Improving Initial Pain Assessments Upon Arrival to the Post Anesthesia Care Unit by Implementing the Critical Care Pain Observation Tool

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Improving Initial Pain Assessments Upon Arrival to the Post Anesthesia Care Unit by Implementing the Critical Care Pain Observation Tool

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Table of Contents

Abstract.........................................................................................................................................4  
Introduction....................................................................................................................................6  
    Problem Description..................................................................................................................6  
    Available Knowledge...............................................................................................................7  
    Rationale....................................................................................................................................14  
    Specific Aim..........................................................................................................................15  
Methods........................................................................................................................................16  
    Context......................................................................................................................................16  
    Intervention..........................................................................................................................17  
    Study of the Intervention..........................................................................................................18  
    Measures....................................................................................................................................19  
    Analysis.......................................................................................................................................21  
    Ethical Considerations...............................................................................................................22  
Results..........................................................................................................................................23  
    Initial Steps..............................................................................................................................23  
    Process Measures......................................................................................................................23  
    Contextual Elements................................................................................................................29  
    Associations.............................................................................................................................29  
    Unintended Consequences.........................................................................................................30  
    Missing Data............................................................................................................................30  
Discussion....................................................................................................................................30  
Summary.........................................................................................................................................30
Abstract

Background

Pain assessments in the post-anesthesia care unit (PACU) are crucial to recovery, the discharge process, patient outcomes, length of stay, and readmission rates. It is one of the main responsibilities of PACU nurses to adequately assess and treat pain when patients are in phase one and two of recovery after surgery. A thorough and accurate pain assessment tool is needed for these critically ill patients because not all of them are able to verbally express discomfort.

Local Problem

The problem that was identified during this quality improvement project was inconsistent initial pain assessments in the PACU. Patients arrive to the PACU in varying conditions, some conscious and some not. When it came to conducting pain assessments on patients, some nurses used the numerical pain scale, the Wong-Baker FACES scale, some would chart “unable to self-report” until the patient was conscious and could verbally express pain, and some would use the behavioral pain scale. This was leading to inconsistent pain assessments, and untreated pain in patients who arrived to PACU unconscious.

Methods

A literature review was conducted to review existing research and evidence about pain assessment tools used in the PACU. The Critical Care Pain Observation Tool (CPOT) was identified as a tool that was promising when it comes to pain assessments on unconscious patients but was lacking additional research. The CPOT was chosen for this quality improvement project to conduct additional research into its effectiveness.
Interventions

The Critical Care Pain Observation Tool was used as the initial pain assessment tool in all PACU patients regardless of their level of consciousness. Nurses were educated on the CPOT scoring criteria and where to find the CPOT within the pain assessment documentation tab. The CPOT criteria was also available in the PACU bays, which allowed the nurses to start assessing pain while receiving report from the anesthesia provider and the operating room nurse.

Results

The CPOT proved to be particularly useful in assessing pain in unconscious patients, although the numerical pain scale proved to be the preferred and most effective pain assessment tool for conscious patients as they are able to articulate their pain, describe it and the location, as well as give it a numerical rating.

Conclusion

The CPOT can be applied to many units because of the ability that it possesses to be applied to such a wide variety of patients of all ages, level of consciousness, and procedure/illness/injury. Additional research is still needed but there are promising results regarding the use of the CPOT in the same day surgical PACU setting.

Keywords: Pain assessment tool, PACU, CPOT, Unconscious patients, Critical Care, Quality Improvement, Improved pain assessments
Improving Initial Pain Assessments Upon Arrival to the Post Anesthesia Care Unit by Implementing the Critical Care Pain Observation Tool

Problem Description

The post-anesthesia care unit (PACU) is the place where patients awake from anesthesia and sedation after their procedures. Many times, some form of pharmacological pain management is given intraoperatively to make the process of waking up and starting recovery easier, but it is often not enough in terms of acute pain management.

When patients are brought to PACU from the operating room, the majority are still unconscious and have some form of artificial airway in place. The first assessment is conducted and recorded by PACU nurses upon arrival after the patient is connected to the cardiac monitor, a set of vitals are taken, and it is confirmed they have a patent airway. This means the vast majority of the first assessment is objective information such as vitals, surgical site assessment, and focused assessments of systems that may have been affected by the procedure (ex. orthopedic surgeries typically require a musculoskeletal and vascular assessment so something like a GI assessment is not relevant at this time).

The first assessment includes a pain assessment, but it was observed that there was no standardized tool that every PACU nurse is using at the facility. Many used Face, Legs, Activity, Cry, Consolability (FLACC), some would chart that the patient was unconscious and unable to verbalize pain, and some would wait until the patient could express their pain and then use a 1-10 scale as their first pain assessment. This inconsistency in initial pain assessments created the potential of leaving pain untreated in patients who were unable to verbalize how they were feeling, leaving only vital signs as a clue to if they were in pain or not. In the pre-intervention
observation period, most nurses (~75%) would select “patient unable to self-report” and then “patient chemically sedated” as their pain assessment until the patient was able to vocalize pain.

If pain management, both pharmacological and non-pharmacological, can be started before the patient is awake and alert enough to fully experience the pain, there will be shorter PACU stays, faster discharges to phase two, and less pain for the patient to go home with because it is easier to stay ahead of treating pain than it is to catch up with it, especially once they are home and only have their oral pain medications available to them.

To ensure early interventions were happening in PACU to set patients up for success when it comes to their pain management, a standardized tool that could be applied to all patients (adult, children, unconscious, awake, and alert, etc.) that the PACU sees needed to be implemented, such as the Critical Care Pain Observation Tool (CPOT) and completed upon patient arrival to PACU. This allowed for thorough assessments and acted as a guide for PACU nurses to determine which interventions would be most appropriate for every patient, regardless of their condition when arriving.

**Available Knowledge**

Pain assessments and management are one of the most important priorities in the PACU. The standard for PACU patient assessments is upon arrival from the operating room, then every ten minutes while in phase one, and then one final assessment prior to transfer to phase two of recovery. At this facility, there was no standard pain assessment tool to use upon admission to PACU because there is such a variety in patient ages, types of procedures performed, and level of consciousness of patients when they arrive to PACU. Two patients who each had the same surgery, by the same provider, could have completely different anesthesia experiences. For example, a patient having a cholecystectomy may come out of the operating room wide awake,
alert, and oriented, and talking, while the next cholecystectomy patient may come to the PACU unresponsive, with an airway still in place, and unstable vital signs. The second patient may be challenging to assess for pain and to treat the pain early because they are unable to communicate.

