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Preventing Delirium through the Implementation of the ABCDE Bundle and PAD Guideline into Everyday Care in a Community Hospital Intensive Care Unit: Opportunities for Practice Improvement

Mary Zody
University of Kentucky, mzody@iuk.edu

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The document mentioned above has been reviewed and accepted by the student's advisor, on behalf of the advisory committee, and by the Assistant Dean for MSN and DNP Studies, on behalf of the program; we verify that this is the final, approved version of the student's DNP Project including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

Mary Zody, Student

Dr. Carolyn Williams, Advisor

Final DNP Practice Inquiry Project

Preventing Delirium through the Implementation of the ABCDE Bundle and PAD Guideline into Everyday Care in a Community Hospital Intensive Care Unit: Opportunities for Practice Improvement.

Mary Zody, MHA, MSN, RN

University of Kentucky

College of Nursing

Fall 2016

Carolyn Williams, PhD, RN, FAAN – Committee Chair

Nora Warshawsky, PhD, RN, CNE - Committee Member

Monette Allen, MSN - Clinical Mentor

Dedication

This paper is dedicated to my father who suffered from delirium following an extensive surgery. He never fully recovered from the event and, even years after, when reflecting on the event, often remarked he knew something was wrong but did not know how to help himself. Delirium not only affects the patient, but the family as well. My family and I watched helplessly as my father suffered from delusions and hallucinations which lasted for weeks after he returned home and for years afterward left him cognitively impaired. It is hoped that this paper will help healthcare providers understand the important role they have in delirium detection and prevention.

Acknowledgments

I would like to acknowledge and thank my DNP committee for their advice, encouragement, and support of this project.

Carolyn Williams, PhD, RN, FAAN – Committee Chair

Nora Warshawsky, PhD, RN, CNE - Committee Member

Monette Allen, MSN - Clinical Mentor

I would like to thank my mother Anna Zody, my sisters Revella Mundy and Glenneth Elkins for their unwavering support of my educational goals.

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Final DNP Project Report Overview/ Introduction

This DNP project focuses on the reduction of delirium through improvement of nursing knowledge of delirium and implementation of evidence based bundle (Awake, Breathing, Coordination, Early Mobility, and Pain, Agitation, Delirium) in a twelve bed intensive care unit located in a 150 bed community hospital. Specifically, this project will review the literature supporting the evidence based bundle and report on a comprehensive gap analysis which was done to determine areas for practice improvement to reduce delirium and improve patient outcomes. The gap analysis included a comparison of current practice to the evidence, a review of administrative policies/ statements of care standards, and knowledge of nurses about delirium and their views of key aspects of the proposed evidence based bundle. This report will also discuss the implementation process of the evidence based bundle into everyday practice in the target ICU using the Consolidated Framework for Implementation Science (CIFR) model and report on preliminary outcomes after implementation of the evidence based care bundles.

Manuscript 1

Delirium: What Every Nurse Needs to Know

Mary Zody, MHA, MSN, RN

University of Kentucky School of Nursing

"I had never before understood how much good nursing care contributes to patient's safety and comfort, especially when they are very sick or disabled. This is a lesson physician and hospital administrators should learn. When nursing is not optimal, patient care is never good."

Bud Relman (NEJM Editor 1977-1990)

Abstract

Delirium, also known as acute confusion state can occur within a matter of hours and, if left unmanaged, can lead to extended hospital stays, added healthcare costs, early nursing home placement, chronic confusion states, and even death (Kratz, 2008; Inouye, Westendorp, & Saczynski, 2014). Careful ongoing nursing assessment, identification of at risk patients, and implementation of nursing interventions to prevent/ manage delirium can significantly improve patient outcomes while conserving healthcare costs. Recent literature has focused on delirium in the intensive care unit; however, delirium can occur anywhere within any vulnerable population. Therefore, the staff nurse, regardless of their practice setting, must be aware of delirium, how to assess for delirium, and how to manage delirium. The purpose of this paper is to educate staff nurses about delirium, the important role they have in recognizing delirium and, through good basic nursing care, actions they can take to mitigate the risk for delirium.

Key words: delirium; assessment, nursing intervention

Delirium: What Every Nurse Needs to Know

Delirium is a serious, often overlooked, health problem that occurs in 25-56% of hospitalized or institutionalized older adults (Kratz, 2008. Leslie & Inouye, 2011). Delirium has been associated with an increase in mortality, persistent functional and cognitive decline, increased nursing time, increased length of hospital stays, caregiver burden, and increased morbidly and mortality (Leslie & Inouye, 2011). Delirium is a primary contributor of hospital complications such as falls and urinary tract infections (Kamholtz, 2010). Persons with delirium are more likely to have long term loss of function, have an increase in hospital stays by up to 4 times the average and have 2-7 times the rate of new institutionalization (Kamholtz, 2010). Economically, costs associated with delirium has been estimated to be between $ 143- 156 billion annually (Leslie & Inouye, 2011). This includes costs associated with more frequent hospitalizations, complications from delirium such as falls, and long term care (Leslie & Inouye, 2011) Perhaps of greater significance, the costly effects of delirium, both in terms of economic and social costs, can be reduced by up to 40% if delirium is recognized early and if basic nursing interventions are routinely implemented (Leslie & Inouye, 2011; Inouye, 2013).

Pathophysiology of Delirium

Delirium is defined as a "transient and etiological nonspecific organic mental syndrome characterized by a reduced ability to focus, sustain or shift attention, disturbance in consciousness or cognition, develops over a short period of time, and there is evidence that, based on assessment and/ or history, that the condition is a result of a physiological consequence of a medical condition" (American Psychiatric Association, 2013). Older adults (over the age of 65) are particularly at risk for the development of delirium due to limited physical reserves, increased prevalence of concurrent disease, and complex medical regimes, all of which are significant contributors to delirium (Inouye et al., 2014; Fong, Tulebaev, & Inouye, 2009). It is estimated that delirium is present in 14-24% on time of admission, 15-53% post operatively, 6-56% develop during hospitalizations, 70-87% occur in the ICU, 20-69% in nursing homes from post-acute care, and 80% or higher during palliative care (Inouye, 2013) There are three forms of delirium: hyperactive in which the client becomes agitated and confused, hypoactive in

which the client becomes withdrawn, or mixed. All three forms of delirium have varying degrees of presentation which may make early diagnosis problematic (O'Keefe & Lavin, 1999; Fong et al., 2009). Hypoactive delirium is the most common form of delirium in adults and has the highest mortality (Inouye, 2013).

The pathology of delirium is not well understood. It is thought that decreased cholinergic activity may contribute to the development of delirium. This theory is supported by studies (Hshieh Fong, Marcantonio, & Inouye, 2008; Flacker & Lipsitz, 1999) in which there was an increased incidence of delirium in patients receiving anticholinergic drugs. However, this relationship is not absolute and delirium does occur in patients with no disturbance in cholinergic activity (Hshieh et al., 2008). Acute, generalized inflammation, as is often seen in ICU patients, is thought to play a role in the development of delirium (Girard et al., 2012). Animal studies have shown that inflammatory mediators can cross the blood brain barrier and create changes in brain wave patterns that are consistent with those seen in septic patients with delirium (Van Der Mast, 1998)

While the mechanism of delirium development remains unclear, risk factors for the development of delirium are known. These include age (persons over the age of 60); persons with multiple comorbidities, prolonged inactivity, unmanaged pain, prolonged sedation or anesthesia, and previous cognitive disorders such as dementia (Collins, Blanchard, Tookman, & Sampson, 2010; Ryan et al., 2013; Inouye, Inouye et al. 2014).

Risk factors for the development of delirium

Risk factors, associated with the development of delirium vary significantly and no one risk factor is considered a greater contributor to the development of delirium over others (Inouye et al. 2014; Ryan et al., 2013; de Castro et al., 2013). It is felt that is the combination of a variety of risk factors which ultimately leads to the development of delirious symptoms (Inouye, Viscoline, Horwitz, Hurst, & Tinetti, 1993; Inouye et al. 2014; de Castro et al., 2013). Common risk factors associated with the development of delirium are highlighted in Table 1. As can be seen from Table 1, there are several modifiable and non-modifiable risk factors. Successful prevention and/ or management of delirium focus

on the reduction of modifiable risk factors through comprehensive nursing care while working collaboratively to manage non-modifiable risk factors.

Risk factors, both modifiable and non-modifiable, are identified through careful admission and ongoing comprehensive assessment of the client. Assessments need to include past and current health history, social history, number of hospital or long term care admissions in the past year, family support, and visual or auditory impairments. Much of this information can be gathered during the comprehensive admission assessment. For nurses, comprehensive completion and evaluation of the admission assessment documents are the first step in identifying the patient at risk for delirium.

Signs and symptoms of delirium

Manifestations of delirium include alterations in cognitive function such as changes in the ability to sustain attention, being easily distracted and difficult to engage in conversation (Collins et al., 2010). Acute onset of progressive loss of orientation is a hallmark symptom of delirium as is auditory and olfactory hallucinations and misperceptions of the events occurring around the individual (Fong et al., 2009) Neurological disturbances such as disturbed sleep, decline in activity levels and emotive responses are common in persons with delirium (Inouye, 2006)

Assessing for delirium

Because delirium is a bedside clinical diagnosis, clinicians must be proactive in their assessment and management of this disorder. Gandreau, Gagnon, Harel & Tremblay (2005) found that while nurses documented changes in cognition it was often labeled as "confused", "disoriented", or "agitated". This study was further supported by the findings in a study conducted by Voyer, Cole, McCusker, St. Jacques & Laplante (2008) in which 216 charts were reviewed and examined nursing documentation related to cognitive changes. The conclusion of Voyer et al. (2008) was essentially the same as the study done by Gandreau et al. in 2005. Devlin et al (2008) surveyed 330 ICU nurses and found that they did not routinely assess for delirium. Reasons cited included lack of knowledge of how to use assessment tools, the belief that general shift assessments were sufficient and acute confusion in the ICU elderly patient was to be expected and therefore not something that required aggressive intervention (Devlin et al., 2008)

Voyer et al (2008), Lemingre et al., (2006) and Gandreau et al. (2005) concluded that nurses were more likely to accurately recognize and identify delirium if a standardized assessment tool was consistently utilized. There are several standardized assessment tools available which have been shown to be reliable in detecting delirium. These include the Mini Mental Exam, Confusion Assessment Method (CAM). Of these, the American Geriatric Society supports the use of the CAM as the assessment tool for delirium detection (Consult Geri, 2012). The CAM has different versions for the intensive care unit and there is a modified CAM which is a shorter version of the CAM but is equally effective. Both the CAM and CAM-ICU have a reported sensitivity of 94-100% and a specificity of 89-95% (Inouye et al., 1990). Training on the use of the CAM is available on the web which enables easy access to training or staff (Consult Geri, 2012). CAM examines 9 different areas related to identification of delirium. In order to considered positive for delirium, the patient must have an acute onset of confusion or mental status changes, exhibit behaviors which fluctuate during the interview and either have disorganized thinking or altered level of consciousness. Lemiengre et al. (2006) and Inouye, Foreman, Katz, & Cooney, (2001) found that the ability of nurses to accurately assess for delirium improved by as much as 50% with the use of the CAM.

Nursing interventions to reduce the risk for delirium

Basic, multi-modality nursing interventions and collaborative care have proven effective at preventing or reducing the effects of delirium (Pretto, Sprig, Milisen, DeGesset, Pegazzoni, & Hasemann, 2009; Inouye, Bargardust, & Charpentier, 1999). Inouye, (2006) achieved a 65% reduction in delirium through the proactive use of multimodal interventions in the care of at risk patients. Kratz (2008) reported a 62% reduction in falls and 100% reduction in the use of sitters when multimodal interventions were implemented on a medical surgical unit. The interventions these researches used are basic interventions nurses provide every day. They include ongoing assessment, ensuring patients were mobilized out of bed, adequate pain management and control, ensuring adequate amounts of undisturbed sleep, keeping the patient hydrated, preventing deoxygenation and infections, and reorientation and use of glasses and hearing aids to improve social interaction. No single intervention has been found to be more

effective at reducing delirium, however, when each of these nursing interventions are implemented in concert with one another, the risk for delirium is significantly reduced (Pretto et al., 2009; Inouye, 2006). Central to the recommendations is a standardized approach to assessment for delirium using validated instruments designed to specifically identify delirium (Inouye, 2006). Inouye (2006) noted that collaborative care, ongoing nursing assessment for delirium using standardized tools, and careful implementation of basic nursing care is vital to the reduction of delirium in hospitalized patients. Highlights of key nursing interventions to reduce delirium are found in Table 2. The information found in Table 2 were developed from evidence based recommendations for the management of delirium found at Yale Elder Life Program, Vancouver Delirium Project, and National Institute for Health and Care Excellence (NICE), and Agency for Healthcare Research and Quality.

