



PERCEPTIONS OF THE ANESTHESIA PROVIDER REGARDING  
OPIOID SPARING TECHNIQUES AND THE OPIOID CRISIS

A Major Paper Presented

by

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Perceptions of the Anesthesia Provider Regarding Opioid Sparing Techniques  
and the Opioid Crisis

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## Abstract

Much of the opioid crisis in the United States is fueled by illicit opioid consumption that has grown from prescription opioids, typically following elective surgical procedures (Brummett et al., 2017). Alternatives to opioid use during and after surgical procedures can lead to a decrease in persistent opioid use and strong evidence in support of using alternatives to opioid prescription in pain management, yet this approach is not readily adopted by anesthesia providers (Soffin et al., 2018; Velasco et al., 2019). The purpose of this project was to assess the knowledge and attitudes of anesthesia providers as it relates to opioid sparing techniques and their effectiveness, as well as the effect of an education intervention on the willingness of anesthesia providers to change practice. The Logic Model was chosen as the theoretical framework for this project due to the fact that it was easily explained, had clearly defined key concepts, and provided both a schematic and textual way of gathering, sharing and evaluating knowledge that is consistent with the nursing process. The design was a one group pre and post-test quality improvement project, involving a 3-step process; a baseline pretest, an educational intervention, and a post-test evaluation. The intervention was a researcher-developed video describing the opioid crisis, addiction as a surgical complication, and the role of the anesthesia provider in relation to this clinical phenomenon. Twenty of a possible 60 anesthesia providers completed the entire program (N=20, 33%), with the mean responses each of the five Likert-scale questions increasing by an average of .41 points after the educational intervention. Overall, this project proved successful by improving the participants' awareness to the opioid crisis, its relationship to surgical patients, and the potential for the anesthesia provider to play a role in mitigating this epidemic.



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## Perceptions of The Anesthesia Provider Regarding Opioid

### Sparing Techniques and the Opioid Crisis

#### **Background/Statement of the Problem**

According to the Centers for Disease Control and Prevention (CDC), opioid overdoses are responsible for an average of 130 deaths per day in the US, with more than 11.5 million Americans reporting prescription opioid misuse in 2017 (CDC, 2020). Much of this phenomenon is fed by illicit opioid consumption that has grown from prescription opioids, typically following elective surgical procedures (Brummett et al., 2017). Studies have shown that there are alternatives to opioid use during and after surgical procedures including regional anesthesia, total intravenous anesthesia, non-opioid analgesics, and adjunct analgesic infusions such as magnesium and lidocaine, and that these alternatives lead to a decrease in persistent opioid use (Soffin et al., 2018). Despite strong evidence in support of using alternatives to opioid prescription in pain management, this approach is not readily adopted by anesthesia providers (Velasco et al., 2019). Hence, the purpose of this project was to assess the knowledge and attitudes of anesthesia providers as it relates to opioid sparing techniques and their effectiveness, as well as the effect of an education intervention on the willingness of anesthesia providers to change practice.

Next, a review of the literature will be discussed.

## **Literature Review**

The literature search was completed utilizing PubMed. Literature was searched from years 2013-2020 and was limited to only English Language articles. Keywords used included anesthesia, opioid sparing, opioid epidemic, long-term opiate and surgery, perceptions, views, and attitudes.

### **The Opioid Crisis**

The history of opioids began in the 1800s with the formulation of morphine from opium. Since then many different preparations, in varying potencies have been formulated. Prior to the 1980s the use and prescribing of opioids was scarce. It was not until the 1980s, that the use and perceptions regarding opioids began to change. Opioids quickly became the gold standard for the treatment of pain as the demand to improve the treatment of patients experiencing pain grew. This “gold standard” of care was further supported with the publication of two articles, supporting the use and safety of opioid use. These authors also concluded that addiction was rare in patients receiving opioids (Rosenblum et al., 2009). By the 1990s more and more publications demanded better assessment and treatment of pain. Government and regulatory agencies such as Joint Commission and The Department of Veteran Affairs demanded patient pain assessment with every encounter. This ultimately led to the origin of pain as the “fifth vital sign”. The Centers for Medicare and Medicaid Services (CMS) required patient satisfaction with pain management in Hospital Consumer Assessments of Health Care Providers and Systems (HCAHPS) scores, which are directly linked to hospital reimbursement rates. Professional organizations and societies began to develop guidelines to encourage provider prescribing of opiates. Pharmaceutical companies increased advertising to both

consumers and providers, incentivized programs for sales representatives and gave special attention to high-frequency prescribers. Changes in state restrictions lead to overprescribing and “pill mills” in many areas (Rosenblum et al., 2009).

Opioid use and overdose in the US have sharply increased since 2007. Opioid sales have done the same, particularly in the setting of noncancer pain (Hah et al., 2017; Sun et al., 2016). Opioid use disorder is defined by the repeated occurrence of two or more problems associated with opioid use, such as opioid withdrawal with stopping opioid use, giving up essential life events for opioid use, and excessive time using opioids (Dydyk et al., 2020). In this country alone, the number of individuals that had an opioid use disorder, in 2017 was estimated to be two million (Soffin et al., 2018). With millions of Americans undergoing surgery each year (Brummet et al. 2017), it is easy to see why opioid prescriptions would be high. Opioid prescribing has quadrupled since 1999, while rate of overdoses has roughly tripled since then, and continues to rise (Hah et al., 2017)

Not only has the opioid epidemic created a devastating human cost, its economic toll is enormous as well. In the US, chronic opioid use continues to impose a substantial burden in terms of morbidity and economic costs (Sun et al., 2016). It is estimated that the opioid crisis has cost Americans over \$78.5 billion each year, in the form of increased healthcare, substance abuse treatment, criminal justice costs and lost productivity (Hah et al., 2017; Soffin et al., 2018).