It is crucial to remember that just because a patient is sedated, does not mean they are not experiencing discomfort. Surgical pain is particularly challenging to “catch up” with rather than stay ahead of, so a standardized pain assessment tool that can be applied to any patient regardless of their initial status in PACU is critical. The goal is to transfer patients from phase one to phase two of recovery as quickly and safely as possible, especially in ambulatory or same day surgical cases.

This goal led to the question, in adult post-operative patients, what objective pain assessment tool can be utilized in PACU to identify early signs of post-operative pain most effectively, regardless of the patient’s level of consciousness?

**Search Methods**

The articles included were found using the CINAHL database, which was accessed through the University of New Hampshire Library search engine and Google Scholar. The key words used in the search were: “post-anesthesia care unit or PACU,” “pain assessment tools,” “pain assessment,” “critical care pain observation tool or CPOT,” and “pain scale.” Filters were applied to show only articles from the past 10 years, published in English, and had the full text linked or could be requested from the library. The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) diagram seen in appendix A shows how, and when, articles were eliminated, but the main reasons included being based solely on pediatric PACU patients and if pre-operative nerve blocks helped prevent severe pain in the PACU.

**Critical Appraisal of Evidence**
When looking for research regarding the most effective pain assessment tool to use in PACU, the first article that was found was, *Use of the Pain Assessment Behavioral Scale (PABS) in PACU* written by Johnson, et al., (2023). This three-month study was conducted in a PACU setting when researchers observed that the most common method of evaluation of pain is through verbal self-reporting, but many patients in phase one of recovery were unable to vocalize pain or discomfort. The PABS assessment data was gathered at set intervals, versus a verbal patient self-report which could occur at any point that a patient is able to verbally communicate.

Strengths of this study is that it was conducted over a three-month period, on a variety of patients who had diverse types of procedures, and at critical points in recovery (on admission (T1), upon emergence (T2), and when the patient was oriented to time and place (T3)). The patients studied ranged from ages 19-91 years, 64% female and 46% male, and they were recovering from orthopedic surgeries, general surgery procedures, and gynecological procedures (Johnson, et al., 2023). A weakness that could be identified in this study for the purposes of this literature review is that it was only the PABS score compared to verbal reporting. For Johnson, et al., 2023, this is a strength because it provides more data for the effectiveness of the PABS, but this literature review is being utilized to determine what the most effective pain assessment tool is, not just if the PABS is effective.

The second article that was found was by Ju In Chan, et al. (2017). This research studies how much of an impact post-operative pain impacts the length of stay in PACU. The method of assessment used in this study was patient reporting. The findings included 67.6% of patients reported no post-operative pain in the PACU, 32.3% reported moderate to severe pain. Factors found to be associated with higher pain ratings were surgeries of the abdomen, procedures > two hours, younger patients, and same day admissions (Ju In Chan, et al., 2017).
A strength of this article is that data was gathered from 590 consecutive patients in this PACU over one month. This is a strength because it captured many diverse types of surgeries, different patient populations, and having taken place over a month, there were a variety of anesthesia providers involved in patient care too. The main weakness of this study was that though it is successful at identifying risks for increased pain which leads to a longer PACU stay, it does not really discuss how that pain is assessed other than relying on patient reports. Descriptive correlation studies are identified as being a level 6 on the hierarchy of evidence meaning it may provide some insight, but it is not the most reliable data that could be collected. By the time the patient can verbally report pain, it may be at the moderate to severe level, rather than being identified and treated when mild.

_Acute Pain Assessment in Sedated Patients in the Post Anesthesia Care Unit by Pereira-Morales et al. (2018)_ was the third article found through the CINAHL database. This study compares the effectiveness of the Nonverbal Pain Scale-Revised (NVPS-R) (appendix B) and to the CPOT (appendix C). A crossover design was used when conducting this study and the CPOT and NVPS-R at set intervals during the PACU stay (Minutes 0, 15, 30, 45, 60, 90, and 120). The results of this research were that at the 0-, 15-, and 120-minute intervals a clinically significant change in vital signs were not found when using the NVPS-R, and that the CPOT vocalization indicator (applicable to both vented and non-vented patients) was more frequent in patients experiencing pain (Pereira-Morales, et al., 2018).

A strength of this research study is that both assessment tools were used at the same time, on the same patients to avoid any factors that could potentially cause the results to be inaccurate, for example using the NVPS-R on a younger patient who had a long abdominal surgery, versus the CPOT on a patient who had a joint replacement. These patients would not be comparable.
because there is so many distinct factors about the two of them, but by using both tools on all the same patients, the data is able to clearly show the most accurate comparison between the two different assessments. A weakness of this study is that the researchers did not include information about the patients that were evaluated other than it being the same patients for both tools. Understanding what the patient population looks like is important in determining if an assessment tool is truly effective enough to use as a standard, or if it just works better in one population of patients.

A fourth article that was found by Devlin, et al. (2018) was the creation of clinical practice guidelines for managing pain (as well as sleep, delirium, agitation, and immobility) in intensive care units. While all of these are unfortunate realities for many intensive care patients, there are steps that can be taken to minimize the risk. Population, Intervention, Comparison, and Outcome (PICO) and nonactionable descriptive questions were formulated by a group of experts in this area of healthcare as well as with the input of former intensive care patients who experienced these situations.

A strength of this article is that there was substantial agreement among the professionals, experts, patients, and research regarding interventions that have shown to improve patient outcomes. In the pain specific portion, self-report scales, behavioral assessment tools, proxy reporters, and physiological measures were all assessed for their validity and reliability. The behavior assessment tools such as the CPOT, Behavioral Pain Scale (BPS), and BPS-non intubated have been recognized as being the most robust scales for assessment of critically ill patients (Devlin, et al., 2018).

A weakness of this study is that while these tools have been identified as the best to utilize in most medical, surgical, trauma, and cardiac intensive care units, there is not much
information regarding their validity when it comes to brain injury patients. This means they are a population of patients who require more research before making these tools the best suggested practice, but surgical and medical patients have proven the CPOT and BPS/BPS-NI to be the best tools available.