Conclusion

Delirium is a serious, complex cognitive disorder which occurs in as much as 65% of the hospitalized elderly. Left undetected and unmanaged, delirium can contribute to higher incidence of falls, urinary tract infections, early long term institutionalization, permanent cognitive changes, and even death. Nurses have an important role in the identification and management of patients who are at risk for the development of delirium. Through the diligent use of common nursing interventions as well as working collaboratively with interdisciplinary team members such as physical therapy and physicians, nurses can be key to reducing the risk for the development of delirium, improving patient outcomes, and enhancing quality patient care. It is imperative that nurses understand that delirium can be prevented or, at the very least, limited in its effects if nurses implement, in a careful and deliberate manner, basic nursing care for all patient

Table 1:

Modifiable and Non-modifiable Risk Factors Associated with Delirium

Non-modifiable	Modifiable
• History of cognitive disorders/ dementia • Male • Age 70 or older • Institutional living arrangements • Social Isolation • Hearing/ visual impairments • Chronic hypoxia from anemia or COPD • Major illness/ hip fractures/ open heart • Surgery, acute respiratory distress.	• Use of restraints* • Use of catheters * • Pain * • Sleep Disruptions * • Sensory Impairments * • Decreased mobility * • Infections/ fever * • Hypoxemia* • Dehydration/ malnutrition* • Anesthesia time over 1 hour • Use of medications known to contribute to the development of delirium# • Low blood pressure/ electrolyte disturbances # • Drug/ Alcohol abuse#

(*) Key areas nurses can use basic nursing interventions to reduce risk for delirium

(#) Key collaborative areas nurses can act to reduce the risk for delirium

Table 2

Nursing interventions for the Management of Delirium

Nursing Assessment with Standardized Instruments	• Greater than 3 risk factors and no evidence of delirium *or* evidence of delirium: Assess with CAM q shift • 2 or less risk factors and no evidence of Delirium: Assess with CAM q 24 hours
Mobility	• Up in chair (if tolerated) or ambulation at least 3 x a day • If on bedrest: Active/ passive ROM 3x daily • Routine toileting schedule: If possible use commode or bathroom
Hydration/ nutrition	• Assess for evidence of dehydration q shift • Accurate I and O • Ensure adequate nutrition/ diet • Supplement as needed. • Dietary Consult • Routine analysis of proteins.
Cognition/ Orientation	• Orient person as needed • Engage in meaningful conversation • Clocks, White Board in Room • Speak clear and slowly

Eliminate use of tethers as able	• Restraint free • Remove catheters as able
Pharmacy	Work collaboratively to limit use or eliminate drugs known to contribute to delirium (See Table 3)
Pain	• Assess for pain • Treat pain aggressively • Understand pain and pain management in the elderly- avoid use of Demerol and morphine. Use of synthetic narcotics such as Fentanyl has fewer side effects.
Sleep/ rest	• Ensure 6-8 hours of uninterrupted rest • Allow for brief rest periods (sleep) every 8 hours.
Control for physiological stressors: Infection, hypoxemia	• Good infection control measures • Monitor oxygen saturation q 4 h. treat for oxygen saturation less than 94%

(*) The nursing interventions, presented in this table, is a compilation from the literature and geriatric programs specifically designed to improve care of the elderly including the Agency for Healthcare Quality and Research, National Initiative for the Care of the Elderly (NICE) project, Elder Life Program at Yale hospitals, and Vancouver Delirium project.

Table 3

Common Pharmacological Agents Associated with Delirium

Drugs which contribute to the development of delirium	Drugs to use to manage agitation in the delirious patient
Alcohol Anticonvulsants Antipsychotics Barbiturates Benzodiazepines – long and short acting Chloral Hydrate No benzodiazepines (Zolpedium) Opioid analgesics esp. Demerol Anticholinergic Antidepressants esp.: Tricyclic agents Amitriptyline Antihistamines Antiparkinsonian agents Antipsychotics H2 blocking agents	Haloperidol Olanzapine Quetiapine Risperidone Clonazepam

Source: Inouye, S. K., 2013.

Manuscript 2

Reducing the Risk for Delirium in the Mechanically Ventilated Elderly Patient: Gap Analysis and Opportunities for Practice Improvement in a Community Hospital

Mary Zody, MHA, MSN, RN

University of Kentucky College of Nursing

"*What I see these days are paralyzed, sedated patients, lying without motion, appearing to be dead except for the monitors that tell me otherwise. Why this syndrome of sedation and paralysis has emerged baffles me, because this was not always the case in the past. When we first started [our intensive care unit] in 1964, patients who required mechanical ventilation were awake and alert and often sitting in a chair…by being awake and alert, these individuals could interact with their family, friends and environment. They could feel human. By so doing they could maintain a zest for living which is a requirement for survival."*

Dr. Thomas L. Perry, MD (1998)

NOTE: The current nursing practices in the study intensive care unit, is reflective of common practices found in many large and small intensive care units. The practice reported in this paper should not be construed as being somehow substandard with regards to current practices related to patients receiving mechanical ventilation. What current practice, in the study ICU is not, however, is grounded in evidence.

Abstract

It is estimated that up to 80% of elderly mechanically ventilated patients will suffer from delirium (Geriod, Pandharipande, & Ely, 2008). Patients who suffer from delirium often have negative outcomes including prolonged hospitalizations, permanent cognitive changes, and premature death. Evidence based care bundles have been developed which have been shown to reduce the risk for delirium in mechanically ventilated patients. Despite what is known about delirium, practice in the ICU often does not include steps to mitigate the risk of delirium. The purpose of this paper is to compare current practice in a twelve bed community hospital intensive care with evidence based practice to identify opportunities for practice improvement with a focus on mitigating the risk for delirium and improving patient outcomes. The results of the study found that current practice does not reflect evidence based care and that numerous opportunities for practice improvement exist.

Key Words: Delirium, Evidence Based Protocols, Gap Analysis

Each year, it is estimated that ICU delirium costs the US healthcare system over 150 billion dollars (Leslie, Marcantionio, Zhang, Summers, & Inouyne, 2008). Convincing evidence suggests that the development of ICU delirium, and its related devastating outcomes, including shortened lifespan, permanent cogitative changes, prolonged mechanical ventilation, severe deconditioning, and sepsis, is related to the care delivered in the ICU rather than disease or accidents (Barr et al 2013). The significance of this is that care delivery can be altered and thus delirium and its highly negative outcomes can be mitigated.

The purpose of this paper is to examine current practices in the care of the older adult (age 60 and above) receiving mechanical ventilation and determine opportunities for practice improvement to reduce the risk of delirium. To achieve this purpose, this paper will present: a review of the evidence related to the reduction of the risk of delirium in the elderly mechanically ventilated patient, a gap analysis describing the current practice within the ICU studied and recommendations for practice improvement. Two evidence based bundles (Awake, Breathing, Delirium, Early Mobility (ABCDE) and Pain, Agitation, and Delirium (PAD) were used as the basis to which current practice was compared. Both of these bundles target the reduction of delirium in the elderly mechanically ventilated patient through a multidisciplinary coordinated approach. The difference in the two bundles is that the ABCDE bundle does not address pain whereas the PAD bundle does.

Review of Literature Supporting the ABCDE/ PAD Bundles in the Management of Delirium

According to the American Association of Critical Care Nurses (AACN), the Awakening and Breathing, Coordination, Delirium Monitoring and Management, and Early Mobility (ABCDE) bundle incorporates the best, most recent available evidence in the prevention and management of delirium in the mechanically ventilated patient (Balas et al., 2012). The ABCDE Bundle has three principles (1) improving communication among members of ICU team, (2) breaking the cycle of prolonged mechanical ventilation and over-sedation, and (3) standardizing care (Vasilevskis et al., 2010). Pain has been documented as a contributor to the development of delirium (Inouye & Charpentier, 1996, Barr et al., 2013). What is noticeably missing from the ABCDE Bundle, is pain assessment and management. In

order to develop a comprehensive approach to the reduction of risk for delirium, Barr et al. (2013) introduced the Pain, Agitation, Sedation (PAD) guideline. This evidence based guide focuses on the reduction of the risk of delirium through pain identification and management. Because pain is common in patients who are mechanically ventilated, the PAD guideline was also incorporated into the ABCDE bundle and implemented at the target hospital.

Definition/ Characteristics of Delirium

Delirium is a serious, often overlooked, health problem that occurs in hospitalized or institutionalized older adults. Delirium is defined as a "transient and etiological nonspecific organic mental syndrome characterized by a reduced ability to focus, sustain or shift attention, disturbance in consciousness or cognition develops over a short period of time and is an *acute change* from baseline, attention and awareness that tend to fluctuate in severity over the course of the day, and there is evidence from the history or physical assessment that the condition is a result of a physiological consequence of a medical condition" (American Psychiatric Association, 2013). According to the American Psychiatric Association (2013) delirium has an acute or sub-acute onset with symptoms developing 2-5 days after hospitalization. There are three subtypes of delirium: hyperactive in which the client becomes agitated and confused, hypoactive in which the client becomes withdrawn, or mixed (O'Keefe & Lavin 1999). All three forms of delirium have varying degrees of presentation which may make early diagnosis problematic (O'Keefe & Lavin, 1999).

The incidence of delirium in the ICU ranges from 45-88%. (Cavallazzi, Saad, & Mank 2012, Ouimet, Kavanagh, Gottfried, & Skrobik, 2007; Ely, Gautam, & Margolin, 2001). The two most common forms of delirium in the ICU are mixed and hypoactive (Peterson et al., 2006). Hypoactive delirium has been reported more frequently in older adults and has a worse prognosis (Cavallazi et al., 2012).

Delirium has been associated with significant adverse outcomes which not only affect the patient's physical and emotional wellbeing but can have serious economic consequences as well. Inouye, Westendorp, & Saczynski (2014) studied the outcomes of delirium and determined the relative risk of

developing specific adverse outcomes related to delirium. This study found that the relative risk for prolonged hospitalization was 1.4-2.1; mortality 1.5-1.6; institutionalization 2.5; functional decline 1.5; and cognitive decline/ dementia 6.4-41.2). It has been estimated that delirium costs Medicare about 164 million dollars annually. These costs were associated with re-hospitalization; institutional care; rehabilitation/ long term care and formal home care services. (Leslie & Inouye, 2011).

Pathology/Risk Factors of Delirium

Pathology of delirium is not well understood. It is thought that decreased cholinergic activity may contribute to the development of delirium. This theory is supported by studies (Hshieh, Fong, Marcantonio, & Inouye, 2008; Flacker & Lipsitz, 1999) in which there were an increased incidence of delirium in patients receiving anticholinergic drugs. However, this relationship is not absolute and delirium does occur in patients with no disturbance in cholinergic activity (Hshieh et al., 2008). Acute, generalized inflammation, as is often seen in ICU patients, is thought to play a role in the development of delirium (Girard et al., 2012). Animal studies have shown that inflammatory mediators can cross the blood brain barrier and create changes in brain wave patterns that are consistent with those seen in septic patients with delirium (Van Der Mast, 1998).

While the mechanism of delirium development remains unclear, risk factors for the development of delirium are known. These include age (persons over the age of 60); persons with multiple comorbidities, prolonged inactivity, unmanaged pain, prolonged sedation, and previous cognitive disorders such as dementia (Ely et al., 2001; Inouye et al., 1996; Inouye et al., 2014). Ely et al (2001) identified, on average, eleven (11) risk factors per patient admitted to the ICU. Of these, exposure to sedative and analgesic medication as well as sleep deprivation was almost always experienced by patients in the ICU setting (Ely et al., 2001).

Assessing for Delirium

Clinical manifestations of delirium vary widely and often present as varying symptoms within one patient. For example, the patient may be wildly agitated one time and more sedated or hypoactive another. Because of the fluctuation of the symptoms of delirium and because there are no definitive

biomarkers to diagnose delirium, astute ongoing assessment using validated instruments to detect delirium is key to delirium management. While there are a variety of instruments with high validity ratings, the most common instrument is the Confusion Assessment Method (CAM and CAM ICU}. The CAM was developed by Inouye in 1990. The Cam has been shown to have a sensitivity of 94-100%, specificity of 90-95%, and high interrater reliability. (Inouye, 1990; Wei, 2008) The CAM consist of nine areas of assessment. They are: acute onset of confusion; inattention, disorganized thinking, altered level of consciousness, disorientation, memory impairment, perceptual disturbance, and psychomotor agitation or retardation. If the symptoms have an acute onset and two or more criteria are met, then the patient is determined to have delirium. The problem with the CAM for use in the mechanically ventilated patient is that it requires the patient to be able to verbally interact with the evaluator. In 2001, Ely et al. developed the CAM ICU which was designed specifically for detection of delirium in the mechanically ventilated or nonverbal patient. Ely et al. (2001) reported a sensitivity of 93-100% and specificity of 89-100% for the detection of delirium. In the same study, Ely reported an inter rater reliability of k=96; CI= 95-99%. Bedside nurses can easily administer the CAM or CAM ICU with no effect on the reliability or validity of the instrument. (Ely et al., 2001) Lin, Liu, Wang, 2008) reported similar findings (sensitivity = 91-95%; specificity =98%; and inter rater reliability k=91). In order to detect delirium early, it is recommended that the CAM –ICU be performed a minimum of once a nursing shift (Balas et al., 2012).