### **Opioid Addiction as a Surgical Complication**

Millions of people undergo ambulatory surgical procedures each year, with many patients receiving their first exposure to opioids following those procedures (Brummett et al., 2017). Both Sun (2016) and Hah (2017) point out the emerging data that suggests

surgery as a risk factor for chronic opioid use. Research finds that persistent and chronic opioid use is a rising surgical complication, even for opioid naïve patients (Sun et al. 2016). According to the retrospective analysis of administrative health claims published by Sun et al. (2016), even opioid naïve patients are at an increased risk for chronic opioid use following surgery. Another retrospective analysis, conducted by Brummet et al. (2017) details the differences between patients of surgery and the development of persistent opioid use after that surgery. While the control group of nonsurgical patients developed new persistent opioid use at a rate of only 0.4 percent, the surgical patients did so at a rate of approximately 6.2 percent. This study, however, is limited by the fact that it does not measure opioid consumption. It also shares a flaw with Sun et al. (2016) in that both studies only collected data from privately insured individuals, decreasing the generalizability of each study (Brummet et al., 2017). Nevertheless, US healthcare providers are now faced with the challenge of simultaneously optimizing post-operative pain management and limiting opioid use after surgery in attempts to decrease the amount of new persistent opioid use (Hah et al., 2017). It seems logical that alternatives to opioid use relative to surgery and recovery should be promoted.

### **ERAS Non-Opioid Anesthesia and Analgesia**

Early recovery after surgery (ERAS) programs are one approach to improving the care of perioperative patients through implementation of standardized pathways/protocols. The implementation of standardized perioperative pathways has been identified as a means of “crossing the quality chasm” and improving surgical care value. ERAS are designed to reduce the surgical stress response and accelerate postoperative recovery (Page et al., 2016).

One major component of the ERAS program is the minimal use of opioid analgesia/anesthesia (Page et al., 2016). With a focus on new persistent opioid use, the ERAS programs pursue alternatives to perioperative opioid use. Among the treatments studied were regional anesthesia, total intravenous anesthesia, non-opioid analgesics, and adjunct analgesic infusions such as magnesium and lidocaine.

A randomized double-blind study was conducted in 2013 with regards to patients undergoing laparoscopic sleeve gastrectomies. These patients received either opioid (fentanyl) or non-opioid (ketamine, tramadol and diclofenac) based anesthesia. The results showed that the two groups had no statistical difference in hemodynamics, but pain scores and nurse satisfaction ratings were higher in the non-opioid group (Mansour et al., 2013). The one drawback reported in this study is that the non-opioid group hallucinated due to the use of the Ketamine, while the opioid group did not experience the hallucinations (Mansour et al., 2013).

Other studies have examined multimodal analgesia with intraoperative use of non-opioid medications, such as ketamine, acetaminophen and/or regional anesthesia (Hah et al., 2017). A study done by Sun et al. (2016) gathered health claim information from the years 2001 to 2013. The results indicate that surgical patients, particularly those at higher risk for chronic opioid use, may benefit from techniques to reduce the risk of chronic opioid use such as multimodal analgesia and regional anesthesia (Sun et al. 2016). According to Hah et al. (2017), ketamine and acetaminophen use are associated with decreased opioid consumption in the immediate perioperative period and up to six weeks post procedure, although to date no studies have examined its effect on opioid consumption at longer postoperative time intervals (Hah et al., 2017). With regards to

long-term outcomes, two studies found that intraoperative lidocaine use was associated with decreased pain and improved quality of life scores at three- and six-months post procedure (Hah et al., 2017).

A study conducted by Page et al. (2016) followed 117 patients undergoing open liver resection. Of these patients, 75 underwent surgery with ERAS implementation, and 42 did not follow an ERAS pathway. It is noted that compliance with all aspects of the ERAS pathway was at 70 percent, while compliance with specific components of it, such as preoperative carbohydrate loading or restricting preoperative intravenous fluids, was variable. No difference in pain scores was noted between the non-ERAS and ERAS groups at 24, 48 or 72 hours. Patients in the ERAS group, however were less likely to receive opioids postoperatively, specifically, on postoperative days one, two and three (Page et al., 2016).

### **Views and Perceptions of the ERAS Program Amongst Healthcare Professionals**

Along with following the aforementioned liver surgery patients, Page et al. (2016) also surveyed 166 health care professionals participating in the ERAS implementation, of which 64 were nurses and 27 anesthesia providers. Ninety-one percent of respondents endorsed the implementation of the ERAS pathway, noting considerable improvements in patient activity, and overall patient satisfaction with care. More than seventy-five percent reported regional anesthesia as the single most important component of the program in relation to improved patient outcomes. That same study reported that a significant barrier to implementation of the ERAS was provider aversion to a standardized protocol, with most respondents identifying surgeons as most likely to resist implementation of ERAS program (Page et al., 2016).



Herbert (2017) interviewed 26 health care professionals from varying disciplines, regarding their perceptions, opinions and experiences in implementing an ERAS protocol. The intent was to gain insight related to both facilitation and barriers of ERAS implementation. This study found, as did previous studies, that protocols guided by best practice evidence facilitated both implementation and compliance. Those surveyed also reported the importance of having flexibility with protocols in order to individualize patient care. It found that education of staff and patients, team approach in care, and communication are key facilitators to practice. Barriers identified included overcoming traditional perceptions of care, staffing, time, and dedicated budgeting for related meetings. They also found that the use of a clinical community model versus the traditional hierarchical method of implementation reduced some of the identified barriers (Herbert et al., 2017). These findings, however, were limited by conducting each of the 26 interviews of respondents working in the same hospital and may not be generalizable to other populations.

The qualitative data collected by both Page et al. (2016) and Herbert et al. (2017) imply that educating each of the various healthcare providers is key to expediting the successful recovery of patients within the ERAS program.

### **Role of the Anesthesia Provider in Reducing New Persistent Opioid Use**

As research has shown, nonopioid-based general anesthesia is as effective as opioid-based general anesthesia for certain surgeries such as bariatrics, liver resections and neuro-skeletal procedures (Mansour et al., 2013). With this type of knowledge in the hands of the anesthesia provider, perioperative procedures might trend toward nonopioid use. A systematic review conducted by Soffin et al. (2018) examined the role of the

anesthesia provider in the current opioid epidemic, and they presented strategies for providers to reduce both supply and demand of opiates in the perioperative period. Preoperative management strategies included patient education related to anticipated pain and analgesia plan, preadmission screening for risk factors independently associated with new persistent opiate dependence such as substance abuse disorders, depression, alcohol, benzodiazepine, and tobacco use. Also noted was the administration of non-opioid analgesics on the operative day and the associated decrease in both postoperative pain and opioid consumption.

