# THE ABCDEF BUNDLE:
# A CONCEPT TO ALIGN THE PEOPLE, PROCESSES AND TECHNOLOGY IN THE ICU

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A dissertation submitted to the faculty at the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Nursing Practice in the Doctor of Nursing Practice Program in the School of Nursing.

Chapel Hill
2016

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## ABSTRACT

Brenda T. Pun: The ABCDEF Bundle: A Concept to align the People, Processes and Technology in the ICU
(Under the direction of Meg Zomorodi)

Intensive Care Unit (ICU) patients frequently suffer from multi-organ failure and often require advanced life support measures. However, many ICUs struggle with noncompliance on evidenced-based guideline recommended practices. Additionally, the interprofessional health care providers often care practices are often siloed and teamwork and collaboration suffer. The purpose of this project is to address this core problem of noncompliance and ineffective team collaboration through an interprofessional unit-wide educational strategy that introduces the concept of these interventions for pain, agitation and delirium in a package called the ABCDEF bundle. This bundle includes these 6 elements: assess, prevent and manage pain (A), both spontaneous awakening trials and spontaneous breathing trials (B), choice of analgesia and sedation (C), delirium: assess, prevent and manage (D), early mobility and exercise (E), and family engagement and empowerment (F). While other studies that have investigated this bundle have both introduced the idea of the bundle and involved widespread protocol changes and the introduction of new procedures, this project introduces just the language and concept of repackaging these elements as a bundle. This project was conducted in an ICU that already had all individual elements of the ABCDEF bundle in place; therefore, the project was uniquely focused on the impact of introducing the concept of bundling those elements and teaching the interprofessional team to use a standard language when discussing patient care. The project focused on the impact of

the educational initiative on processes (i.e., compliance with the bundle elements), the people (i.e., teamwork and collaboration), and patient outcomes (e.g., ICU and hospital lengths of stay, hospital discharge location, and first time to ambulation). Baseline measures were obtained prior to the education and then patient compliance and outcomes were tracked for an additional 3 months.

This project demonstrated that introducing the ABCDEF bundle in a unit that already had each element in place resulted in improvement in element compliance and teamwork and collaboration. There was no overall effect on patient outcomes. However, it also demonstrated that improvement was marginal and more work with bundle implementation was needed to build on the foundation of improvement. The ABCDEF bundle provides a solid framework for the interprofessional team to flourish and improve in their teamwork and collaboration while delivering quality patient care even in units where the bundle elements are already in place.

To my father who always encouraged me to reach higher while being incredibly proud of exactly where I was.

**ACKNOWLEDGEMENTS**

I would like to thank Dr Meg Zomorodi, chair of my DNP committee for her commitment to this project and me. She endured many of my "brains dump" sessions and has helped to greatly refine this project. She along with my entire committee provided invaluable feedback and guidance that was much needed and appreciated. Additionally, I would like to thank the staff of the MICU at UNC Hospitals. Thank you for allowing me to join your amazing team and to learn from the great work you are doing.

Many have made sacrifices along the past two years that have enabled my investment in this project. Specifically, I want to thank my husband and children for sacrificing many things. You have selflessly allowed me to devote my time, attention and energy to this project and I am grateful and humbled. Also I want to thank my colleagues and friends at Vanderbilt University Medical Center and the Society of Critical Care Medicine ICU Liberation ABCDEF Bundle Collaboration for encouraging me along this journey and enduring with me along the way.

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## LIST OF ABBREVIATIONS AND SYMBOLS

| | |
|---|---|
| α | Cronbach's alpha |
| AITCS | Assessment of Interprofessional Team Collaboration Scale |
| AACN | American Association of Critical Care Nurses |
| ARDS | Acute respiratory disease syndrome; |
| BPS | Behavioral Pain Scale |
| BC | Before Christ |
| CAM-ICU | Confusion assessment method for the intensive care unit |
| COPD | Chronic obstructive pulmonary disease |
| CPOT | Critical care pain observation tool |
| DNP | Doctor of Nursing Practice |
| EMR | Electronic medical record |
| HWEA | Healthy Work Environment Assessment |
| ICU | Intensive care unit |
| IQR | Interquartile range. |
| IHI | Institute for Healthcare Improvement |
| IOM | Institute of Medicine's |
| i.e | *id est* (that is) |
| e.g. | *exempli gratia* (for example) |
| *Mdn* | Median |
| MHA | Michigan Hospital Association |
| MI | Myocardial infarction. |
| MICU | Medical intensive care unit |
| *n* | Number |
| PAD | Pain, agitation, and delirium |

| | |
|---|---|
| RASS | Richmond agitation-sedation scale |
| SAS | Sedation agitation scale |
| SAT | Spontaneous awakening trial |
| SBT | Spontaneous breathing trial |
| SCCM | Society of Critical Care Medicine |
| *SD* | Standard deviation |

# CHAPTER 1: INTRODUCTION

Over 5 million critically ill patients are admitted to intensive care units (ICUs) each year in the United States (Society of Critical Care Medicine [SCCM], 2012). These patients often require advanced life support measures and technologies that include mechanical ventilation, hemodialysis, and extracorporeal membrane oxygenation. While the leading cause of morbidity and mortality in ICUs is multi-organ failure (SCCM, 2012), many members of the health care team still approach patient management from a single organ system (e.g. respiratory, cardiovascular, nephrology, musculoskeletal) perspective. These siloed care practices have hindered teamwork and collaboration (Johnson, Miller, & Horowitz, 2008) and have resulted in the inability for ICU systems to implement and sustain interdisciplinary and interprofessional care measures resulting in practice gaps that are not approximating current clinical practice guideline recommendations (Barr et al., 2013). Advances in teamwork and collaboration are needed.

Recent clinical practice guidelines recommend a number of interventions in order to decrease sedative use, maximize comfort and improve patient outcomes which include awakening and breathing trials, delirium monitoring, early mobility, and active family involvement (Barr et al., 2013; Davidson et al., 2007). However, significant challenges in the implementation and routine compliance with these individual interventions have been reported (Mehta, McCullagh, & Burry, 2009; Miller, Krein, George, Watson, Hyzy, & Iwashyna, 2013).

A possible cause of the poor compliance is lack of awareness of the interconnectedness of both the patient care interventions and the staff involved in them and a corresponding lack of effective teamwork and collaboration. Vasilevskis, et al. (2010) proposed one strategy to bridge this gap and help "align the people, processes and technologies" that are already in place was to *package* these ICU practices for sedation and delirium as a *bundle of interventions* (p.1225). The Institute for Healthcare Improvement (IHI) introduced the bundle concept in order to enhance teamwork and communication in ICUs (Resar, Griffin, Haraden, & Nolan, 2012). The use of bundles has been shown to improve communication and collaboration in the ICU and has resulted in improved compliance with guideline recommendations. The bundle concept provides a helpful framework for staff to see the interrelatedness of the people; processes and technology involved in patient care activities. The bundle proposed by Vasilevskis, et al. (2010) is now known as the ABCDEF bundle and includes 6 components: assess, prevent and manage pain (A), both spontaneous awakening trials and spontaneous breathing trials (B), choice of analgesia and sedation (C), delirium: assess, prevent and manage (D), early mobility and exercise (E), and family engagement and empowerment (F). Throughout the remainder of this manuscript this set of evidenced based interventions will simply be referred to as the ABCDEF bundle.

The purpose of this project is to address this core problem of noncompliance and ineffective team collaboration through an interprofessional unit-wide educational strategy that introduces the concept of these interventions packaged as the ABCDEF bundle and provides specific tools for patient care rounds, such as checklists, to facilitate

interprofessional engagement of the bundle. Specifically, this project aims to address the following questions:

1.Will an educational initiative that introduces the ABCDEF bundle concept improve the processes of care management (i.e., compliance with the bundle elements)?

2. Will an educational initiative that introduces the ABCDEF bundle concept improve the interaction between the people working in the ICU (i.e., teamwork and collaboration)?

3. Will an educational initiative that introduces the ABCDEF bundle concept improve patient outcomes (e.g., ICU and hospital lengths of stay, hospital discharge location, and first time to ambulation)?

## CHAPTER 2: LITERATURE REVIEW

### Introduction of the ABCDEF Bundle Elements

Each of the ABCDEF bundle elements (i.e., assess, prevent and manage pain, both spontaneous awakening trials and spontaneous breathing trials, choice of analgesia and sedation, delirium: assess, prevent and manage, early mobility and exercise, and family engagement and empowerment) are evidenced based and received individual recommendations in recent clinical practice guidelines from the SCCM for pain, agitation, and delirium (PAD) (Barr et al., 2013) and family support in the ICU (Davidson et al., 2007). Although they are separate interventions; they are interrelated and influence one another. Bundles have been shown to improve patient outcomes in common critical care conditions such as sepsis and ventilatory associated pneumonia (Chamberlain, Willis, & Bersten, 2011; Resar et al., 2012; Resar et al., 2005) by pulling multiple interventions together and signifying their important and often synergistic role in preventing patient harm and/or improving patient outcomes. However, the elements of the ABCDEF bundle are often implemented independent of one another with little to no education of their interdependence. A brief description of each intervention is provided here.

**A - Assess, prevent and manage pain.** Pain is a significant struggle that many ICU patients suffer with during their ICU stay. The pain experience has been associated with routine care activities such as turning, suctioning, chest tube removal, wound drain removals, wound care, and arterial line insertions (Puntillo et al., 2001; Puntillo et al., 2014). Additionally, many critically ill patients also have baseline chronic pain

issues. While pain assessment is the foundation of pain management and self-report is the gold standard of pain assessment (Chanques et al., 2014), the assessment of pain is particularly challenging in this patient population. They are often unable to self report pain secondary to altered levels of consciousness and/or the presence of endotracheal tubes thus making it difficult to ascertain when pain is present. However, there are now valid and reliable scales available for assessing pain in nonverbal ICU patients such as the Critical Care Pain Observation Tool (CPOT) (Gelinas, Fillion, Puntillo, Viens, & Fortier, 2006) and the Behavioral Pain Scale (BPS) (Payen et al., 2001). The SCCM guidelines recommend that patients be assessed regularly for pain using either self report (gold standard) or when unable the CPOT or BPS (Barr et al., 2013). Consistent and regular pain assessment using valid tools enables clinicians to detect pain, determine when to initiate treatment, either pharmacologic or nonpharmacologic, and assess response to that treatment.

**B - Both spontaneous awakening trials and spontaneous breathing trials.**

Awakening and breathing trial protocols pair daily sedation interruption with spontaneous breathing trials. The seminal study of this strategy reported that when compared to patients receiving standard of care, patients who received daily sedative interruption had two fewer days of mechanical ventilation, three and a half fewer days in the ICU, and fewer posttraumatic stress disorder symptoms (Kress et al., 2003; Kress, Pohlman, O'Connor, & Hall, 2000). The Awakening and Breathing Controlled trial built on this concept and created a protocol that paired daily sedative interruption [spontaneous awakening trials (SATs)] with spontaneous breathing trials (SBTs) that was coordinated by nurses and respiratory therapists (Girard et al., 2008). Patients who were managed with this protocol had fewer days of mechanical ventilation, shorter ICU and hospital lengths of stay (Girard et al., 2008).

Patients who received this "wake up and breathe" protocol (Sessler, 2004, p.1413) also had better post hospital outcomes with improved 1-year survival and no increased long-term cognitive impairment (Girard et al., 2010; Girard et al., 2008). In a recent 20-site study, the implementation of the SAT plus SBT protocol resulted in decreases in mechanical ventilation duration, hospital length of stay, ventilatory associated events risk, and infection-related ventilatory-associated complications (Klompas et al., 2014). The SAT plus SBT protocol has been a successful sedation titration strategy and resulted in improved patient outcomes.

**C - Choice of analgesia and sedation.** Sedative medications are frequently used to facilitate the invasive interventions, as well as, to provide anxiolysis and even amnesia while patients are in the ICU. However, due to lack of evidence the guidelines do not provide a prescriptive approach to choosing specific agents for sedation and instead provide a recommendation against the general use of category of benzodiazepines (Barr et al., 2013). The recommendations for choice of sedation include either hypnotic sedatives (i.e., dexmedetomidine or propofol) or analgo-sedatives (e.g. morphine, fentanyl) (Barr et al., 2013). The choice of specific sedative agent is left up to the individual practitioner and unit practice patterns. However, the guidelines provide evidence to support that while there are no data to support specific agents at this time, there are data that have associated negative patient outcomes with deep sedation. Shehabi et al. (2012) reported that early deep sedation (i.e., deep sedation within the first 48 hours of ICU care) when patients are typically the sickest was an independent predictor of prolonged time on the ventilator, hospital mortality, and 180-day mortality. Similarly, another study focused on the long-term outcomes of sedation depth and reported that when compared to patients with light sedation, those with deep sedation spent more time on the ventilator, more time in the ICU, had fewer memories

of the ICU, and had more disturbing memories of the ICU (Treggiari et al., 2009). These studies underscore that deep sedation is not benign, and together with other studies provide the evidence base for the recommendation that sedation be titrated to a light level, versus deep, sedation for critically ill patients unless clinically contraindicated (Barr et al., 2013). The guidelines also recommend the routine use of valid and reliable arousal scales for assessing sedation/agitation, setting targets sedation goals, and identifying the Richmond Agitation-Sedation Scale (RASS) and the Sedation Agitation Scale (SAS) as the two preferred sedation/arousal scales due to their psychometric properties (Barr et al., 2013). Thus the first step in choosing the right sedative is to set the sedation level goal and communicate that among the interprofessional team.

**D - Delirium: assess, prevent and manage.** While sedation strategies such as the SAT plus SBT protocol focus primarily on level of consciousness, content of consciousness (i.e., the ability to think clearly) has gained a lot of attention in the past 15 years primarily related to advances in ICU delirium research. Delirium, or acute brain failure, is a change in mental status that is accompanied by inattention and either disorganized thinking or altered level of consciousness (American Psychiatric Association, 2000). Delirium affects up to 80% of critically ill patients and is associated with many negative outcomes including increased length of stay, long-term cognitive impairment, increased mortality, and increased costs (Ely et al., 2004; Lin et al., 2008; Milbrandt et al., 2004; Ouimet, Kavanagh, Gottfried, & Skrobik, 2007; Pandharipande et al., 2013; Thomason et al., 2005). One study reported that the one-year mortality risk increased 10% for every additional day of delirium (Pisani et al., 2009). The SCCM PAD guidelines recommend that all ICU patients be assessed at least once per shift with a valid and reliable delirium assessment tool (Barr et al., 2013). While no

pharmacologic strategies have consistently shown effectiveness in either preventing or treating delirium, several studies point to sedatives as one of the risk factors for the development of ICU delirium (Barr et al., 2013; Pandharipande et al., 2006). Thus strategies such as the ABC protocol that result in lower sedative use may help in decreasing the incidence of delirium. The only other strategy that has been shown to decrease delirium is early mobility.