A systematic review conducted by Baamer, et al., 2022 utilized four online databases to screen articles relating to the measurement properties of unidimensional tools to quantify pain after surgery and to assess how pain interferes with functional recovery (Baamer, et al., 2022).

A strength of this review is that four different databases were used and a total of 31 studies were reviewed. This provides data and information on many different tools to identify post-surgical pain. A major weakness is that when assessing the studies using the Consensus-based Standards for the selection of health Measurement Instruments (COSMIN) checklist, most of the studies that were found were excluded. Five of the 31 studies were excluded based on low-quality evidence and seven based on responsiveness with convergent validity being the most studied property in 13 of the studies, and there was only one objective pain score tool that was included in the systematic review (Baamer, et al., 2022).

**Evidence Synthesis**

According to Johnson, et al., 2023, the authors found that patients were more likely to receive pain medication in the PACU if their PABS score was greater than or equal to 5 at all three intervals, and that verbal and PABS scores were correlated, but that PABS scores were typically lower than verbal reports (Johnson, et al., 2013). This data confirms what was well known already, pain is best treated when the patient can verbalize their symptoms and describe the pain but of course this is not always possible. The PABS has shown promising results when it
comes to assessing patients who are sedated or unresponsive but further studies like this one are needed before deciding it should be the standard.

In the article, *Factors Affecting Postoperative Pain and Delay in Discharge from the Post-Anesthesia Care Unit: A descriptive correlational study*, Ju In Chan, et al., 2017 discuss how pain can cause a longer stay in the PACU but it is important to also acknowledge that the longer a patient is kept in PACU rather than transferred to phase two, their inpatient bed, or discharged home, the higher the risk for them experiencing pain in PACU is. It is not uncommon for post-operative pain to occur hours or even a day after the procedure. While pain control is important in PACU, it is well known that patients are more comfortable and relaxed when they can be home or at least in their inpatient room, rather than the perioperative setting. This is why timely discharge from PACU is a priority once the patient is deemed stable enough for the next phase.

The evidence gathered from the study conducted by Pereira-Morales, et al., 2018 while slightly limited, provides a good starting place to continue this research. The data shows that the CPOT can be successful in identifying post-operative pain quickly and can be used on PACU patients regardless of their presentation at any of the intervals. If this study could be repeated on a larger scale and for a longer period, the data would be even stronger and would encourage the CPOT to be used as the standard for PACU pain assessments.

The results of the Devlin, et al., 2018 article were that, “… we considered a pain scale with a psychometric quality score of 15–20 to have very good psychometric properties; a score of 12–14.9 good psychometric properties; 10–11.9 some acceptable psychometric properties; and 0–9.9 very few psychometric properties reported and/or unacceptable results…The CPOT and the BPS remain the most robust scales for assessing pain in critically ill adults unable to self-
Each has very good psychometric properties with scores of 16.7 and 15.1, respectively. The BPS-NI obtained a psychometric weighted score of 14.8. Although both the BPS and the CPOT have been validated across large samples of medical, surgical, and trauma intensive care units. Each of the other scales considered (i.e., the Face, Legs, Activity, Cry, Consolability; the Non-verbal Pain Assessment Tool; the PAIN; the BOT; the FACES; the Fear-Avoidance Components Scale; and the PAINAD) had low psychometric weighted scores (< 10)” (Devlin, et al., 2018).

The systematic review conducted by Baamer, et al., 2022 concluded that there was no evidence found that any one unidimensional tool has superior measurement properties when assessing post-operative pain. Additionally, psychometric validation studies of functional pain assessment tools are needed to improve pain assessments and management (Baamer, et al., 2022).

Rationale

The framework used for this project was the Focus, Analyze, Develop, and Execute (FADE) model (appendix D). This model best guided this project as it is one that is consistently used for quality improvement within healthcare, as well having the four basic components of the process while also guiding the smaller yet just as important steps within each of the 4 main sections (Duke University School of Medicine, 2021). This makes each step of the improvement project clearer and can allow the project to be tailored to the specific needs of the unit.

In the focus stage, one problem is identified as the one that will be addressed, in this case the problem is sub-optimal initial pain assessments in the PACU. In the analysis stage, influential factors are assessed, and baseline data is collected. This is where it was identified that every nurse was using a different pain assessment tool when performing initial assessments on patients.
The develop stage is when solutions to the problem are created and the most effective one is selected. The solution chosen for this quality improvement project was implementing the CPOT as the standard tool to be used upon patient arrival in PACU. Execution is the final phase of the FADE model. This is when the selected solution was put into action and the results were tracked.

**Specific Aim**

Pain management is one of the main priorities in PACU, yet at this outpatient facility, there was no standard for how to complete a pain assessment upon arrival. Admission pain assessments that were observed ranged from using a FLACC score, to charting “unable to assess” until the patient was awake, a 1-10 scale, or no assessment at all until the patient expresses pain themselves, all depending on the nurse.

The purpose of this quality improvement project is to implement the use of the CPOT, a standardized pain assessment tool to use upon patient arrival to PACU that can be completed regardless of patient presentation. The goal of this project is to educate nurses in a method to thoroughly assess for pain immediately after handoff from the anesthesia provider and operating room nurse to address pain management needs early in the recovery process. The expected outcomes are: patients will experience less severe post operative pain in phase one of recovery, pain will be managed appropriately before getting to the point of extreme discomfort and then nurses and providers are trying to “chase” the pain and catch up with it, and nurses will feel that they are better able to assess pain in both conscious and unconscious patients.

The progress of implementing this tool was tracked on a physical tracking sheet (appendix E) within the unit. The CPOT scoring criteria was hung in each PACU bay along with a tracking sheet where the patient’s age, procedure, and score upon arrival was documented. This protects patient privacy but also shows that it is being implemented and used daily, as well as
identifying trends among age ranges and types of procedures. A pre-intervention and post-intervention survey was also distributed to the PACU nurses as a way to gather baseline data and post-intervention data on their thoughts and feelings regarding current pain assessments.

**Methods**

**Context**

The surgical center that this project was conducted at is comprised of three departments, pre-operative/phase two, intraoperative (OR), and the PACU. Pain assessments and pain management are one of the primary responsibilities of the PACU, so this quality improvement project was focused on PACU alone.