Intraoperative management strategies included use of regional anesthesia, total intravenous anesthesia, and adjunct analgesic infusions such as magnesium and lidocaine, all of which have been shown in randomized control trials to reduce postoperative opioid consumption (Soffin et al., 2018). The investigators also describe the initiation of an anesthesiologist-led education program for both patients and prescribers at John Hopkins University designed to reduce the amounts of opioids prescribed with elective surgeries. This initiative resulted from the lack of specific guidance for postoperative weaning of analgesics, and physicians having little to no education related to the opioid epidemic or opioid prescribing in medical school. Early reports of the program outcomes demonstrate a significant decrease in the amount of postoperative opioid prescribing. Soffin (2018) also addresses anesthesiologists as being at the crux of opioid use crisis. Anesthesia providers that are properly educated regarding the opioid sparing component of the ERAS program are in a unique position to manage pain effectively while simultaneously decreasing opioid consumption (Soffin et al., 2018).

## **Evidence Supporting Study Design**

Machan et al. (2013) utilized a one group pretest post-test design to determine the perceptions of anesthesia providers regarding the use of disposable laryngoscope blades and whether an educational intervention based on literature review and clinical evidence regarding laryngoscope blades could change clinical practice. The study was created as a result of anesthesia providers having historically been reluctant to fully embrace its use in the past. It consisted of a convenience sample of 12 anesthesia providers ranging in experience and took place over a period of three consecutive months. The anonymous 11-item pre and post-tests included fixed alternative and open-ended questions that were developed by the principal investigator.

The educational intervention involved participants reading an evidence-based article composed by the principal investigator. The intention of the intervention was to increase provider use of disposable blades. Inventory of the disposable blades was also collected preintervention and at one and three months to assess for changes in the frequency of their use by providers. The data were analyzed using descriptive statistics, SPSS statistical software, and the Wilcoxon signed rank test to assess for differences in group perception and use of blades from pre to post test.

The study found a 23 % increase in use of blades at completion of project. Limitations of this project include the small sample size (N = 12), the duration of the project, and the possibility that the participants did not read the intervention article. There is also the possibility of participants altering their behavior in response to their awareness of being studied. The strength of the study was demonstrated in the evident change in

practice post dissemination of the literature as evidenced by the increased provider use of the disposable blades.

Another study supporting this design, was conducted by Jahan and Henary (2013) based on the social cognitive theory framework, utilizing the pre-experimental, one-group pre-test–post-test, design. The authors examined the attitudes of primary health care physician managers toward research and the effects of an educational program on those attitudes. The study involved administration of a baseline pre-test, an educational intervention, and a post-test evaluation. The study sample consisted of 23 eligible participants, invited by an official letter. While all 23 participants filled out the pre-test questionnaire, only 22 participants completed the posttest questionnaire. The researcher's developed a nine-item survey, utilized multiple choice questions, and a seven-point Likert scale to collect participants' demographics, interest in research, involvement in research, attitudes toward research, barriers in conducting research, training and support needs, and future intentions regarding research.

The educational intervention consisted of a one-day training involving group activities. Descriptive statistics such as mean and standard deviation, frequency and proportions were used to analyze data. Likert type items were compared using Pearson's correlation coefficient paired t-test and ANOVA F-test. The results from this study indicated that the participants had a baseline positive attitude toward research that was further enhanced by the educational intervention. The limitations of this study include small sample size (n=23), participants from only one province, and differences in participants qualifications and work environments which may limit generalizability. The self-administered questionnaire may also limit the validity of the findings.

More recently, an article was published touting the benefits of microlearning, a term that is defined as “an approach that focuses on a single concept, utilizing multisensory and multimodality, in a focused short amount of time” (Dolasinski & Reynolds, 2020, p.551). The study recognizes that diminishing attention spans, the influences of smartphones and social media and the ease with which quick burst information is gathered by conducting simple Internet searches have led to changes in the ways that employees will interact with organizational training. The authors propose that workplaces need to embrace a new approach to training and knowledge creation, and cite microlearning as having an 18% increase in students’ learning abilities when compared to traditional methods. Microlearning involves narrowing the focus of any given instruction module to a single idea and transferring this targeted information using multisensory/multimodality delivery in order to enhance comprehension and retention. Utilization of technology and cyberspace are key components of effective microlearning. There are several benefits of this approach to learning noted in the article. Dolasinski and Reynolds cite its low cost, ability to deliver content quickly, and effectiveness with regards to in-service industry applications, noting that delivery can occur at anytime and anywhere, doing away with the constraints of time and physical space.

The educational intervention to be used in this study is a PowerPoint / video presentation that will run no longer than 6 minutes in length. This short form of multisensory/multimodal informational delivery is shown to be effective by Brame (2016) in a study conducted to create guidelines for maximizing student learning from video content. The author developed three elements of video design and implementation to help maximize a video’s utility in educating the student – cognitive load, student

engagement and active learning. Brame summarizes the findings by stating that videos should be brief and targeted, and use audio and visual elements in a complimentary manner in order to convey information effectively.

In conjunction with the COVID-19 pandemic, an article was published in 2020 that showed the impact of a brief educational intervention on knowledge, safety and resiliency of the public during the crisis (Kaim et al., 2020). This study demonstrates that educational interventions, such as the brief video, provide an easy and effective means for educating and empowering. The authors report findings that demonstrate a significant overall increase of knowledge, and show that brief educational interventions are an effective method for improving beliefs and behaviors. The results of this study demonstrate that an inexpensive and convenient short intervention can be an effective means of educating and empowering students.

An article published in the American Association of Nurse Anesthetists Journal details a study on Certified Registered Nurse Anesthetist (CRNA) perspectives and practices regarding intraoperative alternatives to opioids (Velasco et al., 2019). The authors used a qualitative design to conduct semi-structured interviews of CRNAs, questioning them about the use of opioid alternatives. Results of these interviews drew attention to both barriers to, and facilitators of, intraoperative opioid use. The findings showed that over fifty percent of participants had limited experience with opioid alternatives, while nine out of ten participants would prefer to use these alternatives to avoid the adverse effect of opioid therapy. Velasco and colleagues conclude their article by stressing the importance of improving education, training and institutional policies in support of opioid alternative medications and strategies.

## **Conclusion**

The sources of information dissected for this literature review fall into one of several design categories. These included studies that were qualitative in nature, others that were systematic reviews, and others still that were retrospective analysis’.