**E - Early mobility and exercise.** Early mobilization protocols focus on the provision of the physical and occupational therapy as early as possible (usually within the first 48 hours) that is titrated as tolerated by the patient's condition. The concept and feasibility of early mobility in the critical care setting was introduced in the last decade (Bailey et al., 2007; Morris et al., 2008) and since then has been gaining momentum (Truong, Fan, Brower, & Needham, 2009). Schweickert et al. (2009) reported that patients who received early mobility when compared to those who received physical/occupational therapy as ordered by the treatment team, were more likely to return to independent function by hospital discharge, had shorter duration of mechanical ventilation, and two fewer days of delirium. Quality improvement studies involving the implementation of early mobility protocols have found similar favorable outcomes (e.g. reduction in delirium and decrease in lengths of stay) (Engel, Needham, Morris, & Gropper, 2013; Needham et al., 2010; Zomorodi, Topley, & McAnaw, 2012). This 'wake up, breathe, and move' protocol has gained widespread attention and is part of recommendations for critical care practice (Barr et al., 2013; Gosselink et al., 2008; Hopkins, Spuhler, & Thomsen, 2007).

**F - Family engagement and empowerment.** The central focus of all these interventions is the patient. The Institute of Medicine's (IOM) strong recommendation for the development of patient-centered care has been particularly difficult in the critical care setting because often the patients' lack the full ability to communicate and participate in decision making (IOM, 2001). Thus, family members and loved ones become an essential voice for the patient. Historically, however, the ICU staff have limited the ways and times in which the family could be present and participate. Family presence in the ICU has been shown to improve patient outcomes (i.e. decreases anxiety and confusion, reduces cardiovascular complications and decreases lengths of ICU stay, and safety) while simultaneously improving patient and family satisfaction (American Association of Critical Care Nurses, 2011; Davidson et al., 2007;). With these data as primary support, the SCCM released a clinical practice guideline in 2007 that recommended active family and patient (when able) participation in ICU care and in rounds (Davidson et al., 2007). In order to keep the interventions of the ABCDE bundle patient/family-centered, Davidson et al. (2013) suggested adding "F" for Family Involvement.

**Bedside Practice Lagging Behind Recommendations**

Despite the evidence to support these individual interventions, improve patient care, and have the potential to save lives, the compliance suffers at many institutions. A 2009 review of 19 international surveys found very few reports ($n = 2$) where the respondents reported consistent use of daily sedative interruption (Mehta et al., 2009). One survey reported that although 76% of respondents had a written policy for daily sedative interruption, only 44% performed sedation vacations regularly (Patel et al., 2009). Another survey reported that although 65% of the respondents had a sedation protocol, only 22% used

it (Tanios, de Wit, Epstein, & Devlin, 2009). The use of valid and reliable delirium assessment tools are also sparse (Devlin et al., 2008; Patel et al., 2009; Pun & Devlin, 2013). Reports on the incorporation of early mobility into clinical practice indicate that the bedside practice rates are alarmingly low; with some reporting less than 25% of patients being mobilized (Carrothers et al., 2013; Jolley, Regan-Baggs, Dickson, & Hough, 2014; Nydahl et al., 2014). Reasons for poor compliance include lack of personnel, poor education and/or equipment for the interventions, fears related to potential patient harm and lack of support from other disciplines, while team discussions on patient care rounds or shared meetings and open multidisciplinary communication were identified in multiple projects as facilitators for success (Engel et al., 2013; Harris & Shahid, 2014; Jolley et al., 2014; Miller et al., 2013; Tanios et al., 2009). Lack of teamwork and collaboration is a unifying theme for poor compliance in these studies. These protocols are recommended by clinical practice guidelines, yet there is still a gap in their routine bedside use and this gap appears to have roots in misalignment of people (i.e. the staff responsible for the interventions), the processes (i.e., the protocols and policies for the interventions) and the technology and tools [i.e., checklist, patient care rounds, collaborative involvement, electronic medical record (EMR) data entry and display].

**The Use of Bundles to Bridge the Practice Gap**

An approach that helps to reveal that the attention is being wrongly placed on the interventions (i.e., solely on having the right protocols for each intervention) rather than the interactions of the interventions (i.e., having processes, people and technology that connect them) is needed. Awakening and breathing trials (ABC), delirium monitoring (D), early mobility (E), and family involvement (F) are interconnected in a synergistic nonlinear

fashion and when they are managed from a fragmented linear approach, compliance suffers and effectiveness is lost. In an attempt to provide unification to these parts, Vasilevskis, et al. (2010) suggested they be bundled (i.e., at that time the ABCDE bundle) and described it as "a multicomponent process that is intentionally interdependent and designed to: (1) improve collaboration among clinical team members, (2) standardize care processes, and (3) break the cycle of oversedation and prolonged ventilation" (p.1226). Often hospitals will have these interventions in place, but do not have any framework for helping staff to see their interrelatedness (e.g., it is difficult to mobilize a deeply sedated patient). The ABCDEF bundle concept is a framework to align the people, processes, and technology and thus improve compliance with these interventions and maximize their impact on patient outcomes.

The idea of using a 'bundle' to connect care interventions in healthcare was introduced in 2001 by the IHI for use in the interprofessional environments of ICUs in order to enhance teamwork and communication (Resar, Griffin, Haraden, & Nolan, 2012). Since this introduction, a number of successful bundle campaigns have been launched. Bundles, defined as "a small set of evidenced-based interventions," (Resar et al., 2012, p.1) have been shown to improve survival in severe sepsis, decrease ventilatory associated pneumonias, and decrease central line infections (Chamberlain et al., 2011; Resar et al., 2012; Resar et al., 2005) and have been hallmark features of the IHI's 100,000 Lives and subsequent 5 Million Lives campaigns (Berwick, Calkins, McCannon, & Hackbarth, 2006; Haraden, 2014). The concept of the bundle pushes healthcare teams to abandon care that is specifically organ focused and adopt care models that focus on multiple systems. The bundle concept also pushes the teams to have common goals and to collaborate on reaching those common goals.

Since the addition of "family involvement" to the bundle (Davidson, et al. 2013) has been recent, all the studies to date have only included the ABCDE portions. The two existing studies have focused on the implementation of the ABCDE bundle and its elements and both have shown that the bundle implementation was associated with significant increases in compliance for all of the individual interventions (Balas et al., 2014; Carrothers et al., 2013). Balas, et al. (2014) reported that the bundle implementation also improved patient outcomes (i.e., fewer ventilatory days, less delirium and more patients ambulating in the ICU) (Balas et al., 2014). Carrothers (2013) focused on the contextual issues that affect the bundle implementation and reported that the main facilitators to successful implementation were interdisciplinary communication (i.e., people), electronic medical record prompts (i.e., processes), and clear documentation (i.e., technology). Similarly, Balas et al. (2013) concluded that the bundle success requires "interprofessional education, coordination and cooperation" (p. S117). While both studies reported increased compliance, neither reached consistent compliance for the individual interventions over 80%, and some interventions never exceeded 50% (Balas et al., 2014; Carrothers et al., 2013). These data highlight that success in the implementation of these interventions is reliant on not just introducing each element, but aligning the people, processes and technology associated with them. Aligning just the processes (i.e. workflow) will help, but additional help is needed to facilitate the teamwork and collaboration needed to align the people. Lastly, technology and tools must be given attention, as they will enable the processes and people to merge more efficiently and effectively.

**Aligning People, Processes, and Technology**

Critically ill patients require management from multiple professionals working in close proximity and tight coordination with one another. Thus, it is no surprise that poor teamwork and collaboration are associated with negative patient outcomes and decreased staff satisfaction (Baggs, et al., 1999; Reader & Cuthbertson, 2011). Research supports that "cohesive, cooperative, nonhierarchical interprofessional team dynamics" are part of the foundational characteristics for successful guideline implementation (Sinuff, Cook, Giacomini, Heyland, & Dodek, 2007, p.2087). However, multiple barriers to effective teamwork have been identified for the ICU area. These include hierarchical structures that produce power shifts towards physicians, differing attitudes and understandings related to roles and responsibilities and constantly shifting staffing (Rose, 2011). Very few clinicians from any of the professions (i.e., nursing, medicine, rehabilitation therapy, pharmacy, respiratory therapy) experience any degree of training on interpersonal relationships in the health care setting (Rose, 2011; van de Cappelle, Hui, & Yan, 2012) and most learn on the job, often from dysfunctional teammates. Thus quality improvement initiatives should include elements that facilitate team development and team collaboration. Tools and concepts such as bundles help guide interprofessional collaboration by explicitly identifying roles and responsibilities and providing clear communication channels for goal setting and progress tracking (Reader, Flin, Mearns, & Cuthbertson, 2009; Rose, 2011; Sinuff, et al., 2007).

There are a number of tools available to help facilitate this alignment. These tools include patient care rounds, goals checklists, smart programming in electronic medical records, and quality improvement collaboratives (Rose, 2011). Patient care rounds are

gatherings of multiple healthcare providers to review individual patients and map out plans of care. From a systematic review of 43 studies, Lane, Ferri, Lemaire, McLaughlin, and Stelfox (2013) reported that when patient care rounds were multidisciplinary, followed a standardized structure and included daily goals checklists, the use of evidence-based practices in the ICU improved. Daily goals checklists are written forms that are used during patient care rounds to summarize the discussion regarding the plan for each individual patient. Pronovost et al. (2003) reported that the inclusion of a daily goals checklist into patient care rounds significantly increased the nurses' and doctors' understandings of daily goals and simultaneously decreased patients length of stay. Daily goals checklists have also been shown to improve communication, synchronize care, improve adherence to guidelines, and decrease infections (Centofanti et al., 2014; Lane et al., 2013; Narasimhan, Eisen, Mahoney, Acerra, & Rosen, 2006; Pronovost et al., 2006; Simpson, Peterson, & O'Brien-Ladner, 2007). The use of these two tools (i.e., structured patient care rounds and daily goal checklists) in the context of the ABCDEF bundle could enhance interdisciplinary communication and facilitate coordination of the bundle interventions.

Another tool that has been shown to be helpful in facilitating team based quality improvement are quality collaboratives. Quality collaboratives are multi-organizational groups that are focused on a single quality improvement topic. The participating organizations commit to working on improvement in a specific area and to sharing about their process with the other participants. Collaboratives often include 2-3 in-person group meetings where an interprofessional work group from each participating site meets together to learn and share. The IHI has hosted a number of successful collaboratives (IHI, n.d.). SCCM's Surviving Sepsis Campaign has existed over 10 years and has included a successful

large-scale quality improvement collaborative (Levy, et al., 2010). Additionally, Michigan Hospital Association (MHA) has had a 12-year history of multiple ICU collaborative of ICUs in the state of Michigan focusing on patient safety and improving compliance with evidenced based recommendations (Goeschel & Pronovost, 2008).

Recently, with financial support from the Gordon and Betty Moore Foundation, SCCM opened enrollment for the ICU Liberation ABCDEF Improvement Collaborative set to launch in August 2015. This collaborative will be a quality improvement initiative focused on implementing the ABCDEF bundle involving 60 hospitals around the country. Member institutions will participate in regional training meetings that will focus both on the ABCDEF bundle components and on teamwork and communication. Central to the collaborative model, the participating ICUs will have the opportunity to share experience, resources and materials (SCCM, 2015).

**Summary**

The components of the ABCDEF bundle (i.e., awakening and breathing trial coordination, delirium monitoring, early mobility, and family involvement) are evidence-supported and guideline-recommended, but yet many institutions have difficulty implementing them into routine practice. It is essential to appreciate that these interventions are interrelated and interdependent (e.g. you cannot mobilize a patient who is deeply sedated). It is equally important to note that these interventions involve multiple members of the health care team to collaborate and coordinate care activities. The ABCDEF bundle acknowledges this interconnectedness of both the processes and the people involved. Interprofessional educational initiatives that introduce the concept of this bundle with emphasis on the interconnectedness to help align the people, processes and technology/tools

may improve teamwork and collaboration with the elements. This bundle concept can serve as a framework to aid bedside clinicians to see the interconnectedness of these interventions and benefit from the tools and technology in place to facilitate its execution.

# CHAPTER 3: CONCEPTUAL AND THEORETICAL FRAMEWORK

## Introduction of General Systems Theory

ICU care demands interprofessional involvement in patient management that includes nursing, medicine, pharmacy, rehabilitation therapy, respiratory therapy, and pharmacy. General Systems Theory provides a helpful framework for understanding why this type of siloed care has not been successful. General System Theory describes systems as having parts that are interconnected and interdependent (Bertalanffy, 1968). While many hospitals have policies in place for each of the "parts" (i.e., awakening and breathing trials, delirium monitoring, early mobility, and family involvement), there is often no explicit mechanism for connecting these interventions or the individuals on the healthcare team responsible for them. Reports from multiple institutions that investigated the implementation and compliance of individual components of the ACBDEF bundle, all included a central barrier of lack of teamwork support from some branch of the healthcare team (e.g. nurse support, physician support, availability, coordination) (Miller et al., 2013; Tanios et al., 2009). The parts of a systems, whether they acknowledge it or not, are interconnected. General Systems Theory describes systems as nonlinear, meaning that they do not function in a straight line of cause and effect (Bertalanffy, 1968). General Systems Theory emphasizes not just getting the right interventions in place, but making sure the that the right people, processes, and technology are in place for the interventions to be connected and successful. The bundle concept is one way to communicate this interconnectedness.

**General Systems Theory's History and Overview**

The concepts of General Systems Theory emerged in the 1920's primarily from the biologist, Ludwig von Bertalanffy as an attempt to identify a larger theory to provide some degree of unity among the sciences. At that time scientific disciplines were becoming increasingly isolated and cross-pollination of ideas and learning was suffering. This fragmentation led to unnecessary inefficiencies with the discoveries of identical principles in separate fields simply because they did not know a well-developed theory for that concept was already established in another field. This redundancy and unnecessary "reinvention of the wheel" was preventing all the sciences from further advancement. Classical science was the predominant basis of inquiry at the beginning of the 20th century. Accordingly, a system (e.g. a machine, organism, or a disease) was best understood by dissecting its parts and studying them individually and in a linear fashion. In-depth study of parts would provide explanation of the whole. This reductionist approach was helpful in adding a great deal of understanding to scientific understanding; however, it provided no assistance in explaining certain gaps and contradictions.

