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## Quality Improvement: Education and Implementation of Proper Narcotic Handling Practices by Nurse Anesthetists

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# Quality Improvement: Education and Implementation of Proper Narcotic Handling Practices by Nurse Anesthetists

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# INTRODUCTION



# Overview of Problem

- Unsafe injection practices are a major safety violation that can include but are not limited to the reuse of a single-use syringe or medication vial and/or the use of a syringe or medication vial on more than one patient.
- It is estimated that a medication error occurs in one out of every 130-300 surgeries.
- Majority of unsafe injection practices result from lack of education or mistaken beliefs on what proper injection safety encompasses.

(Pugliese et al., 2010; Wahr et al., 2017)

# Overview of Problem

- The CDC estimates that the global burden of unsafe injection practices in 2000 resulted in approximately 20 million new hepatitis B infections, 2 million new hepatitis C infections, and 250,000 new human immunodeficiency virus infections.
- An infamous breach in injection safety at an endoscopy center in Nevada in 2008 resulted in costs that estimated around \$16 million to \$21 million, simply from notifying and testing all those involved (Ford, 2013).
- Unsafe injection practices can lead to increased morbidity and mortality, diminishing the quality of life of patients and can contribute to substantial increases in healthcare costs.

(CDC, 2013; Ford, 2013)

# Clinical Significance

A study was conducted with an online survey that assessed injection practices outlined by the AANA to 325 student registered nurse anesthetists (SRNAs) across the U.S.

- 14 (4%) administered medications from the same syringe to multiple patients
- 59 (18%) have reused a needle on the same patient
- 266 (82%) have refilled used syringes

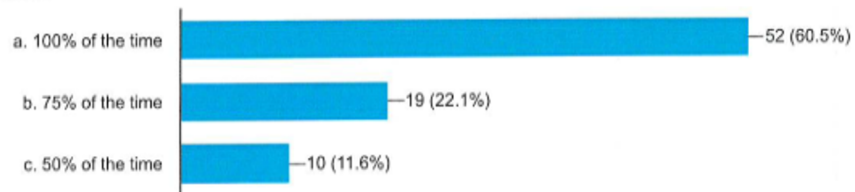
Two survey questions were aimed at obtaining data regarding observed CRNA practice.

- 257 students (81%) witnessed a CRNA breach at least 1 of the 6 safe practice standards
- 184 (58%) have been asked or instructed by their CRNA to violate at least 1 of the 6 standards

# Identified Clinical Problem

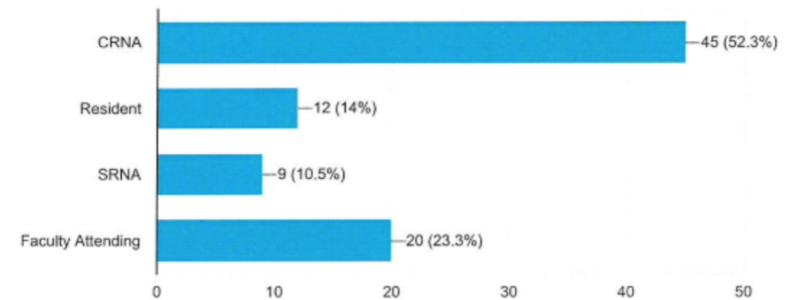
## 5. Do you label your narcotics with a patient sticker