This surgical center performs a wide variety of procedures and treats a variety of patient populations as well. Patient ages range from 6 months to any advanced age if they are otherwise healthy, and an anesthesia provider clears them first. Some of the most common specialties seen here include orthopedics, otolaryngology, plastics (both cosmetic and reconstructive), general, urology, and gynecology.

With such a variety of patients and procedures, patient presentation in the PACU can be drastically different for every single patient. Some would be brought from the operating room awake and alert, and some arrived to PACU unconscious with an airway still in place. This makes conducting an initial assessment a bit challenging, particularly when it comes to a thorough pain assessment.

The surgical center PACU operates Monday-Friday from 7am-6pm and is staffed with fourteen nurses who work rotating days, and one resource nurse and licensed nursing assistant who work fulltime Monday-Friday. Each of the nurses have differing nursing experiences and
backgrounds which contributes to how they approach an initial assessment when getting a new patient from the operating room.

There is currently no standard pain assessment tool that the nurses are expected to use for assessments, and with patients who vary so much in age and level of consciousness, each has found their own way to conduct a pain assessment, leaving the possibility for pain to go untreated or unidentified longer than necessary. This gap in care is what prompted the quality improvement project of implementing the CPOT in the surgical center PACU as the standard for the initial pain assessment.

**Intervention**

The tool that was utilized in this quality improvement project was the CPOT and the intervention was educating the PACU nurses on how to use the CPOT and its benefits. This education took place in an informal face-to-face meeting, and then again on an as needed for nurses who may not have attended the meeting, or nurses who expressed wanting or needing additional information. The CPOT is a very versatile tool that works well in critical care settings, such as the PACU.

While there is a newer pediatric specific version for pediatric intensive care units, the CPOT scoring criteria can be applied to any patient regardless of level of consciousness which is what makes it so effective in the PACU. A comparative study looking at the CPOT versus the behavioral pain scale describes the CPOT as criteria as having, “…four main dimensions, namely, facial expression, body movement, compliance with ventilator (or vocalization for extubated patients), and muscle tension (Nazari, et al., 2022). Each dimension is scored between zero and two, resulting in a possible total score between zero and 8. A score of zero means no
pain whereas scores > two show pain and the necessity for pain management” (Nazari, et al., 2022).

The pain assessment flowsheet tab on the EMR is where PACU nurses currently choose which pain assessment tool they want to use for each 15-minute pain assessment. The EMR can make the CPOT be the pain assessment tool that populates when this section is selected, as well as having the criteria seen in appendix C be listed on the side of the screen for reference as the nurse is conducting the pain assessment. In addition to this, there was a printed copy of the CPOT scale including scoring criteria hung in each of the PACU bays as many nurses conduct their initial assessment while getting report from the operating room nurse and the anesthesia provider. Providing the criteria visually at bedside can increase accessibility as it eliminates the alternative method of reference via computer log-in which can distract nurse attention when simultaneously receiving bedside report.

**Study of the Intervention**

The effectiveness of this intervention can be assessed in a few different ways. Gathering information from the nurses regarding length of stay in PACU, amount of pain medications given on average for certain patient age groups or certain surgical procedures, and how soon the patient can ambulate to transfer to phase two of PACU or be discharged from phase one. For the purpose of this quality improvement project, the area of focus for data collection was qualitative data from the nurses on how adequate they felt their pain assessments were prior to learning about the CPOT, and after, as well as quantitative data about how long they’ve been a nurse and which surgical specialties require the most pain medication to be administered in PACU. When patients can stay ahead of their surgical pain, it leads to a decreased length of time using prescription pain
medications, shorter PACU stays, and sooner initiation of physical therapy or ambulation which is particularly important for joint patients.

A post-data collection survey was given to the PACU nurses as well to determine how practical the CPOT is to use in this setting, as well as if they feel it is making a difference in patient care and outcomes (either positive or negative). Nursing is a field that incorporates both art and science so it is important to collect information based on numbers and pain scores, as well as how the patient recovers overall during their time in PACU. Do the nurses feel long PACU stays due to unmanaged pain are becoming less frequent? Are patients able to start ambulating sooner when medicated earlier? This is information that is crucial when determining if this is an intervention that would be beneficial in keeping as a standard practice or not.

Oftentimes patients are discharged from phase one with “tolerable” pain which they were made aware of prior to surgery because with any surgery the body will know there has been some sort of trauma and discomfort is to be expected, but “tolerable” can range so greatly from patient to patient like the 1-10 pain scale. The use of the CPOT will identify signs and symptoms of discomfort before the patient may even be awake and alert enough to vocalize it so pain management can be initiated sooner based on the nurse and anesthesia provider’s judgement.

Patients do better when they are able to be in their own environment when healing and recovering so the goal is to get them discharged and sent home as soon as safely possible after surgery. The longer they are in PACU waiting on discharge instructions, prescriptions to be sent to the pharmacy, or waiting for their family member/ride to return, the higher risk there is of a new onset of pain that will be much more challenging to manage, rather than getting them home to where they can rest comfortably and start their home medications.

Measures
The data that was collected for this quality improvement project was gathered and organized through a survey platform as well as the tracking sheet with the patient’s age, procedure, and CPOT score upon arrival (along with any post-operative pain medications that were given). This was the most effective way of tracking how often this tool was being used because the number of cases each day could be compared to the number of cases tracked on the sheet. When talking with the key stakeholders (the nurses that would be the one’s doing this documenting), they were in agreement that this would be not only the most straightforward approach and prevent additional charting, but it would allow for the data to be presented in a way that would make patterns easier to identify (CPOT scores based on age, type of procedure, if a nerve block was used, etc.).

The main factor that contributed to the success of this project was staff willingness to participate by recording the data from their patients on the tracking sheet in addition to just recording the CPOT scores in the medical record. If needed, the pain assessment flowsheet for any patient could be accessed if the data were not recorded and could then be added afterwards, but the goal was to track the initial CPOT scores daily, as the patients were arriving to the PACU.

When this quality improvement initiative was first decided on, feedback such as willingness to implement this into their assessment, whether they believed surgery center patients were appropriate candidates to use this tool on, and ease of implementation from the PACU nurses was collected. This feedback was used to determine if this project would gain the support of the people directly involved with the data collection. All the feedback received was positive and the nurses all felt this had the potential to greatly improve patient care, reduce PACU length of stay, and lead to better patient outcomes. A pain assessment would be conducted
on every patient, but all the nurses felt this was a tool that was thorough, simple to use, and the assessment would not be so time consuming that it would take away from patient care.