In his 1968 book entitled *General Systems Theory*, system was defined as "a set of elements standing in interaction" (Bertalanffy, 1968, p. 33). Systems were best understood by studying the parts and their relationships to one another and external stimuli. In General Systems Theory the relationships and interactions of the parts are more important that the parts in isolation. This was not a new concept, but one that had largely been labeled as philosophical and has thus been abandoned by classical science throughout the scientific revolution. Aristotle (trans. 1989, 1045a) in the 4th century B.C. is credited with the idea that *the whole is more than the sum of its parts*. Through General Systems Theory, von

Bertalanffy revived this idea and provided detailed descriptions of system characteristics with solid mathematical modeling support and thus enabled systems thinking to infiltrate many sciences and disciplines (Bertalanffy, 1968). This theory would provide the basis of great scientific stimulation and led to the creation of models and tools for interdisciplinary use (Bertalanffy, 1968).

The universal commonalities that von Bertalanffy described form the basis of General Systems Theory. Concepts and assumptions are presented in Table 1. As stated above, according to General Systems Theory, systems are made up of elements or parts (Bertalanffy, 1968). These elements may be any number of things such as atoms, animals, humans, or even money. While the elements are important, how they relate with one another and the outside environment is most important to understanding the system of which they are part. The relationships of those parts can be described as interconnected, interdependent and co-evolving. Components of a system influence one another and that interconnectedness results mutual change over time that happens in nonlinear ways. Linear relationships are proportional and thus one part changes in proportion to the changes of another part, always in a constant relationship. The relationships of the parts with one another and the responses of the parts to one another are essential to understanding the overall system (Bertalanffy, 1968).

**Using General Systems Theory to Align People, Processes and Technology**

In addition to providing a framework for interdisciplinary teamwork, General Systems Theory provides the theoretical support for quality improvement initiatives and the need to align people, processes and technology to ensure success. This can be readily seen in the application of system thinking in high reliability organizations such as the airline industry. In 1990, Reason outlined a systems approach to analyzing safety called the Swiss

Cheese Model of Accident Causation. In this model, he proposed that active errors are often preceded by latent errors or holes in the system in which the error occurred (Reason, 1990). Many of these latent errors point to baseline issues with teamwork and communication. If those holes could be patched then the active errors will be much harder to make. This model led to the improvement of processes through the development of safety checklists and communication techniques that have advanced aviation safety (Shappell & Wiegmann, 2000). These aviation tools and techniques have been modified and applied to the hospital system and resulted in such tools and strategies as structured patient care rounds and daily goals checklists which have lead to improved teamwork and communication and positive patient outcomes (Centofanti et al., 2014; Lane, Ferri, Lemaire, McLaughlin, & Stelfox, 2013; Pronovost et al., 2003; Pronovost et al., 2006; Simpson, Peterson, & O'Brien-Ladner, 2007). Bundles rely heavily on the use of these types of tools to keep the shared goals on the forefront of each team member's daily agenda for patients.

General Systems Theory provides a firm theoretical foundation of support for both understanding the problem for the ICU's lack of compliance with the evidence-based recommendations and their roots in misaligned teamwork and communication. Also this theory provides a helpful framework for designing an intervention to enhance the collaboration. There are many critical care interventions with strong evidence to support they advance patient outcomes and are thus recommended by guidelines (e.g. the ABCDEF bundle elements) and yet many units struggle to adopt them into daily practice. It is essential to appreciate that these interventions are interrelated and interdependent (e.g. you cannot mobilize a patient who is deeply sedated). It is equally important to note that these interventions involve multiple members of the health care team to collaborate and coordinate

care activities. The ABCDEF bundle acknowledges this interconnectedness of both the processes and the people involved. The principles of General Systems Theory support the concept of bundling these interventions and using checklists in patient care rounds to facilitate teamwork within the multi-disciplinary ICU team. As teamwork and collaboration improve, the compliance with the interventions will as well, and thus the sum of the ABCDEF bundle will be greater than it parts.

**Table 1. General Systems Theory Concepts and Assumptions**

| Concepts (Bertalanffy, 1968) | Description |
|---|---|
| Relationships | Parts of a system are interconnected, interdependent and co-evolving. |
| Coevolution | Coevolution is when a part changes, or evolves, in response or reaction to the change in a related part. |
| Nonlinearity | Linear relationships are proportional and thus each part changes in proportion to the changes of another part, always in a constant relationship. However, in nonlinear relationships, change affects the two parts in non-constant ways. |
| Open systems | An open system is one that continual interacts with its environment. A closed system is one that does not interact with its environment and its final state is directly related to the initial state. |
| Equifinality | In an open system the final state can be reach through a variety of paths and initial conditions. |
| Assumptions (Skyttner, 2005) | |
| Laws must exist and there is a law of all laws. | |
| Traditional science is unable to solve problems because it is too narrow and abstract. | |
| The universe is a hierarchy of systems. | |

# CHAPTER 4: METHODOLOGY

## Introduction

In order to evaluate the impact of introducing the ABCDEF bundle concept, this quality improvement project evaluated the compliance with current recommendations for each bundle elements: assess, prevent and manage pain (A), both spontaneous awakening trials and spontaneous breathing trials (B), choice of analgesia and sedation (B), delirium: assess, prevent and manage (D), early mobility and exercise (E), and family engagement and empowerment (F). This study also examined the impact of introducing the bundle concept on teamwork and collaboration and patient outcomes. This pre-post implementation study design was approved by the hospital nursing research council and was determined by the institutional review board to meet criteria as a quality improvement initiative.

## Project Questions

The project questions were:

1.Will an educational initiative that introduces the ABCDEF bundle concept improve the processes of care management (i.e., compliance with the bundle elements)?

2. Will an educational initiative that introduces the ABCDEF bundle concept improve the interaction between the people working in the ICU (i.e., teamwork and collaboration)?

3. Will an educational initiative that introduces the ABCDEF bundle concept improve patient outcomes (i.e., ICU and hospital lengths of stay and hospital discharge disposition)?

## Setting

This project took place in the medical ICU (MICU) of a large academic medical center in the southeast United States. The MICU is one of seven ICUs in the hospital and has 18 beds with 1100 annual admissions. The average length of stay is three days and while the unit manages a variety of medical conditions, the most common admitting diagnosis is severe sepsis.

## Subjects/Sample

At the time of the study, the MICU leadership team consisted of a nurse manager, two assistant nurse managers, and a medical director who is a pulmonary critical care physician. When the census is full, the unit is typically staffed with 10-11 registered nurses assigned to bedside caregiving, one charge nurse, 10 house staff physicians, two attending physicians, two pharmacists, and two respiratory therapists. There are no unit based rehabilitation therapists (physical/occupational), thus rehabilitation services are achieved via formal consults. The unit utilizes daily interdisciplinary rounds on each patient, which routinely includes the physicians, registered nurses, respiratory therapists, and pharmacists.

## Implementation Procedures

**Securing senior leadership commitment.** Throughout the fall of 2014 and spring of 2015, the author had a series of meetings with the Chief of the Division of Pulmonary and Critical Care Medicine to introduce the project and solicit interest and buy-in. Simultaneous to this local project development, the SCCM's ICU Liberation Campaign's ABCDEF Bundle Collaborative invited both the author and the Chief of Pulmonary to be part of their national faculty team and requested that the MICU submit an application for involvement in their 18-month long collaborative. It was determined that the larger SCCM Collaborative project

would provide outside context and legitimacy for the initial project proposed as well as a structure for building on progress made and sustainability. This project would serve as the initial start of the collaborative interventions in the MICU and then continued participation in the collaborative provides the framework and resources for sustained and building growth and development of the implementation of the bundle elements. In the spring of 2015, the MICU was selected to be a collaborative site.

The application process provided a formal mechanism for identifying core team members to serve as ABCDEF bundle experts and champions and identify a broader team who would become the ABCDEF bundle workgroup. The application also required securing senior leadership (i.e., chief executive officer, chief nursing officer, MICU nurse manager, the MICU medical director) signed commitments to provide both staff time and resources to the project. The Chief of Pulmonary contacted each senior leader by phone and/or email and introduced the project and requirements and after discussions obtained signed commitment from each.

**Engaging and creating champions.** In August of 2015 the SCCM hosted an educational and leadership training meeting in Charlotte, NC for the ICU Liberation Campaign's ABCDEF Bundle Collaborative. Each participating hospital was required to send a team of three interprofessional members to learn about quality improvement, teamwork and collaboration, and implementing the ABCDEF bundle. The MICU sent the medical director, a physical therapist, and a nurse to the SCCM training meeting. Additionally, the author and the Chief of Pulmonary were also present as faculty members with SCCM. This two-day "train the trainer" event served as an opportunity to directly

engage this small core team from the MICU about the ABCDEF bundle and its elements and equip them with the tools to teach others.

**Creation of interprofessional workgroup.** This core team returned to the MICU and assembled an interprofessional workgroup that included the core team of champions described above (i.e., the medical directory, a physical therapist, and a nurse) plus a pharmacist, two respiratory therapists, and three physicians. Since the hospital utilizes Epic electronic medical records system it was also important to have a team member that worked closely with Informational Technology in order to investigate capabilities and make requests for changes. Two additional nurses were also recruited as additional educators and trainers who helped with rollout education. The medical director facilitated each meeting and the group members were given time for discussion. Group members' were tasked to represent their respective professions in regards to items discussed and were in charge of disseminating information to their professions from the workgroup.

The initial workgroup meetings focused on describing ABCDEF bundle and its elements, the SCCM Collaborative, and discussing why efforts were needed to improve performance. While no metrics were readily available at the initial meeting, everyone agreed that the unit was in need of performance improvement both in terms of ABCDEF bundle compliance and in teamwork. There was a protocol or policy for each element of the bundle, but there was not a cohesive format for tying them together or for coordinating them. Thus, the team gathered the policies and protocols for each element of the bundle. Additionally, in this phase a survey was distributed to all ICU staff members as described in Measures that would assess the MICU's educational needs.

**The ABCDEF introduction education planning and execution.** Using the baseline survey results as a guide, the workgroup created a 30-minute presentation that introduced the concept of bundles and the specifics of the ABCDEF bundle. The sessions stressed that protocols and/or policies were already in place for each element of the bundle and that the purpose of this first step was to help staff realize that these elements are connected to each other and as team members they are dependent on one another when providing patient care and using language such as the ABCDEF bundle can help remind everyone of that connectedness. A total of 16 30-minute educational sessions were scheduled over a 10-day period. The educational sessions were offered at multiple different times of the day and included weekends and nights in order to provide convenient opportunities to staff working on all shifts. Each session was presented by at least two members of the workgroup from different professions a nurse, a pharmacist or a physician, and a nurse, and was attended by members from each professional group.

**Additional efforts to introduce the bundle concept.** In addition to these educational sessions, there were two other efforts to introduce the concept of the ABCDEF bundle to the interprofessional team of the MICU. An educational bulletin board was created that colorfully introduced the ABCDEF bundle and each element. Additionally, the daily goals checklist that is used in patient care rounding was edited to reflect the ABCDEF language (Appendix A). Most of the items were part of the sheet already and were just rearranged and lumped together and distinguished in their letter category (A, B, C, D, E, and F). This would allow the language of the ABCDEF bundle to be a regular part of the discussion used daily in rounds.

## Data Collection

Specific measurement tools to address teamwork, bundle compliance, and patient outcomes are discussed below. For Aims 1 (processes) and 3 (outcomes), data were collected from the electronic medical records of patients admitted to the MICU over a four month period to represent a baseline month prior to the ABCDEF Bundle Education initiative and the three months following. These data were directly entered into electronic case report forms (eCRFs) in a secured password-protected database. For Aim 2 (people) the MICU interprofessional staff were surveyed at two time points – prior to the educational initiative (Baseline) and 3 months later (Post-Implementation). A link to the online staff surveys was distributed to via email to the respective professional groups. Additionally, hard copy surveys were handed out on the unit to the staff present and in ICU physician group conferences. These hard copy surveys were later entered into the online survey database by the investigator or research assistant. The study utilized Research Electronic Data Capture (REDCap) for data collection, transmission and storage. All study data were entered via a password protected, study unique REDCap database website.

## Measures

**Compliance with ABCDEF bundle components (processes).** Compliance with the ABCDEF Bundle components was monitored throughout the course of the study on each patient on a daily basis for as long as 14 days, death or ICU discharge, as relevant. Patients with an ICU length of stay greater than 14-days are considered chronic critically ill and respond to treatments in a different way than those with shorter stays (Carson, 2012; Hough et al., 2015). Therefore this project focused only on the first 14 days of their ICU hospitalization. Patients were chosen for audit review from the MICU census list using an

online random number generator. Patients were excluded if they were not in the ICU for a minimum of 24 hours. Baseline compliance data was collected from the medical records for 30 patients admitted to the MICU during the 30 days prior to the end of the educational initiative.

Since the project was a rapid continuous quality improvement project it was determined that testing monthly would give timely compliance data as feedback to refine the process. Compliance data were then collected for a subset of patients, identified using the online random number generator, for three months following the educational initiative. (i.e., Month 1, Month 2, Month 3). For Month 1, data were collected for 20 patients. After reviewing the data from the Baseline and Month 1, and evaluating the feasibility of sustaining data collection in the in the next phases of implementation, the decision was made to decrease the subset of random patients to 10 for Months 2 and 3. Compliance for each intervention was evaluated on the days that the patient is eligible for the intervention (e.g. compliance for the breathing trials will be evaluated only for days a patient is receiving mechanical ventilation). Measures defining compliance for each bundle item are presented as Table 2.

**Table 2. ABCDEF Bundle Element Compliance Definition**

| Bundle Element | Compliance Definition |
|---|---|
| Assess, prevent and manage pain | The unit protocol requires that patients be assessed a minimum of every 4 hours for a total of 6 times per 24 hours with either the Numeric rating scale (NRS) when able to self report or the Non-Verbal Adult Pain Scale (NAPS) when unable to self report (e.g. when mechanically ventilated). The number of pain assessments/day that were documented in the nursing flowsheet was recorded. |
| Both spontaneous awakening trials (SAT) and spontaneous breathing trials (SBT) | SAT compliance was defined as the number of patient days that a patient was on continuous or intermittent sedatives and either received an SAT or there was documentation for contraindication to stopping the sedatives in the medical record.<br><br>SBT compliance was defined as the number of patient days that a patient was receiving invasive mechanical and there was either an SBT or there was documentation for contraindication to performing the breathing trial in the medical record. |
| Choice of analgesia and sedation | The foundational daily first step of the sedation protocol is for the interprofessional team to set a sedation scale target using, the Richmond Agitation-Sedation Scale (RASS). Additionally, the unit protocol requires that patients be assessed a minimum of every 4 hours for a total of 6 times per 24 hours with the RASS scale. During the 14-day data collection period, the number of RASS assessments that were documented in the nursing flowsheet per day, the number of days a RASS target was documented in medical record, and the number of days that the actual assessment was not at the set target RASS were recorded. |
| Delirium: assess, prevent and manage | The unit protocol requires that patients be assessed a minimum of once per shift for a total of 2 times per 24 hours for delirium with Confusion Assessment Method for the ICU (CAM-ICU). The number of CAM-ICUs that were documented in the nursing flowsheet was recorded. |
| Early mobility and exercise | Early Mobility compliance was defined as the number of patient days that a patient either received early mobility or there was documentation for contraindication for mobility in the medical record. |
| Family engagement and empowerment | Family engagement is dependent on family presence. The number of days that a family member or friend were visiting was recorded. Additionally, any documented engagement with the family member was tracked (e.g. participation in a family conference). |

**Interprofessional teamwork survey (people).** Interprofessional teamwork was measured with two scales, the Assessment of Interprofessional Team Collaboration Scale (AITCS) and the American Association of Critical Care Nurses' (AACN) Healthy Work Environment Assessment (HWEA) tool. The surveys were distributed to all potential interprofessional members of the MICU staff.