Sedation/ Sedation Management

Continuous deep sedation, as is often the practice in the care of the patient receiving mechanical ventilation, can be a significant contributor to the development of delirium, ventilatory dependency, infections, and even early death (Reade, Phil, & Finfer, 2014). One method of breaking the cycle of continuous deep sedation is a daily spontaneous awakening trial, targeted light sedation strategies or both, (Tanaka et al., 2014; Needham & Korupolu, 2010; Jackson, Proudfoot, & Walsh, 2010). Hager et al. (2013) evaluated the effectiveness of light sedation and improved patient outcomes. Following implementation of targeted light sedation protocols the patient wakefulness significantly increased ($P < 0.0001$) and the incidence of delirium in the awake patient significantly decreased from 19% to 0% (P. <

0.0001). Another strategy for reducing deep sedation is the daily awakening trial in which the patient is allowed to awaken from sedation. Regardless of the approach to sedation management (continuous light sedation, daily interruption of sedation or some combination of both), it is clear that any approach must have protocols to support decision making regarding sedation management (Hughes, Girard, Pandharipande, 2013).

Instruments have been developed specifically to assess sedation and depth of sedation. One of the most common is the Richmond Agitation Sedation Scale (RASS) (Sessler et al., 2002). The RASS scale ranges from – 5 (unarousable) to + 4 (combative). Using the RASS scale, the PAD guideline defines light sedation as - 2 to 0 (Barr et al., 2013). At this level of sedation, the patient can follow command but demonstrates no agitation. Light sedation should be a goal for the majority of mechanically ventilated patients. (Hughes et al., 2013; Bales, 2013) The RASS scale has been shown to have a high degree of reliability and validity. Ely et al., (2003) conducted a study which evaluated the reliability and validity of the RASS scale in management of sedation using 290 paired observations by nurses. Ely et al., (2003) concluded that the RASS scale demonstrated a high degree of reliability ($r=.78$, $p<.001$) and inter- rater reliability (weighted $k= 0.91$), and showed significant validity in detecting different levels of sedation and consciousness ($p=<.001$). In the same study, the RASS sedation scale was shown to be better than the Glasgow Coma Scale in inter rater reliability ($k=.64$; $p<.001$) and has been shown to be more reliable then the Glasgow Coma Scale (GCS) at assessing sedation levels (Ely et al, 2003). Using sedation scales, which are reliable and valid have been shown to reduce the incidence of deep sedation and improve patient outcomes (Bales, 2012). Despite the known benefits of using such scales, surveys have shown that up to 30% of ICU's do not routinely use sedation scales to assess the depth of sedation in their patients (Svenningsin et al., 2013; Patel et al., 2009).

Girard et al (2008) found that coordination of spontaneous awakening trials with spontaneous breathing trials reduced mechanical ventilation on average, by three (3) days and reduced hospital length of stay by four (4) days Klompas et al., (2015) developed a quality improvement project to reduce adverse events in the mechanically ventilated patient. Using a coordinated effort between spontaneous awakening

trials with spontaneous breathing trials, they were able to decrease ventilator adverse events from 9.7 to 5.2 events/100; decrease infection rates from 3.5 to 0.52 per 100 and also had shorter ventilator days as well as shorter ICU and hospital length of stays. Patients who had a spontaneous awakening trial coordinated with a spontaneous breathing trial had a 32% reduction risk of mortality at one year compared to those who received a spontaneous breathing trial only.

Levels of sedation may be an important determinate of delirium. Treggari et al. (2009) found that patients who were lightly sedated had 1.5 days fewer ICU days, had one day less of mechanical ventilation, and at a 4 week follow up found that patients who had received heavier sedation had higher PTSD scores than those who received lighter sedation. At the end of four weeks, patients who received higher levels of sedation also had difficulty completing a basic questionnaire, were more forgetful, and reported greater anxiety (Treggari et al. 2009).

Choice of sedation also impacts patient outcomes. Propofol is a common anesthetic class drug that is used to sedate patients on mechanical ventilation. It has a short half-life and few side effects. When comparing Propofol with benzodiazepines, Londardo et al., (2014)
concluded that the use of Propofol was superior in achieving better sedation quality, less time to awaken patients, reduced length of stays in the ICU, reduced costs of sedation, and less time to extubation. Regardless of the sedation used, sedition medication should be titrated according to specific criteria in order to assure appropriate sedation is achieved.
(Reade & Finfer, 2008)

Pain/ Pain Management

Unmanaged pain is a major risk factor associated with delirium (Inouye, 1996; Barr, 2013) Barr et al. (2013) concluded that pain, in patients receiving sedation, is often under assessed and further contributes to the development of delirium and agitation. In the ventilated patient, pain should be routinely assessed using nonverbal scales and managed before there is an increase in sedation. (Peitz, Balas, Olsen, Pun, & Ely, 2013). Because ventilated patients are nonverbal, use of pain scales designed specifically for the nonverbal patient is recommended. One such scale is the Critical Care Pain

Observation Tool (CCPOT) which was developed by Gelinias, Fillion, Puntillo, & Fortier, in 2006. This tool is designed to evaluate pain based on facial expressions (such as grimacing) as well as muscle tension and general body movement. Scores on the CCPOT range from 0 (no pain) to 8 (maximal pain). While any non-verbal pain scale remains somewhat subjective, the CCPOT tool has been recognized as being a reliable measure of pain (Gelinias, Arbour, Michaud, Vailant, Desjardins, 2011) Pun (2012) stated that making pain management a priority over sedation significantly reduced the duration of mechanical ventilation and reduced the length of stay in the ICU.

Analgosedation is the process of treating pain before sedation. This technique is in alignment of the PAD guideline (Barr et al., 2013) which recommends that pain be appropriately managed and that sedation be minimized. Devabhakthuni, Armahizer, Dasta, & Kane-Gill (2012) conducted a literature review to determine the effectiveness of analgosedation in the management of agitation. Devabhakthuni et al., 2012) concluded that analgosedation is well tolerated, reduced the need for sedation, and improved patient outcomes.

Early mobility

A risk of prolonged mechanical ventilation is generalized muscle wasting and deconditioning. (Lipshutz & Gropper, 2013). The effects of prolonged immobility can include an increased risk for sepsis, prolonged mechanical ventilation due to difficulty with mechanical ventilation weaning, muscle and bone wasting which can contribute to falls resulting in fractures. (Lipshutz & Gropper 2013). Negative outcomes associated with ICU deconditioning can be devastating. Hermans et al., (2014) found that patients who had severe deconditioning related to mechanical ventilation, were more difficult to wean from mechanical ventilation ($p=.009$), had an increased incidence of death in the ICU ($p=.008$); and were less likely to survive post hospital discharge ($p=.007$).

Early mobilization has been shown to prevent or reduce the incidence of weakness in the ICU patient and improve short and long term outcomes (Schweickert, et al. 2009). Needham et al., (2010) demonstrated that early mobilization resulted in a reduction in sedation use, increased patient functionality without an increase in adverse events, significantly reduced the risk for delirium ($p=.003$),

decreased ICU length of stay (p=.02) and hospital length of stay (p=.03). However, despite studies which have shown the benefit and safety of early mobilization in the ICU, many ICU's have not implemented plans or guidelines to achieve such outcomes (Balas et al., 2013).

Research supporting effectiveness of the ABCDE Bundle and PAD Guidelines

A bundle is a multi-modality approach to care which is based on evidence. Studies (Balas et al., 2013; Schweickert et al, 2009; Dale et al., 2014) have shown the effectiveness of both the PAD and the ABCDE bundle at reducing delirium and improving patient outcomes in the mechanically ventilated patient. Schweickert et al., (2009) examined outcomes of ICU patients when combining a standardized approach to sedation management with physical and occupational therapy (mobilization). Schweickert et al., (2009) reported that when compared to sedation management alone ICU length of stay decreased by 2 days, ventilator free days increased by 2.1 days, and the odds of ICU patients returning to an independent functional status at the time of discharge from the hospital nearly tripled. Dale (2014) evaluated an integrated approach using the PAD guidelines to target light sedation as recommended in the ABCDE bundle, and coordination of daily awakening with spontaneous breathing trials. They found that patients were more likely to be assessed for pain, agitation and delirium, use of benzodiazepines was reduced by 30%; risk for delirium decreased by 33%; duration of mechanical ventilation was reduced by 20%; ICU length of stay was reduced by12.4%, and hospital length of stay was decreased by 14%. Balas et al., (2013) studied the effectiveness of combining the PAD guidelines with spontaneous awakening trials coordinated with spontaneous breathing trials and early mobilization. They found that when a bundled approach was used, patients were more likely to receive a daily spontaneous awakening trial coordinated with a spontaneous breathing trial, and received daily mobilization. The results were a decreased risk for the development of delirium by nearly 50%; decrease in mechanical ventilation by 3 days, and an increase in delirium free days by 1. Of particular note was that these improvements in patient outcomes were achieved in spite of incomplete bundle adherence by the nursing staff and little difference in medication utilization in the pre and post treatment groups. From these studies it is clear that a planned, multi-modality approach to care can improve patient outcomes.

Gap Analysis: Current Practice compared to Evidence Based ABCDE/ PAD Bundle

The purpose of the gap analysis is to compare current practice with the evidence to determine opportunities for practice improvement and thus patient outcomes.

Guiding Questions: Questions to help guide the gap analysis were:

1. How does current practice, related to the management of the mechanically ventilated older adult compare to the evidence based ABCDE bundle and PAD guidelines?
2. What are the current clinical outcomes of older adults receiving mechanical ventilation in the target ICU?
3. What are the opportunities for practice improvement?

The population of interest was the older adult (age 60 and above) receiving mechanical ventilation. This population represents approximately 80% of the mechanically ventilated patients in the target ICU. With the current emphasis on "pay for quality", it was felt that this population represented both the greatest fiscal risk to the healthcare organization as well as the greatest opportunity for improvement of patient outcomes.

The setting in which the study took place was a twelve (12) bed intensive care unit in a 150 bed community hospital located in the Midwest. The community hospital is operated by a large academic hospital which is part of a national healthcare organization. The specific ICU studied is a 12 bed ICU with predominately older (over the age of 60) population. It is a medical surgical ICU. Any advanced level patients such as major trauma, cardiac or neurological issues are transferred to the larger academic hospital.

Nursing staff, within the ICU, are predominately Associate and Baccalaureate prepared nurses who have been in nursing over 10 years. Many of the nurses have not worked at another facility. There is one intensivist and general hospitalist who provide medical direction for the patients in ICU.

Procedure for Conducting the Gap Analysis

This was a systematic review of charts to examine current practice related to care of the mechanically ventilated patients and their clinical outcomes. In order to determine the most current practice, care had to be delivered within 12 months of the time of the chart audit. Inclusion criteria were individuals over the age of 60, no known cogitative disorders such as dementia, received mechanical ventilation for at least 48 hours, and did not have a terminal illness. Beginning with the most recent charts and working backward for 12 months, charts were selected for screening if they met the basic inclusion criteria of age (over the age of 60) and length of time on mechanical ventilation (48 hours or longer). A total of twenty-two (22) charts were obtained for initial screening for suitability for inclusion. Of the 22 charts, two (2) were excluded because the patient was terminally weaned and therefore kept more heavily sedated; five (5) charts were excluded because the patients had a known history of cogitative disorders which could enhance the risk for delirium. A total of fifteen (15) charts was included in the gap analysis. In order to fully capture the practice patterns of the nursing care of the older adult receiving mechanical ventilation, a minimum of six (6) days or total ventilator time (whichever was smaller), was reviewed for each chart audited. Eighty- two (82) ventilator days representing 164 nursing care shifts were reviewed.

Development of Audit Tool for Gap Analysis

Based on the ABCDE bundle and PAD guidelines, five (5) key areas were identified for the basis of the gap analysis. They were:

- Sedation/ sedation management:

  Criteria were use of sedation instruments specific to the evaluation of sedation levels, documented sedation vacations, sedative use, and documentation of need if sedatives were adjusted.

- Coordination of awakening from sedation and ventilator weaning trials:

  Criteria were documentation of interdisciplinary coordination of care between respiratory therapy and nursing when conducting ventilator weaning trials and spontaneous awakening trials and documented safety screens prior to ventilator weaning trials.