Nazari, et al. 2022, found that, “An earlier psychometric evaluation of CPOT showed that 91% of a panel of experts confirmed the validity of the instrument and the intraclass correlation coefficients of the instrument and its dimensions were between 0.73 and 0.99. In that study, the scores of CPOT significantly increased during position change and did not change during noninvasive blood pressure measurement, which confirmed the discriminant validity of the instrument” (Nazari, et al., 2022, p. 475). This proves that the CPOT has proven to be an effective tool with other critical care patients and that it could certainly be applied in the surgery center PACU as patients all present differently after surgery and respond to anesthesia differently.

Analysis

Quantitative

The quantitative data that was collected and analyzed included PACU nurse years of experience, the different surgical specialties and procedures performed, and patient age. Continuous data that will be tracked is the patient’s CPOT score upon arrival to PACU, age, and how much (if any) additional pain medications are administered while in phase one of recovery. Discrete data that will be collected is the type of procedure performed as there are orthopedic days, urologic and gynecologic surgery days, and plastic and reconstructive days where many of the same procedures are done based on a specific day.

Qualitative

Qualitative data that was gathered came from the pre- and post-intervention surveys. This also included informal check-ins to gain feedback about how practical the CPOT was to use in
this setting, as well as if they felt it was making a difference in patient care and outcomes (either positive or negative).

Nursing is a field that incorporates both art and science, so it was important to collect information not only based on numbers and pain scores, but also on how the patient recovered overall during their time in PACU. Do the nurses feel long PACU stays due to unmanaged pain are becoming less frequent? Are patients able to start ambulating sooner when medicated earlier? This is information that is crucial when determining if this is an intervention that would be beneficial in keeping as a standard practice or not. If the nurses felt their patients were overall having more difficulties or unmanaged pain due to using this as the pain assessment tool, that was important to know too so a process that is negatively impacting the unit could be stopped.

**Ethical Considerations**

There were no ethical concerns for this quality improvement project. No patient identifiers were used, only the procedure that was done and the patient’s age was recorded for data collection purposes and determining the CPOT’s effectiveness in different age groups having the same procedure. Rather than creating additional charting or documentation for the PACU nurses, the use of the CPOT replaced the many different pain scales used by staff for the initial assessment so it did not take away from the nurse being able to focus on the patient by creating additional charting. The only potential for bias identified was in the qualitative data collected from the nurses on the practicality of implementing this tool, how effective it seemed to be, and if it was leading to positive patient outcomes. This data was identified and disclosed as being qualitative self-responses from the nurses and was used in addition to the quantitative data that was collected based on each of the PACU patients which did not allow for any potential bias. This project was reviewed by the University of New Hampshire Department of Nursing Quality
Review Committee to attest that it meets quality improvement criteria, which is exempt from full Institutional Review Board approval.

**Results**

**Initial steps**

The initial steps of the intervention were to complete a pre-intervention survey with the unit nurses to gain insight as to how effective they feel their pain assessments are on both awake and alert patients, as well as unresponsive patients. This pre-intervention survey also asked what patient population tends to have the most post-operative pain in phase one of recovery, what pain assessment tool they typically use, how long they have been a nurse, and if they have any feedback about improving pain assessments in phase one.

The only modification made was the timeline in terms of length of the pre-intervention, intervention, and the post-intervention periods. The pre-intervention planning phase took one week longer than expected due to delays in survey responses, more pre-intervention observation was required to assess the best way to implement the intervention, and more time to educate the unit staff on CPOT efficacy and accordance with best practice. It was discovered that there was no consistency among nurses about what pain scales were being used, and many were charting “unable to self-report” on patients who were not responsive upon arrival to recovery, which is what lead to the CPOT being chosen as the intervention.

**Process Measures**

To improve pain assessments in the post-anesthesia care unit, the nurses’ feelings regarding their current pain assessment techniques were assessed. Implementation of the CPOT standardizes pain assessments among all patients, regardless of their level of consciousness when they arrive to the PACU. By adequately assessing pain in all patients, not just alert and oriented
ones, post-operative pain can be addressed and managed sooner, leading to better patient outcomes.

The results of the pre- and post-intervention survey were analyzed and are displayed in the chart below. Some questions had responses that were able to be translated into a mean, standard deviation, and variance, where others were a percentage, such as how long the respondent has been a registered nurse. The post-intervention survey reassessed these same questions with the addition of questions based on the implementation phase. This allowed for comparison between their perceptions pre- and post- the implementation of the CPOT as the standard pain assessment tool. The results of the repeated questions were the same, as expected, and the results of the newly added questions were added to a post-survey data chart.

**Figure 1**

*Pre-survey data*
**Question**

How long have you been a Registered Nurse? (Results for this question are just a percentage)

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&lt;5 years</td>
<td>22.22%</td>
</tr>
<tr>
<td>2</td>
<td>6-10 years</td>
<td>55.56%</td>
</tr>
<tr>
<td>3</td>
<td>11-15 years</td>
<td>11.11%</td>
</tr>
<tr>
<td>4</td>
<td>&gt;15 years</td>
<td>11.11%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

My typical initial pain assessment tool is...
(Results for this question are just a percentage)

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wong-Baker PACES</td>
<td>22.22%</td>
</tr>
<tr>
<td>2</td>
<td>Critical Care Pain Observation Tool (CPO)</td>
<td>0.00%</td>
</tr>
<tr>
<td>3</td>
<td>Numerical Scale</td>
<td>55.56%</td>
</tr>
<tr>
<td>4</td>
<td>Behavioral Pain Scale</td>
<td>22.22%</td>
</tr>
<tr>
<td>5</td>
<td>Other</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

I feel my initial post-operative pain assessment on alert and oriented patients is...

| 5.00 | 0.00 | 0.00 |

I feel my initial post-operative pain assessment on unresponsive patients is...

| 3.44 | 1.07 | 1.14 |

In your experience, what type of surgical patients have the most pain in Phase 1 of recovery?