The AITCS is a 37-item survey designed to evaluate team collaboration (Orchard, King, Khalili, & Bezzina, 2012). Each item is preceded by the stem, "When we work as a team, all my team members are…" Each item is rated using a 5-option response scale (5 = always; 4 = most of the time; 3 = some of the time; 2 = occasionally, and 1 = never). The AITCS was developed based on four attributes of collaboration: cooperation, coordination, partnership and shared decision-making, and was revised based on feedback from content validity experts, factor analysis, and reliability testing. Items for the AITCS were developed following a literature search on interprofessional collaborative practice. Items were then subjected to validity testing with 24 interprofessional experts to review clarity, comprehensiveness, and content validity. Following revisions by the experts, the AITCS was subjected to field testing with 125 health care professionals. Factor analysis revealed 3 factors (61.02% of variance). The overall internal consistency estimates for reliability were 0.98 for the total scale and ranged from 0.80 to 0.97 for the three subscales (Orchard et al, 2012). The final instrument includes 37 items: 19 items for partnership/shared decision making, 11 items for cooperation, and 7 items for coordination (Orchard et al, 2012).

The HWEA is an 18-item survey designed to evaluate teamwork and work environment health (AACN, n.d.). AACN created this tool to evaluate the six standards for establishing and sustaining a healthy work environment: Skilled Communication, True

Collaboration Nurses, Effective Decision Making, Appropriate Staffing, Meaningful Recognition, Authentic Leadership (AACN, 2005). These standards were created by an expert panel to align with the IOM's core competencies recommended for healthcare professionals and the 9 provisions in the American Nurses Association's Code of Ethics (AACN, 2005). Respondents are asked to evaluate each item in regards to their agreement about the item's applicability to their current work environment. The answer choices are "Strongly Disagree, "Disagree," "Neutral," "Agree," and "Strongly Agree." There was no evidence of any prior work to examine the reliability or validity of this instrument.

The *ICU Care and Perceptions Survey* was developed by subject matter experts in conjunction with the SCCM ICU Liberation Collaborative project. This survey contains 83 items and is designed to evaluate respondents' perceptions and reported practice as they relate the individual elements of the ABCDEF bundle. This survey also evaluates respondents' awareness of polices and protocols for the bundle elements. The purpose of this survey is to serve as the basis of the needs' assessment for the educational initiative and ongoing projects related to implementation of the bundle elements. There was no evidence of any prior work to examine the reliability or validity of this instrument.

**Patient Outcomes Data**. Patient outcome data were collected on the same patients that compliance data were gathered on. The following outcome data were collected:

- **ICU Length of stay** – Length of ICU stay was measured from ICU admission date/time until ICU discharge date/time or death date/time, whichever came first. The length was measured in days and rounded to the nearest half day.
- **Hospital Length of stay** – Hospital length of stay was measured by how much time the patient was in the hospital admission date/time until hospital discharge date/time

or death date/time, whichever came first. The length was measured in days and rounded to the nearest half day.

- **Discharge disposition** – For patients who survived to hospital discharge, the specific location of discharge disposition was recorded. Discharge location possibilities include: home, assisted living, rehabilitation facility, long-term acute care center, nursing home, skilled nursing facility, another hospital, hospice or inpatient psychiatry.

**Data Analysis Plan**

To determine if the introduction of the ABCDEF Bundle concept has an impact on the compliance rates of each element of the bundle (Aim1: processes) the following statistics were used:

- Descriptive statistics were used to describe the general demographic characteristics of the patients (e.g., age, sex and admission diagnosis) in the compliance data collection in the baseline and post-education groups (i.e., Month 1, Month 2, and Month 3).
- Descriptive statistics including frequency and proportion were used for the ABCDEF compliance variables, which are binary. The compliance definitions provided in Table 2 were used to determine days of compliance for each element of the bundle.

To determine if the introduction of the ABCDEF Bundle concept has an impact on teamwork and collaboration (Aim 2: people) the following data analysis plan was used:

- The relevant descriptive statistics based on the level of measurement of the variable were used to describe the demographic characteristics of the staff (e.g., professional group, years experience in MICU, and practice years) that participated in the AITCS

teamwork survey and the HWEA survey between baseline and 3-month Post-implementation groups.

- Descriptive statistics including means and standard deviations were used for the survey subscales (i.e., partnership/shared decision making, cooperation, and coordination) and the survey total scores, which are continuous variables. All surveys included questions that were used to generate an anonymous code (Damrosch, 1986), which allowed matching the pre- and post- surveys. For the surveys that could be matched, the paired *t*-test were used to examine if significant differences exist between the pre- and post- intervention groups. For the surveys that could not be matched Student's *t*-tests were used.
- Cronbach's alpha was used to measure the internal consistency of the AITCS and the HWEA surveys at both time points.

To determine the relationship of the ABCDEF Bundle concept with ICU and hospital lengths of stay, and hospital discharge location (Aim 3: patient outcomes) the following statistics were used:

- Descriptive statistics were used to describe the general demographic characteristics of the patients (e.g., age, sex and admission diagnosis) in the outcomes data collection in the baseline and post-intervention groups (i.e., Month 1, Month 2, and Month 3). These were the same patients that were used in the compliance data collection groups.

- Descriptive statistics including medians and interquartile ranges were used for the continuous patient outcome data (i.e., ICU length of stay and hospital length of stay).
- Descriptive statistics including frequency and proportion will be used for the categorical patient outcome data (i.e., discharge disposition).

## CHAPTER 5: RESULTS

Due to the sample size and nature of this continuous quality improvement project the data for Aims 1 (compliance) and 2 (outcomes) were not evaluated for statistical significance and thus any changes are reported as trends rather than significance. The data for Aim 2 (teamwork and collaboration) were evaluated for statistical significance and are reported as thus. The results for all three aims are presented below.

### Compliance (Processes)

There were a total of 102 patients screened and 32 were excluded (31 that were in the ICU less than 24 hours and one whose chart access was restricted). A total of 70 patients were included in the chart audit over the four-month period. More than half of these patients were between the ages of 50-69, and most were white, English speaking, and admitted with the diagnosis of sepsis and/or septic shock. Demographics of each group are shown in Table 3.

Compliance was tracked on days that patients were in the ICU for a full 24 hours and receiving aggressive care management (e.g. not on comfort care only status). This resulted in a total of 99 days for the Baseline month, 78 days for Month 1, 38 days for Month 2, and 32 days for Month 3. The compliance performance for each bundle element was variable over the four-month period. Compliance with both pain (A) and agitation-sedation (C) assessments increased from baseline for Months 1, 2 and 3. Compliance with pain assessments was 72% at Baseline and rose to 84% at Month 3. Compliance with agitation-sedation assessments started at 36% at Baseline and rose to 44% at Month 3. Delirium (D)

assessment compliance fluctuated throughout the four months but remained low (i.e., ≤ 16%). Compliance with the B portion (i.e., Both SAT and SBT) of the bundle was split. Days of SAT protocol compliance decreased over time (i.e., from 75% at Baseline to 40% at Month 3), while SBT protocol compliance increased over time (i.e., from 55% at Baseline to 70% at Month 3). Early mobility (E) protocol compliance remained similar over the four-month period (i.e., 51% at Baseline and 53% at Month 3). Family presence (F) increased over time (i.e., 29% at Baseline and 47% at Month 3), but there was only a slight increase in family conferences (i.e., 10% at Baseline and 13% at Month 3) and a decrease in family participation in the plan of care (i.e., 24% at Baseline to 0% at Month 3). Table 4 provides details of the compliance performance for each element of the bundle.

**Table 3. Patient Demographics**

| Characteristics | Baseline (*n* = 30) *n* (%) | Month 1 (*n* = 20) *n* (%) | Month 2 (*n* = 10) *n* (%) | Month 3 (*n* = 10) *n* (%) |
|---|---|---|---|---|
| Age, in years | | | | |
| 18-49 | 6 (20) | 2 (10) | 3 (30) | 4 (40) |
| 50-69 | 23 (77) | 11 (55) | 5 (50) | 4 (50) |
| 70-89 | 0 (0) | 7 (35) | 2 (20 | 1 (10) |
| 90 + | 1 (3) | 0 (0) | 0 (0) | 1 (10) |
| Sex | | | | |
| Male | 13 (43) | 10 (50) | 60 (60) | 60 (60) |
| Female | 17 (57) | 10 (50) | 40 (40) | 40 (40) |
| Race | | | | |
| American Indian | 1 (3) | 2 (10) | 0 (0) | 0 (0) |
| Black/African American | 9 (30) | 4 (20) | 1 (10) | 3 (30) |
| White | 16 (53) | 13 (65) | 8 (80) | 7 (70) |
| Other/Non-Specified | 4 (13) | 1 (5) | 1 (10) | 0 (0) |
| English Speaking | 29 (97) | 19 (95) | 9 (90) | 10 (100) |
| Mechanical ventilation | 17 (57) | 9 (45) | 6 (60) | 3 (30) |
| ICU diagnosis | | | | |
| Sepsis/septic shock/ARDS | 10 (33) | 8 (40) | 7 (70) | 4 (40) |
| Airway protection/obstruction | 2 (7) | 0 (0) | 1 (10) | 0 (0) |
| COPD/Asthma | 3 (10) | 5 (25) | 0 (0) | 1 (10) |
| Pneumonia | 8 (27) | 2 (10) | 3 (30) | 0 (0) |
| Congestive heart failure | 4 (13) | 3 (15) | 1 (10) | 0 (0) |
| Acute MI/cardiogenic shock | 0 (0) | 2 (10) | 0 (0) | 0 (0) |
| Drug overdose/withdrawal | 2 (7) | 0 (0) | 2 (20) | 0 (0) |
| Gastrointestinal bleed | 2 (7) | 1 (5) | 1 (10) | 3 (30) |
| Renal failure | 3 (10) | 1 (5) | 2 (20) | 1 (10) |
| Endocrine/electrolyte disturbances | 1 (3) | 1 (5) | 0 (0) | 1 (10) |
| Cirrhosis/hepatic failure | 3 (10) | 3 (15) | 1 (10) | 1 (10) |
| Malignancy | 3 (10) | 0 (0) | 0 (0) | 2 (20) |
| Neurological disease/injury | 3 (10) | 0 (0) | 0 (0) | 0 (0) |
| Change in mental status | 1 (3) | 0 (0) | 0 (0) | 0 (0) |
| Other | 3 (10) | 0 (0) | 0 (0) | 0 (0) |

Note. Data presented in frequency and percentage of total. ICU = intensive care unit; ARDS = acute respiratory disease syndrome; COPD = chronic obstructive pulmonary disease; MI = myocardial infarction. More than one diagnosis could be chosen for each patient.

**Table 4. Frequency of Compliance Days with the ABCDEF Bundle Elements**

| ABCDEF Element | Baseline (*n* = 99) days (%) | Month 1 (*n* = 78) days (%) | Month 2 (*n* = 38) days (%) | Month 3 (*n* = 32) days (%) |
|---|---|---|---|---|
| **A - Assess, prevent and manage pain** | | | | |
| Pain assessment compliance | 71 (72) | 59 (76) | 32 (84) | 27 (84) |
| **B - Both SAT and SBT** | | | | |
| Days on sedatives | 24 (24) | 36 (46) | 27 (71) | 5 (16) |
| SAT protocol compliance | 18 (75) | 18 (50) | 14 (52) | 2 (40) |
| Completed | 15 (63) | 11 (31) | 5 (19) | 2 (40) |
| Contraindicated | 3 (13) | 7 (19) | 9 (33) | 0 (0) |
| SAT protocol noncompliance | 6 (25) | 18 (50) | 13 (48) | 3 (60) |
| Days on mechanical ventilation | 53(54) | 51(65) | 27(71) | 10(31) |
| SBT protocol compliance | 29 (55) | 48 (94) | 20 (74) | 7 (70) |
| Completed | 10 (19) | 23 (45) | 2 (7) | 6 (60) |
| Contraindicated | 19 (36) | 25 (49) | 18 (67) | 1 (10) |
| SBT protocol noncompliance | 24 (45) | 3 (6) | 7 (26) | 3 (30) |
| **C - Choice of analgesia and sedation** | | | | |
| Sedation assessment compliance | 36 (36) | 32 (41) | 18 (47) | 14 (44) |
| Days a sedation target was set | 24 (24) | 34 (44) | 27 (71) | 3 (9) |
| Days patient was off sedation target | 16 (67) | 28 (82) | 25 (93) | 0 (0) |
| **D - Delirium: assess, prevent and manage** | | | | |
| Delirium assessment compliance | 7 (7) | 3 (4) | 6 (16) | 2 (6) |
| **E - Early mobility and exercise** | | | | |
| Early mobility protocol compliance | 50 (51) | 39 (50) | 21 (55) | 17 (53) |
| Completed | 21 (21) | 23 (29) | 8 (21) | 15 (47) |
| Contraindicated | 29 (29) | 16 (21) | 0 (0) | 2 (6) |
| Early mobility noncompliance | 49 (50) | 39 (50) | 17 (44) | 15 (47) |
| **F - Family engagement and empowerment** | | | | |
| Days family present | 29 (29) | 42 (54) | 16 (42) | 15 (47) |
| Family conference | 3 (10) | 5 (12) | 3 (19) | 2 (13) |
| Participated in plan of care | 7 (24) | 6 (14) | 0 (0) | 0 (0) |

Note. All data are reported as frequencies and percentages. SAT = spontaneous awakening trial; SBT = spontaneous breathing trial.