- Pain and pain management:

  Criteria were use of pain scales appropriate to sedated, mechanical ventilated patients, use of pain medication to reduce pain and results.

- Early mobilization:

  Criteria was documentation of mobilization of patient at least daily.

- Delirium assessment

  Criteria was documentation of delirium assessment using tools appropriate to the evaluation for delirium.

Other Data Collected

Patient outcomes and policy/ procedure related to care of the patient receiving mechanical ventilation was also included in the gap analysis. Patient outcomes were evaluated by identifying the total number of ventilator days per patient and total number of ICU days per patient. Patient outcomes were evaluated by determining placement of patient following hospitalization and, based on patient assessments, determination of cognitive changes from patient admission to discharge Administrative analysis included a review of current practice guidelines and policy to determine if specific practice guidelines currently exist.

Demographic data collected for each patient were patient age, sex, primary diagnosis on admission, living arrangements prior to admission, disposition of patient at discharge, number of co- morbidities; and primary admitting diagnosis.

Results

Population Demographics (See Table 4 and 5) A total of fifteen (15) client records were reviewed. Of these 47% were female and 53% female. The mean age was 75.9 (range 65-89). Of the 15 clients, 1 (7%) was admitted from a nursing home, 1 (7%) was admitted from an assisted living facility; and 13 (87%) were admitted from the community where they were living independently; the mean number of comorbidities per patient was 1.73 (range 1-3). Admitting diagnosis were respiratory 7 patients (47%); cardiac 1 patient (7%); surgery 2 patients (13%); sepsis 1 patient (7%); and other medical 4 patients (27%).

As seen in Table 5, total ICU days for the 15 patients was 169 days for an average of 11.26 days (range 2-29) per client. Of the 169 ICU days, 121 days were spent on the ventilator for an average number of ventilator days, per patient, of 8.06. Of the 121 total ventilator days, 82 (67%) were reviewed for this gap analysis. Total hospital days was 237 for an average of 15.8 hospital days (range 4-28) per patient.

Patient outcomes were: 12 patients (80%) were admitted to a long term care facility; 1 (7%) returned to the community to live with family; 1 (7%) was admitted to a long term ventilatory care facility (LTAC); and 1 (7%) died in the hospital Of the 15 patients reviewed, all (100%) experienced some degree of physical deconditioning which required rehabilitation services post hospitalization and 12 (80%) had reports of confusion or difficulty following commands post ICU. This change in cognition was new to the patient and not present on admission.

Sedation/ Sedation management

As can be seen on Table 6, significant gaps exist between current practice and ABCDE Bundle. All mechanically ventilated patients received sedation. The sedative of choice, in the study ICU, was Propofol. According to the literature review this is an acceptable medication for sedation and has not been linked to an increased incidence of delirium.

Evaluation of sedation levels were reviewed for number of times sedation was evaluated and if a validated instrument, such as the RASS, was utilized. Sedation level was evaluated 149 times

for a mean of 9.93 (range 2-26) times per patient. Of the 149 sedation assessments that were documented, 141 (94.6%) used the Glasgow Coma Scale and/ or the Ramsey scale. Both the GCS and the Ramsey Scale are considered less sensitive to the various degrees of sedation, cannot be used to establish sedation goals, and have a lower inter rater reliability rating (Bales et al., 2013). The RASS sedation scale is specifically recommended in the ABCDE Bundle because it has been shown to effectively evaluate degrees of sedation and can be used to set sedation goals which can significantly help in guiding sedation titration. In the study ICU, the RASS scale was used in three (3) patients for a total of 8 times to evaluate sedation.

According to the ABCDE bundle, patients should be allowed to "wake up" from sedation at least once a day. Ventilator weaning trials should be coordinated with awakening trials. From the chart audit, 5 patients (33%) had documented awakening trials at least once while mechanically ventilated. However, none of the awakening trials were coordinated with ventilator weaning trials. The ABCDE bundle also calls for safety screens prior to ventilator weaning trials and spontaneous awaking trials. No documentation could be found regarding safety screens.

Pain/ pain management

According to the PAD guidelines, pain in the ventilated patient should be assessed using a nonverbal scale. According to the documentation in the charts that were audited for this study, pain was primarily assessed using the observational method but no specific pain tool was indicated. Of the 15 patients reviewed, all (100%) had pain assessed. Total assessments documented was 275 which averaged 18. 33 (range 2- 8) times per patient. The PAD guideline states pain in the mechanically ventilated patient should be assessed routinely using an appropriate non- verbal scale and that pain medication should be provided first instead of increasing or altering sedation medication (Barr et al., 2013). According to the literature, pain in the sedated mechanically ventilated patient is often under assessed and undermanaged (Bales et al., 2013). While pain assessment was documented an average of 18.33 times per patient, pain scales utilized was not documented and pain medication was provided to only 4 (26.6%) of the patients.

Delirium assessment/ early mobility

According to the ABCDE Bundle, early mobilization and consistent assessment of delirium, using a reliable and validated instrument, should be done at least once a day. No mobilization or delirium assessment was documented in the any of the charts reviewed.

Conclusions/ Recommendations

The results of the chart audit of nursing care provided in the study ICU clearly indicate an opportunity and need to standardize care and improve patient outcomes through the implantation of the ABCDE/PAD bundle. Currently nursing care is highly variable both in the care delivered between patients as well as care delivered from shift to shift in the same patient. For example, patients who had had a spontaneous awakening trial were often heavily sedated on the next shift and may not have been allowed to wake up for another 3-5 days. This extreme variability in care (inconsistent spontaneous awakening trials and use of continuous deep sedation) has been shown to increase the risk for delirium and increase the risk for ventilator associated complications such as hospital acquired infections (Svenningsen et al., (2013)

Sedation management is another area for practice improvement. Deep sedation does not equate to either physical or mental comfort. Studies show that, when patients can recall their time spent on mechanical ventilation, they experienced pain, fear from lack of the ability to communicate, and a sense of isolation (Treggari et al. 2009) Other studies have found that, when asked, patients prefer to be awake during mechanical ventilation, so that they can interact with healthcare providers and family (Capuzzo et.al 2001). Lighter sedation, while maintaining patient comfort, can be achieved through the use of reliable and validated sedation scales (such as the RASS) which allows the nurse to assess degrees of sedation and set sedation goals. From the chart audit, it was clear that the majority of the patients are kept in a deep sedative state. Continuous deep sedation has been shown to be a contributor to the development of delirium and prolonged ventilator time. Sedation must be titrated by some measure and specific guidelines, to ensure that the patient is receiving adequate sedation to facilitate comfort but not so

excessive amount of sedation so as to render the patient obtunded and unresponsive for a prolonged period of time.

Pain and pain management is another opportunity for practice improvement. Proprofol, which is a commonly used sedative for mechanical ventilation, has no analgesic properties. Therefore, it is possible that even if heavily sedated, patients can still experience pain. While pain is being assessed in the studied ICU, a standardized instrument such as the Critical Care Observation Pain Tool (CCOPT) is not being used. Restlessness and agitation were noted in the documentation as an indicator of pain yet little or no use of pain medication was found. Often if a patient is agitated, the first response from the documentation was to increase the sedation. However, according to the ABCDE/ PAD guideline, pain should always be considered first if the patient is agitated and treated accordingly with appropriate pain medication.

Mobilization is another area for practice improvement. Currently, patients are kept in a deep sedative state with little to no mobilization. Lack of mobilization can quickly lead to profound deconditioning. Deconditioning not only includes wasting of bone and muscle but also decreased cardiac output which can contribute to decreased perfusion to the brain and kidneys as well as suppression of the immune system which can contribute to secondary infections.

Today, reimbursement for hospital care is dependent on patient outcomes. Because of this, hospitals cannot afford to allow providers to continue to practice as they always have. With the current practice, patient outcomes are not optimal as is evidenced by the length of time on the ventilator, severe debilitation from lack of mobilization, and cognitive changes that are new for the patient when they were allowed to awake from their deep sedation. We, as nurses, must recognize that we have a key responsibility in the outcomes our patient achieves. Perhaps Florence Nightingale stated it best when she said, "It *may seem a strange principle to enunciate as the very first requirement in a hospital that it do the sick no harm",* Use of evidence to support and guide patient care is one of the best means to meet the principle of "do the sick no harm".

See Appendix A: Proposal for implementing ABCDE/PAD bundle.

Components of the ABCDE Bundle and PAD Guideline

The ABCDE bundle consists of three principle elements

1. Awakening and Breathing Trial Coordination: Collaborative approach to sedation management with the goal of minimizing sedation through the use of targeted sedation levels using reliable and valid instruments such as the RASS sedation scale and allowing the patient to safely wake up daily for the purpose of assessing for delirium and determining the patient's ability to safely breath independently from mechanical ventilation. Sedation medication should be titrated according to specific criteria and guidelines.
2. Delirium Assessment and Management Daily monitoring for delirium through the use of standardized approaches and tools such as the CAM ICU.
3. Early Progressive Mobility: Collaboration and coordination to prevent deconditioning by early, safe, progressive mobility. Mobility is dependent on patient's condition and can range from passive to ambulation.

Pain, Agitation, Sedation (PAD) Guidelines

The PAD guidelines offer specific guidelines in the assessment and management of pain in the mechanically ventilated patient. Pain is the underlying factor which may contribute to increased agitation and delirium. Therefore, effective pain management through ongoing pain assessment using a standard tool for nonverbal patients, and active pain management is key to the reduction of the incidence of delirium in the mechanically ventilated patient.is key to reducing agitation, deep sedation, and the incidence of delirium.

Table 4

Patient Characteristic

Characteristic	Number (%) (n= 15)	Mean	Range
Age		75.9	65-89
Gender:			
Female	7 (47%)		
Male	8 (53%)		
Residence preadmission			
Nursing Home	1(7%)		
Community			
Assisted Living	1(7%)		
Independent	13 (87%)		
Dependent	0		
Residence post hospitalization			
Nursing Home	12 (80%)		
Community			
Independent	0		
Dependent	1(7%)		
LTAC	1 (7%)		
Deceased	1 (7%)		
Admitting ICU Diagnosis			
Respiratory	7 (47%)		
Cardiac	1 (7%)		
Surgery	2(13%)		
Sepsis	1 (7%)		
Other/ medical	4 (27%)		

Table 5

Length of Stay (n= 15)

	Total	Mean	Range
Total ICU day	169	11.26	2-29
Total Ventilator days	121	8.06	1-29
Total Hospital days	237	15. 8	4-29
Total Ventilator Days reviewed	82 (67.7%)		

Table 6

ABCDE/ PAD Components.

	# of Patients (n=15)	Total	Mean	Range
Sedation				
Continuously infused sedative anytime	15 (100%)			
Sedation Evaluation anytime *	15 (100%)	149	9.93	2-21
Use of RASS to Evaluate Sedation anytime *	3 (20%)	8	2.66	1-4
Sedation adjustments anytime	15 (100%)	83	5.53	1- 6
Documentation reason for				
sedation adjustment anytime *	5 (30%)	7	1.4	1- 4
Sedation adjustment linked to Sedation Scale *	2(13.3%)	2	1.0	-------
Coordination of Awakening and Breathing Trial				
Coordination of Breathing Trial and				
Spontaneous Awakening anytime *	0 (0%)			
Spontaneous Awakening Trial				
Safety Screen done anytime *	0 (0%)			
Spontaneous Awakening Trial anytime *	5 (33%)	8	1.6	1-2

Delirium				
Delirium Assessment with CAM anytime *	0 (0%)			
Change in Cognition post ventilator *	12 (80 %)			
Pain				
Pain assessed anytime	15 (100%)	275	18.33	1-8
Pain Medication provided *	4 (26.6%)	19	4.75	1-6
Sedation Medication provided	2 (13.3%)	3	1.5	1-2
Early mobility				
Physical therapy consult anytime *	0 (0%)	0 (0%)		
Early mobilization out of bed anytime *	0 (0%)	0(0%)		

***= gaps in care**

Manuscript 3

Implementing the ABCDE Bundle and PAD Guideline into Everyday Care in a Community Based Hospital ICU: Opportunities for Practice Improvement.

Mary Zody, MHA, MSN, RN

University of Kentucky Collage of Nursing

Abstract

Delirium in the elderly mechanically ventilated patient remains a serious, yet preventable, disorder. Left untreated, delirium can lead to permanent cognitive changes, prolonged mechanical ventilation, prolonged hospitalization, early institutionalization, and even premature death. (Katz, 2008; Inouye, 2014) Despite over twenty years of research which has clearly linked delirium with mechanical ventilation and evidence supporting interventions to help reduce the risk for the development of delirium, implementing these strategies into everyday practice remains elusive (Bales et al. 2013). The focus of this paper is to describe strategies used to implement an evidence based approach to improve outcomes of mechanically ventilated patients utilizing the Awake, Breathing, Coordination, Delirium, Early Mobility Bundle (Pandharipande, Banerjee, A McGrane, & Ely, 2010) and Agitation, Delirium (PAD) guidelines (Barr et al. 2013) within a 150 bed community hospital. Initial findings are presented and discussed and practical suggestions are made to increase provider adherence to the guidelines.