Aforementioned limitations aside, the resources selected provided a tremendous amount of information regarding the opioid crisis, and how surgical patients are at risk for persistent opioid use. It also detailed ERAS program protocols and their effectiveness in reducing the use of opioids in surgical patients, as well as perceptions and opinions of healthcare providers that were involved. Ultimately, this review of literature has demonstrated how anesthesia professionals can be a catalyst to combat the new and persistent opioid use epidemic that is sweeping across the United States.

Therefore, the research conducted directly applies to the purpose of this quality improvement project, which is to assess the knowledge and attitudes of anesthesia providers as it relates to opioid sparing techniques and their effectiveness, as well as the effect of an education intervention on the willingness of anesthesia providers to change practice.

Next, the theoretical framework that guided this quality improvement project will be discussed.

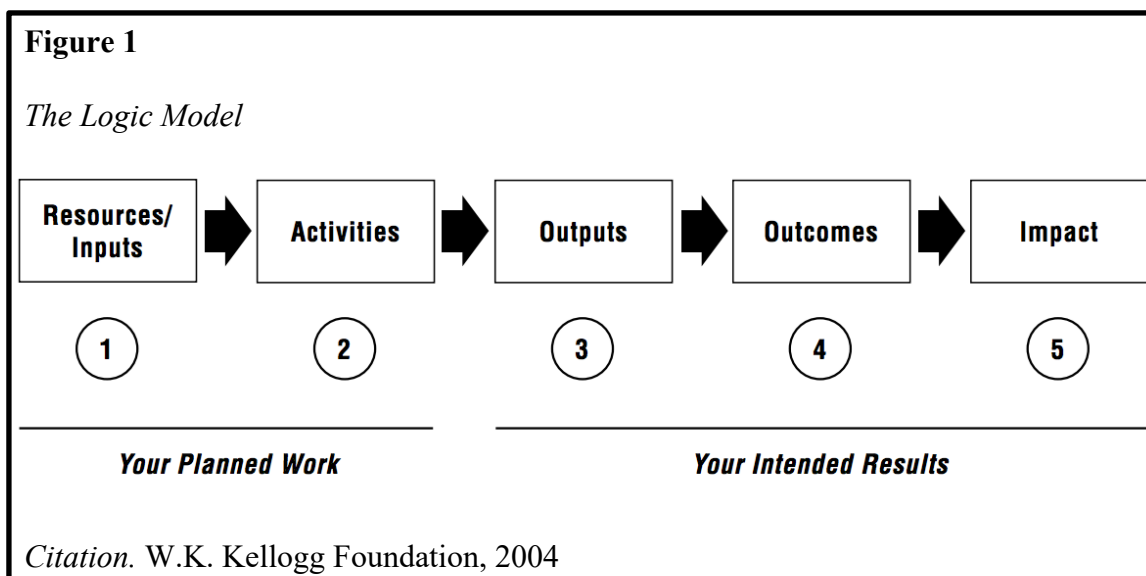
## Theoretical Framework

The selected theoretical framework for this quality improvement project was the Logic Model (W.K. Kellogg Foundation, 2004, see Figure 1). This framework was selected related to its capacity to facilitate the exploration of the needs to be addressed. It also provided an underpinning for program development and assessment of its short-term and long-term effectiveness. The model is a conceptual framework that was easily explained, has clearly defined key concepts, and provided both a schematic and textual way of gathering, sharing and evaluating knowledge that is consistent with the nursing process.

The Kellogg Foundation describes the logic model as a systematic and visual way to present and share your understanding of the relationships among the resources you have to operate your program, the activities you plan, and the changes or results you hope to achieve (W.K. Kellogg Foundation, 2004). The logic model assists in the planning, implementation, and evaluation of program development through a systematic and visual approach utilizing concept mapping. The model's focus is on the "if" and "then" relationship of each phase and the components of which they consist. If a particular set of resources is available and used, then a particular set of outcomes will result. If certain outcomes are good, then long-term, positive impacts will result.

The model begins with identifying the "*planned work.*" The planned work phase consists of identifying two components. The first component, referred to as "inputs," includes available resources such as personnel, time, funding, and materials. Potential barriers to those resources, such as environment, policies, and culture climate, are also included. The second component of the planned work phase is referred to as "activities."





This is when available resources are utilized to determine the aim and sequence of interventions, and how to appropriately evaluate them.

A descriptive, exploratory, study published in 2018 by Edmond and colleagues used the Logic Model to research the needs of parents who experience a miscarriage while in the emergency department. The inputs, or resources, of this study's *planned work* phase of the model consisted of the patients who have presented to the emergency department for miscarriage, emergency department nurses, and emergency department nurse managers. The activities that followed were interviews with 26 participants from the three aforementioned groups of respondents (Edmond et al., 2019).

In another study by Ball et al. (2017), researchers used the logic model to guide their investigation into enhancement of the methodological quality of primary healthcare interventions. Inputs of the planned work phase included: having sufficient funding, appropriately skilled researchers, and fully developed and tested interventions, along with

activities revolving around the identification of barriers, the creation of tailored intervention components and the collection of output data (Ball et al., 2017).

The second phase of the Logic model is the *intended results* phase. This phase includes three components, *outputs*, *outcomes*, and *impacts*. The first component, *outputs*, results from delivering the project interventions to the targeted population to create an outcome. Whereas the second component, *outcome* refers to the target populations' change in knowledge base, skill set, or practice. Such changes can be short-term or mid-term, dependent on the time frame they are achieved. The last component is *impact*, or long-term outcomes/changes on a larger scale such as within an organization or community (W.K. Kellogg Foundation, 2004).

Ball and colleagues (2017) reported the outputs in their study as collaborative communication with stakeholders to identify potential participants for the study, delivery of the intervention and collection and review of data. The outcomes were the existence of fewer barriers to providing nutritional care, the growth of confidence and competence within primary healthcare providers, and the increase in frequency of patients with dietary risk factors receiving nutritional care. And finally, the impacts of the study were the improvement in dietary behavior for patients with dietary risk factors and the reduced incidence and progression of lifestyle-related chronic disease (Ball et al., 2017). As for the research conducted by Emond et al. (2019), regarding miscarriages within emergency departments, the outputs were the findings that specific physical, cognitive and emotional health needs were not met. The outcomes were the ability to provide recommendations for improvement in emergency department miscarriage care and an increase in nursing awareness of miscarriage patient needs. The long-term impact was identified as

institutional policy and guideline changes in the overall care of miscarriage emergency department patients for future improvement of practice (Emond et al., 2019)

The Logic Model is the appropriate model for both studies reviewed here, as well as this proposed quality improvement project. As with any research framework, there are advantages and limitations. Limitations include the simplified format having potential to oversimplify key connections.