86 responses



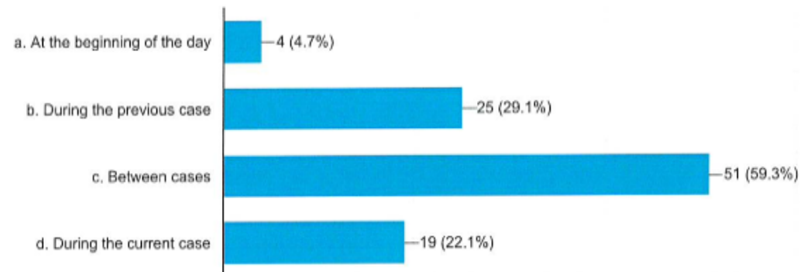
## 8. My role in the department is

86 responses



## 6. For fentanyl, when do you draw up the medication

86 responses



# SWOT Analysis

INTERNAL FACTORS	
STRENGTHS (+)	WEAKNESSES (-)
<ul style="list-style-type: none"> <li>• <b>Accessibility</b> - The project site is where the DNP students will undergo most of their clinical training.</li> <li>• <b>The project will be focused on current CRNAs and new anesthesia providers</b> - Adjusting to a new environment has its challenges, but new providers are typically more conducive to learning and utilizing the new narcotic handling protocol.</li> <li>• <b>Changes in narcotic medication handling stemmed from the quality improvement department</b> - Since it is a departmental change, there might be less resistance from tenured anesthesia providers.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Availability</b> - Anesthesia providers are usually busy due to cases, and there might be issues with availability.</li> <li>• <b>Lack of consistency in the OR environment</b> - The OR environment is typically fast-paced and challenging, which may necessitate some time to adjust for new anesthesia providers.</li> <li>• <b>Pressure from attending anesthesiologist and surgeon</b> - During training, there is a possibility that the surgeon or the attending anesthesiologist would resist the new narcotic handling protocol and influence the new provider to participate in unsafe medication handling (i.e., no patient label).</li> </ul>
EXTERNAL FACTORS	
OPPORTUNITIES (+)	THREATS (-)
<ul style="list-style-type: none"> <li>• <b>Root cause analyses</b> - Two root cause analyses were performed which yielded valuable data and determined areas for improvement.</li> <li>• <b>Part of the National Patient Safety Goals 2020</b> - There is a national effort for safe medication handling, which could provide additional guidelines and recommendations.</li> <li>• <b>Part of the Quality Improvement goals within the Anesthesia Department</b> - The Quality Improvement department is open to ideas to decrease the number of SI reports related to the mishandling of narcotic medications.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Time constraint in the OR</b> - Due to the fast-paced environment in the OR, there might be circumstances where an emergent situation will occur and take priority vs. placing a patient label.</li> <li>• <b>High turnover time in the OR</b> - Gives the anesthesia providers less time to get ready for each case.</li> <li>• <b>Lack of communication between different anesthesia providers</b> - Incomplete handoff report sometimes given by the outgoing provider to the incoming provider, which can lead to confusion with medications.</li> </ul>

*Note:* CRNA = Certified Registered Nurse Anesthetist; DNP = Doctor of Nursing Practice; OR = operating room



# Project Purpose

**GOAL:** improve compliance of the Narcotic Handling Policy in the perioperative setting by offering educational resources and reinforcement of basic aseptic technique and safe narcotic handling practices.

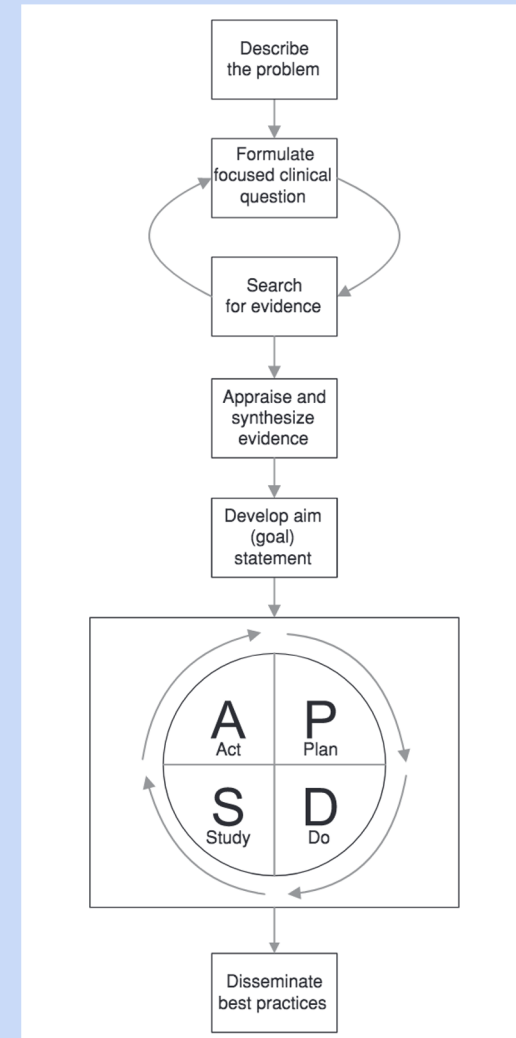
**AIM:** see improvement in number of appropriately labeled narcotic syringes outlined per the project site's Narcotic Handling Policy guidelines within a one month time frame.

