rise as well. Falls are the cause of 95% of hip fractures (Brauer, Coca-Perraillon, Cutler, & Rosen, 2009). These patients tend to have comorbidities with the most prevalent comorbidities being heart failure, chronic lung disease, and diabetes (Brauer et al., 2009). The 1-year, all-cause mortality following hip fracture hovers around 30% and following a repair, postoperative delirium is common in this population with an incidence of around 20% (Urban, 2015). Opioids are the most commonly administered medications for analgesia in hip fractures and with their systemic mechanism of action, they could pose a higher risk for delirium compared to a patient receiving regional anesthesia administered at or near the site of injury (Cowan, Lim, Ong, Kumar, & Sahota, 2017). However, this risk appears to be lower than the risk of delirium resulting from untreated pain (Cowan et al., 2017).

### **Local Problem**

The typical progression in a hip fracture patient's admission involves the diagnosis by an emergency department (ED) provider. Once diagnosed, a hip fracture patient will await an orthopedic consult, and will likely be admitted to their service line or the general medicine service line. Orthopedic surgeons work to repair hip fractures as quickly as possible, however,

comorbidities may delay surgery for several days all whilst the patient is experiencing constant pain. Certified registered nurse anesthetists (CRNAs) are highly trained experts in managing complex pain conditions across all patient populations. While concerns about pain going untreated are important, these must be balanced against concerns for the risk of delirium and the context of the current opioid crisis. In 2016, the State of Arizona declared a state of emergency related to opioid overdoses in Arizona with 790 confirmed opioid-related deaths (State of Arizona, 2017). The state of emergency led to the Opioid Epidemic Act which addresses opioid prescribing habits of Arizona providers and increases surveillance data available to the State's Department of Health (State of Arizona, 2017). This heightened awareness of the larger impact opioid medications have on our society has tasked healthcare professionals to develop new strategies to reduce the use and abuse of these medications. CRNAs will be at the forefront of this innovation.

In the orthogeriatric population, current strategies in managing pain associated with a hip fracture are inadequate. The current strategy of managing this pain relies on the use of the parenteral administration of opioids, such as morphine and fentanyl. Professional organizations such as the American Academy of Orthopaedic Surgeons (AAOS) have examined alternative strategies and now support the use of preoperative regional anesthesia in the geriatric hip fracture patient according to their 2014 hip fracture clinical practice guideline (CPG). The use of regional anesthesia offers the benefits of improved pain scores and reduced opioid consumption compared to the use of parenteral opioids (Ritcey, Pageau, Woo, & Perry, 2016). Initial studies show the peripheral nerve blocks that offer the most promise for this population and indication would include the ultrasound-guided three-in-one femoral nerve block (FNB) and the fascia iliaca

compartment block (FICB) (Beaudoin, Haran, & Liebmann, 2013). Factors, such as ease-to-perform and time-to-perform, may shift provider preference towards the FICB.

### **Purpose**

This project's primary aim was to focus on the modification and reevaluation of the AAOS's CPG regarding the use of preoperative regional anesthesia for hip fracture into a usable, readily-applicable practice guidelines. The author began work on this project by identifying the AAOS's guideline on hip fracture care. This document contains a strong recommendation for the use of preoperative regional anesthesia (AAOS, 2014), however, the recommendation is vague and doesn't specify which peripheral nerve block should be used. The recommendation was published in 2014 and contains 6 articles. While the evidence is of high quality, there have been several randomized controlled trials (RCTs) and systematic reviews (SRs) since 2014. The CPG from the AAOS was revised to include new knowledge along and stakeholder feedback in order to improve pain management for patients with a hip fracture while remaining practical.

A secondary aim of this project was to expand healthcare providers' knowledge about managing preoperative pain in patients experiencing a hip fracture. This was accomplished by disseminating the updated recommendations along with the results of the appraisal via a poster. These posters were distributed to clinical sites with CRNAs participating in the appraisal process.

### **Stakeholders**

Stakeholders are those that work with a project, have an interest in the topic, and provide feedback for logistics that a Doctor of Nursing Practice (DNP) student may not be aware of (Anderson, Knestruck, & Barroso, 2015). Stakeholders for this project include patients with hip

fractures and their families, as well as orthopedic, anesthesia, and emergency medicine health care providers and their teams. Specifically, these providers will include physicians and advanced practice nurses of the ED, surgeons and physician assistants representing orthopedic surgery, and the CRNAs/physicians of the anesthesia department.

### **Project Question**

For CRNAs responsible for pain management of the patient with hip fracture across the State of Arizona, will the modification of the AAOS's CPG on preoperative regional anesthesia, adjusted for emerging evidence and stakeholder feedback, compared to the conventional therapies, be viewed as an acceptable CPG for the management of preoperative pain in the patient admitted for hip fracture?

## **THEORETICAL FRAMEWORK AND SYNTHESIS OF EVIDENCE**

### **Theoretical Framework**

Many factors led to an increased sense of urgency that providers feel regarding the implementation of best practice. These factors vary from reduced reimbursements to a heightened sense of awareness regarding complications (e.g. healthcare-acquired infections.) The practice of changing provider practice via one-way dissemination has not yielded favorable results and typically lacks considerations of local contextual factors (Dobbins, DeCorby, & Robeson, 2011).

The Diffusion of Innovation (DOI) Theory explains the process of adoption that occurs during the lifespan of a change. The theory categorizes adopters according to when in the lifespan they adopt the change (Dobbins et al., 2011). When mapping out a timeline of change adoption, the theory states the curve will usually take an "inverted U" shape. These categories

align with a distribution of a bell-curve. The inspiration for this program came from a practicing certified registered nurse anesthetist (CRNA) regarded as an expert in regional anesthesia that founded the Society for Opioid Free Anesthesia (SOFA.) Following a conversation with the expert, it was determined that his actions were aligned with the first group of adopters in the theory, innovators (Figure 1.) Innovators are change agents open to innovative ideas and are crucial in spreading the new change (Kaminski, 2011).

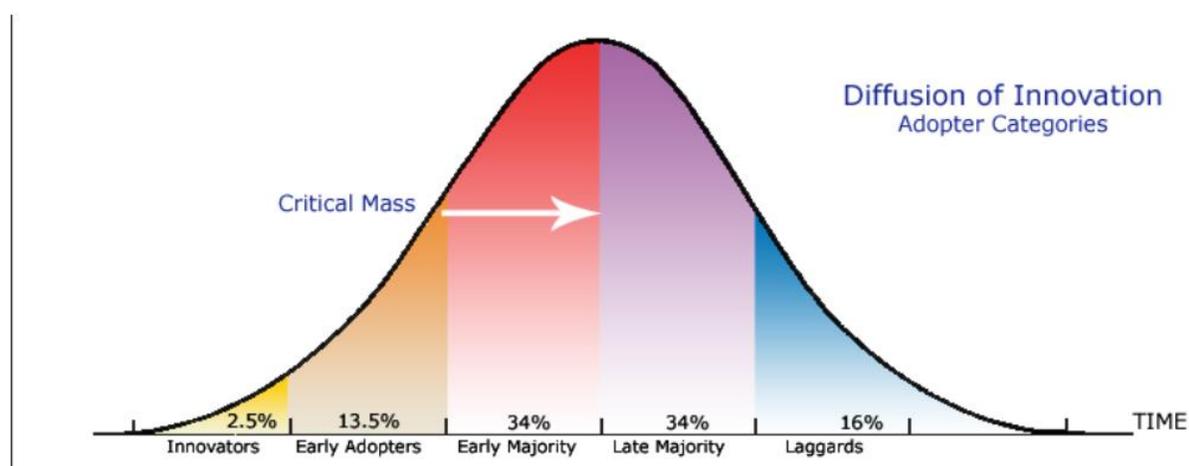
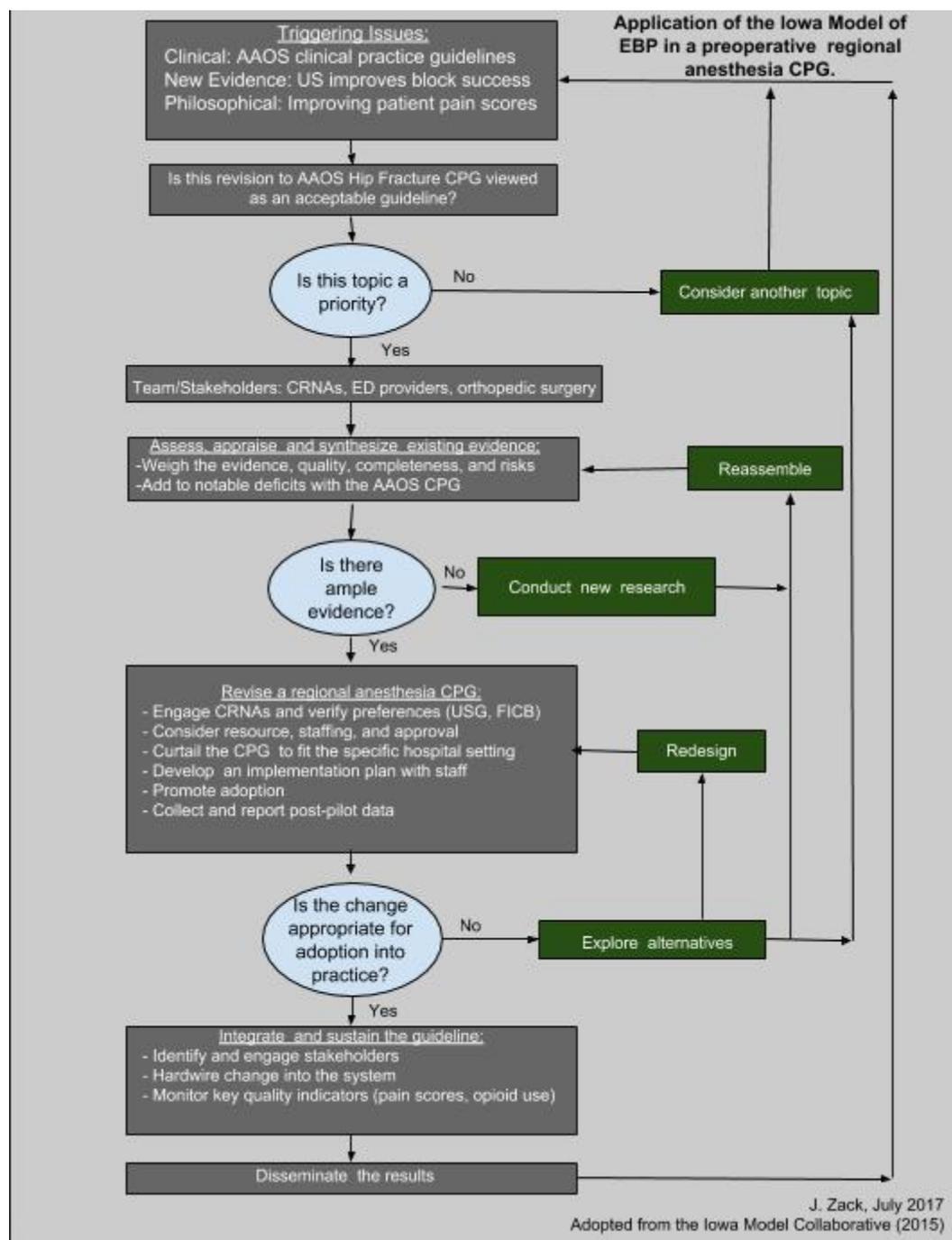


FIGURE 1. Diffusion of innovation theory adopter categories (Kaminski, 2011).