Key words: Implementation strategies, ABCDE/PAD bundle, delirium, community hospital

Introduction

Despite years of research and evidence supporting the fact that appropriate nursing interventions can reduce the risk for hospital acquired delirium in the mechanically ventilated patient, implementation of these interventions, in a consistent and thoughtful way, has been slow to be adopted and are not routinely done. (Patel et al., 2009). The disparity between what has been shown, through evidence, to be effective, and the implementation of these processes can viewed as an implantation gap. With the advent of care reimbursement based on patient outcomes, emphasis has now shifted to the care and, ultimately, patient outcomes over which nursing has direct influence. The Awake, Breathing, Coordination, Delirium, Early Mobility (Pandharipande et al. 2010) and Pain, Agitation, Delirium Bundles (Barr et al, 2013) (hereafter referred to as ABCDE/ PAD bundle) is an example of a nurse driven evidence based practice and collaborative care model which has been shown to be effective in reducing the incidence of delirium in the mechanically ventilated patient, improve patient safety, and improve patient outcomes (Balas et al., 2012). The Multi-society task force for Critical Care Medicine acknowledges that bringing evidence based practice into the critical setting can be a slow process with many health care practitioners reluctant to move from the current methods of practice to evidence based practice (Deutschman, Ahrens, Cairns, Sessler, & Parsons 2012). This paper discusses methods which were utilized in a small community hospital to bring the evidence based ABCDE/PAD bundle into everyday practice.

Brief history of the project:

This project arose out of a concern regarding patient outcomes for elderly mechanically ventilated patients. In a 150 bed community hospital intensive care unit (ICU). In a record abstract study (Zody, 2016) it was found that patients were kept heavily sedated while receiving mechanical ventilation, often experienced prolonged ventilation time with difficulty in weaning off the ventilator in a timely manner, and physical weakness when they left ICU which resulted in placement in long term care facilities for extensive rehabilitation. A driving force to examine these issues was not only an interest in improving care, but the move towards payment based on patient outcomes. This shift in how hospitals are

reimbursed places a specific focus on nursing care and patient outcomes of this care. Because of this, it is more imperative now, more than ever before, for nurses to use evidence to implement and guide care.

Bundling of care has been shown to be an effective way of improving quality and patient outcomes (Institute of Healthcare Improvement, 2012). A bundle is "a set of evidence based interventions for a defined patient segment/ population and care setting, that, when implemented together will result in significantly better outcomes then when implemented separately" (Institute of Healthcare Improvement, 2012). The ABCDE bundle is an evidence based care bundle which was designed to improve outcomes for mechanically ventilated patients through reduction in sedation (A); improved spontaneous breathing (B), coordination of care (C), routine delirium assessment (D) and early mobilization (E). Pain has also been shown to be a significant contributor to the development of delirium. However, the original ABCDE Bundle did not include pain management as a component. The Pain, Agitation, Delirium Guideline was developed in 2013 for the purpose of guiding pain management in the mechanically ventilated patient and is now used in conjunction with the ABCDE Bundle. The combination of the ABCDE Bundle and the PAD Guideline have proven to be effective in reducing delirium which has led to decreased mechanical ventilation time, decreased weakness associated with mechanical ventilation, and improved patient outcomes (Balas et al., 2013).

In order to assess the care being delivered within the target ICU, a chart audit was completed. The chart audit compared care provided to the target population (mechanically ventilated patients over the age of 65) with six key elements of the ABCDE/PAD Bundle. The six elements were sedation management, spontaneous breathing trials and coordination of care, delirium assessment, early mobility and pain management (Zody, 2016). The chart audit found that mechanically ventilated patients were kept deeply sedated, were seldom allowed to spontaneously awake, did not have their sedation levels monitored nor adjusted using tools which were reliable and validated in determining sedation levels, did not routinely receive pain medication despite monitoring of pain, and were seldom mobilized out of bed. Finally, the chart audit revealed there was no standardized approach to delirium assessment. The result of this care was an average of 8 days of mechanical ventilation, patients who experienced cognitive changes,

and who were severely debilitated such that many required admissions to rehabilitation facilities post hospitalization. Evidence based care, such as the ABCDE/ PAD bundle, clearly demonstrate that through changes in practices, patients experience a reduced number of days receiving mechanical ventilation, had less reported incidence of delirium, and were physically less debilitated (Balas 2013).

Implementing Evidence Based Practice

In order to successfully implement, assimilate, and sustain evidence based practice into everyday clinical practice, knowledge transformation must occur. Knowledge transformation is the process by which new knowledge, such as evidence based practice, is taken into and assimilated into current practice thus changing that practice into the desired practice (Carlile & Rebentisch, 2003). Simply knowing that a process will improve practice outcomes does not ensure adoption. Instead, for adoption and assimilation to occur, factors including the perceived complexity of the desired change, current practice environment, individual characteristics, and external influences must be evaluated and taken into account when planning to implement the desired change.

The goal of this project was to successfully implement the ABCDE / PAD bundle into everyday clinical practice within a twelve bed medical surgical intensive care unit. Implementation was guided by the Consolidated Framework for Implementation Science (CIFR, 2009). The CIFR model focuses on constructs related to implementation and assimilation of evidence into everyday clinical practice (Damschroder, Aron, Keith, Kirsh, Alexander, & Lowery, 2009). The CIFR model considers five domains: intervention characteristics, characteristics of the individuals who are expected to implement the change, internal and external influencers, and the process of implementation. All of these are proposed to interact in a salient and complex way to influence effective implementation of a new process. Breimaier, Heckemann, Halfens, & Lohrmann (2015) conducted a study to evaluate the effectiveness, applicability, and usefulness of the CIFR model in implementing evidence based nursing practice. The authors concluded that the model demonstrated a comprehensive framework for the implementation of an evidence based guideline into nursing practice. However, the authors also concluded that the model did not account for crucial factors during the planning phase such as consideration of stakeholder aims, pre-

established measures related to the evaluation of the goals/ outcomes of the innovation being implemented. For this reason, the IOWA model (Titler et al., 2001) was also incorporated into the planning process for the purpose of guiding the evaluation of the project.

As stated above, the CIFR model has 5 domains when considering the implantation of evidence based practice. Each of the 5 domains and their use in implementing this project are discussed in the following paragraphs.

Intervention Characteristics

The first major domain of the CIFR Model is related to the characteristics of the intervention being implemented. The ideal intervention should be both adaptable (so that it can align more properly with current practice) and yet have "core" elements which are those elements which are essential and indispensable elements to the intervention (Darnschoder, et al. 2009).

The ABCDE Bundle/ PAD bundle is comprised of six core elements that include sedation management, spontaneous breathing trial, and coordination of care, agitation / delirium screenings, pain management and mobilization. Because the ABCDE/ PAD bundle is a bundle, the six elements could be implemented separately or in smaller pieces until all had been implemented. The approach of stepwise implantation of the six core elements has been utilized successfully in various ICU units across the United States (Carrothers, Barr, Spurlock, Ridgely, and Damberg. & Ely, 2013).

External Influences/ Outer Setting

The outer settings include social, political, and regulatory processes while the inner setting considers the institution/ unit specific culture, values and beliefs. Changes in Medicare reimbursement are a major driver in the adoption of evidence based practice. Another major driver towards the adoption of evidence based practice is the Institute of Medicine's (IOM) report (2001) which stressed the need to use evidence based practices as an essential element for improving quality and patient outcomes Because of the changes in reimbursement and the recommendations of the IOM, hospitals are focusing in on patient outcomes which can be directly influenced by nursing and interdisciplinary care. The reduction in hospital acquired delirium is one such example in which through careful, coordinated

interdisciplinary care, the mechanically ventilated older adult can have significantly improved patient outcomes including reduced risk for delirium, fewer days spent on mechanical ventilation and less debilitation from prolonged sedation, (Balas 2014)

Internal influences/ Inner Setting and Practice Environment

The inner setting is a 12 bed medical surgical ICU located in a 150 bed community hospital. The hospital is part of a larger healthcare organization. However, the parent organization does not routinely share evidence based practice or practice improvement with its smaller hospitals. The ICU is considered a semi closed unit. Staff assigned to the unit do not "float" to other hospital units, however, RN's in the float pool, with appropriate training, routinely work in the ICU. There are two physicians' who are the principle intensivists. Both of these physicians are employed by the hospital (a move which occurred within the last 3 years.) Physicians are available 24/7 in the hospital. Over 80% of the patients admitted to the ICU are over the age of 60. The predominate diagnosis in the unit's client population are respiratory failure, sepsis, congestive heart failure, and multiple organ dysfunction syndrome. The nurse to patient ratio is typically 1:2.

Individual Characteristics of the Providers*:*

Twenty-three RN's are assigned to work in the ICU. One is certified in critical care and perusing her masters in nursing. Of the twenty-three RN's, twelve are full time and the remainder are part time. Thirteen hold BSN degrees and ten have AD degrees. Experience ranges from less than 5 years to over 30 years. The unit nurse manager is a Masters (MSN) prepared nurse who was recruited from the large "parent" hospital. The Department Head is a nurse manager, also Masters prepared, who is responsible for ICU and ER. There is no ongoing ICU education specific to the ICU except for the annual competencies of which none relate to the ABCDE/PAD bundle. Currently the hospital has no clinical nurse specialists. One full time pharmacist is assigned to the ICU on a rotating basis. Each day a pharmacist is available in the unit for approximately 3 hours for consultation. A respiratory therapist is assigned to the ICU on a rotating basis. Depending on the need, a second respiratory therapist may also be assigned. There is one board certified pulmonologist who is also the physician coordinator for the ICU.

The pulmonologist has over thirty (30) years of experience. Other physicians, who are board certified in internal medicine, also provide care to patients in the ICU as needed. Melnyk, Fineout-Overholt, Gallagher-Ford, & Kaplan (2012) examined facilitators and barriers to implementing evidence based practice. In a survey of 20,000 nurses, they found that there was a negative correlation between adopting evidence- based practice and years of practice. The more years of practice the less likely the registered nurse was to adopt evidence based practices. Likewise, older graduates (those who had over 5 years of practice) were less likely to have had training, in their basic nursing program regarding utilization of evidence based practice and therefore may not be comfortable in the of incorporation of evidence based practice in their own nursing care.

Process of Implementation:

Planning/ engaging phase

The Department Head was the first person contacted regarding the possible implementation of the ABCDE/ PAD Bundle. The Department Head had assumed responsibility for the ICU the previous year and had often remarked in conversations that she was concerned about the heavy sedation and lack of mobilization she was seeing in the care of patients in the ICU. After discussing the idea of implementing the ABCDE/ PAD Guidelines into everyday care, the Director of Nursing Services was contacted and the possibility of the project was further explored with her. A chart audit (Zody, 2016) was preformed which compared the current practice in the ICU with the evidence based ABCDE/ PAD guideline. The chart audit found several areas in which practice could be improved. The findings of the chart audit were shared with the ICU Department Head and ICU manager.

With the support of the Director of Nursing, Department Head, and Nurse Manager of the ICU, planning for implementation was initiated. The Department Head, at this point placed the ICU manager in the lead for the ICU. Working collaboratively, the ICU manger, one staff nurse from the ICU who was interested in the project and working on her masters, a pharmacist, and respiratory therapist, and the author met and strategized how to implement the project. The nurse manager of the ICU maintained liaison with the physician, kept him informed of the plan and received input from him. Each team

member was provided a comprehensive overview of the ABCDE/ PAD Bundle. This inter professional team met on numerous occasions to discuss educational strategies, surveying techniques to determine knowledge and perceptions regarding the project, marketing strategies, and outcome assessment. The team also established a time line for implementation with goal dates. The team began meeting in the fall of 2014 with a stated goal for beginning implementation of May 2015.

Executing phase

In order to achieve the goal of implementing the ABCDE/PAD bundle into routine care, a needs and attitude survey for the nurses was developed. This survey was modeled after a survey developed by Ely et al (2014) in a study which specifically examined knowledge of delirium, the ABCDE bundle/ PAD protocol, and attitudes towards use of the bundle. All RN's, who work in the ICU, were invited to participate. A total of 23 RN's completed the survey. Three had less than 5 years of experience, with the remainder having over 10 years of experience. One was certified in ICU practice. The survey was divided into five sections; delirium knowledge and management; sedation management, comfort/ pain management, early mobilization, and one area for free text.

Results of the Survey

In Table 1 data on the percentage of nurses who responded for each of the questions in the four sections is presented by years of nursing experience.