**PURPOSE:** improve patient outcomes and align with the NPSGs outlined by The Joint Commission.

# Guiding Framework

## Evidence-Based Practice Improvement Model

(Levin et al., 2010)



# PICOT Question

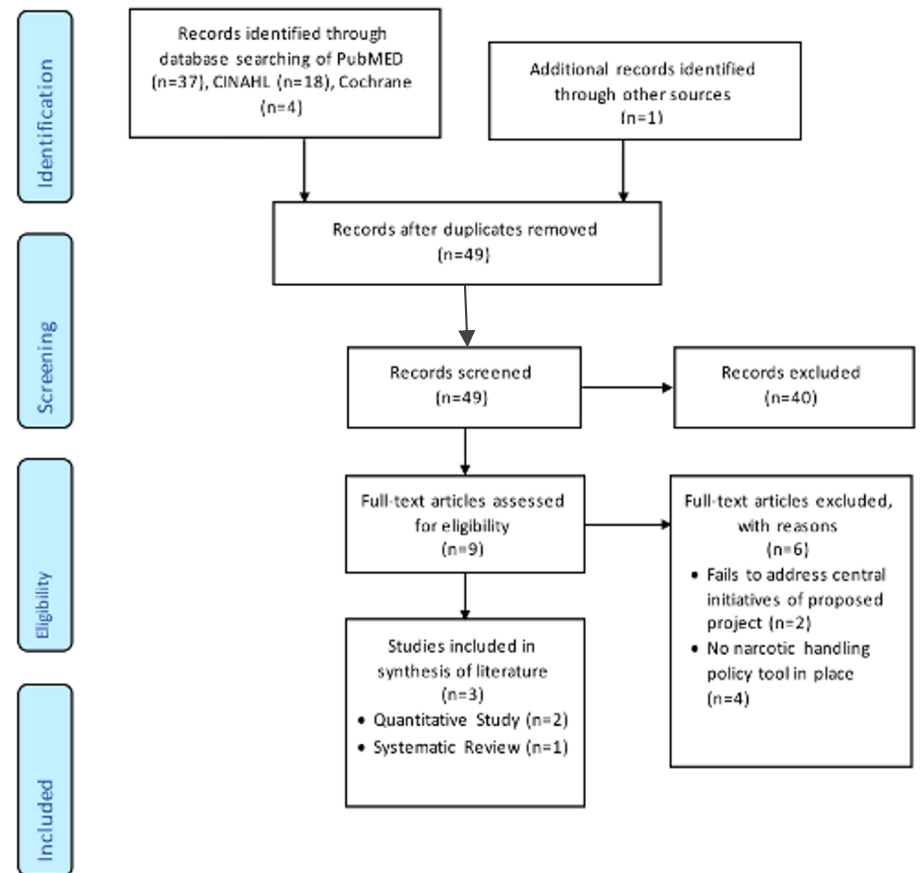
“In the Nurse Anesthesia Department at an urban Level 1 Trauma Center, how does the implementation of an educational initiative about proper narcotic handling practices compared to the current practice of no Narcotic Handling Policy Guideline education affect the rate of properly labeled narcotic syringes over a two-week timeframe?”