This theory has recently been applied to the adoption of a related project, the use of regional anesthesia for orthopedic surgery. In the study hospital, the team tracked the adoption of the change from only general anesthesia for ambulatory orthopedic procedures (distal radius repairs and knee arthroscopies) to the inclusion or alternative of a peripheral nerve block (PNB) in their anesthetic. The adoption and diffusion of the change (adoption of PNBs) followed an inverted U shape curve consistent with the Diffusion of Innovation theory (Leggot et al., 2016). The Diffusion of Innovation theory helps explain how this project may change provider behaviors.

While classic theories help provide explanations for how change occurs, implementation scientists turn to process models such as the Iowa Model of Evidence-Based Practice to help guide implementing new practices. Developed by the Iowa Model Collaborative, this team of nurses from the University of Iowa Hospital and Clinics (UIHC) developed this framework for practitioners to help guide assessment and installation of new evidence into practice (Iowa Model Collaborative, 2017). The Iowa Model has been revised and validated since its creation in the 1990s. The Iowa Model can be quickly applied to the implementation of a nerve block protocol in the preoperative setting that emphasizes the use of regional anesthesia in treating pain resultant from a hip fracture (Figure 2). Permission was obtained from the IOWA Model Collective (see Appendix A). The model first requires the identification of a triggering issue or opportunity for improvement. Triggers include philosophical perspectives or in this project's case, the increasing body of evidence that shows improved outcomes in patients that receive preoperative regional anesthesia for pain management (Ritcey, Pageau, Woo, & Perry, 2016). The model then has seven steps and three decision points that help guide the implementation (Figure 2). Each of the decision points directs the team to constantly reevaluate the topic to ensure it is aligned with the hospital's vision and in-line with current evidence (Iowa Model Collaborative, 2017).



**FIGURE 2.** Application of the Iowa model of EPB to the revision of the AAOS CPG. (Used/reprinted with permission from the University of Iowa Hospitals and Clinics, copyright 2015. For permission to use or reproduce, please contact the University of Iowa Hospitals and Clinics at 319-384-9098.)

## Concepts of the Project

Several concepts require elaboration to make this project a success. Defining concepts informs fellow researchers and readers of assumptions that stakeholders operate under (Anderson et al., 2015) These concepts requiring elaboration include: pain management, regional anesthesia, and hip fracture.

### **Pain Management**

*Pain management* describes the approach to preventing, diagnosing, and treating pain. This project hopes to change the “treatment” portion within the concept of pain management. Evidence shows that our current strategies for pain management inadequately treat pain (Cowan, Lim, Ong, Kumar, & Sahota, 2017). Severe pain threatens a patient’s sense of wellbeing (Mauleon, Palo-Bengtsson, & Ekman, 2007).

### **Delirium**

*Delirium* refers to an abrupt change in mentation as the results of some abnormal brain functioning (American Geriatrics Society, 2019). Patients experiencing delirium may experience hypervigilant behaviors such as agitation or hypovigilant behaviors such as lethargy and decreased awareness (AGS, 2019). Delirium more commonly affects the elderly and is very common during a medical illness, affecting one-third of patients admitted. It also affects two-thirds of the elderly that undergo major surgery, such as hip fracture repair (Cowan et al., 2017). Untreated pain is a potential cause of delirium, unfortunately, it may also prevent a healthcare provider from properly assessing a patient’s pain, resulting in inadequate pain management.

## **Regional Anesthesia**

*Regional anesthesia* describes a method of anesthesia delivery where a medication called a local anesthetic is delivered to a site such as a major nerve, a muscle compartment, the epidural space or the subarachnoid space (Nagelhout & Plaus, 2014). The considerations for care vary greatly depending on where the local anesthetic is injected. This project will focus on a nerve block that works by depositing a large quantity of local anesthesia into a muscular compartment. The focus of this project will strictly involve the use of peripheral nerve blocks (PNBs) in the hip fracture patient population. This distinction bears mentioning as, within the greater practice of anesthesia, *regional anesthesia* describes the delivery local anesthetics to block sensations to one or several regions of the body preoperatively. Studies that explore the differences between general anesthesia and neuraxial anesthesia as the *primary anesthetic* are numerous and remain an important topic of discussion in the care of the hip fracture patient. However, the debate between general anesthesia and spinal anesthesia will not be the focus of this project. Studies showing how FICB can facilitate and aid in spinal placement do have a role in this guideline and thus were included in this project.

## **Fascia Iliaca Compartment Block**

The *fascia iliaca compartment block* (FICB) is a peripheral nerve block that delivers local anesthetic medication to the space between the iliacus muscle and fascia iliaca, which is the location of the femoral nerve and the lateral femoral cutaneous nerve (Hebbard et al., 2011). These nerves are thought to be the primary sensory nerves responsible for sensation in the anterior hip (Amin et al., 2017), the area responsible for most pain in a hip fracture.

## **Hip Fracture**

*Hip fracture* is defined as a fracture that occurs to the upper fourth of the femur bone (Centers for Disease Control and Prevention, 2016). It is a painful condition that affects approximately 340,000 patients a year (CDC, 2016). As a condition associated with the elderly, the number of hip fractures is expected to rise with the aging population of the United States (Brauer et al., 2009). This injury affects the elderly and women much more frequently. Radiographic imaging studies along with a detailed history and physical provide sufficient data in the diagnosis of hip fracture (AAOS, 2014).

### **Synthesis of Evidence**

A PubMed search using the MeSH terms “nerve block” and “hip fractures” was entered. Results were limited to the last five years and excluded results that examined neuraxial anesthesia. Sixty-three results were found and 12 were used. Time periods searched also included studies conducted within the last 10 years as some sources had implications beyond the last 5-10 years, such as the theoretical framework sources. Sources that cited the found articles were also explored using PubMed’s “Related Articles” feature. “Fascia iliaca compartment block” as a PubMed search yielded 131 articles. Articles discussing FICB and its role in hip fractures were included and the rest excluded. Excluding the duplicate articles already included, 2 additional articles were included in this literature review.

### **Strengths**

The best evidence supporting the use of regional anesthesia to treat hip fracture pain comes from a systematic review by Guay, Parker, Griffiths, and Kopp (2017) which shows a high reduction of pain within 30 minutes of receiving the nerve block. Guay et al. also found that

providing the nerve block also reduced pneumonia rates in the intervention groups, time to first mobilization was reduced, and the cost of analgesic regimens was also reduced (2017).

Morrison et al. found improved pain scores and improved mobility in hip fracture patients that received the nerve block (2016). In another randomized controlled trial, Beaudoin, Haran, and Liebmann found a nerve block protocol in the ED significantly reduces pain intensity, decreased the need for other parenteral analgesics, and did not have any additional complications compared to the standard therapy of parenteral (opioid) analgesics (2013). From the evidence provided by the current literature, the conclusion can be made that peripheral nerve blocks reduce preoperative pain in hip fracture patients and effectively reduce the requirement for opioid medications. While opioids may be helpful in reducing pain scores of hip fracture patients at rest, they inadequately control their pain overall by providing inadequate relief with transfer and movement (Cowan, Lim, Ong, Kumar, & Sahota, 2017). Movement and repositioning are unavoidable in the repair of the fracture. PNBs used for preoperative analgesia improve dynamic pain scores which is more useful during positioning the patient for spinal neuraxial block, a commonly used anesthetic technique for surgical anesthesia in hip fracture repair (Amin, West, & Basmajian, 2017). This superiority was demonstrated in comparison with the parenteral opioid medication, alfentanil in which patients received either a nerve block or parenteral narcotics prior to the placement of a spinal anesthetic (SAB). This study showed patients who received the block prior to spinal placement had higher successful SAB placement, quicker placement of the block, improved postoperative pain scores, and higher patient satisfaction (Amin et al., 2017). Several studies have demonstrated the opioid-reducing effect of using regional anesthesia along

with a lower incidence of opioid-related side effects (Yang, Li, Chen, Shen, & Bu, 2017; Ritcey, Pageau, Woo, & Perry, 2016).

### **Weaknesses**

All articles found pertaining to this topic showed favorable outcomes for patients who received a PNB. The evidence varied some between how much of a benefit the patients received, how much of a reduction there were in adverse side effects (such as from opioids or postoperative cognitive dysfunction.) One of the motivating factors for moving towards more regional anesthesia is to reduce the complications from conventional therapies such as opioids. Delirium is a grave concern in geriatric patients and our current understanding of delirium is that both pain, inflammatory response, and opioids can result in or worsen delirium (Liu, Yu, & Zhu, 2018). This would naturally lead the advanced practice registered nurse (APRN) to think that strategies that reduce pain and uses fewer opioids would reduce delirium and some RCTs have suggested that PNBs *may* reduce this comorbidity, but the systematic review by Guay et al. did not find that PNBs reduced delirium rates in this patient population (2017). Most of the current literature agrees on the benefits of peripheral nerve block for preoperative pain. However, the current evidence is sparse when examining the impact these blocks have on postoperative outcomes including long-term outcomes (Ritcey et al., 2016; Guay et al., 2017).

### **Knowledge Gaps**

The exact way the existing evidence should be implemented remains a question. A facility's available resources, existing processes, and staffing models will vary making implementation a challenge. Reavley et al. (2014) explored the difference between using femoral nerve blocks (FNBs) compared against fascia iliaca compartment blocks (FICBs) in the

perioperative setting and found equivocal outcomes with minor advantages to each. Further minor differences remain prevalent in the question of how to best manage the hip fracture patient's pain and the answer is not always clear. The question of whether to use a single-shot FICB or a continuous catheter technique was examined, and the results were mixed. While pain scores were improved in the postoperative period for those that received a pain catheter, technical proficiency in placing the catheter and other additional costs leave some doubt to whether they should be used routinely or not (Guay et al., 2016). Which specialty of provider should provide this service remains the last glaring omission in the evidence. Implementation experts, such as the DNP nurse will have the challenge of working across several specialties (emergency medicine, anesthesia, orthopedics) to determine how to best serve the hip fracture patient (American Association of Colleges of Nursing, 2006). All three of these specialties have contributed greatly to the existing evidence showing that perhaps a shift towards multidisciplinary, single-specialty teams may be beneficial for healthcare moving forward.

## **METHODS**

### **Design**

The purpose of this DNP project was to modify and update a clinical practice guideline from the American Academy of Orthopedic Surgeon that recommended the use of preoperative regional anesthesia to improve pain control in patients with hip fracture. This quality improvement project consisted of an updated literature review, modification to the existing guidelines, and reevaluation of the CPG. A clinical practice guideline represents a condensed and applicable summary of a large body of evidence (Polit & Beck, 2017). The purpose of a clinical practice guideline is to provide a systematic review of the literature and influence how providers

practice (Shekelle, Woolf, Eccles, & Grimshwa, 1999). Before beginning data collection, project approval was obtained from the Institutional Review Board (IRB) of the University of Arizona to verify all necessary steps were taken to ensure the safety of the school and privacy of participants. The University of Arizona Institutional Review Board deemed this project minimal risk research and approved this project following the submission of an application. This project was not federally funded or supported, or under FDA regulation and did not significantly affect the welfare of the participants.

### **Process**

The first step after deciding on the AAOS CPG was to recruit a provider as a local champion to explore the current practices of pain management for hip fracture patients and the need for an evidenced based tool to implement in practice. This local provider would then be regularly consulted when developing the modified CPG for use. Clinical champions are front-line clinicians that have leverage that can be used to influence practice decisions (Soo, Berta, & Baker, 2009). During this phase, it would be advisable to obtain feedback from experts and stakeholders within the field for guidance and direction in this project (such as the ED stakeholder.) This will serve as a needs assessment for patients in this population group. The author identified CRNA stakeholders familiar with this regional anesthesia technique.