Knowledge of Delirium

A total of seven questions were asked. Five of these questions were general knowledge of delirium and cognition and aging, two were about delirium assessment and management. When asked about assessment of delirium, 100% of the participants agreed that the use of standardized instruments would aide in the identification of delirium. General lack of knowledge about delirium symptoms and outcomes of delirium was evident from the response especially among the RN's with over 10 years of experience. For example, 66% of the RN's with 10 years or less of practice was able to correctly identify that causes of delirium are multifractal and that delirium can be manifested in ways other than agitation. In the RN's with over 10 years of practice, only 33% identified multifactorial issues as causes of delirium and only10% were

able to correctly state that delirium can manifest itself in other forms other than agitation. Thirty-three percent (33.3 %) of the RN's with less than 10 years of experience were felt that nursing care could reduce the risk for delirium whereas only 10% of the RN's with over 10 years' experience felt that nursing care could reduce the risk for delirium and the potential deleterious outcomes. None of the RN's with less than 10 years of experience were able to identify permanent cognitive changes as a potential outcome of delirium and only 15% of RN's with over 10 years of experience was able to identify this potential outcome of delirium. Perhaps of most concern is that 73.3% of the RN's surveyed felt that cognitive decline was a normal aging process.

Sedation/ Sedation management

A total of eight questions were asked about sedation and sedation management. Of these 3 were questions about sedation and potential outcomes of sedation, and 5 were about sedation management. Sixty-six percent (66.6%) of the RN's with 10 years or less of experience were able to correctly identify that it was better for patients to receive as little sedation as possible and that prolonged sedation had been shown to be a contributor of delirium. Of the RN's with over 10 years' experience, only 10% felt the patient should receive minimal sedation and that prolonged sedation was a contributor to delirium. One hundred percent (100%) of the RN's with less than 10 years of nursing experience recognized that the Glasgow Coma Scale was not an acceptable measure of sedation. This compares to 20% of the RN's with over 10 years of experience who felt that the Glasgow Coma Scale was not an acceptable instrument to measure sedation.

Five questions centered on sedation management. Only one of the 23 RN's felt that the physician wanted the mechanically ventilated patient to be awake, Sixty-six percent (66.6%) of the RN's with less than 10 years' experience agreed that allowing the patient a sedation vacation reduced the risk for delirium compared to 20% of the RN's with over 10 years' experience. Of the 23 RN's who were surveyed, only 8.6% felt that the patient should be allowed to awaken that is have a sedation vacation and only 13% felt that it was safe for the patient receiving mechanical ventilation to remain awake.

Pain/ Pain management

A total of six questions were asked regarding pain and comfort. Regardless of the years of practice 100% of the responding RN's agreed that agitation was evidence of pain. Thirty-three percent (33.3%) of the RN's with 10 years or less experience felt in patients who were agitated agreed increasing sedation was not an appropriate choice whereas RN's who had 11 years or more experience was more likely to agree (15%) that an increase in sedation was the best choice for the patient who was agitated. One hundred percent (100%) of the RN's with 10 years or less experience were able to correctly correlate prolonged mechanical ventilation with use of sedation whereas only 7.1% of the RN's with over 10 years of experience made this correlation. When asked about sedation as a means of providing comfort, only one RN (4.3%) of the 23 who took the survey was able to correctly state that sedation does not mean comfort. Responses did reflect what was supported in the chart review conducted in the gap analysis (Zody, 2016). Nurses appear to equate comfort with sedation thus if the patient is agitated increasing the sedation will improve comfort. However, sedatives such as Proprofol have no analgesic effects therefore increasing these drugs does not mean control of pain.

Early mobilization

Four questions were asked about early mobilization and mechanical ventilation. Seventy-three percent of the participating RN's felt that mobilization while the patient was receiving mechanical ventilation was safe and could improve patient outcomes. However, only 26% felt that mobilization could reduce the time on mechanical ventilation and only 30% felt that the physician wanted the patient mobilized out of bed while receiving mechanical ventilation.

Free text comment

The participants were allowed to enter free text regarding the ABCDE PAD bundles. Consistent themes, regarding perceptions of the components of the ABCDE/ PAD Bundle emerged. These perceptions included potential harm to the patient, lack of support by administration, and lack of support by the physician. Harm was identified as potential extubation if the patient was allowed to "wake up" or if the sedation was reduced. There was also a concern about safety during mobilization (falls and extubation).

Other concerns that were identified was the pain the patient might experience if the sedation was lessened or if the patient was allowed to wake up. There are a few studies which have examined patients experience while mechanically ventilated. Prime, Arkless, Fine, Winter, Wakefield, & Scatena, (2016) and Holms & Dryer (2015) concluded that patients did report pain while mechanically ventilated but that patients and their families preferred to be awake rather than sedated. Nurses also expressed concern regarding support for allowing the patient to be awake while mechanically ventilated. Some felt that they would not have the support of the physician and thus they would not have support of management.

Summary of Nurse's knowledge of delirium and management of delirium

The total number of RN's who took the survey regarding knowledge of delirium and management of delirium was small (n= 23) representing 76% of the RN's who work in the ICU. Of the 23, the majority (n=20) had been in practice over 10 years. This is significant because how we practice can become ingrained over time and this make practice change difficult. While all RN's surveyed stated that they valued evidence based practice, the majority of those in practice less than 10 years were able to correctly identify the elements of the ABCDE/ Pad bundles. The majority of the nurses surveyed, regardless of years of practice, were able to correctly identify that cogitative decline is not a normal part of aging, that standardized tools aide in identifying persons with delirium, and agitation is a sign of pain. However, the majority of the RN's with over 10 years of experience did not correctly the potential deleterious outcomes of delirium nor could they identify implementation strategies to reduce the risk for delirium. In summary, the survey found a general lack of knowledge in all areas and was reflective of the current practices being done in the ICU.

Implementation Strategies (Education, Step wise progression, and policy

Based on the survey, educational sessions were developed in which the significance of delirium and the ABCDE/ PAD Bundle were reviewed. Specific components of the education included delirium and detrimental outcomes associated with delirium, sedation and sedation management, coordination of care with respiratory for spontaneous breathing trials, a video on mobilization techniques for the mechanically ventilated patient, delirium assessment using the CAM, and pain management in the nonverbal patient.

These educational sessions were provided over a period of 5 months with the goal that nurses would implement the specific section into their care after the training had occurred. The lead nurse in the ICU was charged with facilitating in the hands on training and feedback to staff at the unit level. Education consisted of face to face approaches, handouts and self-study sheets for those who were unable to attend. The staff RN who served on the implementation committee was the unit champion and was available to support and reinforce the educational sessions as well as serving as a resource for the staff RN's.

Administrative Factors

An administrative review for associated policies found that no policy or procedure existed which would serve as a guide for implementing the ABCDE/PAD Bundle. Without a clear policy or procedure, it was felt that nursing staff may feel that they were being asked to implement procedures without the authority to do so. Because of this a policy was developed which reflected the process of the ABCDE/ PAD bundle. The purpose of the policy was to establish the ABCDE/ PAD Bundle as the standard of care for the mechanically ventilated patient. All members of the implementation team were provided draft copies of the proposed policy and input received, where possible, was incorporated into the policy. This process continued until the committee felt the policy was ready to be forwarded to the two in house committees which needed to pass the policy in order for it to become the standard of care. The policy was finalized and passed by those committees in April of 2015. (The policy can be found in Appendix A)

Implementation began in a step wise fashion in May of 2015. The first phase of implementation included sedation assessment using the RASS score, daily awakening, sedation management following established protocol developed by the pharmacist and physicians, delirium screening, and daily mobilization of the patient. The last part of the protocol to be implemented was daily goal setting for sedation and coordination of spontaneous breathing trials with spontaneous awakening trials. These were determined to be the last steps because the manager wanted the staff to become familiar with the basic processes (sedation assessment, sedation vacation, sedation management, delirium assessment, and mobilization first).

Evaluation of the Project

Evaluation of the progress of the implementation plan is ongoing with a comprehensive review to be done at the end of 6 months. The established benchmark is 85% compliance in all areas. Staff are provided quarterly feedback on their progress of implementation on a quarterly basis. At the end of one year the staff will be re surveyed to determine their concerns regarding the implantation of the ABCDE/ PAD bundle.

At the time this paper was written, the project had been implemented approximately 8 months. The unit manager has taken on this responsibility and is monitoring use of the CAM for delirium monitoring, RASS for sedation monitoring, daily awakening trials, mobilization, pain control, and use of sedation. What has been noted so far is that delirium screening using the Confusion Assessment Method (CAM) is being done and documented 100 % of the time. However, antidotally, the nursing staff state they do not see any added value to doing this. Daily awakening trials are being done with 95% of the patients. Sedation is being evaluated with the RASS tool 98% of the time. However, goal setting with the RASS on a daily basis and the coordination of ventilator weaning with sedation vacation is still not being done. Overall use of Propofol (sedation) is down which suggests that patients are kept more lightly sedated but this aspect has not been formally evaluated. Early mobilization is being implanted on a mixed way. Part of the mobilization depends on the staff perception of time and the busyness of the unit. Another concern remains safety and fear of accidental extubation.

Future plans include chart audits using the tool used in the gap analysis to determine if the change in practice is sustained and the extent to which use of the ABCDE/PAD bundle is integrated into daily practice. Because of the size of the unit and the number of persons who are mechanically ventilated that meet the criteria as outlined in the gap analysis, this will not be done until 18 months from the time of implementation.

A final consideration is the electronic health record (EHR). The current electronic health record does not have the CAM ICU built into the program. The result is that the CAM is being used to evaluate for delirium. This may not provide an accurate assessment of delirium since it is not designed for the

mechanically ventilated patient. The EHR does not have a comprehensive ICU page where all elements of the ABCDE/PAD bundle can be documented on one page. Being able to document the key components on one page would provide a more comprehensive, visual overview of the patient and may improve compliance.

Discussion

Implementing evidence based practice is a process which takes careful planning and time. Full integration into everyday practice requires several things including a clear message from the manger or leader of the unit about the importance of the use of evidence in everyday practice, policies/ procedures which support the implantation of specific evidence based practices, interdisciplinary collaboration, and consistent ongoing support and feedback as nurses implement and sustain the process.

Facilitators for this project included a nursing staff who believe that evidence based practices improve patient care, strong administrative support, and a culture in the institution of good interdisciplinary cooperation and culture of client centered care. Continued education regarding the ABCDE/PAD bundle and delirium is viewed as essential to solidify practice change. This education is being achieved via ongoing feedback and through annual competency reviews.

Barriers include nursing staff who predominately have over 10 years of practice and, while they value evidence based practice, their willingness to change their personal practice may be more difficult. Because of this, the breakdown and implementation of the individual components of the ABCDE/PAD bundle did facilitate the implementation of the comprehensive bundle. One of the first components of the bundle was the evaluation of pain using a standardized pain instrument. The tool selected was the Critical Care Observation Pain Tool (CCOPT) because it is specific for nonverbal patients. Pain assessment was selected because it was already routine to assess for pain every two hours. The second component to be implemented was the sedation management in which the patient is allowed a sedation vacation and sedation is assessed with the RASS score to evaluate agitation and sedation. The implantation of this component remains mixed. Nurses are routinely assessing for sedation with the RASS score, and doing the sedation vacation at least once a shift. However documented safety screening prior to the sedation

vacation, daily sedation goal setting, and titration of sedation according to the protocol remains mixed. One of the recommendations has been to post the process in each room. However, the manager remains resistant to this idea often stating that the staff are too over- whelmed. Because of the extended practice of many of the RN's, management support is viewed as a key driver for successful change. Nurses who have been in practice for greater than 10 years may view change in practice as driven by administration vs. staff nurses and thus look to administration to take the lead. Failure do so may send a mixed message regarding the importance of the change.

Conclusion and Recommendations

Implementing evidence based practice into everyday care remains difficult and elusive. This may be especially true in smaller community based hospitals often lack the resources necessary to facilitate this process. Yet, in today's healthcare environment, with a public who is more astute in examining healthcare delivery, reimbursement based on patient satisfaction and outcomes, and recommendations by influential organizations such as the Institute of Medicine, healthcare organizations of all sizes can no longer delay in implementing evidence based practices to improve the quality and safety of patient care. Nurses have a pivotal role in the use of evidence to improve practice (Balas et al., 2012) Health care providers (doctors and nurses) as well as managers in non-teaching community hospitals, often have more difficulty with change in practice (de Vos, et al., 2010) Therefore, support systems such as practice mentors, ongoing education, and feedback loops must be planned for and in place for change to fully and successfully implemented. Hospitals should look to partnering with local universities to aide in this education. The establishment of care committees which involve participation of staff nurses may also prove helpful and would further invest them in the utilization of evidence based practices.

