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Supporting Nurse Education in the Implementation of a Pediatric Delirium Assessment Protocol in the Pediatric Intensive Care Unit

Lucy Camarena, RN, BSN, CNL, CPN, PHN
lcamarena122@gmail.com

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University of San Francisco

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The incidence of delirium in the pediatric acute care setting is becoming more widely known, prompting the need for appropriate tools to prevent and manage this deteriorating condition that can prolong hospital stays and even cause mortality. Williams (2016) defines delirium as "a syndrome of acute brain dysfunction…a disturbance of consciousness and cognition with inattention that develops acutely and fluctuates over time" (p. 8). She considers that although the incidence of delirium has been well researched in the adult population, the best treatment plan has yet to be formed for the pediatric population (Williams, 2016). There is a need for a complete pediatric delirium care plan—including the identification, management and treatment of delirium. In many instances delirium is viewed by health care providers as simply a restless child that needs to be sedated—in the case of hyperactive delirium (Williams, 2016). On the other hand, those patients with hypoactive delirium who present with "apathy, a depressed level of consciousness and withdrawal from the environment" are often neglected in the belief that they are "easy" patients. (Smith, Brink, Fuchs, Wesley & Pandharipande, 2013, p. 745). Several studies demonstrate the need to educate healthcare providers about the prevention, identification and management of delirium in children.

Respectively, nurses are the frontline providers for patients; spending time assessing changes, making them the most qualified to evaluate patients for delirium. However, Flaigle's, Ascenzi's and Kudchadkar's (2015) qualitative study assessing nurses' knowledge regarding screening and prevention of delirium demonstrated a need for education about delirium. Nurses' knowledge about prevention and management of delirium was found to be minimal because of the absence of attention it has received thus far. Of 105 nurses who answered the questionnaire,

provided by Flaigle et al., (2015) only one nurse answered all questions correctly, further indicating need for education regarding delirium. But, more than 90% identified a poor diet and dehydration as risk factors, as well as, knowing the three types of delirium that exist (Flaigle et al., 2015). Risk factors for delirium include requirement for mechanical ventilation and sedation used, immobility, poor nutrition and disruption of sleep-wake cycles (Flaigle et al., 2015). Given these points it is evident that there is a need for a delirium assessment protocol for pediatric intensive care unit (PICU) patients to become permanent as more patients are at risk and are being managed incorrectly—attributing their behaviors to other factors (Williams, 2016). In this change strategy, the goal is to educate PICU nurses on how to prevent, assess for and treat delirium by using one-to-one and group education. The protocol (Pediatric Delirium Assessment Protocol Using Cornell Assessment of Pediatric Delirium, Appendix A) can be easily integrated into current assessments and will aid nurses in identifying delirium and reporting it to the care team. The long-term goal of this project is to decrease days spent in the PICU by treating both the physical and emotional components of the patient.

Clinical Leadership Theme

My change project focuses on the Clinical Nurse Leader (CNL) as an educator, in mastering the CNL competency of Clinical Outcomes Manager. The American Association of Colleges of Nursing (AACN, 2013) defines the Clinical Outcomes Manager as an individual who assesses the microsystem, then uses data to design a change project to increase optimal patient outcomes. As the CNL, I aim to improve the assessment, identification and prevention of pediatric delirium in the PICU at UCSF Benioff Children's Hospital Oakland (BCHO) by having 75 of 100, 75%, PICU staff nurses attend a mandatory delirium class and have one-on-one education of delirium via the CNL and super users by the end of summer 2017. This goal will

also include the proper understanding and implementation of a delirium assessment tool to be

used every shift by 85% of PICU nurses who received additional education via the CNL and

super users.

Statement of the Problem

Assessment of pediatric delirium is an underdeveloped topic in the PICU at BCHO. Until

three months ago, pediatric delirium was not regularly assessed for by the PICU nurse. There

was no official protocol for the assessment, prevention and treatment of delirium in the PICU.

The psychiatrist had not been regularly consulted in patient cases that involved behavioral

changes due to prolonged sedative and opioid use. The needs assessment of the unit, nurses and

doctors confirmed the need for nurse education regarding the pediatric delirium assessment

protocol. This education will aid nurses in identifying delirium, and in initiating a discussion

concerning treatment with the care team. During the needs assessment, I surveyed (Pre-

intervention Nurse Survey, Appendix B)**,** nurses about their delirium knowledge—its

assessment, prevention and treatment. My results concluded that 52 of 75, 70%, PICU nurses did

not consider delirium when caring for an agitated patient that had previously been intubated and

on sedatives. All 75, 100%, nurses were not aware delirium could occur in infants younger than

12 months. Contributing to this problem is the resistance nurses posed in not seeing the need for

an added assessment to their required charting; they would rather spend more hands-on time with

the patient. In the CNL role, I identified a need for PICU nurses to be able to identify the

difference between an agitated or calm patient versus a hyper- or hypoactive delirious patient.

The assessment identified not only an increase in misdiagnosis of delirium, but also over

utilization of benzodiazepines when treating hyperactive delirium. The benzodiazepines included

diazepam, lorazepam and midazolam. The nurses were administering these as needed (PRN)

medications shortly after an intubated patient started moving, instead of using non-pharmacological calming interventions first.

Additionally, resistance was anticipated among some staff nurses in addressing these findings because habitually the initial plan of care in the PICU patient includes optimal sedation to aid in healing the body. Resolving the potential for delirium was found to come second. Nurses considered hands-on care to take precedence over charting assessments. Porter (2016) emphasizes the need for early identification of delirium in the pediatric patient because it is considered a psychiatric emergency in the developing brain.

Other potential barriers include obtaining the time needed to educate each nurse about the new protocol and nurses' compliance given all their other tasks. In addition, there may be resistance from doctors to changing medications. Compiled with this is the cost that initiating a new protocol entails in training hours. To manage these barriers, I will need to receive the support of the nurse manager who will be responsible for approving training time and serve as liaison with the doctors. On the other hand, incentives to push this change forward include reducing hospital stays, which reduce PICU costs, improving rates of successful discharges and overall safety for all of our patients.

Project Overview

The goal of this project is to improve the assessment, identification and prevention of pediatric delirium by increasing the use of the new pediatric delirium protocol by providing group and one-on-one education to 75 of 100 PICU nurses, and having 85% of those nurses properly implementing the tool every shift. I, as the CNL, will be conducting a quasi-experiment to determine the effectiveness of the educational intervention.

Conducive to increasing the awareness of delirium in the pediatric population, the pediatric delirium assessment protocol will be included as part of a mandatory skills class for all PICU nurses. This will allow increased coverage of nurse education. These nurses will have the opportunity to learn about pediatric delirium, as well as the new protocol. By including pediatric delirium education into this already mandatory class, time and money can be saved, decreasing the overall cost of this change project.

Initiating this new practice begins with the use of the Cornell Assessment of Pediatric Delirium (CAPD) tool each shift in evaluating patients. To be successful in using this tool, PICU nurses must have the proper knowledge regarding delirium. The bedside nurse will be expected to complete the CAPD, at least once at the end of his or her shift, and report any score above 0 to the PICU care team. The change project is successful and will end when this tool is being used during daily care team rounds to create a plan for prevention or treatment of further delirium.

By educating and supporting staff nurses with this new protocol process, I expect to: (1) decrease the risk factors for developing delirium (2) identify symptoms and behaviors of delirium early in the hospital stay (3) decrease length of stay in the PICU, and (4) improve patient outcomes where a diagnosis of delirium is present. It is important to work on this now because I have identified (1) an increase in misdiagnosis of agitation versus a delirium diagnosis, (2) an increase in use of benzodiazepines for sedation without regard to length of use (3) a deficit in knowledge about pediatric delirium in nurses, and (4) a need for a standardized care plan to treat patients with delirium at BCHO.

Rationale

After conducting a root cause analysis (Appendix C Fishbone Diagram), using pre-intervention nurse surveys (Appendix B), as well as, a SWOT analysis (Appendix D) it was

concluded that delirium was being caused by the medical interventions necessitated at the time of admission, the hospital environment, and nurses' minimal knowledge of delirium prevention tools. Because BCHO is a Level I trauma center in the Bay Area, many of the patients admitted to the PICU will require extensive medications to keep them sedated, while at the same time managing their pain. Unfortunately, these medications can lead to the development of delirium, regardless of the patient's age (Williams, 2016).

In an article published by Drugs and Therapy Perspectives, (2009) the prevention of delirium was found to be the most effective intervention, as opposed to treating and reversing its symptoms. This prevention can be accomplished by providing support and orientation to the patient, providing an environment free of unnecessary objects and ensuring patient maintains his or her autonomy while in the hospital. Per the data collected from 75 of 100 PICU nurses of varying nursing experience, 95% identified risk factors for delirium as including loud noises, bright lights and an interruption in sleep/wake cycle. On a scale from 1-10, with ten being the most knowledge, the average answer with regards to placing one's knowledge of delirium and its risk factors on a scale was a four. These nurses identified increased education before, during and after their shifts to be the most favorable times for education to occur. They identified an inability to come to classes on their days off to be a barrier to increased education time.