Feedback from an attending, resident, or advanced practice providers from orthopedic surgery, anesthesia, and emergency medicine was incorporated while making the interdisciplinary considerations. The intent was to speak with providers from multiple specialties to collect stakeholder information surrounding the current practices across several facilities to determine if there is interest in adopting an intradisciplinary modified practice guideline for hip

fracture care. These individual meetings were conducted on an informal basis with a short series of questions regarding impressions on the current care of the orthogeriatric patient with a hip fracture. The emergency department (ED) provider most frequently sees the patient before any other provider. Following diagnostic testing, they prescribe an analgesic and consult orthopedic surgery. Orthopedic surgery will then determine the timing and approach to repairing the fractured hip. Once a decision regarding surgery is made, orthopedic surgery consults anesthesia. These three groups of providers all have various considerations during the preoperative period, but what can occur is that all parties may overlook the patient's level of discomfort prior to surgery.

The second step of this project would be to update the existing AAOS CPG. The revised CPG must be made with 3 considerations in mind. 1) It must meet the unique needs and address facility-related logistical considerations. This was accomplished using stakeholder data. 2) The revised CPG must contain evidence for each recommendation. This was accomplished by performing a focused literature review and synthesis of evidence. 3) The CPG must fulfill the domains listed in the AGREE II tool to create a comprehensive guideline. The authors of the AGREE II tool advise the tool not only to be used to evaluate CPGs but also in the formulation of guidelines (AGREE Next Steps Consortium, 2010). The author based the revised CPG off the recommendations and domains contained in the AGREE II tool. These recommendations were included in a final, revised CPG that was presented to the reviewers.

The final step was the evaluation of the newly developed CPG using the AGREE II instrument.

## **Participants**

The preoperative care of the patient experiencing a hip fracture requires multidisciplinary expertise. The emergency medicine stakeholder was a physician with board certification in emergency medicine and 30 years of experience. A meeting was conducted with an ED physician from a Southern Arizona hospital and a series of questions were asked regarding the care of hip fracture patients within the facility. The orthopedic surgery stakeholder was a physician associate (assistant) with 10 years of experience.

During CPG evaluation, anesthesia providers (n=4) familiar with regional anesthesia were consented to participate in the evaluation of a modified CPG for the care of the hip fracture patient. The CRNAs were recruited using an email list given to the author during his clinical rotations. The providers reviewed and evaluated the updated CPG using the Appraisal of Guidelines for Research & Evaluation (AGREE) II tool after receiving training on how to use the AGREE II tool.

## **Tools**

The AGREE II instrument was created to assess the quality and variability between practice guidelines (AGREE Next Steps Consortium, 2010). The AGREE II tool contains 23 items which are organized into 6 domains: 1) scope and purpose; 2) stakeholder involvement; 3) rigor of development; 4) clarity of presentation; 5) applicability; and 6) editorial independence (Introduction to AGREE II, n.d.). The instrument was designed to be very generic as to allow its application across a broad spectrum of guidelines. The instrument appraises guidelines focusing on health care treatments or interventions. The instrument is intended for use by healthcare professionals, developers of guidelines, policymakers, and/or educators (Introduction to AGREE

II, n.d.). When applying the AGREE II tool, the reviewers should read the guideline in full before assessing it. The methodology used in the guideline should be thoroughly elaborated and relevant documents pertaining to the guideline should be listed or publicly available in some format. The instrument developers suggest at least 2 reviewers use the tool on a guideline, with improved validity coming with 4 reviews or more (AGREE Next Steps Consortium, 2010).

The creators of the AGREE II tool also offer an interface on the tool's website called My AGREE Plus. My AGREE Plus is The comprehensiveness of the My AGREE PLUS tool cannot be understated. This tool allows the administering researcher to track the completion of the evaluations with identifying information in a secure, organized manner. When the researcher creates a finalized report on the My AGREE PLUS platform, the platform hides the participants identifying information and computes all the scores that were described above (domain scores, domain percent scores, individual item scores, averaged item scores and comments.) That report is attached to this paper under "Results."

### **Intervention**

The intervention in this project consisted of working with local providers to modify an existing CPG for preoperative hip fracture pain for use at this facility. The expanded CPG would be evaluated by expert clinicians ( $n \geq 2$ ) using the AGREE II tool. These reviewers first underwent orientation and training on how to use the AGREE II tool before assessing the new CPG. The reviewers viewed a module on the AGREE website (<https://www.agreetrust.org/my-agree/>) that explained the tool and provided a sample guideline to assess. During this orientation, the reviewer provides a score for each of the 23 items and then compares their score to that of professional evaluators. This module has been validated to ensure the proficiency of the reviewer

in assessing a CPG (Brouwers, Makarski, Durocher, & Levinson, 2011). This tutorial and practice exercise together take approximately one hour to complete with another 45 minutes to an hour to review the revised CPG. Once all reviewers had completed their appraisals, the feedback was implemented into the CPG and a final CPG was presented to the reviewers for consideration of implementation at each of their own facilities.

### **Ethical Considerations**

While implementing evidence-based practice and conducting research on humans, the ethical principles of beneficence, respect for persons, and justice must be appreciated. This project was submitted to the University of Arizona College of Nursing Institutional Review Board (IRB) which deemed this project minimal risk research and approved it after reviewing the submitted application and relevant materials (see APPENDIX E.)

#### **Beneficence**

Beneficence describes an action done for the betterment of others. This can be done by removing the harm associated with something or by improving the existing situation. Operating under the assumption that access to adequate pain control is a patient's right, nurse anesthetists must constantly strive to improve pain management. Cowen et al. elaborated on the inadequacies that exist in the pain management of the hip fracture patient and determined that current strategies do not address the pain the patient experiences while waiting for surgery (2017). This project fulfills the beneficence requirement by improving pain management in hip fracture patient population while also reducing the side effects associated with conventional therapy.

### **Respect for Human Dignity**

For the nurse investigator to respect the subject's dignity, they must respect the patient's right to self-determine and to full disclosure (Polit & Beck, 2017). The author will respect the patient's right to autonomy by providing education to the CRNAs, the orthopedic team (surgeon and physician assistant) and the ED providers (nurse practitioners and physicians.) That way, when providers offer the nerve block, they may provide the necessary information regarding the risks and benefits of the FICB and allow the patient to make an informed decision and respecting their *right to full disclosure*. The evidence clearly shows that pain management is superior in patients when they receive this block as part of their management but receiving it will be completely voluntary as to respect the patient's *right to self-determination*.

### **Justice**

Justice involves the patient's *right to fair treatment* and their *right to privacy*. To respect the patient's fairness in treatment, researchers work to distribute the risks and the benefits of the research equally across all participants, not just to one specific group such as women, minorities, or children (Polit & Beck, 2017). To respect the patient's right to privacy, the author adhered to the Department of Health and Human Service's (HHS's) Standards for Privacy of Individually Identifiable Health Information.

### **Data Collection**

Step I of data collection began by recruiting a local champion and holding consultation sessions about modifying the existing CPG from the AAOS for development within the Arizona CRNA community. Conversation with the local champion provided data used to construct the framework for focusing on a relevant CPG. The next step focused on conversations with

professions from the stakeholder specialties regarding current practice and attitudes about the current care of the hip fracture patient. The professions from orthopedic surgery and emergency medicine were recruited using a convenience sample provided by the deputy director of a Southern Arizona hospital. The deputy director introduced the author to both professions stating they would both gladly provide information surrounding their current practice. Informal interviews were conducted with the emergency medicine and orthopedic surgery stakeholders.

In Step II, after the development of the CPG, the author recruited 4 reviewers to evaluate the newly modified CPG using the AGREE II tool. The participants were recruited via email invitation letters where consent was obtained (Appendix C.) Directions to the competency training module were sent out and the reviewers emailed their competency form to the investigator. After verification of competency, the participant was sent an invitation to complete an appraisal via the “Group Appraisal” feature of the My AGREE PLUS platform. The My AGREE PLUS platform is a secure method of administering the AGREE II tool (AGREE Next Steps Consortium, 2010) and was utilized during this project.

### **Data Analysis**

Data analysis was done entirely on the My AGREE Plus platform. Each item received a score from the four provided. Each item’s score was added together and then divided by the maximum possible score for each item. Since there were four reviewers and the highest possible score on each item is 7, the max total score for each item would be 28. This number was multiplied by 100 which gave the percentage score for each item. The total possible score for a domain is calculated the same way, by adding the actual domain scores (out of 7) and dividing that number by the total maximum possible score for a domain. The My AGREE Plus platform

computes this data automatically once the reviewer finalizes the appraisal and selects to “view the appraisal results” (AGREE Next Steps Consortium, 2010).

The total scores collected by the appraisers should not be used as one large score (such as the total scores from domains 1-6.) For example, if 4 people appraise a guideline, the 4 scores obtained for each domain (e.g. Domain 1: scope & purpose) are added together and scaled to the maximum score possible for a domain. Domain scores do not have a correlation to empirical outcomes such as adaptation or implementation (AGREE Next Steps Consortium, 2010). Stakeholders for a project may decide how to use the domain scores, such as monitoring the strength of a certain domain or to track improvement within a domain.

## **RESULTS**

### **Step I: Stakeholder Feedback**

The local champions recruited for this project provided input from the anesthesia department’s perspective. The two CRNAs both voiced an interest in the topic stating that regional anesthesia is of growing importance in the field of nurse anesthesia. They stated that a quicker intervention would usually be preferred in terms of block selection unless it was clearly inferior block. This feedback would mirror studies examining the difference in efficacy between blocks in this population. The femoral nerve block was clearly inferior to the FICB and the 3-in-1 FNB (Reavley et al., 2014) so the local champions agreed it should not be considered. The preference for a quicker intervention shifted the proposed revisions to recommend the FICB by default. The local champions also emphasized the need for analgesics prior to any transferring of the hip fracture patient. This resulted in the author including the study showing the efficacy of

the FICB in improving spinal placement and overall quality of care when they received the block prior to undergoing surgery (Diakomi, Papaioannou, Mela, Kouskouni, & Makris, 2014).

The emergency medicine stakeholder confirmed that the typical presentation of the hip fracture patient was via an ambulance and the fractures typically occur as the result of a fall. The pain management regimen used currently relies almost exclusively on parenteral narcotics with occasional use of ketorolac. Patients typically spend several hours in the emergency department before they are admitted to the general floor. Surgery typically occurs within 24 hours of the patient presenting but occasionally, additional medical workup is required such as a consult to cardiology or pulmonology (Cowan et al., 2017). The ED provider stakeholder was aware that in the perioperative setting, anesthesia providers use nerve blocks to manage pain in hip surgeries, but he was unaware of the use of the FICB in the ED. He also acknowledged that his more recently-trained peers were trained to use regional anesthesia to manage pain conditions in the ED when appropriate. When the author explained the revised CPG to the provider, the stakeholder voiced much interest in that block being used, as his experience confirmed what the literature states, that hip fracture pain is inadequately managed using parenteral analgesics (Cowan, Lim, Ong, Kumar, & Sahota, 2017). The stakeholder stated that the ED may be an optimal place for the anesthesia provider to perform the block as the transfer from the stretcher to the patient's inpatient bed is usually a very agonizing experience. Again, this aligned with current literature showing that the use of the FICB has been shown to be superior in managing pain from repositioning when compared to intravenous (IV) analgesics (Diakomi, Papaioannou, Mela, Kouskouni, & Makris, 2014).

The orthopedic PA voiced an interest in providing superior pain management, admitting that pain management in hip fractures is usually a “lost cause.” However, he was unfamiliar with new evidence on how to improve care. The PA was interested in the prospect of providing regional anesthesia to improve pain and voiced his concerns with the use of the FICB catheters as another potential point of entry for a potential infection. The study exploring the use of FICB catheters found no significant increase in infections in the catheter group (Ma Y. , Wu, Xue, & Wang, 2018).