Next, the methodology for this quality improvement project will be discussed.

## **Method**

### **Purpose**

The purpose of this quality improvement project was to assess the knowledge and attitudes of anesthesia providers as it relates to opioid sparing techniques and their effectiveness, as well as the effect of an education intervention on the willingness of anesthesia providers to change practice.

### **Design**

The design for this project was a one group pre and post-test design (with both quantitative and qualitative data) quality improvement project, without a control group method. This design involved a three-step process including a baseline pretest, an educational intervention, and a post-test evaluation created and distributed using Microsoft Forms. The educational intervention was a video presentation that ran five minutes and four seconds in length. A pilot was done, for validation purposes, with the Chief CRNA of Narragansett Bay Anesthesia (NBA).

### **Sample/Site**

The project lead used a non-probability, convenience sampling method, with the objective to include all practicing anesthesia providers employed by the selected and approved anesthesia practice, NBA. This method was selected due to an anticipation of a small available sample size. An invitational email (see Appendix A) and text message, requesting voluntary participation and outlining the project's purpose and procedure, was sent to the chief CRNA of Narragansett Bay Anesthesia. She then forwarded these to all anesthesia providers within the practice who care for surgical patients, ranging from neonate to geriatric. Inclusion criteria included anesthesia providers with greater than six

months experience currently practicing, as some level of independent practice experience is needed in order to form an attitude or perception related to ones' practice. Having the chief CRNA do this kept participants' contact information confidential and unknown to this investigator. Exclusion criteria included anesthesia providers with less than six months experience, those not currently practicing, and student anesthesia providers.

### **Procedures**

This project involved human subjects and was approved by the Rhode Island College Institutional Review Board before implementing. Administrative approval from the Narragansett Bay Anesthesia group was also obtained. There were no vulnerable populations or identifying demographic data involved in this study. Consent was implied upon providers leaving the initial email or text message, and continuing on to the provided survey link, and participants could stop at any time throughout this quality improvement project. The electronic survey was constructed to allow participants to complete the pre-test prior to viewing the educational content. An electronic reminder to complete the survey, along with the necessary links, was sent to eligible participants three weeks later to encourage survey completion. Initial email/text message links, and reminders were sent by administration. In order to elicit participation, subjects were given the option to participate in a gift card raffle by following an additional link. There was one gift card, 100 dollars in value, awarded to a randomly selected participant. In order to facilitate/promote participation of all anesthesia providers meeting inclusion criteria, invitations via both text and email, identical in content, were sent (see Appendix A).

### **Educational Session**

An educational program was developed based on a thorough literature review and designed using The Logic Model through the W.K. Kellogg Foundation. The program objectives were based on the researcher developed test questions. The intervention took place spring 2021. The intervention included a researcher developed power point presentation / video describing the opioid crisis, addiction as a surgical complication, and the role of the anesthesia provider in relation to this clinical phenomenon.

### **Measurement**

A researcher developed pre- and post-test was used to assess the effect of the educational intervention with regard to the nurse anesthetists' perceptions. With the exception of the first two questions about anesthesia experience and level of education, the identical pre- and post-tests consisted of five multiple-choice questions (see Appendix B). These five questions surveyed subject perceptions of the opioid epidemic, opioid addiction as a surgical complication, and the role of the anesthesia provider in reducing chronic opioid use utilizing a five-point Likert-scale. These responses were measured based on the following options: strongly agree, agree, undecided, disagree and strongly disagree. The final question of the survey was open-ended and asked respondents to describe any professional or personal experiences that have shaped their perception of opioid alternative anesthesia/analgesia techniques.

### **Data Analysis**

Pre-test and post-test responses were first compared, and descriptive statistics were used to analyze the data, which was processed through Microsoft Excel. Means, percentiles and standard deviations were used to measure the effectiveness of the educational intervention. Descriptive statistical analysis such as means, percentiles and

standard deviations are appropriate for this study, as it does not intend to generalize the results to a larger population at this time. The results will be disseminated among Narragansett Bay Anesthesia leadership, fellow students and professors by way of PowerPoint presentation, and published on Digital Commons.

Next, the results of this project will be discussed.

## Results

There was a total of 23 responses to the survey, although three of these completed no further than the first couple of questions. Therefore, 20 anesthesia providers, of the possible 60 total (33%), completed the first survey before watching an educational video, then completed the second survey immediately following, (N=20). Among these 20 respondents were 15 Master's Degrees, four Doctorate Degrees and one Bachelor's Degree. Forty percent of these anesthesia providers who responded have been practicing for ten years or more, while only one of the 20 respondents had one year or less of experience.

Each of the survey questions responses were based on a Likert-scale, with the exception of the two that asked about length of practice and degree achieved, as well as the open-ended question about the respondents' own personal or professional experiences and how they may have shaped their perceptions on this topic. The survey questions and the scale of responses can be found in Appendix B. For the purpose of reporting data, the Likert-scale was converted to numerical values. The numbers 1-5 were used to report data; 1 – strongly agree, 2 – agree, 3 – Neutral, 4 – Disagree, and 5 – Strongly Disagree. The data from the anesthesia providers responses to the pre- and post-survey questions are presented below (see tables 1 and 2).



Table 1

*Mean Response Scores to Likert Questions (n=20)*

	<b>Mean Pre-Survey Response</b>	<b>Mean Post-Survey Response</b>
<b>Question 3</b>	1.85	1.70
<b>Question 4</b>	2.25	1.85
<b>Question 5</b>	2.95	2.15
<b>Question 6</b>	2.35	1.90
<b>Question 7</b>	2.00	1.75

Table 2

*Standard Deviation Scores and p-values for Likert Questions (n=20)*

	<b>Standard Deviation Pre-Survey Response</b>	<b>Standard Deviation Post-Survey Response</b>	<b>p-value</b>
<b>Question 3</b>	0.6708	0.4702	0.58232
<b>Question 4</b>	0.7865	0.4894	0.16452
<b>Question 5</b>	0.8256	0.6708	0.00578
<b>Question 6</b>	0.8127	0.5525	0.07672
<b>Question 7</b>	0.7255	0.5501	0.37346

In review of the questions numbered 3 and 9, 85% of the respondents initially agreed or strongly agreed that the opioid crisis is a major perioperative concern in the United States. The remaining 15% respondents identified as neutral on this matter, yet after the educational intervention it can be reported that 100% of the respondents are in agreement with the aforementioned statement.