Likewise, the SWOT analysis was reassuring because it identified strengths and opportunities congruent to the aim. These included the involvement of key stakeholders in the planning process, the creation of a protocol in the electronic health record and support from the PICU educator who could facilitate the education process. This analysis also recognized time limitations in educating and completing the CAPD tool, as well as, knowledge deficit in preventing delirium as weaknesses to the project goal.

Cost Analysis

Moreover, the cost analysis identified the average cost of stay for a patient in the ICU to be roughly between $3000 and $5000 per day. When a patient is on the unit longer than anticipated with no need for qualifying PICU medical interventions, the unit starts to lose money. The patient population at BCHO is primarily government based health insurance that does not reimburse for a patient's hospital stay if they have been cleared of physical medical conditions. The cost of incorporating a pediatric delirium assessment protocol to the daily assessments performed by each nurse in the PICU is minimal compared to the projected savings to the unit in the long-term, as evidenced by the cost analysis—provided that the nurse is educated properly. The goal of this protocol is not only to benefit the patient in decreasing their length of stay by preventing delirium, but also helping the unit from incurring unnecessary charges that can add up when a patient's physical needs have been met, but still need to be in the hospital for mental needs, such as delirium. Holmes (2009) defines delirium as a complication of physical illness and thus claims a discrepancy between official diagnosis of delirium and its reimbursement. He further analyzes international classification of diseases (ICD) codes to implicate that mental health codes do not carry additional reimbursement if associated as a complication of physical illness (Holmes, 2009).

Currently the key stakeholders for this change project include two PICU doctors, the PICU Educator, PICU Manager, PICU Clinical Nurse Specialist (CNS) and me (CNL). Most of these BCHO employees are paid through salary, yet their time is valuable and every moment they spend developing delirium education is a moment taken away from another project. Most of the delirium education will occur at the mandatory PICU skills class, at this class I will be able to simultaneously educate 60 nurses, based on the number of nurses who have registered for the

class. By incorporating pediatric delirium into the PICU mandatory skills class, time and money will be used effectively. Because this day is mandatory, nurses will get paid for at least four hours of their base pay. Their base pay can range from as low as $55 to $100 per hour, to include up to 100 nurses currently working for the PICU. Since these quarterly in-service opportunities are already allotted for in the PICU budget, time and money will be saved by providing the majority of education at this time.

Overall, the benefit of decreasing delirium in the PICU outweighs the minimal monetary costs. The initial cost of educating the nurses will cost roughly between $10,000-12,000, accounting for mandatory class time. For every patient that delirium can be prevented in, the PICU saves at least $3000 per day in PICU expenses. Over the course of a year, even if this change project just prevented one case of delirium per month the PICU would be saving at least $36,000 assuming delirium only delays discharge by one day. The net balance would be roughly $24,000 in savings for one year, for preventing one case per month, if the stay only extended by one day. After the initial education is provided, the savings for decreasing length of stay will continue, thus increasing the total savings for the unit. The benefit could be even greater if a delirium prevention care plan could be applied when the patient is admitted.

Methodology

Following the needs assessment and analyses, I formulated an educational intervention focused on teaching PICU nurses about the incidence of delirium, including its definition, assessment, prevention and treatment. The intervention includes two major components. One is to conduct nursing rounds on each shift in which I first assess what the nurse knows about delirium, and then explain the purpose and need of the pediatric delirium assessment protocol. This will also include troubleshooting any problems nurses have encountered in assessing,

charting or communicating delirium findings. Secondly, I will be hosting a station at the PICU

skills class which will allow me to reinforce my one-on-one teaching. Once there are nurses who

feel confident in their understanding of delirium and its place in the PICU, I will ask them to join

our committee as "super users." Super users are people who have a clear understanding of the

topic at hand, or are experts in the topic, and can aid me in educating others. This will allow for

greater coverage in achieving the project goal. The whole of the action plan will take

approximately six months, first to trial the delirium assessment, then incorporate it into the

electronic health system, and lastly build a roadmap for managing these patients.

To provide for an effective change, an appropriate change theory is needed to keep the

goal in line—in this case I will be utilizing Ronald Lippitt's Change Theory, involving seven

phases, (Mitchell, 2013). I chose to incorporate this change theory as it is consistent with the

nursing process and provides a structured framework. The seven phases include "diagnosing the

problem, assessing the motivation and capacity for change, assessing leaders' motivation and

resources, selecting an objective, choosing an appropriate change agent, maintain the change and

terminating the helping relationship" (Mitchell, 2013, p. 33) (Appendix E Ronald Lippitt's

Change Theory). With these seven steps, I will assess the readiness for change on the unit and

evaluate the effect of the change in a timely and organized manner. Lippitt's Theory is most

valuable because it allows for the assessment of motivation, which was identified as a barrier

interfering with changes during my SWOT analysis. While it may seem that seven phases are

complicated when planning a change, just the opposite is true; with each phase comes the

opportunity to plan most details of a change plan specifically rather than a broad idea. The

detailed plan will be more effective in keeping all stakeholders on target. To apply this theory,

the stakeholders and I will create a plan using the seven phases, editing as needed while putting

the change agent into effect. Pediatric delirium is still a new topic in the PICU; my assessment demonstrates the need for education, as well as, applying the knowledge nurses already have about this important topic.

Phase one is the need for a pediatric delirium protocol which has been identified. Phase two is the assessment of motivation and capacity for change of staff nurses through a pre-intervention survey. The nurses with the most confidence in properly assessing and preventing delirium will be asked to become super users. Phase three will assess for the change agent's willingness to adjust the plan of care to include screening for delirium. Phase four moves on to more of an action stage. I will select an objective from which to measure our progress. My role as change agent in phase five will be to audit staff nurses' compliance in using the assessment tools for identifying delirium. Education to patients' families at bedside about the possibility of delirium will also be conducted. I will be creating a flyer that will have the most recent information for family members to learn and understand more about their child. Most importantly, and phase six, will be maintaining the change, this meaning that the pediatric delirium protocol will earn momentum leading to a long-term change. In conclusion, phase seven is to end the pediatric delirium committee; however, a small group of stakeholders will still be invested in auditing patient charts to ensure continued, proper use of the pediatric delirium assessment protocol. This same small group will continue to reinforce the education initially given to PICU nurses.

After spending time on all shifts in the PICU making rounds with the nurses asking questions about risk factors, the definition of delirium, how to assess for it, usefulness of the CAPD assessment tool, its ease of use and other concerns voiced by the nurses, I will repeat the rounds, but this time I will be providing education on the concerns the PICU nurses voiced. I will

also be providing this education during our mandatory PICU skills class. My goal is to have one-on-one education with at least 75% of PICU nurses, and have them correctly identify delirium risk factors at least once during their shift, 85% of the time.

Literature Review

Following my literature review related to pediatric delirium and nursing knowledge about delirium, I collected evidence based data supporting a project focused on the educational need of nurses in the PICU. While there are not many research studies currently in place regarding prevention and treatment of delirium in the pediatric population, those that exist correlate with one another. In my search for evidence based practice I used the following PICO statement: Does providing one-on-one nurse education and a class on delirium decrease nurses' shortfall in knowledge of pediatric delirium, while also increasing the assessment, knowledge and prevention of delirium in pediatric patients? The first task is to identify the obstacles related to implementing a change project whose initial aim will appear to be an increase in nurse workload. These obstacles include a deficiency in knowledge about delirium, including its risk factors, identifying best methods of educational intervention, best tools to recognize delirium and finally the steps in which to implement the change for it to be successful.

Kelly and Frosch (2012), sought to find out the frequency with which pediatric patients were correctly being diagnosed with delirium and if this diagnosis was added to their problem list at discharge. They discovered that of a total of 64,000 patients between 2003 and 2011, only 515 were referred to psychiatry by the PICU team. Of this 515, six were diagnosed with delirium. Psychiatry found 47 additional patients that were not referred. Behavior that prompted referral to psychiatry included aggression, psychosis, depression, change in mental status, anxiety, somatization and pseudoseizures. Only eight of the 53 patients diagnosed with delirium

had this diagnosis on their discharge problem list. Although the overall findings of this study confirmed that delirium was underdiagnosed, all the patients that were referred did have delirium. The study also identified a need for proper documentation about delirium.

In the article by, Doucette et al., (2016), the need for an established best practices protocol in the PICU comparable to the adult setting is identified. The authors claim the lack of assessment and ability to recognize delirium comes from a lack of knowledge about this disease from those caring for pediatric patients. Often misdiagnosis occurs because of the similar symptoms between delirium and behavioral changes unrelated to delirium. They argue that ignorance in the clinical manifestations and "clinical significance" of delirium often causes undesirable cognitive impairments in patients (Doucette et al., 2016, p. 19). Similarly, Sakuramoto, Subrina, Unoki, Mizutanis and Komatsu (2015) piloted a cohort study identifying the short term cognitive impairment that may occur with the presence of delirium in the ICU. They found that 19% of the 79 patients in the study were identified to have some sort of cognitive impairment at the time of discharge as a secondary effect of delirium during their hospital stay; the extent of the impairment correlated with the time in a state of delirium (Sakuramoto et al., 2015). These articles provide strong interventions that could be implemented to increase delirium awareness. These could include a strengths-based nursing approach to care, including addressing the stress caused on both patients and their families by behavioral problems that could be delirium.