**Teamwork and Collaboration (People)**

At the Baseline survey time point, a total of 158 staff surveys were collected. Of these surveys, 29 were not included because they were either blank or only contained demographic information resulting in a total of 126 surveys with at least one completed section completed, an overall response rate of 77%. A total of 80 Post-Implementation surveys were collected. Of these surveys, 10 were not included because they were either blank or only contained demographic information resulting in a total of 70 surveys with at least one completed section, an overall response rate of 38%. The mean age of respondents at Baseline of 38.35 years (*SD = 11.21)* was similar to the mean age at Post-Implementation *(M* = 35.92, *SD* = 11.21*)*. The two groups were also similar in sex and professional group composition. The majority of the respondents at both time points were nurses and physicians. Table 5 provides demographic characteristics of the respondents at both time points. The two groups were similar in years of both critical care experience and experience in this ICU. However, the Post-Implementation respondents had significantly fewer years of critical care experience (*M* = 7.38, *SD* = 8.12) when compared to Baseline respondents (*M* = 10.19, *SD* = 9.41, *p* = 0.04). Table 6 provides the comparisons of the years of experiences of the two groups.

To obtain internal consistency estimates for each of the scales, Cronbach's alpha was used. The overall reliability of the AITCS was 0.98 at Baseline with a range of 0.92 to 0.97 for the subscales. The overall reliability of the HWEA was 0.96 at Baseline with a range of 0.76 to 0.86 for the subscales.

At the Baseline time point, the mean score for the all the items of the AITCS for all respondents was 3.62 (*SD* = 0.75). There were 16 surveys that did not have a professional

category marked. These surveys scored a mean of 3.38 (*SD* = 0.99) on the overall score. At the 3 Month time point, the mean score for the all the items of the AITCS for all respondents was 3.70 (*SD* = 0.72). Of the three teamwork and collaboration attributes measured by the AITCs, coordination had the lowest score for the overall respondents at both time points (*M* = 3.30, *SD* = 0.87 at Baseline and *M* = 3.25, *SD* = 1.12 at Post-Implementation). Coordination was also the lowest scored category for each individual profession. Baseline AITCS scores are presented in Table 7 and 3 Month scores are presented in Table 8.

The overall HWEA mean score at baseline was 3.28 (*SD* = 0.78). There were 8 surveys that did not have a professional affiliation marked and these "unknowns" had an overall mean score of 3.22 (*SD* = 0.77). The 3 Month HWEA overall mean score was 3.43 (*SD* = 0.73). At the Baseline time point True Collaboration was the lowest subscale score (*M* = 3.15, *SD* = 0.95) and at the Post-Implementation time point Appropriate Staffing was the lowest subscale score (*M* = 3.29, *SD* = 0.84). Baseline HWEA scores are presented in Table 9 and 3 Month scores are presented in Table 10.

Baseline scores were compared to 3-Month scores and while both surveys, AITCS and HWEA showed increased scores in the 3 Month results, they were not statistically different from the Baseline scores. There were statistically significant improvements in the HWEA subscales of Skilled Communication (*p =0.02)* and Effective Decision Making (*p =0.04)*. The comparisons of the paired survey responses and the non-paired survey responses are reported in Table 11.

The details from the ICU Care and Perceptions survey are reported in Appendices B (Baseline) and C (Post-Implementation). The percent of Agree/Strongly Agree responses for the item, "I have heard of the ABCDEF bundle for the management of pain, agitation and

delirium" trended up from 46% at baseline to 93% at Post-Implementation. Similarly, the percentage of respondents that agreed/strongly agreed that the "ABCDEF bundle improves patient outcomes" trended up (85% at Baseline to 87% at Post-Implementation) and that they were "confident in the ability to use the bundle" also trended up (71% at Baseline and 77% at Post-Implementation). Also important to highlight, the percentage of respondents who agreed/strongly agreed that "All mechanically ventilated patients require sedative medications while they are in the ICU" trended down from 23% at Baseline to 7% at Post-Implementation. There was a trend up in the percentage of respondents that agreed/strongly agreed that "keeping patients deeply-sedated negatively affects patient outcomes" (65% at baseline and 78% at Post-Implementation). Lastly, there was a trend up in the number of respondents that noted at Post-Implementation that they "actively participate in interprofessional rounds daily" (75% at Baseline and 90% at Post-Implementation).

**Patient Impact (Outcomes)**

The patients included in the outcomes analyses are described in Table 3. ICU length of stay, hospital length of stay and discharge disposition were similar at Baseline and Post-Implementation Period (Month 3). A total of 5 patients sampled had hospital lengths of stay that were considerably longer than the median scores. Therefore, the decision was made to report hospital length of stay twice---with all patients reported and then for all the patients excluding the patients with greater than 70 day hospital stays. Table 12 reports the length of stays for each month of the project. There were no differences in discharge disposition locations for survivors as shown in Table 13.

**Table 5. Demographic Data for Survey Respondents**

| | Data collection | | |
|---|---|---|---|
| | Baseline ($n$ = 126) | Post-Implementation ($n$ = 70) | $p$ |
| Demographic characteristic | $n$ (%) | $n$ (%) | |
| Sex | | | 0.48 |
| Male | 33 (34) | 24 (34) | |
| Female | 67 (53) | 34 (49) | |
| Unknown | 26 (21) | 12 (17) | |
| Professional Group | | | 0.06 |
| Registered Nurse | 42 (33) | 26 (37) | |
| Physician | 26 (21) | 18 (26) | |
| Attending | 12 (10) | 10 (14) | |
| Fellow | 7 (6) | 8 (11) | |
| Resident | 7 (6) | 0 (0) | |
| Respiratory Therapist | 23 (18) | 13 (19) | |
| Rehabilitation Therapist | 7 (6) | 8 (11) | |
| Pharmacist | 8 (6) | 4 (6) | |
| Nursing Assistant | 4 (3) | 1 (1) | |
| Unknown | 16 (13) | 0 (0) | |

Note. All data are reported as frequencies and percentages unless otherwise noted. Significant at the $p<0.05$ level.

**Table 6. Experience Years for Survey Respondents**

| | Data collection | | |
|---|---|---|---|
| | Baseline ($n$ = 126) | Post-Implementation ($n$ = 70) | $p$ |
| Experience Category | Mean (*SD*) | Mean (*SD*) | |
| General practice | 10.19 (9.41) | 7.38 (8.12) | 0.04* |
| Critical care | 8.81 (8.79) | 6.96 (8.07) | 0.15 |
| Current ICU | 5.90 (6.84) | 5.42 (7.30) | 0.65 |

Note. All data are reported as means and standard. *SD* = standard deviation. *Significant at the $p<0.05$ level.

**Table 7. Means and Standard Deviations of the AITCS Survey Response Scores at Baseline**

| Professional Group | *n* | Total Score | Subscales | | |
|---|---|---|---|---|---|
| | | | Partnership / Shared Decision Making | Cooperation | Coordination |
| | | Mean (*SD*) | Mean (*SD*) | Mean (*SD*) | Mean (*SD*) |
| All | 126 | 3.62 (0.75) | 3.71 (0.74) | 3.68 (0.83) | 3.30 (0.87) |
| Registered Nurse | 42 | 3.66 (0.61) | 3.73(0.59) | 3.74 (0.64) | 3.31 (0.80) |
| Physician | | | | | |
| Attending | 12 | 4.05 (0.43) | 4.19 (0.43) | 4.13 (0.48) | 3.36 (0.50) |
| Fellow | 7 | 3.98 (0.32) | 4.05 (0.26) | 4.05 (0.36) | 3.72 (0.75) |
| Resident | 7 | 4.01(0.64) | 3.98 (0.54) | 4.14 (0.67) | 3.88 (0.99) |
| Respiratory Therapist | 23 | 3.18 (1.01) | 3.27 (0.98) | 3.14 (1.16) | 3.00 (1.40) |
| Rehabilitation Therapist | 7 | 3.30 (0.36) | 3.37 (0.32) | 3.48 (0.44) | 2.79 (0.65) |
| Pharmacist | 8 | 4.01 (0.37) | 4.15 (0.35) | 3.99 (0.32) | 3.68 (0.64) |
| Nursing Assistant | 4 | 4.03 (0.11) | 4.11 (0.11) | 4.02 (0.37) | 3.82 (0.27) |
| Unknown | 16 | 3.38 (0.99) | 3.50 (0.99) | 3.38 (1.09) | 3.05 (1.14) |

Note. All data are reported as means and standard deviations.

**Table 8. Means and Standard Deviations of the AITCS Survey Response Scores at 3 Months Post-Implementation**

| Professional Group | *n* | Total Score | Subscales | | |
|---|---|---|---|---|---|
| | | | Partnership / Shared Decision Making | Cooperation | Coordination |
| | | Mean (*SD*) | Mean (*SD*) | Mean (*SD*) | Mean (*SD*) |
| All | 70 | 3.70 (0.72) | 3.76 (0.71) | 3.69 (0.93) | 3.25 (1.12) |
| Registered Nurse | 26 | 3.84 (0.59) | 3.90 (0.57) | 3.86 (0.70) | 3.55 (0.95) |
| Physician | | | | | |
| Attending | 10 | 4.04 (0.35) | 4.12 (0.37) | 4.21 (0.38) | 3.57 (0.54) |
| Fellow | 8 | 3.74 (0.27) | 3.86 (0.13) | 3.85 (0.44) | 3.25 (0.77) |
| Resident | 0 | | | | |
| Respiratory Therapist | 13 | 3.18 (0.97) | 3.25 (0.92) | 3.18 (1.13) | 3.00 (1.08) |
| Rehabilitation Therapist | 8 | 3.74 (0.42) | 3.78 (0.50) | 3.23 (1.5) | 2.30 (1.92) |
| Pharmacist | 4 | 4.06 (0.07) | 4.13 (0.11) | 4.16 (0.21) | 3.71 (0.35) |
| Nursing Assistant | 1 | 1.00 | 1.00 | 1.00 | 1.00 |

Note. All data are reported as means and standard deviations.

**Table 9. Means and Standard Deviations of the HWEA Survey Response Scores at Baseline**

| Professional Group | *n* | Total Score | Subscales | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Skilled Communication | True Collaboration | Effective Decision Making | Appropriate Staffing | Meaningful Recognition | Authentic Leadership |
| | | Mean (*SD*) | Mean (*SD*) | Mean (*SD*) | Mean (*SD*) | Mean (*SD*) | Mean (*SD*) | Mean (*SD*) |
| All | 114 | 3.28 (0.78) | 3.33 (0.85) | 3.15 (0.95) | 3.44 (0.81) | 3.17 (0.91) | 3.20 (0.84) | 3.39 (0.85) |
| Registered Nurse | 40 | 3.32 (0.89) | 3.45 (0.97) | 3.26 (0.94) | 3.49 (0.85) | 2.93 (1.03) | 3.41 (0.89) | 3.35 (1.02) |
| Physician | | | | | | | | |
| Attending | 11 | 3.46 (0.54) | 3.58 (0.50) | 3.36 (0.77) | 3.61 (0.61) | 3.52 (0.50) | 3.09 (0.79) | 3.79 (0.66) |
| Fellow | 7 | 3.32 (0.66) | 3.48 (0.50) | 3.29 (0.76) | 3.29 (0.97) | 3.33 (0.88) | 3.14 (0.66) | 3.43 (0.57) |
| Resident | 7 | 3.71 (0.67) | 3.67 (0.69) | 3.67 (0.47) | 3.90 (0.76) | 3.71 (0.76) | 3.48 (0.74) | 3.64 (1.01) |
| Respiratory Therapist | 22 | 2.94 (0.87) | 2.86 (0.98) | 2.55 (1.12) | 3.17 (0.96) | 3.09 (0.97) | 2.79 (0.94) | 3.20 (0.89) |
| Rehabilitation Therapist | 7 | 3.30 (0.36) | 3.37 (0.32) | 3.48 (0.44) | 2.79 (0.65) | 2.79 (0.65) | 2.79 (0.65) | 2.79 (0.65) |
| Pharmacist | 8 | 4.01 (0.37) | 4.15 (0.35) | 3.99 (0.32) | 3.68 (0.64) | 3.68 (0.64) | 3.68 (0.64) | 3.68 (0.64) |
| Nursing Assistant | 4 | 4.03 (0.11) | 4.11 (0.11) | 4.02 (0.37) | 3.82 (0.27) | 3.82 (0.27) | 3.82 (0.27) | 3.82 (0.27) |
| Unknown | 8 | 3.38 (0.99) | 3.50 (0.99) | 3.38 (1.09) | 3.05 (1.14) | 3.05 (1.14) | 3.05 (1.14) | 3.05 (1.14) |

Note. All data are reported as means and standard deviations.

**Table 10. Means and Standard Deviations of the HWEA Survey Response Scores at 3 Months Post-Implementation**

| Professional Group | *n* | Total Score | Subscales | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Skilled Communication | True Collaboration | Effective Decision Making | Appropriate Staffing | Meaningful Recognition | Authentic Leadership |
| | | Mean (*SD*) | Mean (*SD*) | Mean (*SD*) | Mean (*SD*) | Mean (*SD*) | Mean (*SD*) | Mean (*SD*) |
| All | 65 | 3.43 (0.73) | 3.58 (0.76) | 3.36 (0.78) | 3.65 (0.70) | 3.29 (0.84) | 3.38 (0.77) | 3.60 (0.84) |
| Registered Nurse | 24 | 3.63 (0.64) | 3.81 (0.68) | 3.61 (0.67) | 3.73 (0.68) | 3.28 (0.87) | 3.71 (0.72) | 3.77 (0.79) |
| Physician | | | | | | | | |
| Attending | 10 | 3.68 (0.43) | 3.83 (0.55) | 3.50 (0.50) | 3.80 (0.61) | 3.57 (0.47) | 3.47 (0.45) | 3.90 (0.42) |
| Fellow | 7 | 3.57 (0.65) | 3.48 (0.50) | 3.29 (0.76) | 3.29 (0.97) | 3.33 (0.88) | 3.14 (0.66) | 3.43 (0.57) |
| Resident | 0 | | | | | | | |
| Respiratory Therapist | 13 | 2.71 (0.83) | 2.77 (0.92) | 2.57 (0.75) | 3.10 (0.87) | 2.67 (1.04) | 2.63 (0.93) | 2.85 (1.03) |
| Rehabilitation Therapist | 6 | 3.46 (0.75) | 3.80 (0.30) | 3.28 (0.77) | 3.80 (0.30) | 3.80 (0.30) | 3.57 (0.28) | 4.00 (0.00) |
| Pharmacist | 4 | 3.82 (0.27) | 3.83 (0.19) | 4.00 (0.72) | 3.92 (0.17) | 3.83 (0.19) | 3.67 (0.27) | 3.67 (0.47) |
| Nursing Assistant | 1 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |

Note. All data are reported as means and standard deviations.