# EVIDENCE



# Literature Search Strategy

Adapted PRISMA Flow Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

# Critical Appraisal Process

- The critical appraisal process, evidence leveling, and assessment of quality rating and strength of recommendations for research evidence were guided by the Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) guidelines and tools (“Johns Hopkins Nursing Evidence-Based Practice Research Evidence Appraisal Tool”)
- Literature was retained according to specific inclusion/exclusion criteria that aligned with the PICOT question and project aims
- As sources of non-research evidence, clinical practice guidelines (CPGs) were evaluated, appraised, and assigned a specific level and grade via the “Appraisal Guidelines for Research and Evaluation (AGREE) II Tool”
- All research evidence was assigned an Evidence Level of I or II and received a Quality Grade of either A or B
  - Level I Evidence applies to Randomized Controlled Trials and Experimental Studies
  - Level II Evidence applies to Quasi Experimental Studies
  - Grade A and B Evidence are defined as “high” and “good quality”, respectively

(Brouwers et al., 2017; Dang & Dearholt, 2018)

# Synthesis of Evidence

- Due to the lack of a standardized syringe handling tool and/or policy among anesthesia providers, research evidence supports the use of educational teaching methods that focus on improving safe medication handling techniques, lowering infection rates, and supporting increased provider compliance
- A study by Keers et al. (2014) demonstrated the effectiveness of provider training and simulation sessions on the long-term reduction of medication errors
- Manchikanti et al. (2011) highlighted the correlation between aseptic technique and reduced surgical infection rates in a large study group
- A review conducted by Merry et al. (2011) examined the potential efficacy of multimodal provider education on improving safe syringe handling techniques among providers that both increased compliance rates and reduced medication errors

(Keers et al., 2014; Manchikanti et al., 2011; Merry et al., 2011)

# Synthesis of Evidence (continued)

*Synthesis Table of Single-Use Medication Handling*

<b>Outcome</b>	Merry et al., 2011	Manchikanti et al., 2011	Keers et al., 2014
Medication Errors	↓ <sup>c</sup>	∅	↓ <sup>s</sup>
Incidence of infection rates	∅	↓ <sup>c</sup>	∅
Provider Compliance	↑	↑	↑
Sample Size	89 anesthesia providers; 1,075 surgical cases	3,179 patients; 18,472 procedural cases	16 – 89 healthcare providers; 1,204 – 129,234 medication administrations
Level of Evidence	I	II	II
Quality of Evidence	B	A	B
Any other information important to the PICOT question	Provider compliance rate was inversely related to medication errors.	Safe injection techniques and precautions reduce the overall rate of infection.	Statistically significant reduction in medication errors after nurse education and training.

*Note.* ↓ = reduction; ∅ = no change noted; ∅ = not discussed in study; ↑ = increased/improved; s=statistical significance; c = clinical significance; RCT = randomized control trial; CT = controlled trial

(Keers et al., 2014; Manchikanti et al., 2011; Merry et al., 2011)



# Clinical Expertise Evidence

- Professional health organizations, such as the Centers for Disease Control and Prevention (CDC), are spearheading efforts to mitigate unsafe syringe handling and injection techniques among providers
  - Safe Injection Practice Coalition
  - “One and Only Campaign”
  - Healthcare Infection Control Practices Advisory Committee
- The Centers for Medicare and Medicaid Services and Federal Drug Administration are also working to implement infection control guidelines
- Two Multidisciplinary Root-Cause Analysis (RCA) Meetings were conducted based on the occurrence of ‘never events’ related to unsafe injection practices among anesthesia providers between 2018-2019
  - As a result, a safe narcotic and syringe handling policy was developed and targeted as a 2020 Quality Improvement goal for the project site

(Centers for Disease Control [CDC], 2019)