Correspondingly, Williams (2016) identifies three subtypes to the diagnosis of delirium as hyperactive, hypoactive and mixed. In hyperactive delirium, a patient is agitated, restless and combative. In hypoactive delirium, the patient presents as apathetic or depressed and withdrawn. Lastly, mixed delirium is when a patient demonstrates qualities from both hyperactive and

hypoactive delirium (Williams, 2016). In addition, she identifies assessment tools for the assessment of pediatric delirium. The author includes the CAPD, Pediatric Confusion Assessment Method-ICU (pCAM-ICU) and Preschool Confusion Assessment Method-ICU (psCAM-ICU) as current tools used in everyday practice. She urges nurses to be aware of behavioral changes in patients that were not present at baseline, communicate with family members to best aid the patient, educate oneself to be able to identify signs of delirium, and lastly to collaborate with the healthcare team, psychiatrist included early on when delirium is identified. Williams (2016) also encourages using preventative strategies, such as, promoting good sleep hygiene, managing pain, and recognizing and treating drug withdrawal. In this article, Williams provides not only a definition of delirium and its subtypes, but also the different assessments, prevention tools and treatment options for managing pediatric delirium.

Moreover, Faustino, Chaves Pedreira, Seixas de Freitas, de Oliverita Silva and Bezerra do Amaral (2016) identified a need for an educational intervention with the intensive care unit nursing staff aimed at increasing the knowledge of delirium in older adults. Their research revealed ten problems related to nursing practice that could be changed. They argue that if these ten problems are addressed prevention and monitoring of delirium will improve. The ten troubles include a lack of staff awareness of delirium, patient's inability to re-orient without a clock or calendar in their room, staff's inability to reorient patients, lack of communication between staff and family members, absence of patient's' daily routine with their sensory devices, the improper use of restraints, excessive noise on the unit, excessive light during the nighttime, too many nighttime interruptions and a lack of tool to assess for delirium. By educating nurses about these delirium risk factors, Faustino, et al. (2016), theorized that there would be an increase in prevention and monitoring of delirium in ICU patients. Their results demonstrated the

effectiveness of an evidence based educational intervention because they could measure the increased awareness of nurses with regards to the risk factors objectively. After the group was exposed to the delirium workshop, they could practice what they learned effectively on the unit.

Similarly, Flaigle, et al., (2016), hypothesized that prior to a targeted educational intervention, PICU nursing staff did not have the appropriate knowledge to correctly assess for and prevent pediatric delirium. They confirm that given the variety in age groups, development and diagnoses a pediatric assessment that fits all patients is hard to encounter. For their study, they chose to use the pCAM-ICU screening tool twice a day. To test their hypothesis, Flaigle et al., (2016), distributed a survey both before their educational intervention and after. The initial survey revealed a knowledge gap in nurses being able to correctly identify risk factors for delirium. This research indicates a need for overall education of delirium for nurses. The researchers could generalize their results by including several facilities around the nation in their survey. Their conclusions provide sufficient data to initiate the conversation of delirium in several institutions that do not already have a protocol.

In the study "Pediatric Delirium: Monitoring and Management in the Pediatric Intensive Care Unit," the success of increasing pediatric delirium assessment and prevention by providing educational in-services and one-on-one training to the health care providers in the PICU was assessed (Smith, Brink, Fuchs, Ely & Pandharipande, 2013). Smith et al., (2013) understood the difficulty associated with implementing a new practice in the PICU. They assessed the numerous tasks related to patient care and hospital protocols that nurses must complete, then formed an educational plan to provide these nurses with the education and support needed to complete all their tasks. As shown above, these researchers not only focused on the implementation of a new policy that would benefit the PICU patient, but they also formed a plan for supporting the nurses

who would be treating these patients. Although, many questions remain unanswered about pediatric delirium, implementing an assessment tool was one way to start getting the questions answered.

Porter (2016) explored the difficulties of assessing an infant under 12 months of age for delirium. Given the severity of medical conditions and comorbidities, assessing the infant for delirium is challenging. The need for a widespread delirium tool that encompasses all age groups is needed to expand the assessment for delirium to even the youngest of patients. Porter (2016) identified the need for the use of the CAPD tool because this instrument encompasses the most age groups. Regrettably, the CAPD tool does not distinguish between age groups, making it difficult to apply to infants. In many cases infants, would score high on the delirium scale because they are unable to verbally communicate their needs, do not always make eye contact and can be restless. The interventions enforced by nurses to prevent delirium in older patients do not necessarily work for the infant; however, for now some intervention is better than no intervention. More research is needed on prevention tools for delirium in the infant, as stated by Porter (2016).

Consistent with the need for a pediatric delirium assessment tool, Stamper, Hawks, Taicher, Bonta and Brandon (2014) initiated a quality improvement project by using the Pediatric Anesthesia Emergence Delirium Scale (PAED). This scale is used in conjunction with the Level of Consciousness-Richmond Agitation and Sedation Scale (LOC-RASS) to determine the alertness of the patient and from there answer a variety of questions that essentially provides the nurse with a number indicating the presence of delirium. Stamper et al., (2014) state the "management of pediatric emergence delirium requires extra attention from nursing personnel, putting undue strain on nurse to patient ratios" (p.480-1). While this may be true, nurses in the

ICU are trained to be vigilant of patients. Hourly assessments aid in the collection of data over time from which to detect a negative change. The PAED scale became validated as a measuring tool for delirium in children. In this scale a series of questions are answered on a 5-point Likert scale, then the scores are summed to indicate the presence of delirium or lack thereof (Stamper et al., 2014). The PAED has been proven to be reliable and have validity by its creators, according to Stamper et al. (2014).

Lastly, by referencing my PICO statement I found research to support my change project which included identifying barriers, best methods of educational intervention, best tools to recognize delirium and finally the steps in which to implement the change project successfully.

Timeline

Considering the data and evidence collected, I have decided to focus my change project on the support and education nurses receive with regards to the pediatric delirium assessment protocol in place in the PICU at BCHO. My first step was to complete a needs assessment, identifying an area at fault in the PICU. This also included surveying PICU nurses as to what they already knew of delirium, how they felt about the new protocol, and how they wished they were being supported in this change (Appendix B). Once I had the barriers and problem identified I researched successful interventions. A literature review was conducted to support my intervention. The educational plan was formulated to provide nurses with information about delirium, as well as how to correctly use the CAPD assessment tool. The intervention will take place in two forms, with individual education during the nurse's shift and as part of a mandatory PICU skills class. The advantage to teaching at the bedside is the ability to assess the patient in that moment, making the education more effective. However, the advantage to having group education during a class is the time and money saved. After a month of continued education, at

least 75% of PICU nurses will have attended an informatory and mandatory delirium class, as well as, have had one-on-one education about delirium. This goal will also include 85% of PICU nurses, who received education, will implement and complete the delirium assessment tool every shift. Over the next few months, I will continue to reinforce proper assessment and prevention of delirium. (Refer to Appendix F for detailed Gantt chart and timeline).

Expected Results

The measurable objective in determining the success of educating PICU nurses on the assessment, identification and prevention of pediatric delirium in the PICU at BCHO will be by having 75% of staff nurses attend a mandatory delirium class and have one-on-one education of delirium by the end of summer 2017. This goal will also include the proper understanding and implementation of a delirium assessment tool to be used every shift by 85% of PICU nurses. Through initiating individual and group educational interventions, I expect to reach at least three quarters of all the PICU nurses at BCHO. These individuals and the super users will aid in spreading their knowledge of delirium to the nurses not educated during the project time frame. In the future, new PICU nurses will be oriented to this protocol from the beginning. The long-term goal is that there will continue to be an increase in awareness for pediatric delirium from all involved in direct patient care.

Evaluation

During the duration of the change project, my educational interventions were slightly altered to correspond with the immediate needs of the PICU. The aim of my change project was to improve the assessment, identification and prevention of pediatric delirium in the PICU at BCHO by having 75% of staff nurses attend a mandatory delirium class and have one-on-one education of delirium by the end of summer 2017. This goal included the proper understanding

and implementation of a delirium assessment tool every shift by 85% of PICU nurses who received education during the change project time frame. My predicted population and setting did not change. While I planned to educate more nurses than I initially predicted in my prospectus, my limited time on the unit as a CNL student did not allow time to teach every nurse and conduct the evaluation of the implemented education. I found that providing one-on-one education for evening and night shift nurses was the most accessible during the shift, while educating day shift nurses required out of shift education. As anticipated 60 of 100 PICU nurses attended the mandatory PICU skills class. While this educational time allowed me to reinforce my individual nurse education to a larger group, nurses were flooded with other relevant PICU information during a short time and may not have gotten the full effect of the delirium education.

To supplement in-person education, I created two visual tools that could be used to reinforce pediatric delirium. The first was a poster placed in the nurses' lounge highlighting the main aspects of the pediatric delirium assessment protocol (Appendix G). On the poster, was included an envelope urging my colleagues to give me feedback on pediatric delirium in the PICU overall in an anonymous matter if they did not feel comfortable directly giving me feedback. The second visual tool I created was a flyer that could be handed out to patients' families including the definition of delirium, its symptoms, causes, management and how they could help the patient (Appendix H). The flyer is both in English and Spanish and is handed out in the admission packets provided to all our patients' families.