### **Step II: AGREE II Scores**

Following the synthesis of evidence, collection of stakeholder feedback, and additions to the AAOS’s CPG on hip fractures, the revised CPG was sent to CRNA reviewers across the state. The completed appraisal was included below in Table 1.

TABLE 1. *AGREE II appraisal scores.*

A critical group appraisal of: Improving Presurgical Pain Management of the Hip of an Evidenced-Based Recommendation Fracture Patient via Adoption of an Evidenced-Based Recommendation for Ultrasound-guided Fascia Iliaca Block							
Scores are on a scale of 1 to 7 (1 = lowest score, 7 = highest score)		$\frac{\text{Obtained score} - \text{minimum possible score}}{\text{Maximum score} - \text{minimum possible score}} \times 100 = \text{Score}$					
Domain 1 - Scope and Purpose		Reviewer	1	2	3	4	Total
1. The overall objectives of the guideline are specifically described.			6	6	7	6	25
2. The health question(s) covered by the guideline is (are) specifically described.			5	7	7	7	26
3. The population to whom the guideline is meant to apply is specifically described.			7	7	7	7	28
		Total	18	20	21	20	79
		Domain 1 Total Score					93%
Domain 2 - Stakeholder Involvement		Reviewer	1	2	3	4	Total
4. The guideline development group includes all relevant professional groups			7	6	6	6	25
5. The views and preferences of the target population have been sought			4	7	6	6	23
6. The target users of the guideline are clearly defined.			7	7	6	6	26
		Total	18	20	18	18	74
		Domain 2 Total Score					86%
Domain 3 - Rigours of Development		Reviewer	1	2	3	4	Total
7. Systematic methods were used to search for evidence.			5	6	5	6	22
8. The criteria for selecting the evidence are clearly described.			4	7	5	6	22
9. The strengths and limitations of the body of evidence are clearly described			7	6	6	6	25
10. The methods for formulating the recommendations are clearly described.			6	7	5	6	24
11. The health benefits, side effects, and risks have been considered in formulating the recommendations.			5	7	4	5	21
12. There is an explicit link between the recommendations and the supporting evidence.			7	6	7	7	27
13. The guideline has been externally reviewed by experts prior to its publication			7	6	7	7	27
14. A procedure for updating the guideline is provided.			3	6	3	6	18
		Total	44	51	42	49	186
		Domain 3 Total Score					80%
Domain 4 - Clarity of Presentation		Reviewer	1	2	3	4	Total
15. The recommendations are specific and unambiguous.			7	6	7	6	26
16. The different options for management of the condition or health issue are clearly presented.			5	7	4	7	23
17. Key recommendations are easily identifiable.			7	7	7	6	27
		Total	19	20	18	19	76
		Domain 4 Total Score					89%
Domain 5 - Applicability		Reviewer	1	2	3	4	Total
18. The guideline describes facilitators and barriers to its application.			7	7	7	6	27
19. The guideline provides advice and/or tools on how the recommendations can be put into practice.			6	7	6	6	25
20. The potential resource implications of applying the recommendations have been considered.			7	7	5	6	25
21. The guideline presents monitoring and/or auditing criteria.			5	7	4	6	22
		Total	25	28	22	24	99
		Domain 5 Total Score					86%
Domain 6 - Editorial Independence		Reviewer	1	2	3	4	Total
22. The views of the funding body have not influenced the content of the guideline.			7	7	7	7	28
23. Competing interests of guideline development group members have been addressed			6	6	7	6	25
		Total	13	13	14	13	53
		Domain 6 Total Score					94%
Overall Guideline Assessment		Reviewer	1	2	3	4	Total
1. Rate the overall quality of this guideline			6	6	6	7	88%
2. I would recommend this guideline for use. (yes, yes with modifications, no)			Yes	Yes	Yes	Yes	

As noted, cumulative scores are not meant to be calculated with the AGREE II. The domain scores provide a baseline for stakeholders to use however they see appropriate (AGREE Next Steps Consortium, 2010). These results are not tied to any clinical outcome. However, stakeholders may deem they would only consider a guideline that scored above 70% in every domain. All domains in this review scored 80% or higher (see Table 2.)

#### **Domain 1 Score**

Scope and purpose scored 93% suggesting the modified CPG was deemed highly acceptable for the target patient population and the purpose of the guideline.

#### **Domain 2 Score**

Stakeholder involvement scored 86% suggesting that the target users of the CPG were clearly stated.

#### **Domain 3 Score**

Rigour of development scored the lowest of the domains but still respectably with 80%. Possible areas of growth for this domain may include further elaborating on recommendation strength and levels of evidence and are described further in the Limitations section.

#### **Domain 4 Score**

Clarity of presentation scored 89% suggesting the reviewers found the guideline recommendations to be specific and unambiguous.

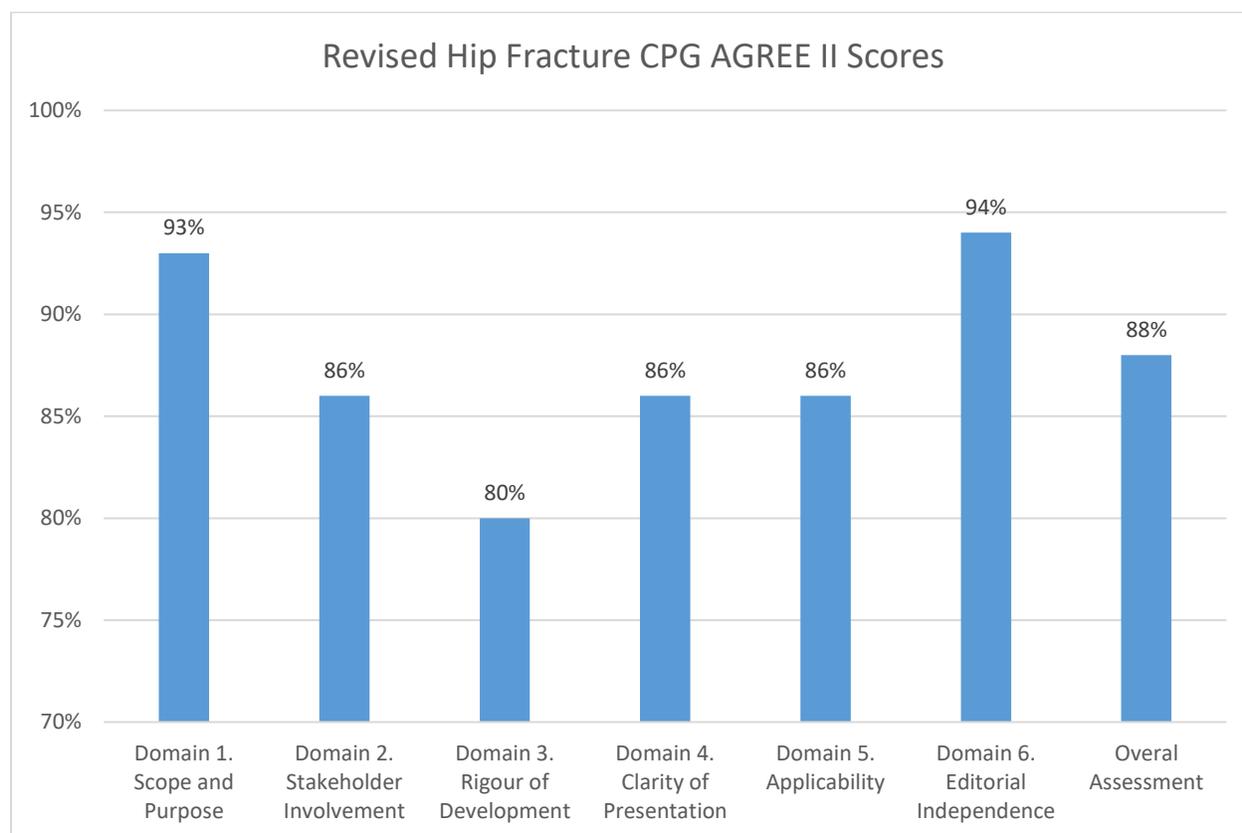
#### **Domain 5 Score**

Applicability scored 86%. This suggests the guidelines did a comprehensive job in discussing how organizational barriers relate to these recommendations.

## Domain 6 Score

Editorial independence scored 94%. This suggests the guideline was almost completed free from any apparent conflicts of interest.

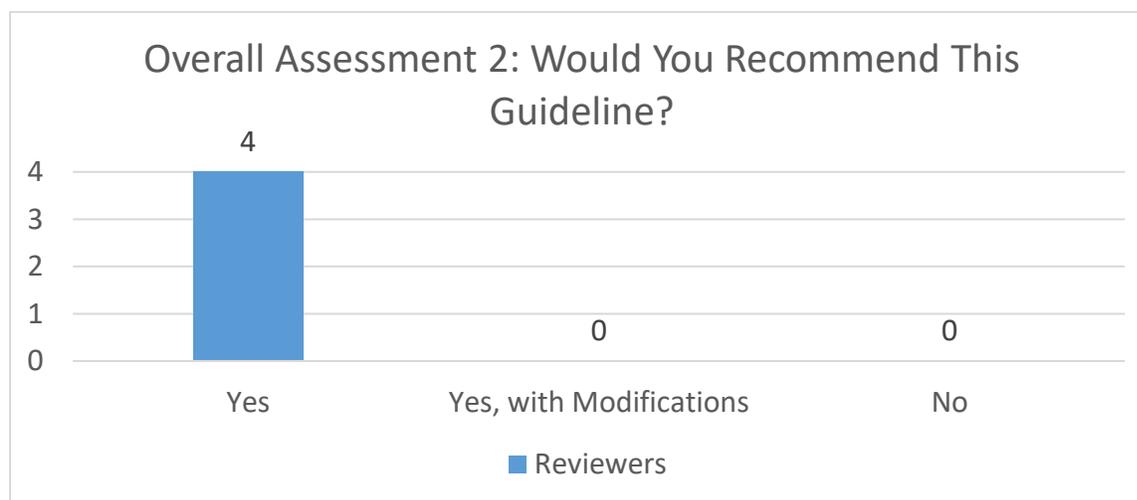
TABLE 2. *Domain scores from the group appraisals.*



## Overall Assessment Scores

The overall quality of this guideline scored 88% in the final section. On the final item, all four reviewers stated that this guideline was appropriate for implementation, without further modifications (Table 3.)

TABLE 3. Overall assessment: Item 2 results.



### Implications

The primary aim of this project was to create a specific recommendation that expanded upon the existing AAOS CPG to improve preoperative pain management in the hip fracture patient. Using the overall assessment questions from the AGREE II group appraisal, it can be stated that this proposed guideline is an appropriate and well-constructed guideline as all four CRNA reviewers stated they would recommend this guideline for use.

Upon reviewing this project's progressing following the IOWA model of evidence-based practice, we may track how this project has done. The project was successful in identifying a patient issue (inadequate pain management in the hip fracture patient.) This was set to the backdrop of an opioid crisis present both here in the State of Arizona and nationally (State of Arizona, 2017). There are three decision points in the IOWA model (see Figure 2.) The author established that this topic was a priority according to studies such as Cowen et al. The author did establish that that enough evidence existed following the completion of a synthesis of evidence (Appendix A.) From there, the practice change was examined for its appropriateness for adoption

for practice, via the AGREE II tool. The results showed the recommendation is appropriate for adoption which answers the IOWA model's third decision point.