| 5.11 | 1.66 | 2.77 |

(77.78% ENT, 22.22% Plastic/Reconstructive, 0% others)
<table>
<thead>
<tr>
<th>Question</th>
<th>Pre-Mean</th>
<th>Std Deviation</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>In your experience, what patient population experiences the greatest amount of post-operative pain (1 being the most, 7 being the least)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young adult females (18-35)</td>
<td>1.89</td>
<td>0.74</td>
<td>0.54</td>
</tr>
<tr>
<td>Pediatrics (&lt;18)</td>
<td>5.56</td>
<td>1.07</td>
<td>1.14</td>
</tr>
<tr>
<td>Young adult males (18-35)</td>
<td>1.67</td>
<td>0.94</td>
<td>0.89</td>
</tr>
<tr>
<td>Middle aged males (36-65)</td>
<td>2.67</td>
<td>0.67</td>
<td>0.44</td>
</tr>
<tr>
<td>Geriatric males (&gt;65)</td>
<td>6.44</td>
<td>0.68</td>
<td>0.47</td>
</tr>
<tr>
<td>Middle aged females (36-65)</td>
<td>4.00</td>
<td>0.82</td>
<td>0.57</td>
</tr>
<tr>
<td>Geriatric females (&gt;65)</td>
<td>5.78</td>
<td>0.79</td>
<td>0.52</td>
</tr>
</tbody>
</table>

**Figure 2**

*Post-Survey Data*
<table>
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<tr>
<th>Question</th>
<th>Post-Mean</th>
<th>Std Deviation</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>How long have you been a Registered Nurse? (Results for this question are just a percentage)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My typical initial pain assessment tool is... (Results for this question are just a percentage)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel my initial post-operative pain assessment on alert and oriented patients is...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel my initial post-operative pain assessment on unresponsive patients is...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In your experience, what type of surgical patients have the most pain in Phase 1 of recovery?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&lt;5 years</td>
<td>22.22%</td>
</tr>
<tr>
<td>2</td>
<td>6-10 years</td>
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<tr>
<td>3</td>
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<tr>
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<td>11.11%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wong-Baker FACES</td>
<td>22.22%</td>
</tr>
<tr>
<td>2</td>
<td>Critical Care Pain Observation Tool (CPOST)</td>
<td>0.00%</td>
</tr>
<tr>
<td>3</td>
<td>Numerical Scale</td>
<td>55.56%</td>
</tr>
<tr>
<td>4</td>
<td>Behavioral Pain Scale</td>
<td>22.22%</td>
</tr>
<tr>
<td>5</td>
<td>Other</td>
<td>0.00%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

5.00 0.00 0.00

3.44 1.07 1.14

5.11 1.66 2.77
(77.78% ENT, 22.22% Plastic/Reconstructive, 0% others)
<table>
<thead>
<tr>
<th>Question</th>
<th>Post-Mean</th>
<th>Std Deviation</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>In your experience, what patient population experiences the greatest amount of post-operative pain (1 being the most-7 being the least)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young adult females (18-35)</td>
<td>1.89</td>
<td>0.74</td>
<td>0.54</td>
</tr>
<tr>
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<td>1.14</td>
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<td>1.67</td>
<td>0.94</td>
<td>0.89</td>
</tr>
<tr>
<td>Middle aged males (36-65)</td>
<td>2.67</td>
<td>0.67</td>
<td>0.44</td>
</tr>
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<td>6.44</td>
<td>0.68</td>
<td>0.47</td>
</tr>
<tr>
<td>Middle aged females (36-65)</td>
<td>4.00</td>
<td>0.82</td>
<td>0.67</td>
</tr>
<tr>
<td>Geriatric females (&gt;65)</td>
<td>5.78</td>
<td>0.79</td>
<td>0.62</td>
</tr>
<tr>
<td>After learning about the CPOT, what is your preferred pain assessment tool for alert and oriented patients?</td>
<td>3.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(numerical pain scale)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After learning about the CPOT, what is your preferred pain assessment tool for unresponsive patients?</td>
<td>1.46</td>
<td>0.50</td>
<td>0.25</td>
</tr>
<tr>
<td>(BPS 6, CPOT 7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you see yourself continuing to use the CPOT for alert and oriented patients?</td>
<td>1.31</td>
<td>0.46</td>
<td>0.21</td>
</tr>
<tr>
<td>Do you see yourself continuing to use the CPOT for unresponsive patients?</td>
<td>3.08</td>
<td>0.47</td>
<td>0.22</td>
</tr>
<tr>
<td>Did you find yourself intervening (pharmacological or non-pharmacological) more, less, or about the same in regards to pain management when using the CPOT as your initial pain assessment?</td>
<td>2.31</td>
<td>0.46</td>
<td>0.21</td>
</tr>
</tbody>
</table>
Contextual Elements

Contextual elements that interacted with the implementation phase of the intervention include communication and willingness to participate. Communication was key during the planning process because education was needed to inform the nurses about what the CPOT is and how it is used. Communication also influenced the intervention as the Project Lead promoted face-to-face communication through on-unit presence. This is also where willingness to participate was important as without nurse buy-in, there would be no data to analyze and ultimately determine if the CPOT was successful or not.

Associations

The association between the intervention (implementing the CPOT as the standard pain assessment tool upon arrival to PACU) and the intended outcome (consistency in pain assessment tools) was that by using the CPOT, all patients regardless of their status upon arrival to the PACU would be assessed using a tool that could be applied to all patient populations. The goal of this intervention was to identify pain sooner in both conscious and unconscious patients so that it could be addressed, treated, and managed, leading to better patient outcomes in phase one of recovery. Awake and alert patients can vocalize pain or discomfort, while unresponsive
patients cannot. By using an assessment tool that can be applied to sedated patients, their pain could be treated before they are awake, and the pain has intensified.

**Unintended Consequences**

An unintended problem that occurred during the implementation phase was the onboarding of a new nurse. The PACU staff were aware of this quality improvement project for three months prior to the initiation of the implementation phase. They had been informed of what it would entail, and the nurses also knew what to expect on the unit and from the patients, unlike the unfamiliar staff member who started orienting in the middle of the implementation phase.

The newly hired nurse was also hired as a per diem which resulted in shift inconsistency and zero shifts when project lead was physically on the unit implementing the intervention. Any staff with a hire date later than the start of the implementation phase was not part of the pre- or post-survey data.

**Missing Data**

In an attempt to improve the number of survey responses for the post-intervention survey, paper copies of the survey were provided as well, and an anonymous folder was available to leave the responses in which. Responses done on paper were then manually entered into the survey platform. The post-intervention survey data validates the intended outcomes of the project and shows that implementing the CPOT did have benefits for the unit, though those benefits were limited to unconscious patients and there was a preferred tool available for conscious patients.