After two weeks of education, I, as the change agent, audited staff nurses' compliance in using CAPD for identifying delirium, in order to evaluate the effectiveness of the change project. The results of this audit measured the extent to which my aim was being accomplished. I found the following problems: nurses were assessing for delirium within one hour of their shift starting

instead of at the end when it is recommended, nurses did not like the location of the assessment in EPIC, or that there was no pre-determined option for indicating a non-applicable assessment. Non-applicable assessments include patients heavily sedated, pharmacologically paralyzed, clinically brain dead, or developmentally delayed at baseline. Several nurses were still having difficulty understanding when completing the CAPD was unnecessary. In multiple cases, the nurse would score the patient high on the CAPD scale, yet did not comment on why the patient scored high, and/or did not notify the PICU care team. Of the twenty charts audited over a 24-hour period, only 25% had correct delirium assessment documentation. Additionally, while attending patient rounds, I noticed minimal mention of delirium, although it is included in the rounding tool.

However, after four weeks of education, and after the skills class, correct documentation of delirium steadily increased. During the second auditing of staff nurses' compliance in using CAPD for identifying delirium, there was 75% correct completion of the CAPD tool every shift, and nurses became increasingly aware of their role in delirium prevention and efforts were made to prevent its occurrence, (Pre-and Post-intervention % PICU Nurses Documenting Delirium Assessment Correctly, Appendix I). They also started correctly commenting on the CAPD when a patient's score did not necessarily tell the whole story of the patient's condition, (Narrative from Nurse Documentation Explaining High CAPD Scores, Appendix J). In an effort to reinforce the positive and provide a gentle reminder of the negative, I sent out a PICU wide email detailing the positive progress and what we as a unit could continue to work on, (Appendix K). Overall, from the start of the change project to the present there has been increased mention of the risk for delirium and more nurses are approaching me with their questions, especially when they are unsure if a patient can be properly assessed using CAPD.

A post-intervention nurse survey was performed to compare pre- and post-intervention data (Appendix L). In the post-intervention survey, 100% of the 75 nurses surveyed stated they had a better understanding of the pediatric delirium assessment protocol after receiving one-on-one education and receiving personal feedback on their CAPD documentation. As I anticipated, nurses were happier with the individualized education and felt they did not absorb as much during the PICU skills class. On a scale from 1-10, with ten being the most knowledge, the average answer with regards to placing one's knowledge of delirium and its risk factors on a scale was a seven, compared to four pre-intervention, (Appendix M).

The biggest indicator that prevention strategies for delirium are taking place in the PICU at BCHO is the management of one patient admitted in the PICU during the implementation of the change project. This patient of eight years old was intubated, on no sedation and was developmentally appropriate. This patient's plan of care included all the aspects integral to the prevention of delirium with long PICU stays. Overnight, the patient was not to be disturbed over a four-hour block, unless he called for assistance; this was to promote uninterrupted rest. In the morning, the curtains were drawn to show the patient it was day time, a calendar hung on his wall to indicate what day it was. With the assistance of one nurse, two physical therapists, and a respiratory therapist the patient was able to walk down the hall while intubated, thus increasing mobility. During the day, the patient had many volunteers come to play with him, keeping him active and awake during the day. Although, the patient could not communicate verbally he used a whiteboard and hand motions to show what he needed. Overall, that patient's plan of care was the prime example of what all patients' plan of care should resemble to prevent delirium.

To maintain the pediatric delirium protocol in the PICU at BCHO, my plan is to continually evaluate for its effectiveness—at least for the next year. I will be initiating the

Doctorate of Nursing Practice program at the University of San Francisco in the fall and hope to continue working towards making pediatric delirium a known disease that can be assessed for and prevented hospital wide. Silvius and Schipper (2015), explored the relationship between sustainability and project success, they concluded the need for sustainability planning while initially forming the change project. They found that by modifying the project to be sustainable, support for the project followed because the benefits were perceived, as well as, as a correlation with the goal (Silvius & Schipper, 2015). Keeping this in mind, before beginning my change project I found stakeholders that were genuinely interested in delirium and could advocate for its assessment and prevention alongside me. This included the PICU manager, educator, CNS and senior doctors, all of which have direct influence on the implementation of any protocol in the PICU.

Over the last year I have spent time assessing the PICU, forming the pediatric delirium assessment protocol and supporting nurses in learning about delirium. To truly be successful, I will plan to continue making the necessary changes to the protocol, taking the advice from nurses into consideration every step of the way. As a CNL, lateral integration is vital as the CNL can coordinate and collaborate with stakeholders, fulfilling his or her competency in this role (AACN, 2013). The delirium protocol is currently required documentation, but there is still a need to have increased nurse buy in of the need for this assessment each shift. From the beginning, I have had the support of the PICU care team, now I need to have the support of the PICU nurses to truly consider this assessment a standard. I expect the topic of pediatric delirium to become better known soon, and I am very excited for it.

Nursing Relevance

Overall, the attentiveness of the PICU care team, specifically the nurses will decrease unwanted side effects for patients. When nurses are aware of the risk factors that contribute to the development of delirium, they are more empowered to advocate for their patients from the start. When children come into the PICU they are in critical condition thus necessitating a variety of sedation, pain and respiratory interventions. The caveat to these interventions is the possible development of delirium (Williams, 2016). By educating nurses about the different aspects of delirium, they can start the prevention process a lot sooner, saving their patients time in the hospital and their unit unnecessary expenses.

Conclusion

Pediatric delirium has been present in the vulnerable population that is pediatrics for many years, specifically in the PICU; it is just recently that we have touched upon fixing the unfamiliarity of this serious condition. By drawing attention to the existence of the condition we can better prepare nurses, doctors and patients to manage patient care appropriately. The integration of multiple healthcare providers in the implementation of a new protocol has shown to be effective in the success of a new plan of care. Per Begun, Tornabeni, & White (2006) the CNL is in the prime position to coordinate lateral integration between medical doctors, staff nurses, CNS educators and the CNL to effect changes in the healthcare system. The CNL assumes the accountability for bringing these individuals together to form and apply evidence based plan of care and continue its evaluation.

Overall, the awareness of delirium in pediatric patients is slowly rising, meaning that as providers we must be aware of this possibility and be prepared to manage the disease process. The research demonstrates a lack of knowledge, action and management in delirium when it

comes to children. The initiation of a delirium protocol in the PICU at BCHO, using an educational intervention and CAPD assessment tool to guide my action plan will continue to aid in decreasing the lack of knowledge revolving this important, preventable condition that can be avoided. My job as a clinical nurse leader will be in pushing this change forward, while continuously adjusting the plan to adhere to patients' needs.

Appendix A
Pediatric Delirium Assessment Protocol Using Cornell Assessment of Pediatric Delirium

PEDIATRIC INTENSIVE CARE UNIT

**PEDIATRIC DELIRIUM ASSESSMENT PROTOCOL USING CORNELL ASSESSMENT
OF PEDIATRIC DELIRIUM (CAPD)**

PURPOSE:

1. To define the process of delirium assessment in the pediatric intensive care unit utilizing the Cornell Assessment of Pediatric Delirium (CAPD) tool.
2. To provide for appropriate referral by nursing staff for patients who screen positive for delirium with the CAPD.

SUPPORTIVE DATA:

Delirium is an acute and fluctuating change in awareness and cognition that is often the result of three synergistic events: the underlying disease process, side effects of treatment, and the critical care environment. Patients may have hyperactive delirium (agitation, restlessness, attempting to remove catheters, and/or emotional lability), hypoactive delirium (flat affect, withdrawal, apathy, lethargy, and/or decreased responsiveness), or a mixed delirium with attributes from both.

Prevalence of delirium in the PICU is estimated to be >20%. Without comprehensive screening, it is estimated that delirium remains unrecognized 66-84% of the time. Pediatric delirium is associated with prolonged hospital stay, increased mortality, and residual perceptual-motor and behavior problems.

Early diagnosis of delirium has been associated with: a decreased length of stay in both the hospital and number of ICU days, decreased days of mechanical ventilation, a decrease in the amount of sedative and analgesic administered, and a decrease in mortality. The (CAPD) observational tool is used to screen patients for delirium and has been validated for use in children of all ages and cognitive levels. It detects all delirium subtypes. It is performed on all patients near the end of every shift.

Factors which contribute to pediatric delirium include: requirement for mechanical ventilation and sedation, immobility, and disruption of sleep-wake cycles. Children of preschool age and those with significant developmental delay are at highest risk of developing delirium. Interventions aimed at increasing early mobilization and decreasing sedative exposure, duration of mechanical ventilation, and sleep disruption, have been shown to improve patient outcomes. These interventions are implemented with the ABCDEF bundle:

Awakening: Daily spontaneous awakening trial
Breathing: Daily spontaneous breathing trial
Coordination: of A and B to hold sedation prior to breathing trial
Delirium: routine delirium and sedation/agitation screening and management
Early: progressive exercise and mobilization

Family: engagement and empowerment
NURSING ASSESSMENT AND CARE: Initiate delirium prevention interventions for all admitted PICU patients:

1. Sedation (interdependent; requires MD order)
    a. Adjust analgesics/sedatives to meet SBS goal.
    b. Discuss unnecessary scheduled or PRN meds (opioids, benzos, anti-cholinergics, anti-histamines)
    c. Discuss use of opioid/benzo sparing agents with medical team (acetaminophen, ibuprofen, dexmedetomidine, clonidine, gabapentin, ketamine)
    d. Treat withdrawal.
    e. Perform daily sedation interruption trial.