**Table 11. Significance Testing for AITCS and HWEA survey scores between Baseline and 3 Months Post-Implementation**

| | Paired Respondents (*n* = 29) | | Non-Paired Respondents (*n* = 140) | |
|---|---|---|---|---|
| | Mean Difference from Baseline | *p* | Mean Difference from Baseline | *p* |
| AITCS | | | | |
| Total Score | 0.06 | 0.67 | -0.02 | 0.88 |
| Partnership/Shared Decision Making | -0.01 | 0.90 | -0.02 | 0.89 |
| Cooperation | 0.12 | 0.29 | -0.09 | 0.61 |
| Coordination | 0.17 | 0.24 | 0.07 | 0.68 |
| HWEA | | | | |
| Total Score | 0.15 | 0.12 | 0.07 | 0.66 |
| Skilled Communication | 0.25 | 0.02* | 0.20 | 0.28 |
| True Collaboration | 0.09 | 0.46 | 0.19 | 0.31 |
| Effective Decision Making | 0.26 | 0.04* | 0.11 | 0.54 |
| Appropriate Staffing | -0.03 | 0.80 | 0.10 | 0.58 |
| Meaningful Recognition | 0.20 | 0.09 | 0.13 | 0.45 |
| Authentic Leadership | 0.15 | 0.22 | 0.14 | 0.44 |

Note. *Significant at the $p<0.05$ level.

**Table 12. Descriptive Statistics for the Patients' ICU and Hospital Lengths of Stays**

| Length of Stay Category | Baseline ($n$ = 30) | Month 1 ($n$ = 20) | Month 2 ($n$ = 10) | Month 3 ($n$ = 10) |
|---|---|---|---|---|
| | Mdn (IQR) | Mdn (IQR) | Mdn (IQR) | Mdn (IQR) |
| ICU | 3.00 (4.38) | 4.00 (3.13) | 2.5 (3.38) | 3.75 (4.13) |
| Hospital - for all patients | 9.25 (13.00) | 10.25 (18.63) | 11.00 (11.63) | 10.50 (8.25) |
| Hospital - excluding patients with >70 days | 8.50 (12.25) | 9.00 (1.00) | 11.00 (11.63) | 10.50 (8.25) |

Note. Data presented in medians and interquartile ranges. Data presented in days. *Mdn* = median; IQR = interquartile range.

**Table 13. Frequency and Percentages of Discharge Disposition of Survivors**

| | Baseline ($n$ = 17) | Month 1 ($n$ = 15) | Month 2 ($n$ = 7) | Month 3 ($n$ = 6) |
|---|---|---|---|---|
| Discharge Location | $n$ (%) | $n$ (%) | $n$ (%) | $n$ (%) |
| Home | 13 (76) | 9 (60) | 3 (43) | 5 (83) |
| Assisted Living | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| Rehabilitation Center | 0 (0) | 1 (7) | 0 (0) | 0 (0) |
| Long Term Acute Care Hospital | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| Nursing Home | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| Skilled Nursing Facility | 1 (6) | 3 (20) | 4 (57) | 1 (17) |
| Another Hospital | 1 (6) | 0 (0) | 0 (0) | 0 (0) |
| Hospice | 1 (6) | 1 (7) | 0 (0) | 0 (0) |
| Inpatient Psychiatry | 1 (6) | 0 (0) | 0 (0) | 0 (0) |

Note. Data presented in frequency and percentage of total.

# CHAPTER 6: DISCUSSION

The purpose of this project was to evaluate the impact of introducing the concept of the ABCDEF bundle on people (teamwork and communication), processes (compliance with bundle elements) and outcomes (patient outcomes). The project found that while there was an impact, it was small, and more work is needed.

Three of the bundle elements strongly rely on the use of patient assessment tools for pain, agitation, and delirium (i.e., A, C, and D). While both pain (A) and sedation/agitation (C) assessments had slightly improved by the end of the 3-month observation period, delirium (D) assessments remained relatively unchanged by the end of the 3-months. Both the pain and sedation/agitation assessment tools are well established for use in ICUs and easy to use with little training. They are both assessed more frequently than delirium by unit policy (i.e. pain and agitation/sedation is assessed every 4 hours and delirium is assessed every 12 hours) and both had greater than 4 assessments per day in the Baseline month. However, delirium is a more recent concept in the critical care setting and the assessments tools are relatively new (Barr et al., 2013). Although the unit had a delirium assessment tool and policy in place, there was only an average of 0.3 assessments done per day in the Baseline month. The ABCDEF workgroup acknowledged that this is not surprising giving the lack of importance that delirium assessment has received over the past few years and earmarked it as an area of needed future education and training especially for new staff members.

The B element of the bundle includes both SATs and SBTs and demonstrated mixed results. SAT compliance decreased and SBT compliance increased. This may be due the fact

that patients in the Month 3 cohort had a lower percentage of days on sedation and those that had a target set were always titrated to target. This could suggest that there are some overall changes happening in the MICU culture toward lighter sedation practices. The remaining patients that are on sedation might be the ones that are more difficult to sedate and thus, staff are more resistant to performing SATs. There are some data that suggest that tight and light sedation titration is more effective than SATs (Mehta et al., 2012). Patients that are more awake are more capable of participating in early mobility. While the early mobility (E) protocol compliance did not change over the course of the observations, Month 3 patients had the highest percentage days of early mobility, in other words less patients had contraindications for having early mobility and thus progressed to getting mobility. The ICU Care and Perceptions results supports this, indicating a culture change in the MICU with a greater percentage of respondents reporting that not all ventilated patients need sedation and deep sedation is dangerous. These changes in staff perceptions represent a shift in attitudes about sedation and that in turn impacts patients' abilities to do the other elements of the bundle.

The last element of the bundle, family presence, was particularly challenging to measure since this was not recorded in a consistent location in the medical record. Additionally, there is not a consistent mandate in the family visitation policies that guide the staff on documentation of family presence or involvement and this could be underreported because it is not frequently documented even when it does happen. Month 3 had a higher percentage of patient days where family presence was documented;, however, there were less days when family engagement (i.e. family conferences or involvement in the plan of care) was documented. It is important to note that days involving de-escalation of care (e.g. terminal

extubation and transition to comfort care) were excluded from evaluation, and those days may have included more family conferences.

Perhaps the most important observation in this study was the observation of the ABCDEF workgroup that greater use of the goals sheets that included the ABCDEF bundle elements at the end of the 3 month observation period helped to facilitate discussions during patient rounds. In a meeting at the end of this 3-month observation period, the ABCDEF workgroup expressed that there was greater use of the ABCDEF goals sheets and that it is helping to facilitate discussions in rounds. Additionally, a greater percentage of staff members were observed participating in interprofessional rounds. While large differences in practices were not observed at the 3-Month follow-up period, these small changes point to changes in overall MICU practices and also underscore the interrelatedness and interdependency of the ABCDEF bundle elements. These findings indicate a culture change towards improving teamwork and collaboration in the MICU, and support the concept that the ABCDEF bundle helps to align not just processes but the staff associated with it. This is important, as the ABCDEF bundle includes interventions and practices that require multiple professionals in the ICU to work in a coordinated and collaborative fashion.

The introduction of the ABCDEF bundle framework and language also made an impact on teamwork and collaboration. While the overall mean scores for the AITCS (3.62 to 3.70) and HWEA (3.28 to 3.43) did not improve significantly, they did increase. The lack of significance can be due to the small sample size and the low response rate at Month 3. Staff turnover, especially from the resident and nursing professions, was not measured, but typically occurs in the ICU setting. Additionally, the nursing staff expanded from 74 to 92 as

the unit experienced a bed expansion. Both of these factors could have impacted the results as new team members can take time to acclimate to the team and adopt unit policies. .

Coordination was shown as the weakest areas of the three teamwork and collaboration attributes evaluated with the AITCS at each assessment point. Similarly, the scores for True Collaboration were among the lowest of the HWEA categories. While mean scores did increase at the 3 Month time point, they did not reach significance. Again, this could be due to the lower response rate and proportion of health care professionals completing the survey. These findings also suggest the need for more clarity of roles and better communication processes between team members. It is important to note that two of the lowest scoring groups of professions on both the AITCS and the HWEA were respiratory therapists and rehabilitation therapists. These two groups are often primarily charged with the completion of several interventions in the ABCDEF Bundle (e.g. respiratory therapists initiate and conduct SBTs) and must work in concert with the bedside nurses to accomplish them. While the bedside nurses consider the MICU their home, these therapist often cover other parts of the hospital and thus it is not surprising that they feel a disconnect and struggle with a sense of unity with the MICU team. This was s driving force for making all the educational activities interprofessional and explicitly sending multiple invitations to these professionals. More work needs to be done to specifically understand how these two professions can feel more a part of the team and to develop strategies to improve communication and collaboration with them.

Significant improvement were seen in the HWEA subscales of Skilled Communication and Effective Decision Making. It is possible that this indicates a culture change in the MICU where communication was improved, leading to more effective decision-making. As

communication skills improve, it is likely that coordination between team members may also improve. Surveying the MICU team again at 6 months, might actually show an improvement in collaboration, as collaboration will increase as communication and decision making also increase. Perhaps collaboration was lower due to the fact that it is a higher skill and would take more time to show improvement. These findings should be used as helpful guiding points for future project work since the elements in this bundle strongly rely on collaboration and coordination among multiple professionals. Repackaging care strategies and interventions that are common in the ICU setting in the bundle concept was a tool to help promote better teamwork and collaboration and thus promoted a healthier work environment.

The introduction of the ABCDEF bundle concept had little to no impact on patient outcomes. This is not surprising given the small sample size of this project and the short duration of the project monitoring However, it is of importance to note that in Month 3, of those 6 patients that survived all but one were discharged to home (83%). Although it is difficult to make strong assumptions on the data from 10 patients, these data could demonstrate a synergistic relationship of improvement in embracing the concepts behind the ABCDEF bundle and their affects on patient outcomes. Future work should be aimed at addressing the impact of the ABCDEF bundle on patient outcomes.

The results of this project underscore that the introduction of the concept of the ABCDEF bundle can lay a critical foundation for establishing culture change and directing new practice habits. The MICU already had protocols and guidelines in place for each element of the bundle prior to the start of the program. In the Practice and Perception survey a majority of respondents were unaware of those policies. The project did not introduce any new protocols, but rather just rebranded the existing interventions into a package called the

ABCDEF bundle. This new language helps to demonstrate that they are interrelated and interdependent. Previous studies with this bundle have focused on rolling out large-scale implementation programs that involve the introduction of the bundle concept and widespread protocol changes (Balas et al., 2014; Carrothers et al., 2013). However, this project demonstrates that there is benefit in just introducing the concept of the bundle – providing teams with a fresh new framework and language to use to pull together many interventions and help align the staff responsible for them. The ABCDEF bundle introduces a new language that ties together already existing policies and procedures. The introduction of the bundle will need a great deal of reinforcement and each element of the bundle will need to be reviewed for process improvement, but the framework for that change has been put in place.

**Limitations and Future Work**

The main limitations of this study are related to the small sample size and short duration. The purpose of this project was to evaluate the impact of introducing the concept of the ABCDEF bundle through a one time educational session and incorporation of the bundle language in the daily goals checklists used in patient care rounds on people (teamwork and communication), processes (compliance with bundle elements) and outcomes (patient outcomes), and was not meant to be generalizable. Therefore future work should consist of testing the impact of this intervention over time and with a larger sample size.

The study design used random convenience sampling for patient selection in order to remove selection bias, however, the resultant groups may have been mismatched (e.g. month 3 had fewer patients who were mechanically ventilated), which could have also impacted patient outcome data.

The survey response rates could also impact interpretation of findings. While the Baseline surveys had an overall response rate of 77%, the 3 Month survey response rate was much lower (38%). This could be attributed to survey fatigue. The staff have received several surveys for various projects in between the two surveys and may not have been inclined to complete another survey. There were 13% of the Baseline survey respondents that did not indicate their profession and therefore could not be categorized. When the initial survey rolled out the question about profession was listed on the last page of the survey. However, as survey response rates were checked it was noted that these data were lost for respondents who failed to complete the entire survey, so the question was moved to the front page of the survey. This move drastically increased the respondents' self-identification of profession (i.e. there were no "unknowns" for profession in 3 Month surveys). The survey data from the "unknowns" could have impacted the scores of individual profession categories for the better or worse. However, their mean scores are similar to the overall mean scores for both the AITCS and HWEA suggesting that this is unlikely.

Other limitations include that two of the survey measurement tools are not validated instruments, the HWEA and the ICU Care and Practice survey. Future work needs to evaluate their content and construct validity in general and especially as it applies to the ICU environment. While the AITCS has validated, its use has not been psychometrically tested among interprofessional ICU teams. Future work should test the reliability and validity of this specific tool in the MICU setting. The reliability testing performed on the Baseline survey results suggest that the AITCS has excellent reliability for the overall test and for the 3 subscales. The overall Baseline HWEA survey also had high reliability, however, the 3

subscales did not score as highly suggesting that some items could be improved. Future work should focus on the refinement of the items and their appropriateness in the HWEA tool.

This project based all compliance definitions on documentation of elements within the electronic medical record system, when in fact interventions and assessments could have taken place that were not charted. For example a spontaneous awakening trial could be attempted (i.e., sedatives are turned off) and the patient failed within a few minutes and the brief period the patient was off sedative was not charted. The ACBDEF workgroup discussed that it is not standard for nurses and doctors to always document interactions with family members. There could have been family member involvement and engagement that was done but not documented. It could be possible that this project underreported compliance with the ABCDEF bundle elements. Future work could evaluate the impact of relying on the EMR for compliance data. One option would be to collect compliance data as it is reported in patient care rounds and compare that to what is charted. Since each element of the bundle is discussed in rounds it may be that things that are not explicitly charted are shared and different information could be obtained from rounds than from chart abstraction. Lastly, this project highlighted a great need for an EMR documentation redesign. It became apparent as this project launched that many of the bundle elements were difficult to find in the EMR, because they were charted in multiple places by different members of the team. Additionally, the EMR software platform used by the hospital allows users to personalize screens so that professions see a different default view (e.g. nurses do not see the same screens or flowsheets as doctors see). Through the data collection process of this project the ABCDEF workgroup was able to have multiple discussions about this issue and was able to educate one another about personalizing (e.g. wrenching in) flowsheets to create flowsheets that provide the data.

However, there is a strong need to simplify the flowsheet documents and reduce unnecessary charting and create a ABCDEF specific flowsheet that everyone can access to allow for quick patient care review. This will allow for better communication outside of rounds and throughout the day. Additionally it will allow for better data abstraction in order to provide more real time feedback on compliance results and decreased data collection burden. As the project moves forward it could build on the limitations of this first phase by collecting data on more patients in subsequent months.