**Discussion**

**Summary**
During the many phases of this quality improvement project, there were findings guiding the process. Utilizing these findings allowed the project to be altered to ensure the most successful outcome possible. During the planning phase, a key finding was that there was no standardized pain assessment tool being used. This is what prompted the CPOT to be identified as a quality improvement intervention.

During the implementation phase, a key finding was that 25% of nurses surveyed felt that their pain assessment on sedated and unresponsive patients could be improved. This speaks to the importance of having a pain assessment tool that can thoroughly assess patients unable to self-report pain. While the survey was completely anonymous, >50% of the nurses surveyed had over five years of nursing experience. This shows that even nurses who are well into their career at the bedside still feel that their pain assessments could be improved for this population of patients.

At the conclusion of the implementation phase, feedback will be collected in a post-survey. The results of this survey helped identify important key findings because of this intervention. The results of the post-survey helped determine if this intervention is something that will continue to be used or not.

**Specific Aim Relevance**

The specific aim of this quality improvement project was to, “implement the CPOT, a standardized pain assessment tool to use upon patient arrival to PACU that can be completed regardless of patient presentation. The goal of this project was to educate nurses in a method to thoroughly assess for pain immediately after handoff from the anesthesia provider and operating room nurse to address pain management needs early in the recovery process. The expected outcome was that patients will experience less severe post operative pain in phase one of
recovery, and pain will be managed appropriately before getting to the point of extreme discomfort and then nurses and providers are trying to “chase” the pain and “catch up with it.” This specific aim has been partially attained because the CPOT was successfully implemented during the execution stage, although the post-survey revealed that there is a better tool for pain assessments on patients who are alert and oriented (numerical pain scale).

**Project Strengths**

Strengths of this project include having strong stakeholder buy-in, a varied population of patients for the intervention to be applied to, and staff willing to provide feedback on the project and benefits and weaknesses they have observed during it. Stakeholder buy-in was extremely important when planning the intervention implementation. If the staff did not feel that the intervention had the potential to benefit patients, they would not have been willing to participate in the implementation of the new pain assessment tool.

Stakeholder buy-in connects to the importance of staff being willing to provide feedback as well. If the nurses who participated in the implementation were not willing to provide feedback throughout the quality improvement process, it would have likely been much less successful. The feedback allowed the planning process to be more thorough, it encouraged nurses to be active participants in the implementation, and it allowed their patient care experience to be incorporated making it a smoother transition.

Having a variety of patients in this setting allows the intervention to be implemented and truly tested as a standard for pain assessments. By using it to assess all ages and types of surgeries, its effectiveness can truly be determined through the results. If the population of patients was narrowed, the pain assessment tool could further evaluate efficacy (or lack of) for that specific group.
Interpretation

Association Between Intervention and Outcome

The intervention for this quality improvement project was implementing the CPOT as the standard for initial pain assessments in the post anesthesia care unit. The outcome of using a standardized pain assessment tool for the initial assessment was more thorough and accurate pain assessments on patients who are both conscious and unconscious upon arrival to PACU. This intervention allows for pain to be identified and managed sooner, creating a positive outcome for patients.

Comparison of Results

While there is not much research regarding the use of the CPOT as a standard pain assessment tool in PACU, the observations made during the implementation phase were similar to findings in the Acute Pain Assessment in Sedated Patients in the Post Anesthesia Care Unit article. This study found that the vocalization indicator (ventilator compliance for intubated, and actual vocalization for extubated patients) of the CPOT was most indicative of pain in post-operative patients. Each section of the CPOT scoring criteria can help the nurse identify pain in patients, but the vocalization section seemed to be the most accurate when identifying pain.

Impact of Quality Improvement Project

The impact of this quality improvement project on the PACU was that more thorough and accurate pain assessments were being conducted on both conscious patients, and patients who were sedated still and could not verbalize pain. Pain that is addressed and managed sooner is a positive patient outcome, and it allows for a smoother discharge process. This quality improvement project shows that though there are many pain assessment tools, having one
standard tool for an initial assessment that can be applied to any patient is beneficial for both staff and patients.

**Anticipated Versus Observed Outcomes**

The anticipated outcome of this intervention was more thorough, accurate, and timely pain assessments on all PACU patients, regardless of level of consciousness upon arrival. The observed outcome of this quality improvement project was the same as what was anticipated. Nurses expressed in the post-intervention survey that their pain assessment skills on unconscious patients were stronger than before as they now knew what non-verbal indicators might be a response to pain. One different outcome than anticipated was that nurses did not feel that the CPOT was the best pain assessment tool available for patients who could vocally communicate their pain.

**Costs**

There was no cost associated with this quality improvement project. The CPOT is a pain assessment tool built into the electronic health record so the assessment can be conducted and documented by the nurse, without purchasing any additional materials or software. The implementation of this intervention required a bit of education for the unit, but the staff was eager to learn how their post-operative pain assessments could be improved for both conscious and unconscious patients. While education did not create a monetary cost, there was a cost in terms of time to teach the unit, however the eagerness and willingness of the staff proved that it was an effective use of time.

**Limitations**

**Limits to Generalizability**
The findings of this quality improvement project would likely be very similar in another geographical region. The main benefit of the CPOT is that it is an objective tool that can be used on nearly all patients. This allows it to be an effective pain assessment tool regardless of the type of unit, the patient, or the procedure they had performed.

**Factors Impacting Validity**

There is minimal bias when using the CPOT. The scoring criteria is straightforward and objective. When subjective data is used, such as the numerical pain scale or behavioral pain scale, there is more of a chance of altered validity because every patient and nurse could have differing definitions and interpretation of a painful sensation. Data collected was how thorough the nurses felt their pain assessments were using previous pain assessment tools versus how they felt about their assessments after using the CPOT as the initial pain assessment, which patients typically experience the most post-operative pain, and if they feel the CPOT had a positive impact on patients and their pain management. This data is qualitative versus the quantitative CPOT scores, and each is valid when looking at the outcome of this project.