# Patient Preference and Values Evidence

- Patients place a great amount of trust in the skills, safety, and expertise of anesthesia providers throughout the perioperative process
- Safe injection practices promote optimal patient outcomes and reduce the risk for infection
- As a professional, anesthesia providers are tasked with the privilege and responsibility of advocating for the safe, competent, and compassionate care of their patients throughout each step of the perioperative process, which includes the diligent, safe administration and handling of narcotic and medication syringes
- Anesthesia provider compliance with safe narcotic and syringe handling techniques helps to ensure the delivery of safe, high-quality care

(Institute for Healthcare Improvement [IHI], 2020; Kossover-Smith et al., 2017)

# Recommendations for Practice

- While there is no standardized, universal syringe handling policy in place to guide the safe handling of narcotic and medication syringes among anesthesia providers, there is high/good quality evidence to support the following recommendations for practice change:
  1. Educate anesthesia providers on the proper handling of single-dose medications
  1. Use a multifaceted educational approach through in-service didactic lectures, case studies, simulations with teach-back demonstration using the ‘ask, teach, ask’ method, and clinical pharmacist-led training sessions

(Keers et al., 2014; Manchikanti et al., 2011; Merry et al., 2011)

# Aims For Practice Change

- Project Aim Statement: “The aim of the proposed project is to see a 100% reduction in the number of never events associated with the inappropriate handling, use, and disposal of single-use syringes by Anesthesiologists, CRNAs, and SRNAs by July 30, 2021”.
- Through the use of educational training sessions, pre- and post-implementation surveys, and long-term follow-up, this project aim will help to improve anesthesia providers’ compliance with the safe syringe handling practices outlined in the project site’s Narcotic Handling Policy, increase the percentage of appropriately labeled narcotic syringes, and improve overall patient outcomes.

(Keers et al., 2014; Manchikanti et al., 2011; Merry et al., 2011)

# IMPLEMENTATION



# Setting and Population

- A large academic medical center, Magnet recognized, and Level 1 Trauma Center located in Knoxville, Tennessee
- Practice population of approximately 190,000
  - 13.2% are over the age of 65
  - 10.7% has a disability and is under 65 years old
- 42 Operating Rooms
  - Average of 118 surgeries performed daily
  - High surgical volume with quick turnover
    - Wide variety of surgical procedures and specialties:
      - Brain and spine, cancer, emergency and trauma, heart, lung, and vascular, orthopedics, and women and infants
- Approval has been granted by the Quality Improvement Coordinator at the project site for implementation of this proposed project

(United States Census Bureau, 2019)

# Project Team/Stakeholders

- Key project site team members
  - DNP students
  - Student Registered Nurse Anesthetists
  - Certified Registered Nurse Anesthetists
  - Chief CRNA
  - Operating Room pharmacists
- Additional team members
  - Quality Improvement Council and the Quality Improvement coordinator
  - DNP committee chair and faculty
  - Nurse Anesthesia professors

- Stakeholders (not on project team)
  - Patients and families
  - East Tennessee Community



# Barriers and Facilitators

- Knowledge and Skills
- Attitudes
- Beliefs
- Organizational influences
- Inadequate resources
- Environmental Culture
- Workload
- Authority to change practice