These results can be compared to the implementation theory described before, the diffusion of innovation (DOI) theory. This theory provides a helpful framework for healthcare changes and understanding the forces that influence such change (Kaminski, 2011). When Leggot et al. studied the DOI theory in relation to the implementation of regional anesthesia, they concluded that adoption of the nerve block was more likely when the providers adopted the change voluntarily, instead of from a protocol (Leggot, et al., 2016). Leggot made some observations on ways to move anesthesia providers through the categories of adopters. Anesthesia providers slower to adopt a change, such as those in the "late majority" or the "laggards" can be moved towards this project when given an orientation to the new technique and are provided a walkthrough (Leggot, et al., 2016).

### **DNP Essentials**

This project served as a functional example of the author's integration of the American Association of Colleges of Nursing (AACN) Doctor of Nursing Practice essentials into this DNP project. Below are several examples of how these essentials have been demonstrated in this academic project.

TABLE 4. *The essentials of doctoral education for advanced nursing practice.*

Essential I: Scientific Underpinnings for Practice
Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking:
Essential III. Clinical Scholarship and Analytical Methods for Evidence-Based Practice
Essential IV. Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care
Essential V. Health Care Policy for Advocacy in Health Care
Essential VI. Interprofessional Collaboration for Improving Patient and Population Health Outcomes
Essential VII. Clinical Prevention and Population Health for Improving the Nation's Health
Essential VIII. Advanced Nursing Practice

### **Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking:**

While all advanced practice nurses must be experts in their direct care specialty, Essential II stresses the need for the DNP graduate to also understand how to conceptualize new methods of delivering care that accommodate several organizational, political, economic and epidemiological perspectives (AACN, 2006). To accomplish this essential, DNP graduates should be prepared to evaluate existing care methods and develop new approaches to meet present and future needs of patient populations based on the scientific findings from the field of nursing and other sciences (AACN, 2006).

The project demonstrated competency of Essential II by ensuring accountability for the quality of health care and improving patient safety for vulnerable populations (AACN, 2006). Hip fracture patients overwhelmingly are older (age > 65 years) and tend to have comorbidities (Ma et al., 2018). This project advocates for a more effective and cost-effective method of pain management in managing preoperative hip fracture pain by providing system-level thinking to streamline care and improve quality of care. In its current form, this proposed CPG could be readily applied to a facility if they wish.

**Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice**

Nurses have long since known the importance of applying new evidence into the growingly complex clinical realm. While research-focused doctoral nurses are prepared to generate new knowledge, the DNP graduate must be prepared to apply their advanced practice knowledge and lead healthcare entities towards evidence-based practices (AACN, 2006). The DNP graduate must be prepared in the evaluation of practice, quality improvement methodologies, and familiarity in working with multidisciplinary research teams (AACN, 2006).

This project addresses Essential III in several different ways. The first scholarly exercise that demonstrated this essential was conducting a literature review. A literature review with a synthesis of evidence table was compiled to evaluate the existing evidence surrounding pain management of the patient with a hip fracture. Later in the project, a revised CPG was authored using the AGREE II as a template and then critically appraised by content experts using the tool. This exercise is aligned with the Essential III's goal of "apply[ing] relevant findings to develop practice guidelines and improve practice" (AACN, 2006).

**Essential V: Health Care Policy for Advocacy in Health Care**

Essential V stresses that DNP graduates must be able to influence health policy, be it via governmental actions, institutional policies, or organizational standards, in order to address the health care needs of their patients (AACN, 2006). Health policy extends beyond simple politics and includes any standard that may facilitate or impede the delivery of health care in a system (AACN, 2006).

This project came at a time where anesthesia providers, healthcare professionals, and other public policy stakeholders were becoming increasingly aware of the opioid epidemic in

Arizona and the nation at-large. The triggering event of Arizona declaring a public health emergency to address the rise in opioid overdoses and deaths served as a secondary motivator for this project. The studies examining the use of FICB and PNBs for preoperative pain management all found a reduction in preoperative and postoperative narcotic administration (Beaudoin, Haran, & Liebmann, 2013; Fadhilillah & Chan, 2017; Ritcey, Pageau, Woo, & Perry, 2016). The studies thus far have yet to examine what effect this reduction in narcotic use has on long-term outcomes, but the largest systematic review did not pneumonia rates did decrease with the use of this block (Guay, Parker, Griffiths, & Kopp, 2017). This is likely a direct result of the decreased opioid administration associated with patients that receive the FICB as the use of opioids in the elderly is associated with an increased rate of pneumonia (Dublin, et al., 2012).

## **Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes**

With the complexity of health care only increasing, advancing modern care will require input and expertise from diverse groups and individuals. DNP-prepared nurses must collaborate on these multidisciplinary teams and demonstrate leadership when necessary (AACN, 2006).

This project highlights the very nature of how care is moving away from the “silos” we once viewed our specialties in. The project began after reading about the opioid-sparing strategies employed by a team in the emergency department. This led to a search on the Publisher’s Clearinghouse for any CPGs regarding regional anesthesia. The author noticed a deficit in the CPG authored by the AAOS, the professional society of orthopedic surgeons in America. Stakeholder input was taken into consideration during the expansion of the CPG, highlighting the benefits of multidisciplinary care led by a DNP-candidate nurse.

### **Essential VIII: Advanced Nursing Practice**

As healthcare continues to become more sophisticated, nursing will continue to require advanced practice nurses (APRN) to specialize further and further. Each specialty must be responsible for their scientific expertise and advanced knowledge. This essential states that DNP program curricula must consist of specialty education that prepares the graduate for a specific APRN specialty (AACN, 2006). This project reflected the author's understanding of the concepts of regional anesthesia and the nurse anesthetist's role in providing regional anesthesia. This understanding came from didactic education, clinical preceptorship, and regional anesthesia conferences.

#### **Strengths**

A strength of this project was the comprehensiveness of the proposed CPG appraisals. Guideline appraisal is an arduous process that requires content expertise and a decent amount of time to complete (AGREE Next Steps Consortium, 2010). The AGREE consortium notes that 2 appraisals are required for guideline validity with improved validity with 4 appraisals. This guideline was able to have 4 CRNAs familiar with regional anesthesia appraise the expanded guideline.

#### **Limitations**

When a team sets out to develop a new practice recommendation, the team assesses existing evidence according to categories of evidence. Category 1A evidence (the highest evidence) comes from meta-analysis and randomized controlled trials while Category 4 evidence comes from expert counsel reports or experts' opinions (Shekelle, Woolf, Eccles, & Grimshwa, 1999). Recommendations are made based on the level of evidence behind them. Grade A

recommendations have the highest level of evidence behind them, category 1 evidence (Shekelle et al., 1999). The original recommendation had such a classification system for their recommendations based on the strength of the evidence. One limitation of this proposed CPG was that the new recommendations did not have accompanying strengths of recommendation similar to the original CPG.

Most of the CRNAs involved with this project noted that only anesthesia providers in their hospitals would be the ones to provide such a nerve block. However, a growing number of facilities have emergency medicine physicians perform various nerve blocks as a part of their pain management strategies. It would have been more beneficial to have an ED physician review the CPG using the AGREE II in addition to the CRNAs. Additionally, buy-in may be higher from orthopedic surgery providers in facilities looking to implement this CPG if a PA or surgeon representing their specialty had reviewed and scored this CPG.

While also a strength of the project was to have CRNAs across several facilities rate this as appropriate, this project may have been more effective if it had been restricted to a specific facility. However, significant barriers may be present when proposing this protocol to a facility and many of these time barriers exceed the expected length of a DNP student's training and education.

### **Dissemination of Results**

The results of this project were presented to the CRNA community via poster presentation to those in attendance at the Arizona Association of Nurse Anesthetist's 2019 Sun N' Fun conference. After the project defense was concluded, the results of the CPG evaluation were presented to the appraisal participants for consideration at their individual facilities.

## **DISCUSSION**

This project served as a solid foundation for future research and implementation projects. Future research could include a formal randomized-controlled trial of this CPG applied in a facility and compare pre-intervention pain scores, complication rates, mobility scores and other secondary measures to post-implementation values. Subsequently, researchers could also compare the results within the facility including post-intervention pain scores and other measures existing literature as these specific recommendations have included techniques that prior studies such as Beaudoin et al. were not aware of (use of the suprainguinal, parasagittal approach.) A future DNP student could potentially use this CPG for the foundation of a project. The project could conduct a focus group on the content provided in this CPG and conduct a pretest, assessing opinions and knowledge. Following the implementation of the CPG at the site, the DNP student could then assess opinions and knowledge via a posttest and subsequent implementation of the CPG.

## **Conclusion**

The primary aim of the project was to improve the AAOS CPG on hip fractures by expanding their recommendation for the use of preoperative regional anesthesia. This expansion included several recommendations including the use of ultrasound while placing the fascia iliaca compartment block, placing the block via the parasagittal approach, use of this block prior to spinal anesthesia placement and considering the use of a continuous catheter if surgical repair of the fracture is to be delayed. These recommendations were added following a literature review yielding several high-level studies (systematic reviews and randomized controlled trials) along with stakeholder feedback from the anesthesia, orthopedic surgery, and emergency medicine

departments. The expanded guideline was then appraised by four CRNAs in the State of Arizona, all of which voiced familiarity with regional anesthesia. The CRNAs all appraised the revised guideline stating it was appropriate for implementation in its current form. This project accomplished its initial aim to improve the AAOS's recommendation on using regional anesthesia to manage preoperative pain in patients with a hip fracture.

APPENDIX A:  
APPRAISAL OF EVIDENCE

## PICO Question:

For providers responsible for pain management of the patient with hip fracture in Arizona (P), will the modification of the AAOS's CPG on preoperative regional anesthesia, adjusted for facility-specific considerations (I), compared to the conventional therapies (C), be viewed as an acceptable CPG for the management of preoperative pain in the patient admitted for hip fracture (O)?

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings Related to Project
American Academy of Orthopaedic Surgeons. (2014). <i>Management of hip fractures in the elderly: evidence-based clinical practice guidelines.</i>	<ul style="list-style-type: none"> <li>To examine the use of regional anesthesia to improve pain control of hip fracture patients in the preoperative period.</li> </ul>	None	Systematic review	Six high-quality studies and one moderate quality study for a total of 593 subjects were studied using a prospective randomized clinical trial design	PubMed, EMBASE, CINAHL, and The Cochrane Central Register of Controlled Trials were searched and articles were reviewed against 21 article criteria.	<ul style="list-style-type: none"> <li>Visual analog pain scores were improved when preoperative regional anesthesia was used.</li> <li>One study in their review found decreased rates of delirium when patients received preoperative regional anesthesia.</li> <li>Complication rates were the same between the regional anesthesia group and the control group.</li> </ul>
Amin, N., West, J. F., & Basmajian, H. (2017). Nerve	Primary measure <ul style="list-style-type: none"> <li>To evaluate the proportion of</li> </ul>	None	Literature review	25 studies were retrieved that examined the use	A search of MEDLINE, PubMed, Embase,	<ul style="list-style-type: none"> <li>These studies detailed FICB being a safe and</li> </ul>

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings Related to Project
blocks in the geriatric patient with hip fracture: A review of the current literature and relevant neuroanatomy. <i>Geriatric Orthopaedic Surgery &amp; Rehabilitation</i> , 8(4), 268-275	patients receiving a FICB prior to hip fracture surgery. Secondary measure • Evaluate the efficacy of these blocks on opioid administration usage, post-operative cognitive dysfunction, return of bowel functioning, and naloxone use.			of FICB in hip fracture patients.	and the Cochrane Database of Systematic Reviews. The terms “hip fracture” and “fascia iliaca block” were used.	effective way to manage perioperative pain in hip fracture repair. • The studies also showed that FICB has can reduce opioid requirement and related side effects.
Beaudoin, F., Haran, J., & Liebmann, O. (2013). A comparison of ultrasound-guided three-in-one femoral nerve block versus parenteral opioids alone for analgesia in emergency department patients with hip fractures:	• To compare the efficacy of ultrasound (US)-guided three-in-one femoral nerve blocks compared to conventional treatment with opioids in elderly patients presenting to the	None	Randomized controlled trial.	A convenience sample of patients, 55 years of age or older. These patients had confirmed hip fractures and pain scores > 5 (n = 36).  Both groups were the same regarding age, sex, fracture type, vital signs, baseline pain	Primary outcomes measured include pain scores and summed pain-intensity reduction over a 4-hour period.  Secondary measures consist of the amount of rescue analgesia administered, adverse events.	• The intervention arm had greater reductions in pain scores (p < 0.001). • No patient in the control group reported clinically significant reductions in pain (p = 0.001). • In terms of rescue analgesia, the control group