Successful implementation of evidence based practice should not be directed solely at the staff nurse but also to the nursing management. Melnke et al. (2012) found that while nurse managers valued evidence based practice, implementing such practice was not considered a priority. While additional information was not provided in Melnke's study about why this finding occurred, possible reasons

include the managers own lack of comfort with evidence based practices as well as the pressing demands of other duties such as budget, hiring staff etc.

In summary, this project has raised serious questions about the challenges of small community hospitals (defined as 150 beds or less) have in addressing the ongoing educational needs of their nursing staff, the role of nursing management, and the resources needed to successfully implement evidence based practice into these settings.

Related Appendices.

Appendix B: Policy/ Standards of Care for ABCDE/PAD Bundle

Appendix C: Graphic overview of ABCDE/PAD Bundle.

Table 7

Percentage of Nurses Who Responded Correctly by Years of Nursing Experience

	Percentage who Correctly Responded Associated with Years of Nursing Experience			All Nurses
CATEGORY/ QUESTION	5-10 years N= 3	11-20 years N=6	➢ 20 years N=14	N=23
KNOWLEDGE OF DELIRIUM				
1. A single factor can be identified for causing acute confusion/ delirium in the older hospitalized patient. (false)	66.6%	33.3%	28.5%	34.7%
2. Cognitive decline is normal function of aging (false)	100%	66.6%	71.4%	73.9%
3. Patients with acute confusion/ delirium have a higher mortality/ morbidity rate compared to those with the same diagnosis who do not experience delirium. (True)	0	0	14.2%	8.6%
4. Patients who recover from acute confusion/ delirium usually regain their previous level of cognitive functioning. (false)	0	16.6%	14.2%	13%
5. Delirium is always manifested by agitation (false)	66.6%	0	14.2%	17.3%
6. Use of standardized instruments can improve the identification of patients experiencing delirium (true)	100%	100%	100%	100%
7. There are things I can do to reduce the incidence of acute confusion/ delirium in patient's receiving mechanical ventilation (True)	33.3%	0	14.2%	13%
SEDATION/ SEDATION MANAGEMENT				
8. Ideally, patients receiving mechanical ventilation should receive as little sedation as possible. (true)	66.6%	0	14.2%	17.3%

9. The Glasgow coma scale is an acceptable measure of sedation (false)	100%	16.6%	7.1%	21.7%
10. Prolonged sedation has been shown to be a direct contributor the development of acute confusion/ delirium (true)	66.6%	0	14.7%	17.3%
11. It is reasonable to set daily goals for sedation (true)	0	0	7.1%	4,3%
12. Daily spontaneous awakening trials have been shown to reduce the risk for acute confusion/ delirium (true)	66.6%	16.6%	7.1%	17,3%
13. The physician wants the patient, receiving mechanical ventilation to be awake. (true)	0	0	7,1%	4.3%
14. Ideally, patients on mechanical ventilation should be allowed to be awake (true)	33.3%	16.6%	0	8.6%
15. It is safe to have the patient receiving mechanical ventilation to remain awake (true)	33.3%	16.6%	7,1%	13%

COMFORT/ PAIN MANAGEMENT				
16. Restless/ agitation is an evidence of pain (true)	100%	100%	100%	100%
17. Pain cannot be assessed adequately in the sedated mechanically ventilated patient (false)	33.3%	33.3%	14.2%	21.7%
18. If a patient is restless, the best choice is to increase the sedation (false)	33.3%	16.6%	14.2%	21.7%
19. Patients who are asleep/ sedated are more comfortable while receiving mechanical ventilation (false)	0	0	7.1%	4,3%
20. Patients receiving mechanical ventilation, and who are continually sedated, have a longer time on the ventilator (true)	100%	0	7.1%	17.3%

21. Keeping the patient asleep is evidence of adequate sedation. (false)	33.3%	16.6%	7.1%	13%
EARLY MOBILZIATION				
22. Mobilization, while receiving mechanical ventilation, can reduce the amount of time the patient is on the ventilator (true)	66.6%	33.3%	14.2%	26%
23. It is safe to mobilize the patient out of bed while on the ventilator (true)	100%	83.3%	64,2%	73.9%
24. Early mobilization, including while receiving mechanical ventilation, can improve patient outcomes (true)	100%	83.3%	64.2%	73.9%
25. The physician wants the patient, receiving mechanical ventilation, mobilized out of bed (true)	66.6%	33.3%	21.4%	30.4%
26. I am comfortable in my skills to safely mobilize the patient receiving mechanical ventilation. (No correct answer)	N/ A	N/A	N/A	N/A

DNP Project Conclusion

Delirium remains a serious and often overlooked complication of physiological alterations. Left unmanaged, delirium can lead to permanent cogitative changes, early institutionalization, and even premature death. It is estimated that delirium occurs in 30-80% of hospitalized patients and adds an estimated 140-156 billion (2011 dollars) per year to healthcare costs. The good news is that, through ongoing assessment and implementation of basic nursing care, delirium is preventable. This DNP project focuses on the role nurses have in delirium detection and prevention both on general care wards and in the intensive care units. The first manuscript was written to help the general staff nurse understand what delirium is and the key role they have in delirium detection and prevention and thus improve patient outcomes through basic nursing care that evidence has shown to be effective in mitigating the risks for delirium.

Elderly mechanically ventilated patients are especially vulnerable to the development pf delirium. Manuscripts 2 and 3 focused on improving patient outcomes through the implementation of evidenced based bundles to reduce the risk of delirium in older adult mechanically ventilated patients. The bundles discussed are the Awake, Breathing, Coordination, Delirium, Early Mobility (ABCDE) and Pain, Agitation and Delirium (PAD) bundles. Manuscript 2 discusses a comprehensive literature review of the components of the ABCDE and PAD bundles and the gap analysis which was done to determine areas for practice improvement. Manuscript 3 discusses the use of the Consolidated Framework for Implementation Science (CIFR) model to implement the ABCDE/ PAD bundle into everyday care of a 12 bed intensive care unit in a small community hospital. It is hoped that these manuscripts may serve as a beginning discussion point to aide other community hospitals in the implementation of the evidence based bundles to reduce the risk for delirium and improve patient outcomes.

Appendix A

Proposal for Implementing the ABCDE/ PAD Guidelines into the ICU

Problem:

- Lack of evidence- based care for the management of delirium in the mechanically ventilated patient
- Lack of standards of care for the management of delirium in the mechanically ventilated patient.
- Significant variation of care of mechanically ventilated patients resulting in poor patient outcomes.
- Prolonged time on mechanical ventilation which results in poor patient outcomes including severe deconditioning, cogitative changes and early institutionalization.
- Significant loss of revenue due to poor patient outcomes
- Concern by nursing management and clinicians regarding care of ventilated patients.

Target Population:

- All mechanically ventilated patients with a focus on the elderly (over the age of 60)

Proposed Change in Practice:

- Standardize care of the mechanically ventilated patient by the adoption of evidence based practice specifically the ABCDE/PAD Bundle.
- Develop and adopt a policy which makes the ABCDE/PAD Bundle the standard of care for mechanically ventilated patient.

Goals and Objectives of Delirium Management Program (a)

1. Evidence based ABCDE/PAD bundle will be the standard of care for all patients receiving mechanical ventilation.
2. Care will be delivered in a coordinated multidisciplinary team consisting of provider, nursing staff, respiratory, pharmacy, and physical therapy.
3. Culture of safety will be enhanced for all mechanically ventilated patients.
4. One hundred percent (100%) of staff providing care to mechanically ventilated patients will receive annual training/ review of the ABCDE/Pad bundle.

(a) Eligible patients include patients who are reasonably expected to be able to be weaned from ventilator. It does not apply to patients who are terminal.

Evaluation of Goals and Objectives

1. 100% of mechanically ventilated patients will receive a sedation vacation at least once a shift.
2. 100% of mechanically ventilated patients will have daily sedation goals established and posted

3. 95% of mechanically ventilated patients will have coordination of sedation vacation and ventilator weaning trials
4. 100% of mechanically ventilated patients will have sedation adjusted per algorithm and rational for sedation adjustment documented in the HER
5. 100% of mechanically ventilated patients will sedation levels assessed using the RASS instrument
6. 100% of mechanically ventilated patients will have pain assessed using a the CPOT instrument every 2 hours
7. 100% of mechanically patients will have pain managed first before an increase in sedation.
8. 95% of mechanically ventilated patients will be mobilized on a daily basis. If not reasons will be documented in the EHR.
9. 100% of mechanically ventilated patients will have a daily assessment for delirium using the CAM and documented in the EHR
10. 100% of mechanically ventilated patients will have documented safety checks prior to sedation vacation and mechanical ventilation weaning trials. If patient does not pass all elements of the safety screen, sedation vacation and weaning trials will be held and reason documented.
11. Length of time on mechanical ventilation will be reduced by 20% the first year and 30% the second year after implementation.
12. Each professional staff member, working in the ICU, will have documentation of annual training on the ABCDE/PAD bundle.

Cost/ Benefit:

- This recommendation involves change in practice and does not have direct costs associated with the recommendation
- Decreased length of stay on mechanical ventilation will decrease cost of care and increase reimbursement by improving patient outcomes
- Patients will have a reduced risk for delirium and therefore potential for reduced negative outcomes associated with delirium including early institutionalization, deconditioning, cognitive changes, and premature morality.
- While delirium incidence is not a quality indicator under the current Medicare guidelines, complications associated with the effects of delirium are. These include falls related to deconditioning, an increased rate of hospital acquired infections, and pressure ulcers (Bales, 2012)

Appendix B

Policy/ Procedure developed to support ABCDE/ PAD Bundle

Awakening and Breathing Coordination, Delirium Monitoring/ Management and Early Mobility (ABCDE) Bundle.

Purpose:

1. To provide an evidence based standardized approach to care of the adult mechanically ventilated patient.
2. To reduce the frequency of delirium and weakness associated with mechanical ventilation in the adult ICU patient.

Target Population:

1. Adult patients receiving mechanical ventilation in the intensive care unit (ICU)
   Overview:

The ABCDE Bundle is an evidence base protocol with three (3) distinct, highly interconnected components. These are:

1. Awakening and breathing trial coordination
2. Delirium monitoring and management
3. Early Mobility

The ABCDE bundle is a team approach to patient care and includes pharmacy, respiratory therapy, physical/ occupational therapy, physician, nurses, and case management working together to provide a comprehensive approach to care.

If a physician does not wish to have the patient participate in the ABCDE Bundle, he/ she must write an order removing the patient from this level of care. NOTE: This bundle DOES NOT allow for weaning trials to begin without a written order by the physician.

Assessment-

Instruments to be used in the implementation of the ABCDE Bundle:

CAM -to assess for delirium (documented on admission and assessed every shift thereafter)

RASS: Richmond Agitation Sedation scale to evaluate for agitation. Sedation is evaluated, at a minimum of every 2 hours.

Pain: If the patient is able, the preferred method is the numbers scale, if the patient is non verbal, the FLACC scale will be used. Pain is assessed at a minimum every 4 hours.

Sedation Management

The goal of sedation is to allow the patient to be as awake as possible while facilitating comfort. RASS goals to achieve this is between 0 to -2.

Each day, the night shift nurse, in conjunction with the day shift nurse will establish the RASS goal for the day. This will be posted on the white board in the patient's room.

Every 2 hours, the nurse will assess and document the RASS score. Sedation will be adjusted accordingly with the goal of moving towards achieving the stated RASS goal. Any increase in sedation must be documented along with the assessment which supported the change in sedation.

Before increasing sedation, pain must be assessed and addressed first.

NOTE: Sedation is to be titrated and managed according to the Sedation Guideline. See Appendix A.

Coordination of Spontaneous Awakening Trial and Spontaneous Breathing Trial.

1. Every mechanically ventilated patient receiving a continuous sedative infusion will be screened for a spontaneous awakening trial (SAT) and spontaneous breathing trial (SBT) daily
2. An RN will conduct the SAT trial; a respiratory therapist will conduct the SBT trial. The physician will make the decision when the patient is ready to begin weaning trials and/ or extubated.
3. Steps for the SAT and SBT screening and coordination:

Step 1: Spontaneous Awakening Trial (SAT) Safety Screen (RN to perform)

a.) The RN will determine if it is safe to interrupt sedation by assessing the following:
   (1) Is the patient receiving a sedative infusion to control active seizures?
   (2) Is the patient receiving a sedative infusion for alcohol withdrawal?
   (3) Is the patient receiving a paralytic agent (neuromuscular blockade)?
   (4) Is the patient RASS Score > 2
   (5) Is there documented myocardial ischemia in the last 24 hours

b.) If any of the above questions is **yes,** the RN will determine that **it is not safe** to turn the continuous analgesic or sedative infusion. The RN will continue the patient regimen, document the reason for failure in the Assessment/ Intervention (A & I) flow sheet and reassess in 12 hours.

c.) If all of above questions are answered **no**, the RN will conclude that it is **safe** to proceed with the SAT trial as outlined in step 2.