**Impact of these findings on the SCCM Collaborative**

This project demonstrates that introducing the concept of the ABCDEF bundle can be helpful in providing a framework for staff to organize already existing protocols and guidelines. However, the results of this project underscore that introducing the concept alone does not make significant widespread impact in compliance, teamwork or patient outcomes. More process improvement work is needed for substantial improvements. The MICU is a participating site in the SCCM ICU liberation Collaborative project and this project has served as a pilot in many ways since the work in this unit was approximately 6 months ahead of the other participating units. Many of the lessons learned in this project were communicated and incorporated into the overall collaborative planning and implementation. The MICU will continue their involvement in this collaborative for the next year and a half. That involvement will provide significant motivation and resources for continuing this process improvement work and building on the work done in this project.

**Implications for the DNP**

The ABCDEF bundle demands interprofessional teamwork and collaboration for successful execution. The DNP is the specifically trained team member to initiate and guide such a quality improvement initiatives (Conrad, 2015a). The DNP is able to facilitate interprofessional teamwork and collaboration (Conrad, 2015b). In this particular project the DNP was a catalyst for initiating the idea and moving it forward, however, the author was not a staff member of the MICU and the interprofessional staff members of the ABCDEF workgroup primarily facilitated the project. The author set up the structures for data collections, created the ABCDEF PowerPoint for the main education, assisted with some of the educational sessions, and collected the patient level data. The workgroup members were the frontline members interacting with the MICU staff and integrating the goals checklist in rounds.

The author also served as a connector as she facilitated connections of the key senior leader, the Chief of Pulmonary and Critical Care with the SCCM ICU Liberation Collaborative project. Also as a member of the national steering committee faculty with SCCM, the author was able to serve as a subject matter expert to guide the education development for the unit. The DNP role is able to serve as a catalyst, leader, team builder and interprofessional collaborator.

**Implications for Practice**

The project has demonstrated the value of incorporating teamwork and collaboration training into the implementation process of the ABCDEF bundle. The interprofessional teams in the ICU environment not only need training and guidance on how to improve protocol implementation and workflow patterns but also how to work together and collaborate. Siloed

care is ineffective and care practices need aligned. This use of a teamwork survey in this project was unique to other ABCDEF bundle projects that have been reported and was beneficial in guiding the interprofessional workgroup in planning for the quality improvement project. Other units working on similar projects should also consider incorporating some type of teamwork evaluation, such as the AITCS or the HWEA.

The project also underscored the value of participating in long-term collaboratives. The participation in the SCCM collaborative catalyzed the project forward and allowed for the quick removal of many obstacles. Securing senior leadership support early in the project was essential to moving the project forward at a reasonable pace. Additionally, the collaborative provided access to education and resources for the workgroup. The two day training class was helpful in providing a firm knowledge base and also was an opportunity to infuse energy that this unit part of something bigger across the country. Lastly, the collaborative participation allows for sustained support over a longer period of time. This project demonstrated that more interventions are needed in order to see measurable change in compliance and outcomes and that can only happen with time.

**Conclusion**

The ABCDEF bundle is comprised of evidenced based interventions that have been shown to improve patient outcomes. Bundling these elements draws attention the fact that the elements are interrelated and interdependent. The bundle also helps communicate that it is not just the processes that are interconnected but the interprofessional staff tasked with the patient care are also interconnected. This project demonstrated that introducing the concept of the bundle in a unit that already had each element in place started to show signs of improvement in bundle element compliance, teamwork and collaboration, and patient outcomes. However,

it also demonstrated that improvement was small and more work with bundle implementation was needed to build on the foundation of improvement. The ACBDEF bundle provides a solid framework for the interprofessional team to flourish and improve in their teamwork and collaboration while delivering quality patient care.

## APPENDIX A: MICU GOALS CHECKLIST

On the following two pages is the document that the MICU used as a Goals Checklist that includes the ABCDEF bundle language. The document is color-coded and is printed double-sided and is laminated. One of these hangs at the door for each patient's room.

**DATE:_____ NURSE:_____TEAM:_____ROOM_____ On-call Resident phone: 4-9876**

| NURSING [ see criteria on reverse] | | | |
|---|---|---|---|
| **"A" Assess, prevent, & manage pain** | **Is pain controlled? Yes No**<br>**NAPS_____**<br>**Numerical Rating _____** | **"D" Delirium: assess, prevent & manage** | **CAM positive_____ negative_____**<br>**UTA _____** |
| **"B" Both SAT & SBT** | **SAT occurred Yes No**<br>**SBT occurred Yes No**<br>**Passed SBT Yes No** | **"E" Early mobility & exercise** | **Mobility Level:**<br>**1_____ 2_____ 3_____ 4_____** |
| **"C" Choice of analgesia & sedation** | **RASS_____**<br>**Current Sedatives/Paralytics:** | **"F" Family engagement & empowerment** | **Updated in last 24hrs Yes No**<br>**Plan meeting/call today Yes No** |

| PHYSICIANS [ see criteria on reverse] | | |
|---|---|---|
| **Intern:** | **Resident:** | |
| **Lines/Tubes to REMOVE** | **Foley CVC A-line FMS NG/OG HD-cath** | |
| **Sedation** | **Awakening Trial Y / N N/A** | **RASS goal: -2 -1 0 Other _____** |
| **Respiratory Goal** | **ARDS-net / Pressure Support / SBT / Trach Collar / CPAP / BIPAP / High Flow**<br>**Wean FiO2 for goal sats: > _____ / Extubate to _____ /**<br>**Other:_____** | |
| **DVT ppx** | **Contraindicated / SCDs / SQ heparin / lovenox / Coumadin / heparin drip / Other** | |
| **GI ppx** | **IV or PO H2blocker / IV or PO PPI / PPI drip / Not indicated** | |
| **Mobility** | **_____ PT /OT order in Epic**<br>**_____ Activity order in Epic**<br>**_____ Level 1: PROM TID, turn Q2H**<br>**_____ Level 3: Sit on edge of bed**<br>**_____ Level 2: Bed in chair position**<br>**_____ Level 4: Transfer to chair, ambulate** | |
| **Ins/Outs goal** | **Net negative _____ / Bolus _____ / CVP goal _____ / encourage PO** | |
| **Nutrition** | **Bowel regimen / NPO / trophic feed / advance TF to goal / TPN / PO diet** | |
| **Procedures, Trips, Consults** | | |

Version: 12/2015

## A: Analgesia

| NAPS score components | |
|---|---|
| Facial expression (0-2) | |
| Activity/movement (0-2) | |
| Muscle tone (0-2) | |
| Vocalizations (0-2) | |
| Consolability (0-2) | |

| NAPS score interpretation | |
|---|---|
| 1 to 3 | Mild or no pain |
| 4 to 6 | Moderate pain |
| 7 to 10 | Severe pain |
| NAPS > 4 | Uncontrolled pain |

## B: Both SAT and SBT

| Awakening trial safety criteria | Spontaneous breathing trial safety criteria |
|---|---|
| No paralytic | FiO2 ≤ 50% |
| FiO2 < 80% (or >80 with O2 saturation >95) | PEEP ≤ 8 |
| No recent increasing agitation (RASS > 2) | Minute Ventilation <15 L/min |
| No active myocardial ischemia in last 24° | Minimal vasopressor requirement |
| No increased ICP or ventriculostomy | No active myocardial ischemia |
| No active seizures or acute withdrawal | No increased ICP |
| **Awakening trial failure** | **SBT Failure** |
| RR > 30 w/ accessory muscle usage | Sustained anxiety or agitation |
| Increased airway pressure | RR > 30 with accessory muscle usage |
| Ventilator dyssynchrony | Oxygen saturation < 90% |
| Oxygen saturation < 90% | Ventilator dyssynchrony |
| New onset symptomatic dysrhythmia | New onset symptomatic dysrhythmia |
| Sustained agitation, anxiety or pain | RSBI > 105 |

## C: Choice of sedation to achieve goal RASS score

| Score | | Description |
|---|---|---|
| +4 | Combative | Violent, immediate danger to staff |
| +3 | Very agitated | Pulls or removes tube(s) or catheter(s); aggressive |
| +2 | Agitated | Frequent non-purposeful movement; fights ventilator |
| +1 | Restless | Anxious, apprehensive but movements not aggressive or vigorous |
| 0 | Alert and calm | |
| -1 | Drowsy | Not fully alert but has sustained awakening to voice (eye opening and contact > 10 seconds) |
| -2 | Light sedation | Briefly awakens to voice (eye opening and contact < 10 seconds) |
| -3 | Moderate sedation | Movement or eye opening to voice but no eye contact |
| -4 | Deep sedation | No reponse to voice, but movement or eye opening to physical stimulation |
| -5 | Unarousable | No response to voice to physical stimulation |

## D: Delirium Assessment (CAM-ICU)

| Delirium | Stop and THINK | | |
|---|---|---|---|
| | | **T** | Toxic situations (CHF, shock, dehydration, new organ failure) |
| | | **H** | Hypoxemia |
| | | **I** | Infection/Immobility |
| | | **N** | Nonpharmacologic interventions (hearing aids, glasses, reorient, sleep, noise control) |
| | | **K** | K+ or other electrolyte problems |

## E: Exercise (Mobility Protocol)

| | | |
|---|---|---|
| Level 1 | Unconscious | Passive range of motion TID |
| Level 2 | Conscious | Bed in chair position 20 minutes TID<br>PT/OT evaluation for active resistive exercises and progressive mobility |
| Level 3 | Able to move extremities against gravity | Bed in chair position 20 minutes TID<br>Sit on edge of bed<br>PT/OT daily for active resistive exercises and progressive mobility |
| Level 4 | Able to sit on edge of bed with minimal assistance | PT/OT: Progressive resistive exercise daily<br>Progression as able to active transfer to chair and ambulate as tolerated |

| Candidacy for mobility protocol | Safety criteria for mobility session |
|---|---|
| Ambulatory prior to ICU admission (use of cane or walker acceptable) | MAP > 60 unless otherwise specified by MD |
| Cognitively intact at baseline | No new vasopressor requirement in last 12 hrs |
| No unstable fracture or spinal instability | No active EKG changes |
| Not moribund or comfort care | HR < 130bpm at rest |
| | PEEP < 12 and FiO2 80% |
| | Not within 4h extubation or 24h of reintubation |