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings Related to Project
A randomized controlled trial. <i>Academic Emergency Medicine</i> , 20(6), 584-591.	ED for a hip fracture.			scores, and baseline analgesics.		received 5.0 mg morphine equivalent units (MEU) (IQR – 2.0 to 8.4) while the intervention arm had 0.0 mg (IQR – 0.0 to 1.5 mg).
Cowan, R., Lim, J., Ong, T., Kumar, A., & Sahota, O. (2017). The challenges of anaesthesia and pain relief in hip fracture care. <i>Drugs Aging</i> , 34(1), 1-11.	<ul style="list-style-type: none"> <li>To examine the multiple factors that play a role in the pain management of the hip fracture patient.</li> </ul>	None	Literature review	94 studies exploring different facets of hip fractures	A search of MEDLINE, PubMed, Embase, and the Cochrane Database of Systematic Reviews using several different search terms was conducted.	<ul style="list-style-type: none"> <li>Pain management in hip fracture patients remains insufficient.</li> <li>Systemic analgesics remain the first-line treatment in managing pain in hip fractures despite their untoward side effects and ineffective analgesia.</li> <li>Regional anesthesia provides superior analgesia, reduced risk of delirium,</li> </ul>

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings Related to Project
						and improved rehab capacity.
Diakomi, M., Papaioannou, M., Mela, A., Kouskouni, E., & Makris, A. (2014). Preoperative fascia iliaca compartment block for positioning patients with hip fractures for central nervous blockade: a randomized trial. <i>Regional Anesthesia and Pain Medicine</i> , 39(5), 394-398. doi:10.1097/AAP.000000000000133.	<ul style="list-style-type: none"> <li>To compare the efficacy of FICB against IV administration of fentanyl to facilitate patient comfort during positioning hip fracture patients for spinal anesthesia</li> </ul>	None	Randomized control trial	41 patients	<ul style="list-style-type: none"> <li>Numeric rating pain scale scores were collected before and after the analgesic intervention</li> <li>Time to first IV postop analgesic was recorded</li> <li>Total morphine consumption was reported along with patient satisfaction</li> </ul>	<ul style="list-style-type: none"> <li>Performing a FICB prior to positioning the patient for the administration of a spinal anesthetic was superior to intravenous administration of fentanyl during all points.</li> <li>In the FICB group: postop morphine consumption was lower, time to first IV analgesic was longer, and patient satisfaction was higher</li> </ul>
Dolan, J., Williams, A., Murney, E., Smith, M., & Kenny, G. (2008). Ultrasound-guided fascia iliaca block:	<ul style="list-style-type: none"> <li>To examine the differences in efficacy between the FICB performed by the loss of resistance</li> </ul>	None	Randomized controlled trial.	N=80 patients undergoing hip or knee replacement.	<ul style="list-style-type: none"> <li>Sensory data was collected on the femoral, obturator, and lateral femoral cutaneous nerves</li> </ul>	<ul style="list-style-type: none"> <li>The use of USG was associated with a more reliable block of the femoral nerve</li> </ul>

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings Related to Project
a comparison with the loss of resistance technique. <i>Regional Anesthesia and Pain Medicine</i> , 33(6), 526-531	and ultrasound-guided techniques.				prior to and after FICB <ul style="list-style-type: none"> <li>• Motor response was also tested pre- and post-block</li> </ul>	and the obturator nerves. <ul style="list-style-type: none"> <li>• This study is useful in updating the CPG provided by the American Academy of Orthopaedic Surgeons (AAOS).</li> <li>• In revising the CPG, this information guides the project to include the recommendation that ultrasound is used when providing the preoperative regional anesthesia.</li> </ul>
Fadhilillah, F., & Chan, D. (2017). Systematic review and meta-analysis of analgesic efficacy and safety profile of single injection fascia	<ul style="list-style-type: none"> <li>• To establish the analgesic safety of single injection FICB when administered in the preoperative setting to manage acute pain in</li> </ul>	None	Systematic review	8 RCTs containing 645 participants were included in the systematic review.	This review used MEDLINE, EMBASE, Cochrane and CINAHL were each searched for RCTs that involved the proximal femur (hip) fractures and	<ul style="list-style-type: none"> <li>• This review adds to the existing evidence by looking specifically at the FICB for preoperative pain management,</li> </ul>

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings Related to Project
iliaca compartment blocks in the acute pre-operative pain management of hip fractures. <i>Emergency Medicine Journal</i> , 34(12), 891-892. doi:10.1136/emerm ed-2017-207308.47	patients presenting with a hip fracture compared to standard analgesic regiments.				received preoperative FICBs.	whereas other systematic reviews included several different types of blocks in their synthesis of evidence.
Guay, J., Parker, M., Griffiths, R., & Kopp, S. (2017). Peripheral nerve blocks for hip fractures. <i>Cochrane Database of Systematic Reviews</i> (5).	<ul style="list-style-type: none"> <li>To examine the use of PNBs as preoperative analgesia, postoperative analgesia, and as supplementation to general anesthesia in patients undergoing hip fracture repair.</li> </ul>	None	Systematic review	31 trials containing 1780 participants were used in this review.	This update to the review examined the Cochrane Central Register of Controlled Trials, MEDLINE, Embase, and CINAHL.	<ul style="list-style-type: none"> <li>This review showed PNB improved pain with movement more reliably than conventional treatments.</li> <li>Pneumonia rates were lower in patients that received a PNB.</li> <li>Complication rates did not increase when a patient received a PNB.</li> <li>Insufficient evidence was collected to determine</li> </ul>

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings Related to Project
						whether PNBs reduce acute confusion, myocardial infarction or death in the 6 months following surgery.
Hebbard, P., Ivanusic, J., & Sha, S. (2011). Ultrasound-guided supra-inguinal fascia iliaca block: a cadaveric evaluation of a novel approach. <i>Anaesthesia</i> , 66(4), 300-305. doi:10.1111/j.1365-2044.2011.06628	<ul style="list-style-type: none"> <li>To examine the deposition of local anesthetic in cadavers when the FICB was placed under USG above the inguinal ligament in the parasagittal plane.</li> </ul>	None	Cadaveric study	12 injections, bilateral injections on 6 cadavers of 20 mL of 0.25% aniline blue dye.	<ul style="list-style-type: none"> <li>Staining of the femoral, lateral femoral cutaneous (LFC) and ilioinguinal nerves was observed following supra-inguinal injections.</li> </ul>	<ul style="list-style-type: none"> <li>This method showed a more reliable approach to reaching saturation of the LFC nerve which is housed in the iliac fossa, above the inguinal ligament.</li> <li>Traditional USG approach (transverse) is placed infra-inguinal and relies on the superior spread of the LA to block the LFC nerve.</li> </ul>
Mauleon, A., Palo-Bengtsson, L., & Ekman, S.-L.	<ul style="list-style-type: none"> <li>To highlight to experience the patient feels when</li> </ul>	Interpretive phenomenological method	Paradigm case	7 patients	<ul style="list-style-type: none"> <li>Interviews were conducted on patients that</li> </ul>	<ul style="list-style-type: none"> <li>This study shows the main theme surrounding the</li> </ul>

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings Related to Project
(2007). Patients experiencing local anaesthesia and hip surgery. <i>Journal of Clinical Nursing</i> , 16, 892-899.	<p>undergoing local anesthesia and surgery</p> <ul style="list-style-type: none"> <li>○ The authors used the term “local anesthesia” in a manner that we in America would typically call “regional anesthesia.”</li> </ul>				<p>underwent regional anesthesia for hip fracture.</p> <ul style="list-style-type: none"> <li>• Verbatim-transcribed narratives were collected and re-read for context clues.</li> <li>• Main themes and sub-themes were extracted from the verbal data.</li> </ul>	<p>patient undergoing hip surgery under regional anesthesia was “compromised well-being and comfort.”</p> <ul style="list-style-type: none"> <li>• Four other sub-themes that describe challenges include: sensing pain, waiting and feeling as though time will not end, surreal feelings, and feelings of trust or distrust in the provider.</li> <li>• This study helps to provide data on the concerns that patients will undergo while receiving regional anesthesia for hip surgery.</li> </ul>

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings Related to Project
<p>Morrison, R., Dickman, E., Hwang, U., Akhta, S., Ferguson, T., Huang, J., . . . Strayer, R. (2016). Regional nerve blocks improve pain and functional outcomes in hip fracture: A randomized controlled trial. <i>Journal of the American Geriatric Society, 64</i>, 2433-2439</p>	<ul style="list-style-type: none"> <li>To examine outcomes in patients that receive regional anesthesia to those that received standard analgesics post-hip fracture surgery.</li> </ul>	None	A multisite randomized controlled trial.	Patients with hip fractures (n = 161).	<ul style="list-style-type: none"> <li>Following a screening by a trained interviewer, a computer randomized the patients to either the control group or intervention group.</li> <li>The control group received the standard therapy of parenteral opioids for pain management.</li> <li>The intervention group received a femoral nerve block (FNB) in the ED and a FNB catheter following hip fracture surgery.</li> <li>Pain scores were measured at baseline, 1 hour, &amp; 2 hours.</li> <li>The patients were also interviewed</li> </ul>	<ul style="list-style-type: none"> <li>Pain scores in the ED and postoperatively were improved in the group that received the FNB.</li> <li>Patients in the FNB group walked further on POD 3.</li> <li>Opioid requirements and opioid-related side effects were lower in the FNB group.</li> </ul>

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings Related to Project
					about pain scores on POD 1, 2, 3. <ul style="list-style-type: none"> <li>• Opioid doses were compiled along with reported opioid side-effects.</li> <li>• Walking distances were collected on POD 3 by a physical therapist on patients that were cleared to walk.</li> </ul>	
Reavley et al., (2014). Randomized trial of the fascia iliaca block versus the '3-in-1' block for femoral neck fractures in the emergency department. <i>Emergency Medical Journal</i> , 32, 685-689.	<ul style="list-style-type: none"> <li>• To compare the efficacy of the FICB and the 3-in-1 FNB in the emergency department</li> </ul>	None	Randomized controlled trial	N = 162 patients were divided between the FICB and the FNB groups	Visual analog pain score	<ul style="list-style-type: none"> <li>• Both the FICB and the 3-in-1 FNB provide equivalent analgesia.</li> <li>• The FICB may be preferential as the risk of injuring the neurovascular bundle is theoretically lower than the FNB</li> <li>• The FICB is also quicker to perform which</li> </ul>

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings Related to Project
						may make it preferable to perform.
Ritcey, B., Pageau, P., Woo, M., & Perry, J. (2016). Regional nerve blocks for hip and femoral neck fractures in the emergency department: A systematic review. <i>Canadian Journal of Emergency Medicine</i> , 18(1), 37-47.	<ul style="list-style-type: none"> <li>To find whether PNBs reduce pain scores, reduce the need for parenteral opioids and reduce complications when compared to conventional treatment in patients presenting to the ED with a hip fracture.</li> </ul>	None	Systemic review	9 studies of the 401 articles they found were included in this systematic review.	This systematic review examined MEDLINE, EMBASE, CINAHL, and the Cochrane Central Register of Controlled Trials for applicable studies.	<ul style="list-style-type: none"> <li>The primary outcome of the review showed improved or equivocal analgesia in the PNB treatment group compared to conventional therapy.</li> </ul>
Yang, L., Li, M., Chen, C., Shen, J., & Bu, X. (2017). Fascia iliaca compartment block versus no block for pain control after lower limb surgery: a meta-analysis. <i>Journal of Pain</i>	<ul style="list-style-type: none"> <li>To examine the analgesic effect of FICB against no block (NB) following lower limb surgery (LLS).</li> </ul>	None	Meta-analysis	7 clinical trials with a total of 508 subjects	<p>The primary measures were pain scores taken 4, 12, and 24 hours following LLS.</p> <p>Secondary measures were the doses of morphine administered at the 24-hour mark, and</p>	<ul style="list-style-type: none"> <li>This study added to the project that pain scores can be reduced at all points during the acute post-surgical period.</li> <li>This study also showed that less morphine is required when a</li> </ul>

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings Related to Project
<i>Research, 10, 2833-2841</i>					the occurrence of postoperative nausea and vomiting (PONV).	FICB is provided and the risk of PONV can be reduced as well.