Questions 4 and 10 involved opioid dependence as being a surgical complication. Prior to viewing the educational video, 25% (5/20) of the respondents did not agree with this statement to any degree. After the intervention, this result was down to 5% (1/20), with that one person not indicating disagreement, only neutrality with regards to opioid dependence as a surgical complication.

A statement about anesthesia providers playing a central role in mitigating the opioid crisis make up questions 5 and 11, between which can be seen the greatest effect when comparing pre- and post-intervention Likert responses. While only 35% (7/20) of the survey respondents agreed with this statement prior to the educational intervention, that number increased to 80% (16/20) after said intervention.

The effectiveness of opioid sparing anesthesia and analgesia when compared to traditional methods was surveyed with questions numbered 6 and 12. The results show an increase in the respondents who agreed that opioid sparing techniques were equally as effective as traditional anesthesia methods, from 55 to 90% (11/20 to 18/20), upon viewing the educational intervention video.

Questions numbered 7 and 13 of the survey centered on the idea that assessment and identification of patients at increased risk for chronic opioid use is essential to the anesthesia plan. All but one of the respondents acknowledged the importance of this risk assessment in the pre-survey. Thus, for this question the, educational intervention served to convert that one respondent that disagreed and, ultimately, added to the total of respondents that strongly agreed with the statement.

An optional question that appeared on the survey asked the participants to describe any professional or personal experiences that may have shaped their perceptions

of opioid alternative anesthesia/analgesia techniques. The participants of this survey varied in both level of education and years of experience working in the field of anesthesia, so it was to be expected that their responses would be just as assorted. The qualitative data showed, much like Velasco et al. (2019) discovered, that the optional responses were mostly driven by two fundamental themes. These were comments that supported and comments that were against, the use of opioid alternative anesthesia/analgesia techniques.

Some providers were totally in support of opioid sparing methods, which was shown by their comments that they “use opioid sparing (techniques) as much as possible , but more for reducing PONV and post op respiratory depression than concerns related to opioid dependence long term” and that “if you’re not using opioid sparing techniques at this point, you’re doing a disservice to patients.” Another respondent commented that “the increased use of regional anesthesia has greatly improved patient's comfort post-op and significantly reduced the amount of opioids needed intra-operatively, as well as improving patient's overall satisfaction.” One very important point was brought up when a respondent replied that “younger anesthesia providers have been more open to new techniques,” like these opioid sparing methods. Finally, another of the survey participants summed this up by stating that it is “easy to forget the long ranging effects of what we do in our brief period of time with our patient,” and that it is “important to remember that our focus on patient safety goes well beyond our short time with the patient.”

Some negative comments were also in the replies to this optional, open response question on the use of opioid alternatives in the profession. Respondents brought up the

access to the non-opioid medications, noting that “many alternate medications are not readily available” in many settings. Another commented that when using the opioid alternative techniques, that “prep takes longer, making it more difficult with room times.” Perhaps both of these barriers that were just recounted have at their cruxes is what another respondent simply deemed as “cost related issues.” One respondent, who has been practicing for greater than 10 years, offered their thoughts that “the pendulum has shifted way too far away from the use of opioids. I think every case should be taken one by one and decisions can be made based on certain criteria”

Aside from these, were several other responses that landed a bit outside of the two previously explored themes. Comments included that both opioid versus non-opioid anesthesia “have their advantages and disadvantages,” with some calling for balanced and individualized anesthesia plans, stating things like “a multi-modal approach is best,” and that “it is essential to customize anesthesia to the individual patient and procedure.” One participant stated “I have been giving anesthesia for over 40 years and during my first 10 to 20 years we used balanced anesthesia, which consisted of high dose narcotics, nitrous oxide and paralytics. We did not have an opioid crisis like we do today despite using less opioids during anesthesia.” Another suggested that our nation’s opioid crisis began “when pain became the fifth vital sign, and it was expected that patients would reply 0 to 2 on the 1 to 10 pain scale.” This respondent continued on to say that “sending (patients) home with unlimited narcotic pills was never a good idea,” and that “patients should be taught to expect some discomfort from certain surgeries once they get home.” They concluded their comments with “giving some narcotic intraoperatively, and some while in the hospital, should begin to come to an end day two.”

Next, the summary and conclusions will be presented.

### **Summary and Conclusions**

Drug overdose is among the leading causes of injury-related death in the United States, with up to 70% of these overdose deaths involving a prescription or illicit opioid (CDC, 2020). New and persistent opioid use in this country is not only more common than previously reported but is also considered one of the most common complications to arise after an elective surgery (Brummett et al., 2017). There are effective alternatives to using opioids intraoperatively and there is also evidence showing that using these alternatives intraoperatively decreases the chances of the patient developing new and persistent opioid habits (Soffin et al., 2018). Although opioid sparing techniques have proven to be successful in the operating room, many anesthesia providers do not readily adopt this approach (Velasco et al., 2019), therein lying the motivation that fueled this quality improvement project.

The pre-test consisted of eight questions, two of which asked about level of academic degree and years of anesthesia experience and another which asked about the respondents' own experiences with, and perceptions about, opioid sparing anesthesia and analgesia. The remaining five questions were statements about the United States' opioid crisis and its connection to anesthesia, with Likert-scale responses ranging from Strongly Agree to Strongly Disagree. At the conclusion of these eight questions, participants viewed a short video, of less than six minutes in running time, that was designed to educate them on the effectiveness of opioid sparing techniques and the role that anesthesia providers play in the opioid crisis. They were then directed to the post-test portion of the survey, where questions numbered 9 through 14 repeated questions

numbered 3 through 8 of the pre-test portion. This pre-test / post-test design, with an educational intervention delivered in between the two, allowed the researcher to compare the participants' responses and, thereby determine the efficacy of the intervention. A total of 20 anesthesia providers completed both surveys and watched the educational intervention video. These 20 professionals varied in both anesthesia related professional experience and education, ranging from less than 1 year to greater than 10 years and Bachelor's to Doctorate degrees.

The first of the Likert-scale based questions of substance on the surveys initially found 85% of the respondents agreeing that the opioid crisis in the United States is a major perioperative concern. Upon viewing the educational intervention, the percentage of respondents that agreed with the aforementioned statement while completing the post-test increased to 100%.