Step 2: Perform the SAT

a.) If the patient passes the SAT Safety Screen, the RN will turn off all continuous sedative infusions. The RN will not give any sedative boluses during the SAT.

b.) If the patient should demonstrate signs/ symptom of pain while the continuous sedative infusion is shut off, the RN will administer bolus does of analgesics as ordered and needed

c.) The SAT should last a minimum of 5 minutes. During this time, the RN will assess the tolerance of the patient for interruption of sedation by assessing the following:
   (1) RASS score of > 2 for 5 minutes or longer
   (2) Pulse oximetry reading of < 88% for 5 minutes or longer
   (3) Respirations > 35 breaths/ minute for 5 minutes or longer
   (4) Acute/ new cardiac arrthymias
   (5) 2 or more of the following new symptoms of respiratory distress:

a. Heart rate increase of 20 or more beats per minute
b. Heart rate less than 55 beats per minute
c. Use of accessary muscles
d. Abdominal paradox
e. Diaphoresis
f. Dyspnea

d.) If the patient displays any of the above symptoms, the RN will conclude the patient **failed** the SAT. The RN will restart the patient's sedation at one half (1 / 2) the previous dose, then titrate to sedation target established for the patient for that day. The RN will repeat Step 1 (above) in 12 hours

e.) If the patient is able to open his/ her eye to verbal stimulation without failure criteria or does not display any of the failure criteria four (4) hours of shutting of the sedation, the RN will conclude the patient passed the SAT. The RN will ask the respiratory therapist to immediately perform the SBT safety screen

Spontaneous Breathing Trial (SBT) done in collaboration with Respiratory Therapy (RT) and only with a written order by the physician.

Step 1: SBT Safety Screen (To be done by RT)

a. The RT will determine if it is safe to perform an SBT by assessing the following:
   1. Is the patient a chronic/ventilator dependent?
   2. Is the patient's pulse oximetry< 88%?
   3. Is the patients FiO2 > 50%
   4. IS the patient's peep set for > 7?
   5. Is there documentation of myocardial ischemia, either by EKG or MD notes, in the last 24 hours
   6. Is the patient receiving mechanical ventilation in an effort to control ICP?
   7. Is the patient currently on vasopressor medications?
   8. Does the patient lack inspiratory effort/ unable to generate adequate spontaneous breathing?

b. IF any of the above questions is answered **YES, the** RT will conclude it is **not safe** to perform a SBT. The RT will continue mechanical ventilation and repeat the safety screen in 24 hours. The RT will ask the RN to restart the sedatives at half the dose if needed.

c. If the answers to (a) above is **no**, the RT will conclude it is **safe** to perfume an SBT.

Step 2: Performing SBT

a. The RT will place the patient on a spontaneous breathing trial

b. The RT will determine if the patient tolerates the spontaneous breathing trial by assessing if the patient demonstrates any of the following spontaneous breathing trial failures
   1. Respiratory rate > 35 breaths per minute for 5 minutes or longer
   2. Respiratory rate < 8
   3. Pulse oximetry reading of < 88% for 5 minutes

4. 2 or more of the following symptoms of respiratory distress:
    a. Use of accessory muscles
    b. Abdominal paradox
    c. Diaphoresis
    d. Dyspnea
5. Acute mental status changes
6. Acute cardiac arrhymia

b. If **any** of items 1- 6 (above) occurs, the RT will conclude the patient **failed** the trial and restart mechanical ventilation at the previous settings. The SBT trial will be attempted in 12 hours. Sedatives will be restarted at half the previous rate if needed.

c. If the patient tolerates the SBT trial for 20 minutes without failure criteria, the RT will conclude the patient passed the SBT and inform the RN and physician. IF the SBT trial is able to extend to 2 hours, it is recommended that the physician should consider extubation

Delirium Monitoring and Management:

a. Every adult mechanically ventilated patient will undergo routine sedation and delirium assessment using standardized, validated assessment tools. These tools are Richmond Agitation Sedation Scale (RASS) and CAM for delirium

b. Nurses will be trained in the administration of these instruments. These are the only accepted assessment instruments which will be utilized in the ICU

c. An RN will perform and record the results of the Confusion Assessment Method (CAM) at a minimum of every shift or whenever It is determined the patient has a change in mental status.

d. Each day, the RN on day shift, in conjunction with the RN on night shift will establish the RASS goal for the day. The target goal should be between 0 to – 3. This will be recorded in the A & I and in the patient's room on the white board. The patent' sedation level, using the RASS will be assessed every 4 hours and recorded in the A & I.

Sedation should be titrated to achieve the RASS goal. *Any change in sedation rates must be recorded with supporting rationale for change in the A & I.*

e. If the CAM is positive, the RN will explore possible causes using the **THINK acronym.**

1. Toxic situations such as medications, congestive heart failure, shock, organ failure (liver, kidney)

    NOTE: common medications known to contribute to delirium development include: benzodiazepines such as Ativan; anticholinergic medications, steroids and narcotics such as morphine.
2. Hypoxemia
3. Infection, inflammation, immobilization
4. Non- pharmacological interventions
5. K or other electrolyte imbalances

f. Non- pharmacologic interventions:
The interdisciplinary team will use non-pharmacologic interventions to reduce or manage the delirious patient including:

1. Eliminate or reduce risk factors such as:
    - Administration of sedatives judiciously, avoid medications known to contribute to delirium.
    - Prevent/ appropriately treat any evidence of infection
    - Prevent/ appropriately treat dehydration; electrolyte imbalance
    - Evaluate and treat pain
    - Maximize oxygen delivery including supplemental oxygen, blood pressure control; ad blood
    - Use sensory aides as needed
    - Regulate bowel and bladder function
    - Provide adequate nutrition

2. Therapeutic Environment:
    A therapeutic environment includes:
    - Orient, reassure, and reorient the patient. Use easily visible clocks, calendars, identification of personnel when managing the patient; explain all activities; clear communication.
    - Provide appropriate sensory stimulation: quiet room, adequate amounts of sleep, adequate lighting, perform one task at a time, noise reduction
    - Facilitate sleep including back massage, relaxation tapes, avoid awakening patient as needed
    - Foster familiarity: encourage family/ friend visitation, bring familiar objects from home, minimize relocations, and maintain consistency of caregivers as able.
    - Maximize mobility; avoid restraints and urinary catheters, mobilize early and often
    - Provide explanations, communicate clearly
    - Educate family
    - Minimize invasive procedures
    - Use psychotropic medications as a last resort

Pain:

The patient should be assessed for pain a minimum of every 4 hours. For nonverbal patients, the FLACC pain scale will be used. The pain score will be recorded on the A & I

a. If a patient has pain indications, the patient should receive pain management including but not limited to:
    1. Use of pain medications such as Fentanyl or Dilaudid
    2. Use of other techniques such as relaxation therapy, repositioning etc.
    3. Reassessment of pain will occur within one hour of treatment and recorded in the A & I

Early Mobilization:

a. Patients are candidates for early mobilization when the following (minimum) criteria are met:
    1. Neurologic: Patient responds to verbal stimulation (RASS > - 3)
        Activity will not be started on comatose patients (RASS – 4 to – 5)
    2. Respiratory: FIO2 < 60%
        PEEP < 10 cm H20
    3. Circulatory/ central lines/ contraindications:
        No increase of vasopressor infusions for at least 2 hours
        No evidence of active myocardial ischemia
        No arrthymia requiring the administration of NEW antiarrhythmic
        Not receiving therapy that requires restriction in mobility such as femoral arterial lines, open abdominal wounds)
        No injuries which mobility is contra indicated
b. Any other justification for not starting early mobilization must be written by the physician.
c. The interdisciplinary care team will assess the patient's readiness for mobilization. The team includes: physical therapist who assesses the patient's physical ability to participate; a nurse who assesses physiologic stability; and a respiratory therapist who is responsible for maintaining the patient's airway. The physician will provide any other reasons for mobilization contraindications.
d. Each patent is assessed on arrival to the ICU. Those who qualify are immediately placed on the early mobility protocol. Those who are determined not to meet criteria will be reevaluated daily.

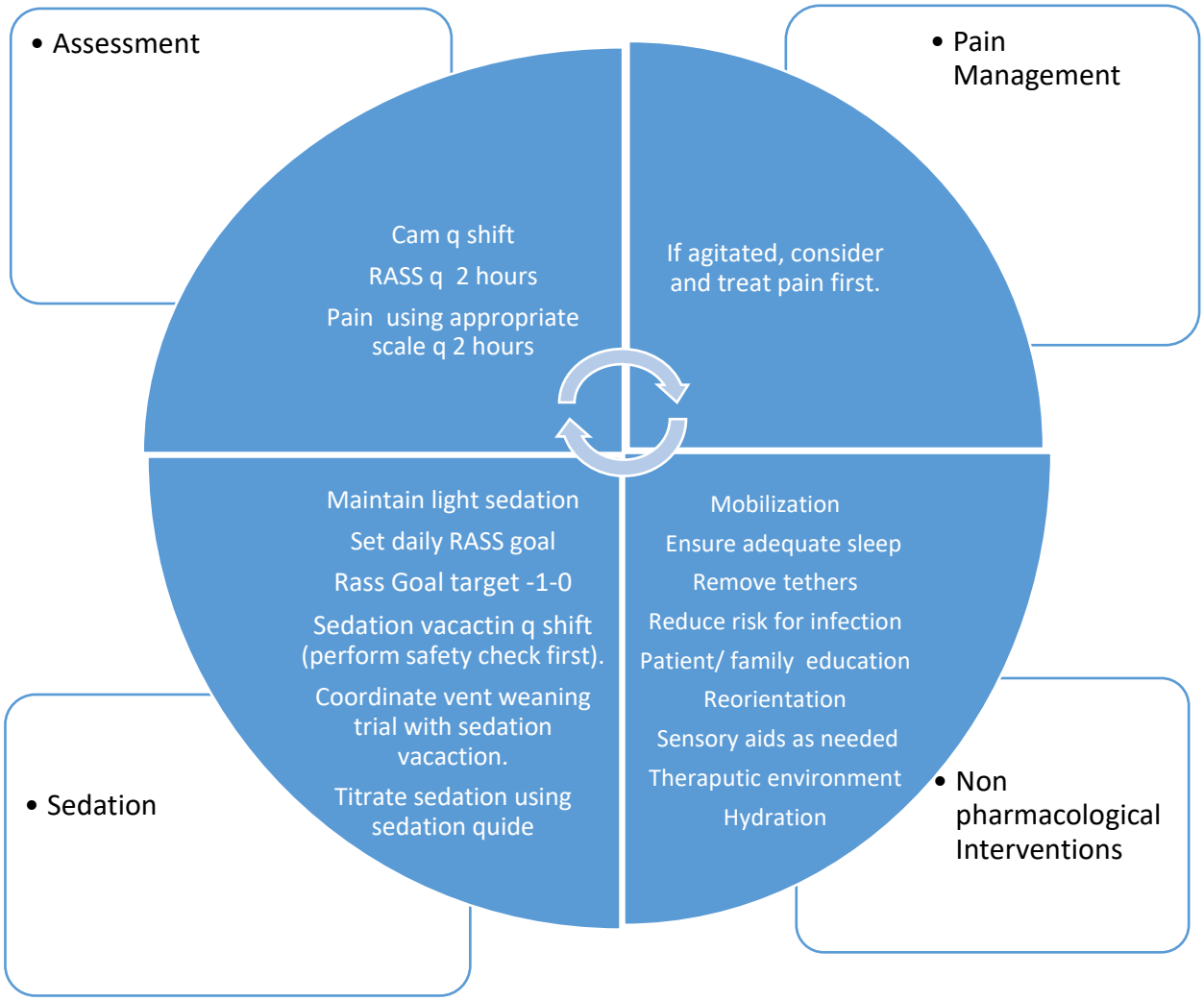
Criteria for halting mobilization therapy includes:

- Symptomatic drop in mean arterial blood pressure
- Heart rate < 50 or > 130 beats per minute x 5 minutes
- Respiratory rate of < 5 or > 40 breaths per minute x 5 minutes
- Systolic blood pressure > 180 mmHg x 5 minutes
- Pulse oximetry < 88% x 5 minutes
- Marked ventilator efforts
- Patient distress
- New arrhythmia
- Concern for myocardial ischemia
- Concern over airway integrity
- Fall to knees
- Endotracheal tube removal

REFER TO THE PROGRESSIVE MOBILITY PROGRAM (HILL ROM) FOR APPROPRIATE LEVELS OF ACTIITY BASED ON THE CLIENTS CONDITION.

Appendix C

Graphic of ABCDE/ PAD Bundle



ABCDE/ PAD Guideline Key Elements

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