APPENDIX B:  
AGREE II INSTRUMENT

## **AGREE II Instrument**

### **DOMAIN 1. SCOPE AND PURPOSE**

1. The overall objective(s) of the guideline is (are) specifically described.
2. The health question(s) covered by the guideline is (are) specifically described.
3. The population (patients, public, etc.) to whom the guideline is meant to apply is specifically described.

### **DOMAIN 2. STAKEHOLDER INVOLVEMENT**

4. The guideline development group includes individuals from all relevant professional groups.
5. The views and preferences of the target population (patients, public, etc.) have been sought.
6. The target users of the guideline are clearly defined.

### **DOMAIN 3. RIGOUR OF DEVELOPMENT**

7. Systematic methods were used to search for evidence.
8. The criteria for selecting the evidence are clearly described.
9. The strengths and limitations of the body of evidence are clearly described.
10. The methods for formulating the recommendations are clearly described.
11. The health benefits, side effects, and risks have been considered in formulating the recommendations.
12. There is an explicit link between the recommendations and the supporting evidence.
13. The guideline has been externally reviewed by experts prior to its publication.
14. A procedure for updating the guideline is provided.

### **DOMAIN 4. CLARITY OF PRESENTATION**

15. The recommendations are specific and unambiguous.

16. The different options for management of the condition or health issue are clearly presented.

17. Key recommendations are easily identifiable.

#### **DOMAIN 5. APPLICABILITY**

18. The guideline describes facilitators and barriers to its application.

19. The guideline provides advice and/or tools on how the recommendations can be put into practice.

20. The potential resource implications of applying the recommendations have been considered.

21. The guideline presents monitoring and/or auditing criteria.

#### **DOMAIN 6. EDITORIAL INDEPENDENCE**

22. The views of the funding body have not influenced the content of the guideline.

23. Competing interests of guideline development group members have been recorded and addressed.

#### **OVERALL GUIDELINE ASSESSMENT**

1. Rate the overall quality of this guideline. (1-7)

2. I would recommend this guideline for use. (Yes, Yes, with modifications, No)

APPENDIX C:  
INVITATION LETTER TO PARTICIPANTS

Dear Participant,

My name is Joshua Zack. I am currently pursuing my doctorate in nursing practice in the nurse anesthesia specialty. I am writing this letter to invite you to participate in my project regarding improving preoperative pain management in patients who experienced a hip fracture. The purpose of this project is to expand upon the existing clinical practice guideline (CPG) from the American Academy of Orthopaedic Surgery (AAOS). You are being asked to participate as you work in a relevant capacity to this project (providing regional anesthesia) and your feedback would be beneficial towards developing a robust clinical practice guideline.

To evaluate my revised CPG, you will need to be oriented to the AGREE II tool. The AGREE II is an international tool that assesses practice guidelines. To verify competency with the tool, you will need to complete the AGREE II Overview Tutorial at <https://www.agreetrust.org/resource-centre/agree-ii-training-tools/>. This tutorial should take approximately 45 to 60 minutes to complete. **In order to verify completion of the module, you will need to email me ([jzack@email.arizona.edu](mailto:jzack@email.arizona.edu)) confirmation that you have completed the module.**

Your participation in this CPG evaluation is completely voluntary. Evaluation of the revised CPG will take approximately 60 minutes. If you do participate in this evaluation your information will be kept completely confidential and anonymous. Your feedback can be used in the development of future scholarly projects.

Your choice to participate in this study is entirely voluntary with no known risks. You may choose to decline or stop participation at any time during the study. Your decision to decline or stop participation will be respected and will not affect any future relationship with the University of Arizona, or affiliated organization.

If you have any questions, concerns, or problems while participating in this project please contact the researcher, Joshua Zack, at [jzack@email.arizona.edu](mailto:jzack@email.arizona.edu) or (217) 891-3644.

Again, thank you for your participation in this Capstone Project,

Regards,

Joshua Zack, BSN RN SRNA

APPENDIX D:  
THE PROPOSED REVISED CLINICAL PRACTICE GUIDELINE

## **Improving Presurgical Pain Management of the Hip Fracture Patient via Adoption of an Evidenced-Based Recommendation for Ultrasound-guided Fascia Iliaca Block**

### **Purpose**

To update and expand the American Academy of Orthopaedic Surgeon's (AAOS) clinical practice guideline on preoperative regional analgesia using stakeholder input, emerging research, and clinical experience.

### **Recommendations**

**Recommendation 1:** In patients that present to the hospital with a diagnosed hip fracture, the patients should be assessed for the appropriateness of having regional anesthesia as part of their multi-modal pain-control regiment.

**Rationale:** This recommendation remains unchanged from the AAOS clinical practice guideline (CPG) on Hip Fractures (2014). Since that recommendation was made, several systematic reviews have reaffirmed the benefits of using regional anesthesia to manage hip fracture pain (Guay, Parker, Griffiths, & Kopp, 2017; Amin, West, & Basmajian, 2017; Ritcey, Pageau, Woo, & Perry, 2016).

**Recommendation 2:** The nerve block of choice will be the fascia iliaca compartment block (FICB).

**Rationale:** Both the 3-in-1 femoral nerve block and the FICB provide adequate analgesia. However, greater technical proficiency is required for the 3-in-1 femoral nerve block and it is a more time-consuming nerve block to perform (Reavley, et al., 2014). Stakeholders voiced a preference towards a less time-consuming nerve block technique.

**Recommendation 3:** The preferred method of performing FICB will be under ultrasound guidance and the approach used to perform it will be the parasagittal approach, instead of the transverse approach.

**Rationale:** The use of ultrasound, when compared to the loss of resistance technique, was associated with a more reliable block of the femoral and obturator nerves (Dolan, Williams, Murney, Smith, & Kenny, 2008). The parasagittal approach described by Hebbard, Ivanusic, & Sha was shown to block the lateral femoral nerve more reliably and with a lower volume of local anesthetic than the previously described transverse approach (Hebbard, Ivanusic, & Sha, Ultrasound-guided supra-inguinal fascia iliaca block: a cadaveric evaluation of a novel approach, 2011).

**Recommendation 4:** In patients with prolonged preoperative wait times, whether from comorbidities, facility availability, or other reasons, the feasibility of administering the local anesthetics via a FICB catheter should be explored.

**Rationale:** A prospective, randomized controlled trial showed that in hip fracture patients given a continuous FICB preoperatively, pain scores were lower, satisfaction scores were higher, and length of stay was decreased (Ma Y. , Wu, Xue, & Wang, 2018). The subjects in this study were also of advanced age (> 80 years) and had at least one cardiovascular, pulmonary, or

neurological comorbidity, suggesting this is a safe technique for analgesia in a fragile patient population.

**Recommendation 5:** When spinal anesthesia is planned as the primary anesthetic for hip fracture repair, the feasibility of providing the patient with a FICB prior to positioning for the spinal should be explored.

**Rationale:** When compared to intravenous administration of fentanyl, a FICB placed prior to positioning a patient for neuraxial anesthesia, provided better pain management, allowed for better positioning, improved postoperative analgesia, & improved patient satisfaction (Diakomi, Papaioannou, Mela, Kouskouni, & Makris, 2014).

### Scope of the Recommendations

Each year, over 300,000 patients age 65 years or older are admitted for inpatient care following a hip fracture (Centers for Disease Control and Prevention, 2016). In 2011, over 41 million Americans were 65 years old or older and almost half of this population has osteoarthritis. In 20 years, the number of Americans 65 years of age and older is expected to double (Urban, 2015), thus, the number of procedures associated with osteoporosis will likely rise as well. Comorbidities associated with hip fracture patients include heart failure, chronic lung disease and diabetes (Brauer, Coca-Perrillon, Cutler, & Rosen, 2009) suggesting that this population of patients is very frail.

The development of a CPG is an arduous and extensive process that can require a team of researchers and content experts. The creation of a new CPG at this time would be an unnecessary use of time and resources. A greater use of resources would be to expand upon the existing recommendation and use the author's focused knowledge of anesthesia to make the CPG more specific and readily operational for practicing anesthesia providers.

This CPG focuses on geriatric patients that present with a hip fracture. "Hip fracture" is defined as a fracture that occurs to the upper fourth of the femur bone (Centers for Disease Control and Prevention, 2016). This CPG is intended to be used in the acute phase of the disease, ideally once a diagnosis has been made in the emergency department. This CPG pertains to hip fractures occurring from low-energy trauma, such as falls, rather than from high-energy trauma such as motor vehicle collisions or from pathological bone lesions. This CPG is intended to be used by anesthesia providers (or emergency department providers if applicable) that can provide regional anesthesia to patients.

"Regional anesthesia" within the context of this CPG will refer to peripheral and compartmental nerve blocks and will exclude any discussion of techniques that introduce local anesthetics around spinal nerve roots (neuraxial anesthesia.)

For providers responsible for pain management of the patient with hip fracture in the State of Arizona, will the modification of the AAOS's CPG on preoperative regional anesthesia, adjusted for emerging evidence and stakeholder feedback, when compared to the conventional therapies, be viewed as an acceptable CPG for the management of preoperative pain in the patient admitted for hip fracture?

## Stakeholder Involvement

Stakeholders are those that work with a project, have an interest in the topic, and provide feedback for logistics that a Doctor of Nursing Practice (DNP) student may not be aware of (Anderson, Knestrick, & Barroso, 2015). Stakeholders for this project include providers from the orthopedic, anesthesia, and emergency medicine (ED) departments. Stakeholder information was collected from a CRNA, physician anesthesiologist (MDA), an emergency medicine physician, and an orthopedic physician assistant (PA) across several facilities. Stakeholder information from the ED stakeholder confirmed that pain management strategies for hip fracture patients in the ED primarily rely on the use of parenteral-administered opioids. The stakeholder reaffirmed what the literature has noted, that opioid analgesics are ineffective at safely managing the pain associated with hip fractures (Cowan, Lim, Ong, Kumar, & Sahota, 2017). The orthopedic PA voiced an interest in providing superior pain management, however, he was unfamiliar with new evidence on how to improve care. The PA also voiced concerns with the use of the FICB catheters as another potential point of entry for a potential infection. The study exploring the use of FICB catheters found no significant increase in infections in the catheter group (Ma Y. , Wu, Xue, & Wang, 2018).