The second question asked respondents' opinions about opioid dependence being a potential surgical complication, something that 25% of did not agree with. The percentage of those participants that did not agree after exposure to the educational intervention, which included results from studies that suggested surgery is a risk factor for new and persistent opioid use, was reduced to 5% (Hah et al., 2017; Sun et al., 2016).

The third Likert-scale question on the pre-test examined the statement that anesthesia providers play a central role in mitigating the opioid crisis, one that 65% of the respondents did not initially agree with. This majority of respondents were in clear disagreement with the findings of Soffin et al. (2018), whose systematic review concluded that anesthesia providers are at the crux of the opioid crisis. Information from

that review was included in the educational video, and post-test results for this statement reversed to record 80% of respondents in agreement after the intervention.

The fourth question of substance asked participants their thoughts on opioid sparing anesthesia and analgesia and whether or not it is equally as effective as more traditional methods of anesthesia and analgesia. While 55% of respondents initially were in agreement with this statement, the post-test results for this statement showed 90% in agreement. The educational intervention that respondents viewed between pre- and post-tests included results from various studies and reviews that showed the effectiveness of regional anesthesia, total intravenous anesthesia, non-opioid analgesics, and adjunct analgesic infusions (Hah et al., 2017; Mansour et al., 2013; Page et al., 2016; Sun et al., 2016).

The final Likert-scale question that participants were faced with was based on the statement that the assessment and identification of patients at increased risk for chronic opioid use is essential to the anesthesia plan, to which only 5% disagreed with on the pre-test portion of the survey. Upon completion of the post-test survey, none of the participants responded as being in disagreement with this notion.

The limitations associated with this quality improvement project were evident. The sample size was rather small with replies from only 20 respondents to process, when excluding the three responses that did not even complete the pre-test. Invitations were sent out to all members of Narragansett Bay Anesthesia (NBA) on two separate occasions. Perhaps the invitations should have been sent out more than just those two times. Low participation may also have been related to the fact that the invitations were sent to the private email addresses each member has on file with Narragansett Bay

Anesthesia, as the organization does not assign corporate email addresses to their providers. It also could be related to availability and willingness of all qualifying anesthesia providers to participate, or perhaps inadequate connectivity/Wi-Fi/data available to the provider. Failure to collect the age of respondents on the survey appears to have been an oversight. As the notion that younger providers may be more open to using opioid sparing techniques than older providers are, gathering ages of the participants would allow researchers to align responses with age groups, in order to investigate this idea further.

Overall, this quality improvement project proved successful regarding those anesthesia providers that participated. It improved awareness of the opioid crisis, its relationship to surgical patients and the potential for the anesthesia provider to play a role in mitigating this United States epidemic.

Next, recommendations and implications for anesthesia providers will be presented.



## **Recommendations and Implications for Anesthesia Providers**

The opioid crisis has had a profound effect on the people of United States and this nation's anesthesia providers have found themselves on the frontline of this epidemic. Those providers that are properly educated on opioid sparing anesthesia techniques are able to decrease opioid consumption, while effectively managing patient pain scores (Soffin et al., 2018). It is crucial, then, that much significance be placed upon educational interventions aimed at improving provider understanding of non-opioid anesthesia/analgesia techniques.

### **Education**

Anesthesia providers with knowledge of, and experience in using, opioid alternative techniques should establish and implement educational program based on the topic. The program should contain a thorough review of the history of the opioid crisis as a foundation of the issue. It should illuminate opioid addiction as a surgical complication, stressing the importance of the need for opioid alternative techniques of anesthesia/analgesia. The program should then detail successful, non-opioid methods of anesthesia/analgesia that providers will feel comfortable taking into practice with them.

The educational interventions should be done in short sessions, as proposed by recent studies, claiming that there have been changes in the ways that workplace learning is consumed. Reasons for these changes are the influences of smartphones, social media, and quick burst information gathering, along with a diminishing attention span that develops as a result of these things (Dolasinski & Reynolds, 2020). As this is a fairly new

concept of learning, more research must be conducted before best practices can truly be agreed upon. Current practice in learning design suggests modules can be as short as five minutes and as long as 18 minutes (Dolasinski & Reynolds, 2020).

### **Clinical Practice**

Once the educational interventions take hold, that is only the first step in this process. In order to ensure that opioid-sparing techniques can be employed, clinical settings will need to have the means to do so readily available to providers. There are many barriers to health care providers adopting these opioid-sparing guidelines, some of which include lack of agreement with the policies, low outcome expectations and the inertia of existing practice (Vetter et al., 2016). Cost issues come into play when implementing opioid-sparing anesthesia programs. Opioid free analgesic medications, such as dexmedetomidine and acetaminophen, carry a significant monetary expense when compared to opioid counterparts. Also, not every provider is trained, willing or able to perform regional anesthesia.

### **Research**

This project has revealed that future research should be conducted, on several different topics. One of those would be opioid-sparing anesthesia/analgesia techniques themselves. By giving anesthesia providers many options to choose from, aside from opioids, the chances of the patient developing new and persistent opioid use as a result of that surgery decreases. Another topic that warrants continued research would be the delivery methods of the educational interventions. Knowing how to best transfer this information on opioid-sparing best practices is essential to effectively combating new and persistent opioid use as a surgical complication. Traditionally, educational interventions

have been in person and with lengthy durations. Recent studies have shown that shorter, more targeted information sessions can enhance learning, but future research is essential to truly know the effectiveness of microlearning (Brame, 2016; Dolasinski & Reynolds, 2020)

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## Appendix A

### Recruitment Letter

Dear Anesthesia Providers,

My name is Corrie Asencio-Costa and I am a Student Registered Nurse Anesthetist (SRNA) in the Rhode Island College / Saint Joseph Hospital School of Nurse Anesthesia program. Each student in this master's program is required to complete a masters level project regarding a topic of their choice. I have chosen to look at perceptions of anesthesia providers as it relates to the effectiveness of opioid sparing techniques and the role of anesthesia providers in the opioid epidemic in the United States. In order to complete this study, I am asking for the participation of all qualifying providers in this group.