**Minimization of Limitations**

Limitations were minimized by choosing a tool that could be applied to any unit or patient, one with clear criteria, and little to no room for misinterpretation on the nurse’s part when conducting the pain assessment. Choosing a tool that required no additional charting compared to the reported most used pain scales (numerical, behavioral, FLACC) was also a way to ensure nurse participation, as well as making sure nurses were not “rushing through” the scoring criteria, but taking the time to conduct thorough assessments and not skipping pain assessments altogether until the patients were able to verbally express pain.

**Conclusion**
Usefulness of the Work

Efforts to improve pain assessments is something of utmost importance in healthcare. The comfort of patients is directly related to their outcomes, length of stay, long term recovery, and chance of readmission. While this project's findings were promising when it comes to improving pain assessments, there is still more research and room for improvement. This project gave PACU nurses the tools and education necessary to better assess unconscious patients for pain as soon as they arrive from the operating room.

Sustainability

Implementation of the CPOT is a very sustainable quality improvement initiative. Based on the findings and stakeholder experience, minor changes may need to be made, such as not using the CPOT as the standard for alert and oriented patients and instead using it as the preferred method for unconscious patients. The electronic medical record can have the CPOT be the automatically populated assessment tool on the documentation page, allowing for more efficient charting.

Potential for Spread to Other Context

The use of the CPOT has been discussed in multiple settings, typically intensive care and PACUs, but it could also be applied in the emergency room, intraoperatively, and even in interventional radiology and cardiology labs. Any unit where a patient is receiving any amount of sedation has the potential for loss of consciousness, or pain management is imperative could utilize the CPOT as a way of assessing for pain.

Implications for Practice

The continued use of the CPOT as the initial pain assessment tool on unconscious patients will allow for better and more timely pain management in phase one of recovery. In
outpatient surgery, the goal is for patients to move through the phases of recovery and to be discharged as efficiently and as safely as possible. Addressing their pain management needs as soon as they start the recovery process is the first step in safely starting the discharge process.

**Suggested Next Steps**

Suggested next steps to continue improving post-operative pain assessments is to continue educating facility nurses about the CPOT and explain how it has proven to be an effective pain assessment tool for patients who have yet to regain consciousness. Expanding the use of the CPOT to other units and settings would also allow for more evidence of its benefits to be collected because of the wide variety of patients it can be applied to.
References


Appendices

Appendix A

PRISMA Flowsheet
Appendix B

Non-Verbal Pain Scale

<table>
<thead>
<tr>
<th>Categories</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face</td>
<td>No particular expression or smile.</td>
<td>Occasional grimace, tearing, frowning, wrinkled forehead.</td>
<td>Frequent grimace, tearing, frowning, wrinkled forehead.</td>
</tr>
<tr>
<td>Activity (movement)</td>
<td>Lying quietly, normal position.</td>
<td>Seeking attention through movement or slow, cautious movement.</td>
<td>Restless, excessive activity and/or withdrawal reflexes.</td>
</tr>
<tr>
<td>Guarding</td>
<td>Lying quietly, no positioning of hands over areas of body.</td>
<td>Splinting areas of the body, tense.</td>
<td>Rigid, stiff.</td>
</tr>
<tr>
<td>Physiology (vital signs)</td>
<td>Stable vital signs</td>
<td>Change in any of the following: * SBP &gt; 20 mm Hg. * HR &gt; 20/minute.</td>
<td>Change in any of the following: * SBP &gt; 30 mm Hg. * HR &gt; 25/minute.</td>
</tr>
<tr>
<td>Respiratory</td>
<td>Baseline RR/SpO\textsubscript{2} Compliant with ventilator</td>
<td>RR &gt; 10 above baseline, or 5% (\downarrow) SpO\textsubscript{2} mild asynchrony with ventilator</td>
<td>RR &gt; 20 above baseline, or 10% (\downarrow) SpO\textsubscript{2} severe asynchrony with ventilator</td>
</tr>
</tbody>
</table>
### CPOT Scoring Criteria

### Critical Care Pain Observation Tool

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial expression</td>
<td>No muscular tension observed</td>
<td>Relaxed, neutral</td>
</tr>
<tr>
<td></td>
<td>Presence of frowning, brow lowering, orbit tightening, and levator contraction</td>
<td>Tense</td>
</tr>
<tr>
<td></td>
<td>All of the above facial movements plus eyelid tightly closed</td>
<td>Grimacing</td>
</tr>
<tr>
<td>Body movements</td>
<td>Does not move at all (does not necessarily mean absence of pain)</td>
<td>Absence of movements</td>
</tr>
<tr>
<td></td>
<td>Slow, cautious movements, touching or rubbing the pain site, seeking attention through movements</td>
<td>Protection</td>
</tr>
<tr>
<td></td>
<td>Pulling tube, attempting to sit up, moving limbs/or thrashing, not following commands, striking at staff, trying to climb out of bed</td>
<td>Restlessness</td>
</tr>
<tr>
<td>Muscle tension</td>
<td>No resistance to passive movements</td>
<td>Relaxed</td>
</tr>
<tr>
<td>Evaluation by passive flexion and extension of upper extremities</td>
<td>Resistance to passive movements</td>
<td>Tense, rigid</td>
</tr>
<tr>
<td></td>
<td>Strong resistance to passive movements, inability to complete them</td>
<td>Very tense or rigid</td>
</tr>
<tr>
<td>Compliance with the ventilator (intubated patients)</td>
<td>Alarms not activated, easy ventilation</td>
<td>Tolerating ventilator or movement</td>
</tr>
<tr>
<td></td>
<td>Alarms stop spontaneously</td>
<td>Coughing but tolerating</td>
</tr>
<tr>
<td></td>
<td>Asynchrony: blocking ventilation, alarms frequently activated</td>
<td>Fighting ventilator</td>
</tr>
<tr>
<td>Vocalization (extubated patients)</td>
<td>Talking in normal tone or no sound</td>
<td>Talking in normal tone or no sound</td>
</tr>
<tr>
<td></td>
<td>Sighing, moaning</td>
<td>Sighing, moaning</td>
</tr>
<tr>
<td></td>
<td>Crying out, sobbing</td>
<td>Crying out, sobbing</td>
</tr>
</tbody>
</table>
Appendix D

FADE Model
Appendix E

*Tracking Sheet*

<table>
<thead>
<tr>
<th>Patient Age</th>
<th>Procedure (include side and any nerve blocks)</th>
<th>CPOT Score upon initial assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex. 62 years</td>
<td>Left total hip with spinal</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>