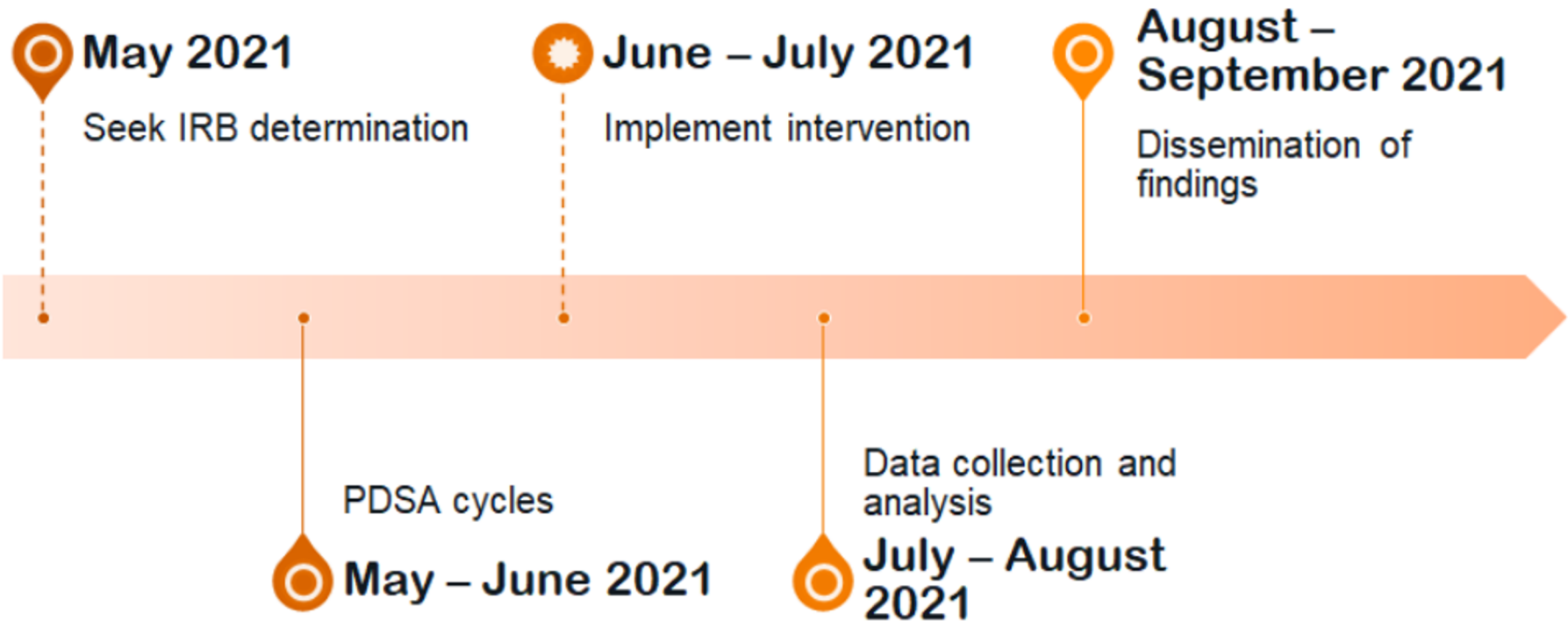


# Educational Bundle

- Pre-implementation Survey
- Project Site Narcotic Handling Policy
- CDC One and Only Campaign Infographic
- ISMP Safe Practice Guidelines for Adult IV Push Medications Clinical Practice Guideline
- Post-implementation Survey



# Implementation Timeline



# Ethical considerations



ETHICS

A close-up photograph showing a hand placing a wooden letter 'S' to complete the word 'ETHICS' on a sandy surface. The letters are made of light-colored wood and are arranged in a row. The hand is positioned above the 'S', with the thumb and index finger holding it. The sand is a light beige color and has a fine, granular texture. The lighting is soft, creating gentle shadows on the sand.

# Economic considerations



# EVALUATION



# Measures of Success

- Outcome
  - Number of 'never events' related to narcotic mishandling
  - Post education behavior changes
- Process
  - Provider and staff compliance with basic aseptic technique and project site's Narcotic Handling Policy guideline



# Data Security

- Data will be recorded in an anonymized, password protected spreadsheet
- Securely stored in encrypted OneDrive account
- Transferred between project members through a password protected UT Vault account



# Data Collection

Data collection:

- Collected post-knowledge survey two weeks after the distribution of the pre-knowledge survey and educational bundle





# Data Analysis

- Data was analyzed and evaluated through the International Business Machines Corporation's (IBM) Statistical Package for the Social Sciences (SPSS) Version 27 software application
- Data was comprised of measurable variables and descriptive statistics
- Statistical Tests:
  - A chi-square McNemar Bowker test was used to evaluate nurse anesthesia providers' knowledge of safe injection practices before and after completion of the educational module
- Evaluation of categorical data related to blood-borne transmission of pathogens was restricted due to the inaccuracy and variability of transmission modes