This project can be completed at your convenience by clicking the provided link, and following the subsequent prompts. The link consists of a brief educational video along with both a pre and post-interventional survey. The pre and post-tests should take no more than a 5-6 minutes to complete and consist of the same eight questions, seven of which use a five-point Likert-scale with the eighth being open-ended. The educational intervention is under six minutes in length, bringing the time to fully complete this study to approximately 12 minutes in total. Upon completion, a separate link will appear that, if clicked, allows you to enter into a raffle for a \$100 Amazon gift card. Following this link is optional, and completely anonymous in relation to your study participation.

Participation in this study is completely anonymous, voluntary. Consent is implied by clicking on the link provided, and your involvement can be discontinued at any time throughout the survey process. The findings of this project will be disseminated among the Rhode Island College School of Nursing Colloquium 2021.

If you have any questions, feel free to email me at [casenciocosta\\_0868@email.ric.edu](mailto:casenciocosta_0868@email.ric.edu). Thank you in advance for your time and participation.

Sincerely,

Corrie Asencio-Costa, BSN, RN, CCRN,CMC  
Rhode Island College Student Registered Nurse Anesthetist

Melinda Hodne, DNP, APRN-BC  
[mhodne@ric.edu](mailto:mhodne@ric.edu)  
774-279-2274

**Appendix B**  
**Pre and Post Survey**

Select your answer for each of the eight questions below

1.) How many years have you been practicing anesthesia?

- a. 1 year or less
- b. 2 to 4 years
- c. 5 to 7 years
- d. 8 to 10 years
- e. Greater than 10 years

2.) What is your highest level of education?

- a. Less than an Associate's degree
- b. Associate's degree
- c. Bachelor's degree
- d. Master's Degree
- e. Doctorate Degree

3.) The opioid crisis is a major perioperative concern in The United States.

- a. Strongly Agree
- b. Agree
- c. Neutral
- d. Disagree
- e. Strongly Disagree



4.) Opioid dependence is a potential surgical complication.

- a. Strongly Agree
- b. Agree
- c. Neutral
- d. Disagree
- e. Strongly Disagree

5.) Anesthesia providers play a central role in mitigating the opioid crisis.

- a. Strongly Agree
- b. Agree
- c. Neutral
- d. Disagree
- e. Strongly Disagree

6.) Opioid sparing anesthesia and analgesia is equally as effective as traditional anesthesia and analgesia

- a. Strongly Agree
- b. Agree
- c. Neutral
- d. Disagree
- e. Strongly Disagree

7.) The assessment and identification of patients at increased risk for chronic opioid use is essential to the anesthesia plan


- a. Strongly Agree
- b. Agree
- c. Neutral
- d. Disagree
- e. Strongly Disagree

8.) OPTIONAL: Please describe any professional or personal experiences that have shaped your perception of opioid alternative anesthesia/analgesia techniques.

## Appendix C

## Educational Content

1  
★




# ANESTHESIA

AS IT RELATES TO THE

# US OPIOID EPIDEMIC

A QUALITY  
IMPROVEMENT PROJECT

2  
★



**128**  
AMERICANS

*Die every day from  
an opioid overdose*  
(including Rx and illicit opioids)

- According to the Centers for Disease Control and Prevention (CDC), opioid overdoses are responsible for an average of 128 Deaths per day in the US, with more than 11.5 million Americans reporting prescription opioid misuse (CDC.gov)

3



- This phenomenon is fed by illicit opioid consumption that has grown from prescription opioids, typically following elective surgical procedures (Brummett et al., 2017)



4



- Persistent and chronic opioid use is a rising surgical complication, even for opioid naïve patients (Sun et al., 2016)

5

- A 2017 study showed that surgical patients developed new and persistent opioid use at a higher rate than non-surgical patients:

Group	Rate
Non-Surgical Group	0.4%
Surgical Group	6.2%

(Brummett et al., 2017)

Detailed description: A circular graphic on the right side of the slide shows a profile of a human head. The head is composed of a dense collection of various pills and capsules in different colors (white, yellow, blue, green). A hand is shown holding one of the pills, symbolizing the concept of opioid use and addiction.

6

**ERAS Key Components<sup>1-3</sup>**

- Preoperative Phase**
  - Pre-admission counselling
  - Bowel prep per current guidelines
  - Carbohydrate loading
  - No premedication
- Intraoperative Phase**
  - Regional anesthesia and multimodal analgesia
  - Short-acting anesthetic agents
  - Avoidance of fluid overload
  - Short incisions, no drains
  - Warm-air body heating
- Postoperative Phase**
  - Early mobilization
  - Multimodal opioid-sparing analgesia
  - Prevention of nausea and vomiting
  - Early removal of catheters
  - No nasogastric tubes
  - Early oral nutrition
  - Adit of compliance

- Anesthesia providers that are properly educated regarding the opioid sparing component of ERAS are in a unique position to manage pain effectively while simultaneously decreasing opioid consumption

(Soffin et al., 2018)



7



• A 2019 study of CRNAs showed that...

- more than 50% of participants had limited experience with opioid alternatives
- 90% of participants would prefer to use these opioid alternatives to avoid the adverse effect of opioid therapy

(Velasco et al. 2019)



8



• Surgical patients with high risk for chronic opioid use...

- *substance abuse disorders*
- *depression*
- *alcohol, benzodiazepine and tobacco use*

...may benefit from multimodal analgesia and regional anesthesia

(Sun et al., 2016)  
(Soffin et al., 2018)

9



- **Alternatives to opioid use during and after surgical procedures include...**

- regional anesthesia*
- total intravenous anesthesia*
- non-opioid analgesics*
- adjunct analgesic infusions*
  - *magnesium*
  - *lidocaine*

**... and that these alternatives lead to a decrease in persistent opioid use** (Soffin et al., 2018)



10



- **Nonopioid-based general anesthesia is as effective as opioid-based general anesthesia for certain surgeries such as bariatrics, neuro-skeletal procedures and liver resections.**

(Mansour et al., 2013)

11



- **117 patients undergoing open liver resection...**

- *75 had opioid alternative ERAS*
- *42 had no ERAS protocols*

**... the opioid alternative group were less likely to receive postoperative opioids, specifically on days one, two and three**

(Page et al., 2016)



12



- **Intraoperative lidocaine use is associated with decreased pain and improved quality of life scores at three and six-months post procedure**

(Hah et al., 2017)



13



- **Ketamine and Acetaminophen use are associated with decreased opioid consumption in the immediate perioperative period and up to six weeks post procedure** (Hah et al., 2017)



14



# THANK YOU

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