2. Monitor patient during spontaneous breathing trial.

3. Minimize disruption of sleep/wake cycles
    a. Implement schedule and bundle daily routines for assessments, medication administration, PT/OT/child life/music therapy, to allow maximum periods of uninterrupted sleep.
    b. Modify environment for patient comfort – adequate lighting during daylight hours, control sources of excess noise (e.g. staff, equipment, visitors), emulate home daytime/bedtime routine as possible.
    c. Reorient patient frequently to person, place & time. Repeat information as necessary; give repeated verbal reminders. Communicate clearly and concisely. Place familiar objects from patient's home at bedside. Place calendar in room.
    d. Educate family to participate in delirium prevention process.

4. Implement early mobility program:
    a. Encourage patient to assist with all physical movement as tolerated: lifting their head for pillow adjustment, reaching for rails to assist with turn, lifting hips/legs for position/linen/attends changes and peri care, raising arms for ADL's (toothbrushing, haircombing, dressing).
    b. Adjust bed to chair position every shift and for meals (or to maximum degree of HOB elevation as tolerated).
    c. Communicate daily with therapy team re: plan for dangling vs out of bed.

5. Assess the patient's mental status for delirium near the end of every shift using the CAPD in combination with the State Behavior Scale (SBS). Assessment is based on your observation of the child over several hours, and not a single point-in-time screen.

6. Delirium scores are reported in daily rounds by RN to medical team.

7. Notify MD of patient's delirium assessment findings if positive (score $\geq$ 9).

8. See Appendix V for Possible causes of delirium and proposed interventions.

DELIRIUM ASSESSMENT PROCEDURE:

1. Obtain SBS Score (See Appendix I):
    a. If SBS is -2 or -3, stop CAPD assessment. If not contraindicated, consider decrease in sedation infusion per written order of Goal SBS to facilitate assessment of mental status.
    b. If SBS greater than -2 (-1 through +2) proceed to next step.

2. Obtain WAT-1 score for all patients weaning from opioids/benzos (See Appendix II).

3. Complete each of the 8 elements of the CAPD, using a 5-choice Likert-type scale ranging from never to always (See Appendix III).
    a. Does the child make eye contact with the caregiver?
    b. Are the child's actions purposeful?
    c. Is the child aware of his/her surroundings?
    d. Does the child communicate needs and wants?
    e. Is the child restless?
    f. Is the child inconsolable?
    g. Is the child underactive?
    h. Does it take the child a long time to respond to interactions?

4. To aid in the assessment of pre-verbal children, a developmental anchor points chart is provided to the nursing staff to use as a reference when necessary (See Appendix IV).

5. A score of ≥ 9 is a positive screen and physician should be notified.

DOCUMENTATION:

1. Document SBS score every hour on the vital signs flowsheet until sedation is completed at GOAL. Document at minimum of every 4 hours when sedation is at GOAL.
2. Document WAT-1 score on all patients weaning from opioids/benzos.
3. Document a CAPD score every shift.

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Appendix I: State Behavioral Scale (SBS) Score as patient's response to voice then gentle touch then noxious stimuli (planned endotracheal suctioning or <5 seconds of nail bed pressure)

Score	Description	Definition
−3	Unresponsive	No spontaneous respiratory effort No cough or coughs only with suctioning No response to noxious stimuli Unable to pay attention to care provider Does not distress with any procedure (including noxious) Does not move
−2	Responsive to noxious stimuli	Spontaneous yet supported breathing Coughs with suctioning/repositioning Responds to noxious stimuli Unable to pay attention to care provider Will distress with a noxious procedure Does not move/occasional movement of extremities or shifting of position
−1	Responsive to gentle touch or voice	Spontaneous but ineffective nonsupported breaths Coughs with suctioning/repositioning Responds to touch/voice Able to pay attention but drifts off after stimulation Distresses with procedures Able to calm with comforting touch or voice when stimulus removed Occasional movement of extremities or shifting of position
0	Awake and able to calm	Spontaneous and effective breathing Coughs when repositioned/Occasional spontaneous cough Responds to voice/No external stimulus is required to elicit response Spontaneously pays attention to care provider Distresses with procedures Able to calm with comforting touch or voice when stimulus removed Occasional movement of extremities or shifting of position/increased movement (restless, squirming)
+1	Restless and difficult to calm	Spontaneous effective breathing/Having difficulty breathing with ventilator Occasional spontaneous cough Responds to voice/No external stimulus is required to elicit response Drifts off/Spontaneously pays attention to care provider Intermittently unsafe Does not consistently calm despite 5 minute attempt/unable to console Increased movement (restless, squirming)
+2	Agitated	May have difficulty breathing with ventilator Coughing spontaneously No external stimulus required to elicit response Spontaneously pays attention to care provider

		Unsafe (biting ETT, pulling at lines, cannot be left alone) Unable to console Increased movement (restless, squirming or thrashing side-to-side, kicking legs)

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Appendix II: WAT-1

WITHDRAWAL ASSESSMENT TOOL VERSION 1 (WAT – 1)

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Patient Identifier													
	Date:												
	Time:												
Information from patient record, previous 12 hours													
Any loose /watery stools	No = 0 Yes = 1												
Any vomiting/wretching/gagging	No = 0 Yes = 1												
Temperature > 37.8°C	No = 0 Yes = 1												
2 minute pre-stimulus observation													
State	SBS[1] ≤ 0 or asleep/awake/calm = 0 SBS[1] ≥ +1 or awake/distressed = 1												
Tremor	None/mild = 0 Moderate/severe = 1												
Any sweating	No = 0 Yes = 1												
Uncoordinated/repetitive movement	None/mild = 0 Moderate/severe = 1												
Yawning or sneezing	None or 1 = 0 ≥2 = 1												
1 minute stimulus observation													
Startle to touch	None/mild = 0 Moderate/severe = 1												
Muscle tone	Normal = 0 Increased = 1												
Post-stimulus recovery													
Time to gain calm state (SBS[1] ≤ 0)	< 2min = 0 2 - 5min = 1 > 5 min = 2												
Total Score (0-12)													

WITHDRAWAL ASSESSMENT TOOL (WAT – 1) INSTRUCTIONS

- Start WAT-1 scoring from the **first day of weaning** in patients who have received opioids +/or benzodiazepines by infusion or regular dosing for prolonged periods (e.g., > 5 days). Continue twice daily scoring until 72 hours after the last dose.
- The Withdrawal Assessment Tool (WAT-1) should be completed along with the SBS[1] at least once per 12 hour shift (e.g., at 08:00 and 20:00 ± 2 hours). The progressive stimulus used in the SBS[1] assessment provides a standard stimulus for observing signs of withdrawal.

Obtain information from patient record (this can be done before or after the stimulus):
  ✓ **Loose/watery stools:** Score 1 if any loose or watery stools were documented in the past 12 hours; score 0 if none were noted.
  ✓ **Vomiting/wretching/gagging:** Score 1 if any vomiting or spontaneous wretching or gagging were documented in the past 12 hours; score 0 if none were noted
  ✓ **Temperature > 37.8°C:** Score 1 if the modal (most frequently occurring) temperature documented was greater than 37.8°C in the past 12 hours; score 0 if this was not the case.

2 minute pre-stimulus observation:
  ✓ **State:** Score 1 if awake and distress (SBS[1]: ≥ +1) observed during the 2 minutes prior to the stimulus; score 0 if asleep or awake and calm/cooperative (SBS[1] ≤ 0).
  ✓ **Tremor:** Score 1 if moderate to severe tremor observed during the 2 minutes prior to the stimulus; score 0 if no tremor (or only minor, intermittent tremor).
  ✓ **Sweating:** Score 1 if any sweating during the 2 minutes prior to the stimulus; score 0 if no sweating noted.
  ✓ **Uncoordinated/repetitive movements:** Score 1 if moderate to severe uncoordinated or repetitive movements such as head turning, leg or arm flailing or torso arching observed during the 2 minutes prior to the stimulus; score 0 if no (or only mild) uncoordinated or repetitive movements.
  ✓ **Yawning or sneezing > 1:** Score 1 if more than 1 yawn or sneeze observed during the 2 minutes prior to the stimulus; score 0 if 0 to 1 yawn or sneeze.

1 minute stimulus observation:
  ✓ **Startle to touch:** Score 1 if moderate to severe startle occurs when touched during the stimulus; score 0 if none (or mild).
  ✓ **Muscle tone:** Score 1 if tone increased during the stimulus; score 0 if normal.

Post-stimulus recovery:
  ✓ **Time to gain calm state (SBS[1] ≤ 0):** Score 2 if it takes greater than 5 minutes following stimulus; score 1 if achieved within 2 to 5 minutes; score 0 if achieved in less than 2 minutes.

Sum the 11 numbers in the column for the total WAT-1 score (0-12).

[1]Curley et al. State behavioral scale: A sedation assessment instrument for infants and young children supported on mechanical ventilation. Pediatr Crit Care Med 2006;7(2):107-114.