# Findings

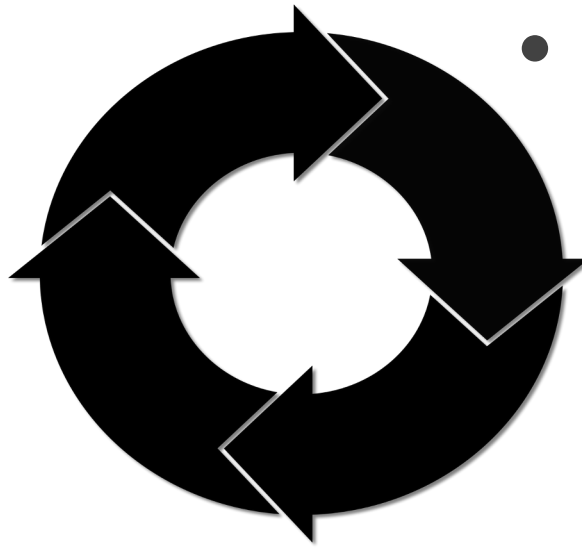
- 87% of participants said the educational bundle was helpful and will impact their practice
- 40% of people who did not label their narcotic syringes prior to the educational bundle reported a positive practice change in their labeling habits
- Not statistically significant but clinically significant



# Modifications & Limitations

- Project Modifications

- Unable to track blood-borne infections
- Unable to count narcotic syringes



- Project Limitations

- Small sample size
- Categorical data
- Continued engagement

# Dissemination

- Crucial component of the DNP Scholarly Project
  - Will allow distribution of findings towards a wider audience
  - Promote professional scholarship, research, and leadership opportunities
- Propose submitting an abstract for podium or poster presentation at a professional anesthesia conference
  - Alternative plan: written executive summary to project stakeholders



# Plan for Sustainability

- Sustainability is a multi-faceted process that helps to secure long-term maintenance of practice and behavioral changes
- Successful change starts with early plans for sustainability that must be developed prior to implementation of evidence-based change

Plans for project sustainability include:

1. Annual review of the Safe Narcotic Educational Bundle among anesthesia providers at the project site
2. Mandatory review of the Safe Narcotic Educational Bundle as a prerequisite for new anesthesia providers at the project site
3. Mandatory review of the Safe Narcotic Educational Bundle among anesthesia providers accruing greater than three narcotic handling violations per quarter
4. Reinforcement of safe narcotic handling practices in cooperation with the OR Pharmacy through continued collaboration and measurement of appropriately labeled narcotic syringes

(Agency for Healthcare Research and Quality, 2013; Breen & Orchowsky, 2015; Chambers et al., 2013)

# Future Implications



- With the descriptive data obtained, we can hypothesize that an educational bundle is an effective way to reinforce safe narcotic handling practices in the clinical setting
- Future research is needed that includes a larger sample size
- Engaging staff to sustain change and support continuous quality improvement
- Valuable role in patient care and safety

# Lessons Learned

- It is vital to patient safety for anesthesia providers to possess the knowledge and skills to follow safe injection, infusion, and medication vial practices.
- Implementation and educational reinforcement of the project site's standardized narcotic handling protocol has significant potential to positively impact the appropriate use of syringes and medication vials by nurse anesthesia providers.
- Utilizing the EBPI framework provides well-defined directions on development, implementation, and evaluation initiatives that target healthcare improvements in a systematic approach.
- Reiterating the importance of safe injection practices through education, policy enforcement, multidisciplinary collaboration, and oversight aligns with the practice site's vision of delivering excellence in clinical outcomes and patient experiences and their values of integrity, excellence, and dedication.

# QUESTIONS?





# References

Please refer to pp. 58 - 63 of the Project Manuscript