The trend in healthcare is that decision making will move towards a multidisciplinary approach. This CPG began following a report of emergency medicine physicians in New Jersey treating patients in the emergency department with non-opioid analgesics and other pain management strategies such as regional anesthesia and trigger point injections (St. Joesph's Health, 2019). This led to the recognition of the AAOS's CPG, a document authored by orthopedic surgeons. From there, expansion and refinement began following conversations with experts in regional anesthesia and was examined further with a literature review. The preference of the anesthesia provider is to provide an analgesic technique that is quick, cheap, effective and safe. The block that fulfills these preferences the most is the ultrasound-guided fascia iliaca compartment block.

In order to accommodate the views and preferences of the target population, anesthesia providers must understand the risks and benefits of this technique. By understanding the risks and benefits, they may obtain informed consent from the patient or their medical decision-making designee (medical power of attorney). An educational in-service may be presented to the anesthesia, emergency medicine, and/or orthopedic departments to highlight the evidence behind these recommendations and to aid in implementation.

Anesthesia providers, both CRNAs and physician anesthesiologists, provide the service that would be essential in making this CPG effective. If deemed an acceptable guideline, this CPG would be expanded to include ED orthopedic providers to improve adherence. It should be noted that in some other medical centers, emergency department providers that are trained in regional anesthesia may be the provider that provides the nerve block for these patients while they are in the emergency department.

## Development and Evidence

A PubMed search using the MeSH terms “nerve block” and “hip fractures” was entered. Results were limited to the last five years and excluded results that examined neuraxial

anesthesia. Sixty-three results were found and 12 were used. Time periods searched included studies conducted within the last 10 years and some sources that have implications beyond the last 5-10 years. Sources that went on to cite these reviewed articles were also explored using PubMed's "Related Articles" feature. The AAOS's CPG on hip fractures was identified using the Cochrane Database. Cochrane is an online resource that promotes evidence-based practice by producing new evidence, making evidence accessible broadly and advocating for a sustainable evidence-informed decision making (The Cochrane Collaboration, 2018).

### **Strengths**

The highest evidence supporting the use of regional anesthesia to treat hip fracture pain comes from a systematic review by Guay, Parker, Griffiths, and Kopp (2017) which shows a high reduction of pain within 30 minutes of receiving the nerve block. Guay et al. (2017) also found that providing the nerve block reduced pneumonia rates in the intervention group, time to first mobilization was reduced, and the cost of analgesic regimens was also reduced. Morrison et al. (2016) found improved pain scores and improved mobility in hip fracture patients that received the nerve block. In another randomized controlled trial, Beaudoin, Haran, and Liebmann found a nerve block protocol in the ED significantly reduces pain intensity, decreased the need for other parenteral analgesics, and did not have any additional complications compared to the standard therapy of parenteral (opioid) analgesics (2013). From the evidence provided by the current literature, the conclusion can be made that peripheral nerve blocks reduce preoperative pain in hip fracture patients and effectively reduce the requirement for opioids. Opioids can be used to reduce pain scores of hip fracture patients at rest, but the analgesia provides inadequate relief with transfer and movement (Cowan, Lim, Ong, Kumar, & Sahota, 2017) which are unavoidable in the repair of the fracture. Nerve blocks used for preoperative analgesia improve dynamic pain scores which are more useful during positioning the patient for spinal neuraxial block, a commonly used anesthetic technique for surgical anesthesia in hip fracture repair. This superiority was demonstrated in comparison with the parenteral opioid medication, alfentanil (Amin, West, & Basmajian, 2017). Several studies have demonstrated the opioid-reducing effect of using regional anesthesia along with a lower incidence of opioid-related side effects (Yang, Li, Chen, Shen, & Bu, 2017; Ritcey, Pageau, Woo, & Perry, 2016).

### **Weaknesses**

All articles found pertaining to this topic showed favorable outcomes for patients who received a nerve block. The evidence varied some between how much of a benefit the patients received and how much of a reduction there was in adverse side effects (from opioids, or postoperative cognitive dysfunction.). One of the motivating factors for moving towards more regional anesthesia is to reduce the complications from conventional therapies such as opioids. Delirium is a grave concern in geriatric patients. Our current understanding of delirium is that pain, the inflammatory response, and opioids can result in or worsen delirium (Liu, Yu, & Zhu, 2018). This would naturally lead the advanced practice registered nurse (APRN) to think that strategies that reduce pain and uses fewer opioids would reduce delirium. Some RCTs have suggested that peripheral nerve blocks (PNBs) *may* reduce this comorbidity, but the systematic

review by Guay et al. did not find that PNBs reduced delirium rates (2017). Most of the current literature agrees on the benefits of peripheral nerve block for preoperative pain. However, the current evidence is sparse when examining the impact these blocks have on postoperative outcomes including long-term outcomes (Ritcey et al., 2016; Guay et al., 2017).

The evidence for the use of FICB for hip fractures is clear and the data supporting their use in total hip arthroplasty is also reassuring. One more recent study may suggest a hip-related procedure where the block may not be as beneficial. In a study of patients receiving the block prior to hip arthroscopy, the FICB was associated with no change in postoperative pain or opioid requirement (Behrends, et al., 2018). One limitation of this study was that both the intervention group and control groups received intraarticular injections of local anesthetics during the study. These results also may have limited implications in a hip fracture where far more tissues are damaged and disrupted when compared to elective hip arthroscopy (Urban, 2015).

### **Knowledge Gaps**

Reavley et al. (2014) explored the difference between using femoral nerve blocks (FNBs) compared against fascia iliaca compartment blocks (FICBs) in the perioperative setting and found equivocal outcomes with minor advantages to each. Minor differences remain common in the question of how to best manage the hip fracture patient's pain and the answer is not clear. The question of whether to use a single-shot FICB or a continuous catheter technique was examined, and the results were mixed. While pain scores were improved in the postoperative period for those that received a pain catheter, technical proficiency in placing the catheter and other additional costs challenge whether they should be used routinely (Guay et al., 2016).

The exact way this evidence should be implemented remains a question as facilities' available resources, existing processes, and staffing model will vary, making the implementation a challenge. Which specialty of provider should provide this service remains unclear, but CRNAs would be the likely option as they are already recognized as experts in pain management. Implementation experts, such as the doctoral-prepared nurse will have the challenge of working across the silos of each specialty (emergency medicine, anesthesia, orthopedics) to determine how to best serve the hip fracture patient. All three of these specialties have contributed greatly to the existing evidence and must continue to provide their insights into managing these patients.

### **Applicability**

#### **Facilitators and Barriers for Implementation**

If this project were implemented, an educational in-service for providers outside of the anesthesia department would assist in implementation. Conversations with experts in regional anesthesia, along with studies comparing the FICB to the 3-in-1 femoral nerve block, have described the FICB as a more technically simple nerve block to perform. This evidence aids in the feasibility of implementing this project (Reavley, et al., 2014) as providers are more likely to

attempt a PNB they feel would be easier to perform. A potential barrier to implementation may be unfamiliarity by some anesthesia providers on how to perform this block. Stakeholder data collected from anesthesia providers demonstrated a high familiarity with this block. However, stakeholders were less familiar with this block being used specifically for preoperative pain management. A recommendation by this CPG's author would be to have an in-service for the anesthesia providers about the existing evidence for this block (FICB) in this population (elderly with a hip fracture) for this intended purpose (improving preoperative pain management.) This in-service may be provided by a staff anesthesia provider or through a third party educational company that specializes in regional anesthesia (such as Twin Oaks Anesthesia Services.)

### **Benefits**

The benefit of this CPG, outside of the patient benefits already noted, is that no additional resources will be required to implement this recommendation. Existing ultrasound equipment, medications, and techniques (i.e. in-plane needle visualization) will remain the same. At this time, there is only lower-level evidence to support the parasagittal approach to the FICB over the transverse approach (Hebbard, Ivanusic, & Sha, Ultrasound-guided supra-inguinal fascia iliaca block: a cadaveric evaluation of a novel approach, 2011), so providers should not be discouraged from performing the block if they are only familiar with the transverse approach.

### **Editorial Independence**

No funding or reimbursement was received during the making of this clinical practice guideline. All evidence was gathered by the author and is void of any conflicts of interest.

APPENDIX E:  
THE UNIVERSITY OF ARIZONA INSTITUTIONAL REVIEW BOARD (IRB) APPROVAL  
LETTER



Human Subjects  
Protection Program

1618 E. Helen St.  
P.O.Box 245137  
Tucson, AZ 85724-5137  
Tel: (520) 626-6721  
<http://rgw.arizona.edu/compliance/home>

**Date:** March 08, 2019  
**Principal Investigator:** Joshua Zack  
**Protocol Number:** 1902391049  
**Protocol Title:** Improving Presurgical Pain Management of the Hip Fracture Patient via Adoption of an Evidenced-Based Recommendation for Ultrasound-guided Fascia Iliaca Block

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**Determination:** Approved  
**Expiration Date:** March 07, 2024

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**Documents Reviewed Concurrently:**

**Data Collection Tools:** *AGREE II INSTRUMENT.DOCX*  
**HSPP Forms/Correspondence:** *Advisor Confirmation Email.pdf*  
**HSPP Forms/Correspondence:** *Confirmation for Scientific Review and Department Review.pdf*  
**HSPP Forms/Correspondence:** *IRB edit - Zack AHR form.pdf*  
**HSPP Forms/Correspondence:** *List of Research Personnel - J.Zack.pdf*  
**HSPP Forms/Correspondence:** *Zack Appendix for alterations. Waiver of consent.pdf*  
**Informed Consent/PHI Forms:** *IRB edit - Invitation email\_Disclosure form.docx*  
**Informed Consent/PHI Forms:** *IRB edit - Invitation email\_Disclosure form.pdf*  
**Other Approvals and Authorizations:** *COI Certification Complete for 1902391049.msg*  
**Participant Material:** *Hip fracture CPG revision (draft 2).docx*  
**Recruitment Material:** *IRB edit - Invitation email\_Disclosure form.docx*

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**Regulatory Determinations/Comments:**

- The project is not federally funded or supported and has been deemed to be no more than minimal risk.
- The project listed is required to update the HSPP on the status of the research in 5 years. A reminder notice will be sent 60 days prior to the expiration noted to submit a 'Project Update' form.

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This project has been reviewed and approved by an IRB Chair or designee.

- The University of Arizona maintains a Federalwide Assurance with the Office for Human Research Protections (FWA #00004218).
- All research procedures should be conducted according to the approved protocol and the policies and guidance of the IRB.
- The Principal Investigator should notify the IRB immediately of any proposed changes that affect the protocol and report any unanticipated problems involving risks to participants or others. Please refer to Guidance Investigators [Responsibility after IRB Approval](#), [Reporting Local Information](#) and [Minimal Risk or Exempt Research](#).
- All documents referenced in this submission have been reviewed and approved. Documents are filed with the HSPP Office.

APPENDIX F:

2014 AAOS PREOPERATIVE REGIONAL ANESTHESIA RECOMMENDATION

To view the full original document from the AAOS please use the following link  
<https://www.aaos.org/research/guidelines/hipfxguideline.pdf>

APPENDIX G:

PERMISSION TO USE THE IOWA MODEL REVISED:

EVIDENCE-BASED PRACTICE TO PROMOTE EXCELLENCE IN HEALTH CARE

University of Arizona Mail - Permission to Use The Iowa Model Revised... <https://mail.google.com/mail/u/0/?ui=2&ik=87e443a11a&jsver=KYXXB...>



Joshua Zack <jzack@email.arizona.edu>

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## Permission to Use The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care

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Kimberly Jordan - University of Iowa Hospitals and Clinics <noreply@qualtrics-survey.com>

Mon, Jun 25, 2018 at 11:30 AM

Reply-To: Kimberly Jordan - University of Iowa Hospitals and Clinics <kimberly-jordan@uiowa.edu>  
To: jzack@email.arizona.edu

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**Citation:** 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

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