Figure Legend: Withdrawal Assessment Tool (WAT-1) and instructions. [1]Reprinted with permission **Pediatric Critical Care Medicine** 2008;9(6):577.

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Appendix III: Pediatric Delirium Assessment (CAPD) Process

Cornell Assessment of Pediatric Delirium (CAP-D) revised					
SBS Score _____ (if -2 or -3 do not proceed) Please answer the following questions based on your interactions with the patient over the course of your shift:					
	Never 4	Rarely 3	Sometimes 2	Often 1	Always 0
1. Does the child make eye contact with the caregiver?					
2. Are the child's actions purposeful?					
3. Is the child aware of his/her surroundings?					
4. Does the child communicate needs and wants?					
	Never 0	Rarely 1	Sometimes 2	Often 3	Always 4
5. Is the child restless?					
6. Is the child inconsolable?					
7. Is the child underactive—very little movement while awake?					
8. Does it take the child a long time to respond to interactions?					
					TOTAL

Source: Used with permission from Weill Cornell Medical College Research Team. Copyright 2012

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Appendix IV: Developmental Anchor Points For Youngest Patients

	NB	4 weeks	6 weeks	8wks	28weeks	1y	2y
1. Does the child make eye contact with the caregiver?	Fixates on face	Holds gaze briefly Follows 90 degrees	Holds gaze	Follows moving object/caregiver past midline, regards examiner's hand holding object, focused attention	Holds gaze. Prefers primary parent. Looks at speaker.	Holds gaze. Prefers primary parent. Looks at speaker.	Holds gaze. Prefers primary parent. Looks at speaker.
2. Are the child's actions purposeful?	Moves head to side, dominated by primitive reflexes	Reaches (with some dis-coordination)	Reaches	Symmetric movements, will passively grasp handed object	Reaches with coordinated smooth movement	Reaches and manipulates objects, tries to change position, if mobile may try to get up.	Reaches and manipulates objects, tries to change position, if mobile may try to get up and walk.
3. Is the child aware of his/her surroundings?	Calm awake time	Awake alert time Turns to primary caretaker's voice May turn to smell of primary care taker	Increasing awake alert time Turns to primary caretaker's voice May turn to smell of primary care taker	Facial brightening or smile in response to nodding head, frown to bell, coos.	Strongly prefers mother, then other familiars. Differentiates between novel and familiar objects.	Prefers primary parent, then other familiars, upset when separated from preferred care takers. Comforted by familiar objects especially favorite	Prefers primary parent, then other familiars, upset when separated from preferred care takers. Comforted by familiar objects especially favorite

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						blanket or stuffed animal.	blanket or stuffed animal.
4. Does the child communicate needs and wants?	Cries when hungry or uncomfortable	Cries when hungry or uncomfortable	Cries when hungry or uncomfortable	Cries when hungry or uncomfortable.	Vocalizes /indicates about needs, e.g. hunger, discomfort, curiosity in objects, or surroundings.	Uses single words or signs.	3-4 word sentences, or signs. May indicate toilet needs, calls self or me.
5. Is the child restless?	No sustained awake alert state	No sustained calm state	No sustained calm state	No sustained awake alert state.	No sustained calm state.	No sustained calm state.	No sustained calm state.
6. Is the child inconsolable?	Not soothed by parental rocking, singing, comforting actions.	Not soothed by parental rocking, singing, comforting actions.	Not soothed by parental rocking, singing, comforting actions.	Not soothed by parental rocking, singing, comforting actions.	Not soothed by usual methods e.g. singing, holding, talking.	Not soothed by usual methods e.g. singing, holding, talking, and reading.	Not soothed by usual methods e.g. singing, holding, talking, and reading. May tantrum, but can organize.
7. Is the child underactive—very little movement while awake?	Little if any flexed and then relaxed state with primitive reflexes (Child should be sleeping	Little if any reaching, kicking, grasping (still may be somewhat dis-coordinated)	Little if any reaching, kicking, grasping (may begin to be more coordinated)	Little if any purposive grasping, control of head and arm movements, such as pushing things that are noxious away.	Little if any reaching, grasping, and moving around in bed, pushing things away.	Little if any play, efforts to sit up, pull up, and if mobile crawl or walk around.	Little if any more elaborate play, efforts to sit up and move around, and if able to stand, walk,

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	comfortably most of the time)						or jump.
8. Are the child's responses sparse and or delayed?	Not making sounds or reflexes active as expected (grasp, suck, moro)	Not making sounds or reflexes active as expected (grasp, suck, moro)	Not kicking or crying with noxious stimuli	Not cooing, smiling, or focusing gaze in response to interactions.	Not babbling or smiling/laughing in social interactions, or even actively rejecting an interaction.	Not following simple directions. If verbal, not engaging in simple dialogue with words or jargon.	Not following 1-2 step simple commands. If verbal, not engaging in more complex dialogue.

Source: Used with permission from Weill Cornell Medical College Research Team

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Appendix V: Possible causes of Delirium and proposed interventions

Hypoxemia- ↓*Hgb;* ↓*cardiac output; pulmonary edema;* ↑*O2 demands*	Administer oxygen if needed Monitor ABGs and HGB levels Transfuse as ordered Administer epogen and Iron as ordered Assess and report signs/symptoms of congestive failure Administer diuretic therapy Administer inotropes and vasoactive medications Assess for fever and administer antipyretics as ordered
Electrolyte or metabolic derangements	Obtain electrolyte, renal and hepatic function tests, folate and B12 levels as ordered Report abnormal findings
Fluid imbalance – *dehydration or fluid overload*	Monitor intake and output Assess for signs/symptoms of dehydration or fluid overload
Infection	Monitor for s/s of infection Monitor for fever Obtain cultures as ordered Administer medications as ordered
Constipation	Assess for constipation Initiate ordered bowel regime
Poorly controlled pain	Review pain scores and number of prn doses of narcotics and analgesics given and report findings
Sedative and/or narcotic intoxication	Adjust doses to meet SBS /pain goal as ordered Review medications ordered and discuss change of medications
Drug withdrawal	Review WAT-1 scores Report scores greater than set goal Implement med dose adjustment as ordered
Drug induced- *antihistamines, calcium channel blockers; anti-cholinergic medications*	Review medications administered Implement medication changes as ordered
Sleep disturbances	Cluster interventions to allow for periods of sleep- goal is 5-6 hours uninterrupted sleep Develop schedule of daily activities Administer sleep promoting medications as ordered
Unfamiliar environment	Familiar and consistent caregiver presence Promote primary nursing model Familiar objects from home Noise control Appropriate lighting Use of patient's assistive devices- eye glasses; hearing aids; communication board Use of clock and calendar for re-orientation Minimize or discontinue use of restraints Daily evaluation of necessity invasive lines, tubes and catheters and removal as soon as feasible
Lack of cognitive stimulation	Encourage conversation, especially reminiscence
Immobility	Early mobilization Daily SAT and SBT trials Encourage patient assistance with repositions and movement

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Appendix B

Pre-intervention Nurse Survey

1. How long have you been a PICU nurse?

2. What do you know about delirium?

3. What do you know about delirium in the pediatric population? In infants?

4. Do you know any risk factors for delirium while in the PICU?

5. Do you consider delirium as a cause when caring for an agitated patient that had previously been intubated and on sedatives?

6. On a scale from 1-10, with 10 being the most, where would you place your knowledge of delirium?

7. On a scale from 1-10, with 10 being the most, where would you place your knowledge of risk factors for delirium?

8. What are barriers to your PICU education?

9. How would you like to learn more about delirium?

Appendix C

Fishbone Diagram

People

PICU nurses have little knowledge about the prevention and treatment of deliriumin the PICU.

PICU doctors are prescribing benzodiazepines for sedation without looking at the long term consequences

PICU nurses are misusing the PRN sedative

Effect:
Knowledge deficit with regards to pediatric delirium, leading to increase hospital stays and increased costs for the PICU.

Quiet time hours are not observed in the PICU to promote rest

When patients are admitted to the PICU intubated they are automatically prescribed opoid and benzodiazepine drips to keep them sedated.

Noise volumes are not adjusted to time of day

Not all patients are near a window

Length of sedation is not determined

Environment

Method

Appendix D

SWOT Analysis

Strengths

- Inclusion of stakeholders that influenced the care of our patients.
- Include PICU doctors, staff nurses, PICU educator, CNS and CNL.
- Protocol created with the input of varies patient care takers.
- The CNL student will round with the nurses to provide continued support in the awareness and assessment of delirium.

Weaknesses

- Implementation of this protocol will take time out of a nurse's already busy shift.
- Educating each nurse individually is very time consuming.
- Nurses do not know what the risk factors for delirium are.
- The PICU does not have the proper knowledge about delirium.
- Fellows and residents are incorrectly sedating patients, without thinking of the future implications for drug withdrawal and risk of delirium.

SWOT

Opportunities

- The inclusion of the PICU educator in the development of this protocol will allow us the opportunity to effectively educate bedside nurses on how to best use the protocol to benefit our patients.

Threats

- The biggest threat to this project is time; there is not enough time to teach all the nurses at once.

Appendix E

Change Theory

Seven-Stage Model: Ronald Lippitt

1. Diagnose the problem.
2. Assess the motivation and capacity for change.
3. Assess the resources and motivation of the change agent. This includes the change agent's commitment to change, power, and stamina.
4. Choose progressive change objects. In this step, action plans are developed and strategies are established.
5. The role of the change agents should be selected and clearly understood by all parties so that expectations are clear. Examples of roles are: cheerleader, facilitator, and expert.
6. Maintain the change. Communication, feedback, and group coordination are essential elements in this step of the change process.
7. Gradually terminate from the helping relationship. The change agent should gradually withdraw from their role over time. This will occur when the change becomes part of the organizational culture

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Appendix F

Table F1: Timeline

Date	Activity	Authority/Responsibility
3/2017	CNL will attend PICU Update: Delirium.	CNL
4/2017	CNL will approach PICU Team about implementing a pediatric delirium protocol in the PICU at BCHO.	CNL
5/2017	CNL will start conducting needs assessment on the unit using observation, patient chart information and surveying PICU nurses about their feelings towards the implementation of this protocol.	CNL
5/24/2017	Used global aim template to identify my goal regarding my internship project.	CNL
5/25/2017	Spent time analyzing the PICU with my preceptor to identify the specific portion of the protocol in which to focus.	CNL, PICU educator
5/30/2017	Revised aim statement to reflect specific findings from needs assessment in regards to knowledge deficit and pediatric delirium.	CNL
5/31/2017-6/30/17	Conducted a literature review in order to complete annotated bibliography for the statement of determination. Found articles and research studies aimed at increasing awareness and knowledge of delirium in the pediatric ICU setting. Education efforts focused on nurses. Used Uptodate and	CNL

|		
	CINAHL Plus with full text.	
6/1/2017	Met with PICU educator and CNS to discuss best strategy for assessing nurses knowledge and an educational intervention to support them. Decided on dividing my time between the three shifts and rounding with nurses first to assess their baseline knowledge and found out what they need. Secondly I will provide a teaching event guided towards nurses. Lastly, towards the end of my project I will continue with rounds ensuring nurses are properly using the CAPD tool and are recognizing prevention strategies for delirium.	CNL, PICU educator, CNS
6/17/2017	Completed cost-benefit analysis in terms of monetary value of implementing a pediatric delirium protocol by estimating cost per day of PICU admission to present to PICU manager. The delirium protocol is meant to decrease the length of hospital stay of patients, thus decreasing the cost incurred by the hospital when they are admitted. The majority of patients at BCHO are Medi-cal and reimbursement is not 100% of the cost of caring for the patient.	CNL
7/2017	Completed rounds on evening shift to promote identification of delirium risk factors in the PICU patients admitted at this time.	CNL
7/12/17	PICU skills class	CNL, PICU Educator, CNS
Week of 7/24/17	Survey nurses again to assess their understanding of the	CNL

	pediatric delirium assessment protocol after the educational interventions.	
8/1/17	By the end of summer 2017, at least 50% of PICU nurses will have attended a mandatory delirium class, as well as, have had one-on-one education of delirium, resulting in their ability to correctly assess and identify risk factors of delirium. The CNL will present her findings to her colleagues.	CNL
August-December 2017	Continue to evaluate effectiveness of protocol and make adjustments as necessary.	CNL, PICU educator

Table F2: Gantt Chart

CNL Change Project-Pediatric Delirium Assessment Protocol Gantt Chart

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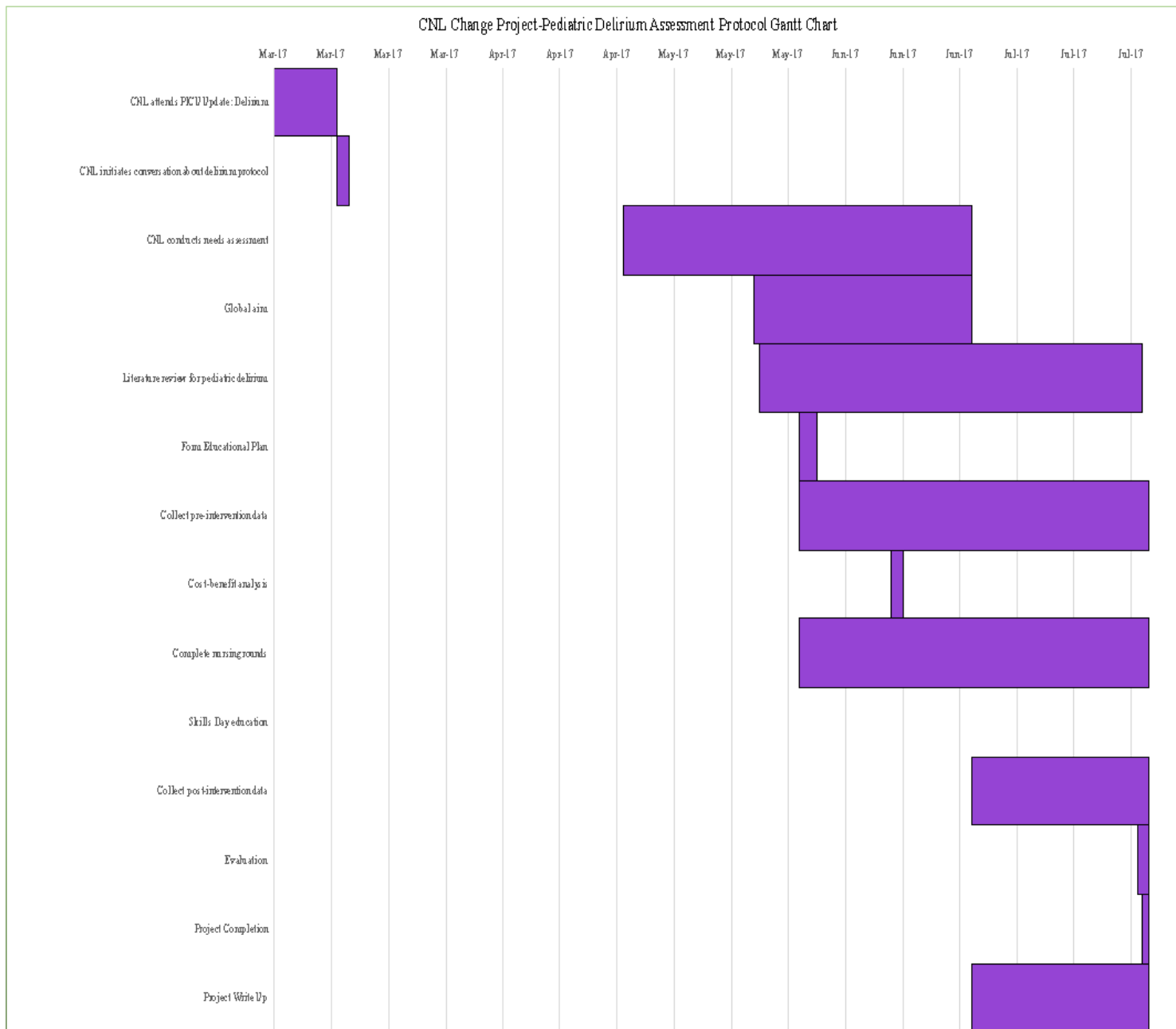
Appendix G

Pediatric Delirium Poster

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Appendix H

Pediatric Delirium Flyer

UCSF BENIOFF CHILDREN'S HOSPITAL OAKLAND
PEDIATRIC INTENSIVE CARE UNIT

Delirium in Children & Adolescents
in the Hospital Setting

What is Delirium?

Delirium is a change in a person's thinking or behavior caused by changes in how the brain is working. It happens commonly in hospitalized patients, even babies and kids.

Symptoms

A delirious person may experience:

- Confusion, not knowing where they are, or who you are.
- Saying mixed up things.
- Inconsolability, emotional upset that may not respond to usual soothing.
- Difficulty paying attention or remembering things.
- Sleep disturbance (too much or too little sleep).
- Reversed day/night cycle.
- Behavior or emotions that are different than usual: aggressive, watchful, suspicious, apathetic or withdrawn
- Seeing or hearing things that aren't real but seem very real.
- Agitation, restless movements, pulling out lines or other important medical devices.
- These signs may fluctuate (come and go).
- Memories of these experiences of confusion can be frightening.

Causes

Delirium may be caused by:

- The underlying illness.
- Infection.
- Medications, such as those needed to calm or manage pain .
- Disruption of the sleep-wake cycle.
- Chemical changes in the brain.
- Less oxygen to the brain.
- Drugs and alcohol intoxication and withdrawal.

Delirium usually clears up as these causes are treated or removed.

Management

The way your child is interacting and behaving will be closely monitored by your nurse and the team. Delirium usually clears up as the causes are identified and addressed. It may be necessary to avoid, reduce, or change certain medications to reduce the risk of delirium. While addressing these things, your child's doctors may recommend one or more medicines to help with symptoms of delirium. Your child's nurse will help make the room calm and help your child get on a good sleep routine, which will help his/her delirium.

How to Help

- Be calm and reassuring at the bedside.
- Remind your child gently where s/he is, what time of day it is.
- Provide familiar things such as a favorite blanket, stuffed animal or comforting music.
- Don't argue with a confused child.
- Distract child to happier thoughts/images.
- Provide glasses or hearing aids if needed.
- Help keep your child safe during any episode of agitation.
- Encourage getting out of bed and being awake in the day, longer stretches of sleep at night.
- Take care of yourself so you can be there for your child.
- Explain to your child later if s/he has questions or remains distressed about confusion or hallucinations.
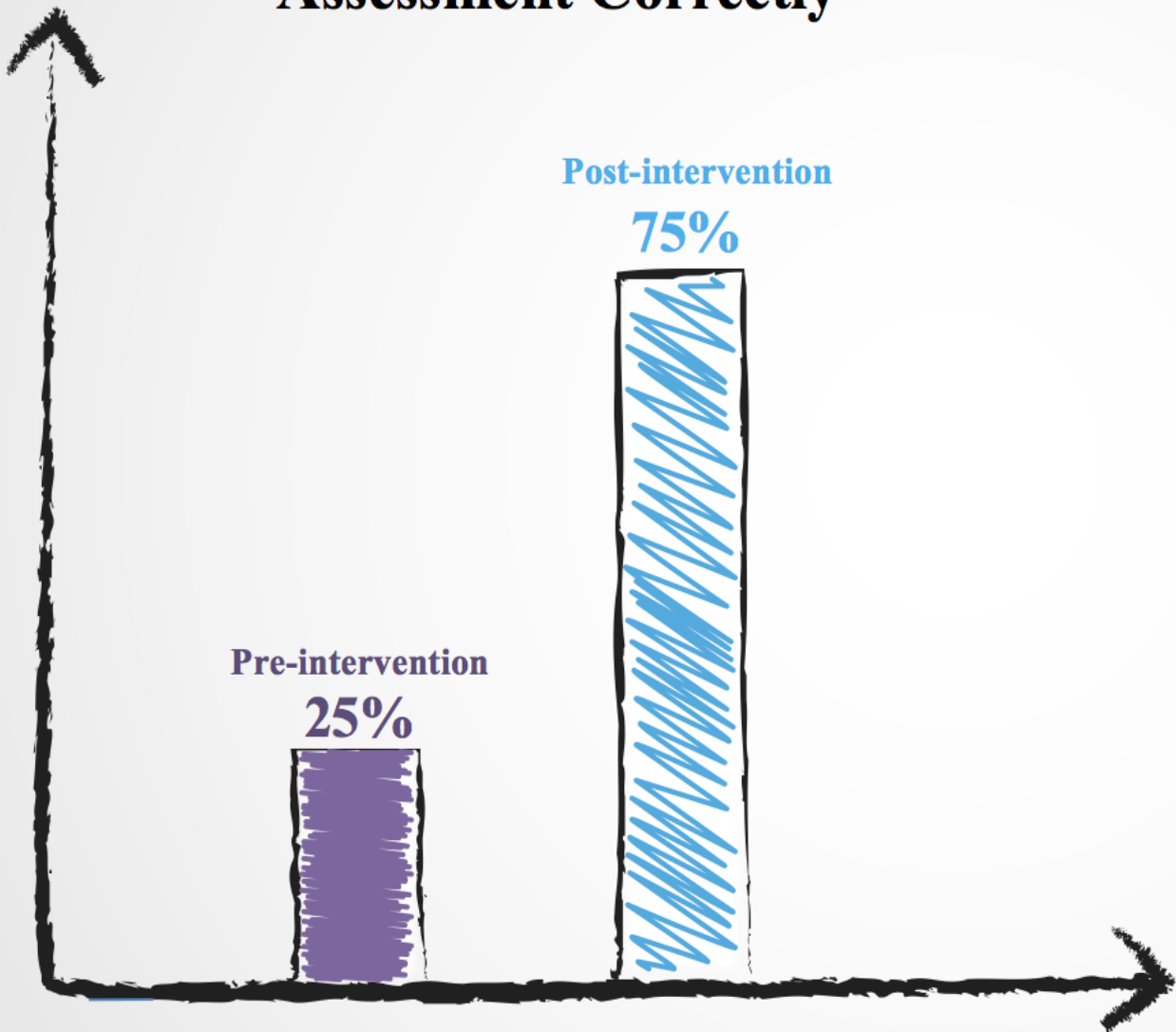
UCSF Benioff Children's Hospital
Oakland

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Appendix I

Pre-and Post-intervention % PICU Nurses Documenting Delirium Assessment Correctly

Pre and Post-intervention % PICU Nurses Documenting Delirium Assessment Correctly

Post-intervention
75%

Pre-intervention
25%

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Appendix J

Narrative from Nurse Documentation Explaining High CAPD Scores

1	"Patient with cp, dd, nonverbal, contracted"
2	"Patient unable to move due to spastic quadriplegic, and DD"
3	"Patient's baseline"
4	"DKA pt, neuro status improving" (scored 8 w/ WNL neuro exam) Scored positive for minimal eye contact, underactivity
5	"Patient sedated, orally intubated. UTA for accurate score"
6	"N/A, pt sedated and medically paralyzed"
7	"Pharmacologically sedated/paralyzed"
8	"Pt is post-op"
9	"Eyes swollen shut preventing eye contact" (scored 9 on CAPD)

Appendix K

Email from CNL to PICU Staff

Hello wonderful PICU Team,

Just a few things to keep in mind when documenting your assessment for delirium:

1. If you score a patient anything higher than a 0 please comment why.
   -For example, patient does not make eye contact because of swollen eyes, DD, etc.
   -Or if patient cannot communicate needs and wants are they nonverbal? Verbal?
   -Or if it takes the child a long time to respond to interactions is it because they are heavily sedated, DD, their baseline, etc.?
**I've seen many high numbers, one 23, with no explanation as to why patient scored high and no intervention was necessary. The more we know the better we can treat the patient. Good examples include: "Patient sedated, orally intubated. UTA for accurate score" "N/A, pt sedated and medically paralyzed" "Patients baseline"
2. While the delirium assessment shows up on your required documentation tab PLEASE PLEASE do not document an assessment until the end of your shift, once you have had at least 6 hours with the patient to truly assess their behavior. Otherwise the assessment will not be as accurate. Please do not score the patient if they are paralyzed or have an SBS of <-2.
3. Delirium is included in our rounding tool, meaning it SHOULD be discussed at rounds (another reason to document your assessment at the end of shift, once a plan has been formulated). If the nurses don't bring it up, chances are it will not be discussed.
**The point of doing these assessments every shift is to PREVENT delirium from occurring, and if it does occur start treating it as soon as possible.
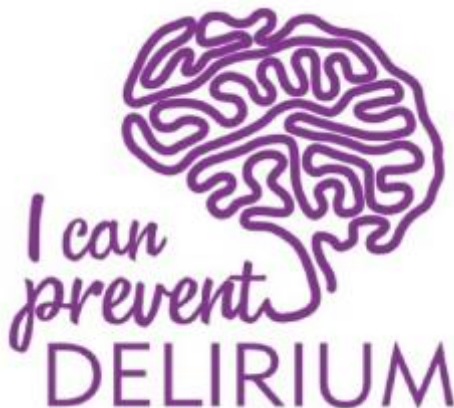
That being said, after talking to PICU staff about thoughts on delirium I've come up with a few things we could change to make it easier to use:
1. Changing its location in EPIC to Head to Toe assessment tab OR next to the Neuro exam
2. Changing the alert to document a delirium score to either pop up on required documentation or work list at 0600, 1400, and 2200 to remind everyone to assess at the end of their shift.
3. Adding common qualifiers to interventions column for ease of documentation
4. Option to indicate what age range patient fits under (similar to GCS assessment)
5. Option to indicate how long patient has been on sedation/in the PICU
**While I would love to do all of these it all has to go through EPIC so stay tuned for more updates BUT know there is a solution being worked on :)

Remember interventions to prevent delirium include:
Efforts to keep patient on day/night schedule
Activities during the day
Being near a window, daylight
Turning off unnecessary lights (especially at night)
Reducing the noise level
Swaddling, comfort measures
Re-orientation
Precedex drip or melatonin at night

I APPRECIATE everything you do for our patients, and want to help make the assessment for delirium as user friendly as possible. If you have any questions, comments, suggestions I am happy to hear them all!

PS: check out the delirium poster in the break room, you can leave anonymous suggestions there too!

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Appendix L

Post-intervention Nurse Survey

1. Do you feel your understanding of delirium has changed in the past month?

2. Which intervention did you find most beneficial? The one-on-one or the class?

3. What do you know about delirium now?

4. What do you know about delirium in the pediatric population now? In infants?

5. Do you consider delirium as a cause when caring for an agitated patient that had previously been intubated and on sedatives?

6. Can you identify at least three risk factors for delirium? List them.

7. On a scale from 1-10, with 10 being the most, where would you place your knowledge of delirium?

8. On a scale from 1-10, with 10 being the most, where would you place your knowledge of risk factors for delirium?

9. What would you recommend for future education and support?

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Appendix M

Pre- and Post-Intervention Knowledge of Delirium

Pre- and Post-intervention Knowledge of Delirium

Pre-intervention Nurse Survey

On a scale from 1-10, with 10 being the most, where would you place your knowledge of delirium?

Post-intervention Nurse Survey

On a scale from 1-10, with 10 being the most, where would you place your knowledge of delirium?

4

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