## APPENDIX B: PERCENTAGES OF ANSWERS OF THE ICU PRACTICE AND PERCEPTION SURVEY AT BASELINE

| | | Item *n* | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|---|---|
| | | | Percent choosing each response | | | | |
| | **Pain** | | | | | | |
| 1 | I believe the presence of pain negatively affects critically ill patients' outcomes. | 107 | 0 | 1 | 3 | 45 | 51 |
| 2 | I believe pain is a problem frequently experienced by patients in this unit. | 107 | 1 | 7 | 12 | 50 | 30 |
| 3 | I am confident in my ability to accurately assess pain. | 106 | 0 | 3 | 20 | 51 | 26 |
| 4 | The patients in this unit are assessed for pain at least once every 2 hours. | 106 | 2 | 8 | 27 | 46 | 17 |
| 5 | This unit prevents and manages pain with high reliability. | 107 | 3 | 4 | 30 | 52 | 11 |
| 6 | I have adequate resources to manage my patients' pain effectively. | 105 | 4 | 3 | 26 | 52 | 15 |
| 7 | I am able to administer the necessary amount of pain medications to effectively manage my patient's pain. | 103 | 4 | 7 | 28 | 46 | 16 |
| 8 | Pain is effectively managed before sedative medications are administered on my unit. | 104 | 4 | 13 | 40 | 38 | 4 |
| 9 | Only mechanically ventilated patients should be assessed with a pain assessment tool. | 105 | 54 | 33 | 5 | 7 | 1 |
| | **Sedation** | | | | | | |
| 10 | All mechanically ventilated patients require sedative medications while they are in the ICU. | 105 | 23 | 41 | 13 | 16 | 7 |
| 11 | It is easier to care for a lightly sedated patient. | 105 | 7 | 13 | 42 | 34 | 4 |
| 12 | Sedative medications promote sleep in the critically ill. | 105 | 12 | 21 | 32 | 32 | 4 |
| 13 | Physical restraints are almost always necessary when caring for patients who require mechanical ventilation. | 104 | 23 | 37 | 15 | 19 | 6 |
| 14 | I believe keeping patients deeply-sedated negatively affects patient outcomes. | 104 | 3 | 13 | 19 | 36 | 29 |
| 15 | I believe keeping patients deeply sedated is a problem frequently experienced by patients in this unit. | 105 | 2 | 43 | 26 | 22 | 8 |
| 16 | I believe sedation is effectively | 105 | 5 | 16 | 35 | 42 | 2 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | managed on this unit. | | | | | | |
| 17 | I am confident in my ability to accurately assess my patients' sedation level. | 103 | 2 | 4 | 24 | 51 | 18 |
| 18 | The patients in this unit are assessed for sedation-agitation (arousal) at least once every 2 hours. | 105 | 1 | 13 | 25 | 49 | 12 |
| 19 | This unit manages the sedation of our ICU patients with a high degree of reliability. | 105 | 3 | 13 | 35 | 42 | 7 |
| 20 | I have adequate resources to manage my patients' sedation level effectively. | 105 | 3 | 10 | 30 | 52 | 6 |
| 21 | I believe agitation negatively affects patient outcomes. | 105 | 2 | 1 | 5 | 58 | 34 |
| 22 | I believe agitation is a problem frequently experienced by patients in this unit. | 104 | 1 | 8 | 23 | 50 | 18 |
| 23 | I am confident in my ability to accurately assess my patients' agitation level. | 105 | 2 | 3 | 12 | 60 | 23 |
| 24 | Only mechanically ventilated patients should be assessed with a sedation-agitation (arousal) assessment tool. | 105 | 35 | 42 | 13 | 10 | 0 |
| 25 | Agitation is effectively managed on this unit. | 105 | 5 | 17 | 34 | 41 | 3 |
| 26 | I have adequate resources to manage agitated patients effectively. | 104 | 4 | 13 | 31 | 47 | 5 |
| | **Delirium** | | | | | | |
| 27 | I believe delirium negatively affects patient outcomes. | 104 | 1 | 2 | 2 | 56 | 39 |
| 28 | I believe delirium is a problem frequently experienced by patients in this unit. | 104 | 1 | 8 | 21 | 48 | 22 |
| 29 | I am confident in my ability to accurately assess for delirium. | 104 | 2 | 6 | 22 | 53 | 17 |
| 30 | The patients in this unit are assed for assessed for delirium at least once per shift. | 105 | 2 | 9 | 36 | 43 | 10 |
| 31 | We prevent and manage delirium with a high level of reliability. | 105 | 2 | 18 | 49 | 30 | 2 |
| 32 | I have adequate resources to manage delirium effectively. | 105 | 4 | 11 | 41 | 38 | 6 |
| 33 | Only mechanically ventilated patients should be assessed with a delirium assessment tool. | 105 | 42 | 48 | 9 | 2 | 0 |
| 34 | Most delirious patients should be physically restrained to prevent themselves and/or others from harm. | 106 | 19 | 42 | 25 | 11 | 3 |
| | **Mobility** | | | | | | |
| 35 | I believe immobility negatively | 108 | 1 | 7 | 21 | 46 | 25 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | affects patient outcomes. | | | | | | |
| 36 | I believe immobility is a problem frequently experienced by patients in this unit. | 106 | 1 | 6 | 10 | 44 | 39 |
| 37 | I am confident in my ability to effectively mobilize patients in this unit. | 106 | 11 | 22 | 24 | 32 | 10 |
| 38 | Immobility is effectively managed on this unit. | 105 | 13 | 29 | 34 | 23 | 1 |
| 39 | I have adequate resources to mobilize my patients effectively. | 105 | 19 | 27 | 29 | 24 | 2 |
| 40 | The risks of mobilizing mechanically ventilated patients outweigh the benefits. | 106 | 24 | 34 | 22 | 16 | 5 |
| 41 | The levels of staffing in my unit are sufficient to handle the number of patients. | 105 | 22 | 30 | 25 | 23 | 1 |
| | **Collaboration** | | | | | | |
| 42 | I experience good collaboration with nurses in this unit. | 106 | 1 | 2 | 5 | 56 | 37 |
| 43 | I experience good collaboration with staff physicians in this unit. | 106 | 4 | 6 | 10 | 54 | 26 |
| 44 | I experience good collaboration with pharmacists in this unit. | 106 | 1 | 2 | 10 | 50 | 37 |
| 45 | I experience good collaboration with respiratory therapists in this unit. | 108 | 2 | 3 | 5 | 68 | 23 |
| 46 | I experience good collaboration with physical therapists in this unit. | 106 | 3 | 6 | 23 | 52 | 17 |
| 47 | Interprofessional rounds are performed daily in this unit. | 106 | 3 | 2 | 6 | 43 | 46 |
| 48 | I actively participate in interprofessional rounds daily. | 105 | 6 | 9 | 11 | 42 | 32 |
| 49 | I know about and have received some education on the Society of Critical Care Medicine's 2013 clinical practice guidelines for the management of Pain, Agitation and Delirium (PAD) in adult ICU patients. | 102 | 17 | 20 | 20 | 31 | 13 |
| 50 | Physical therapists assist with early mobilization on this unit. | 105 | 3 | 10 | 26 | 53 | 8 |
| 51 | This unit has an early mobility team. | 104 | 20 | 20 | 33 | 23 | 3 |
| 52 | This unit has sufficient equipment to perform daily mobilization/exercise. | 104 | 15 | 27 | 33 | 23 | 2 |
| | **Family** | | | | | | |
| 53 | This unit has a plan in place to include families in orienting loved ones and assisting with their movement and we have open communication between staff, patients and families about plans | 102 | 11 | 29 | 33 | 25 | 2 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | for each day. | | | | | | |
| 54 | In this unit, family members are frequently present during interprofessional rounds. | 104 | 17 | 38 | 21 | 21 | 2 |
| 55 | I believe that daily Spontaneous Awakening Trials (SATs) also known as daily sedation interruptions (DSIs) are dangerous for most patients. | 105 | 37 | 37 | 18 | 8 | 0 |
| 56 | We perform daily Spontaneous Awakening Trials (SATs) on most of the patients in this unit. | 106 | 3 | 9 | 26 | 50 | 11 |
| 57 | We perform daily Spontaneous Breathing Trials (SBTs) on most of the patients in this unit. | 106 | 2 | 8 | 23 | 56 | 12 |
| 58 | It is important to complete Spontaneous Awakening Trials (SATs) prior to Spontaneous Breathing Trials (SBTs). | 104 | 1 | 3 | 20 | 52 | 24 |
| 59 | I have heard of the ABCDEF bundle for the management of pain, agitation and delirium. | 104 | 19 | 18 | 16 | 30 | 16 |
| 60 | My whole unit uses the ABCDEF bundle in our language when discussing patients' care and management. | 103 | 23 | 32 | 36 | 8 | 1 |
| 61 | A few individuals in my unit refer to the ABCDEF bundle when discussing patients' care and management, but it is not a unit wide practice. | 100 | 20 | 22 | 29 | 23 | 6 |
| | **Protocols and Policies** | | **Yes** | **No** | **Unsure** | | |
| 62 | Does this unit use a validated pain assessment tool? | 105 | 68 | 5 | 28 | | |
| 63 | Does this unit have a pain management protocol in place? | 105 | 34 | 21 | 45 | | |
| 64 | Does this unit have a protocol in place for daily Spontaneous Awakening Trials (SATs), also known as daily sedation interruptions (DSI)? | 105 | 58 | 11 | 30 | | |
| 65 | Does this unit have a protocol for Spontaneous Breathing Trials (SBTs) daily? | 105 | 69 | 11 | 20 | | |
| 66 | Does this unit use a validated sedation/agitation (arousal) assessment tool? | 105 | 62 | 5 | 34 | | |
| 67 | Does this unit have a sedation protocol? | 104 | 39 | 18 | 42 | | |
| 68 | Does this unit use a validated delirium assessment tool? | 104 | 63 | 7 | 31 | | |
| 69 | Does this unit have a delirium management protocol? | 105 | 28 | 23 | 50 | | |
| 70 | Does this unit have a protocol for early exercise/mobilization? | 103 | 48 | 16 | 37 | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 71 | I have read journal articles, websites or attended a lecture about the ABCDEF bundle. | 104 | 32 | 55 | 13 | | |
| 72 | Does this unit have a formal ABCDEF bundle policy or protocol? | 105 | 8 | 38 | 54 | | |
| | **Answer questions #73-83 only if you answered "Yes" to question #72** | | | | | | |
| | | **Item (n)** | **Strongly Disagree** | **Disagree** | **Neutral** | **Agree** | **Strongly Agree** |
| 73 | I understand the components of the ABCDEF bundle. | 7 | 0 | 0 | 0 | 86 | 14 |
| 74 | I am confident in my ability to use the ABCDEF bundle. | 7 | 0 | 14 | 14 | 57 | 14 |
| 75 | I believe the ABCDEF bundle improves patient outcomes. | 7 | 0 | 0 | 14 | 71 | 14 |
| 76 | The ABCDEF bundle is too complex to carry out in everyday practice. | 7 | 0 | 71 | 29 | 0 | 0 |
| 77 | On this unit we use the "Opt out" method for the ABCDEF bundle, meaning patients receive all of the bundles' components daily unless a physician/Advanced Practice Provider places an order not to do so. | 7 | 0 | 14 | 43 | 43 | 0 |
| 78 | This unit uses the ABCDEF bundle on the majority of our patients. | 7 | 0 | 0 | 43 | 57 | 0 |
| 79 | I am provided regular feedback on ABCDEF compliance on this unit. | 7 | 14 | 29 | 29 | 29 | 0 |
| 80 | I am provided regular feedback on patient outcomes on this unit. | 7 | 14 | 0 | 43 | 29 | 14 |
| 81 | Those providers who do not perform the ABCDEF bundle are held accountable on this unit. | 7 | 14 | 14 | 43 | 29 | 0 |
| 82 | The most challenging obstacle to effective ABCDEF bundle implementation is……<br>(Free text) | 3 | -Physicians not placing orders to correlate with the bundle<br>-time<br>-Education and time | | | | |
| 83 | The thing that would help the most with effective ABCDEF bundle implementation is ……. (Free text) | 3 | -Completion or knowledge of order sets by physicians<br>-simplify<br>-Education and time | | | | |

## APPENDIX C: PERCENTAGES OF ANSWERS OF THE ICU PRACTICE AND PERCEPTION SURVEY AT 3 MONTHS POST-IMPLEMENTATION

| | | Item *n* | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|---|---|
| | | | Percent choosing each response | | | | |
| | **Pain** | | | | | | |
| 1 | I believe the presence of pain negatively affects critically ill patients' outcomes. | 61 | 0 | 0 | 7 | 43 | 51 |
| 2 | I believe pain is a problem frequently experienced by patients in this unit. | 59 | 2 | 2 | 17 | 54 | 25 |
| 3 | I am confident in my ability to accurately assess pain. | 58 | 0 | 2 | 19 | 62 | 17 |
| 4 | The patients in this unit are assessed for pain at least once every 2 hours. | 57 | 0 | 11 | 39 | 40 | 11 |
| 5 | This unit prevents and manages pain with high reliability. | 57 | 0 | 11 | 39 | 42 | 9 |
| 6 | I have adequate resources to manage my patients' pain effectively. | 56 | 2 | 7 | 27 | 48 | 16 |
| 7 | I am able to administer the necessary amount of pain medications to effectively manage my patient's pain. | 55 | 4 | 5 | 38 | 36 | 16 |
| 8 | Pain is effectively managed before sedative medications are administered on my unit. | 56 | 2 | 13 | 41 | 39 | 5 |
| 9 | Only mechanically ventilated patients should be assessed with a pain assessment tool. | 58 | 57 | 33 | 5 | 3 | 2 |
| | **Sedation** | | | | | | |
| 10 | All mechanically ventilated patients require sedative medications while they are in the ICU. | 58 | 31 | 47 | 16 | 2 | 5 |
| 11 | It is easier to care for a lightly sedated patient. | 60 | 5 | 15 | 38 | 38 | 3 |
| 12 | Sedative medications promote sleep in the critically ill. | 59 | 17 | 36 | 22 | 22 | 3 |
| 13 | Physical restraints are almost always necessary when caring for patients who require mechanical ventilation. | 60 | 33 | 40 | 10 | 15 | 2 |
| 14 | I believe keeping patients deeply-sedated negatively affects patient outcomes. | 60 | 2 | 7 | 13 | 45 | 33 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 15 | I believe keeping patients deeply sedated is a problem frequently experienced by patients in this unit. | 59 | 0 | 31 | 31 | 31 | 8 |
| 16 | I believe sedation is effectively managed on this unit. | 58 | 0 | 21 | 31 | 47 | 2 |
| 17 | I am confident in my ability to accurately assess my patients' sedation level. | 58 | 2 | 3 | 19 | 57 | 19 |
| 18 | The patients in this unit are assessed for sedation-agitation (arousal) at least once every 2 hours. | 57 | 7 | 19 | 35 | 33 | 5 |
| 19 | This unit manages the sedation of our ICU patients with a high degree of reliability. | 57 | 2 | 19 | 35 | 39 | 5 |
| 20 | I have adequate resources to manage my patients' sedation level effectively. | 55 | 2 | 7 | 42 | 36 | 13 |
| 21 | I believe agitation negatively affects patient outcomes. | 60 | 2 | 3 | 5 | 57 | 38 |
| 22 | I believe agitation is a problem frequently experienced by patients in this unit. | 59 | 0 | 7 | 17 | 6 | 14 |
| 23 | I am confident in my ability to accurately assess my patients' agitation level. | 58 | 0 | 0 | 12 | 67 | 21 |
| 24 | Only mechanically ventilated patients should be assessed with a sedation-agitation (arousal) assessment tool. | 58 | 31 | 57 | 3 | 7 | 2 |
| 25 | Agitation is effectively managed on this unit. | 58 | 2 | 17 | 50 | 29 | 2 |
| 26 | I have adequate resources to manage agitated patients effectively. | 55 | 2 | 9 | 33 | 51 | 5 |
| | **Delirium** | | | | | | |
| 27 | I believe delirium negatively affects patient outcomes. | 59 | 0 | 0 | 2 | 41 | 58 |
| 28 | I believe delirium is a problem frequently experienced by patients in this unit. | 57 | 0 | 4 | 14 | 61 | 21 |
| 29 | I am confident in my ability to accurately assess for delirium. | 56 | 0 | 4 | 29 | 50 | 18 |
| 30 | The patients in this unit are assed for assessed for delirium at least once per | 57 | 2 | 16 | 25 | 51 | 7 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | shift. | | | | | | |
| 31 | We prevent and manage delirium with a high level of reliability. | 56 | 5 | 30 | 39 | 25 | 0 |
| 32 | I have adequate resources to manage delirium effectively. | 56 | 2 | 21 | 39 | 32 | 5 |
| 33 | Only mechanically ventilated patients should be assessed with a delirium assessment tool. | 57 | 49 | 47 | 4 | 0 | 0 |
| 34 | Most delirious patients should be physically restrained to prevent themselves and/or others from harm. | 58 | 38 | 40 | 10 | 12 | 0 |
| | **Mobility** | | | | | | |
| 35 | I believe immobility negatively affects patient outcomes. | 60 | 0 | 5 | 8 | 48 | 38 |
| 36 | I believe immobility is a problem frequently experienced by patients in this unit. | 60 | 0 | 3 | 7 | 57 | 33 |
| 37 | I am confident in my ability to effectively mobilize patients in this unit. | 58 | 5 | 19 | 29 | 36 | 10 |
| 38 | Immobility is effectively managed on this unit. | 59 | 5 | 25 | 32 | 36 | 2 |
| 39 | I have adequate resources to mobilize my patients effectively. | 59 | 12 | 31 | 24 | 32 | 2 |
| 40 | The risks of mobilizing mechanically ventilated patients outweigh the benefits. | 60 | 27 | 33 | 13 | 20 | 7 |
| 41 | The levels of staffing in my unit are sufficient to handle the number of patients. | 58 | 26 | 28 | 17 | 29 | 0 |
| | **Collaboration** | | | | | | |
| 42 | I experience good collaboration with nurses in this unit. | 59 | 2 | 0 | 7 | 58 | 34 |
| 43 | I experience good collaboration with staff physicians in this unit. | 59 | 2 | 2 | 7 | 63 | 27 |
| 44 | I experience good collaboration with pharmacists in this unit. | 58 | 0 | 2 | 5 | 48 | 45 |
| 45 | I experience good collaboration with respiratory therapists in this unit. | 59 | 2 | 0 | 7 | 54 | 37 |
| 46 | I experience good collaboration with physical | 58 | 2 | 7 | 14 | 48 | 29 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | therapists in this unit. | | | | | | |
| 47 | Interprofessional rounds are performed daily in this unit. | 59 | 0 | 2 | 5 | 44 | 49 |
| 48 | I actively participate in interprofessional rounds daily. | 59 | 3 | 2 | 5 | 53 | 37 |
| 49 | I know about and have received some education on the Society of Critical Care Medicine's 2013 clinical practice guidelines for the management of Pain, Agitation and Delirium (PAD) in adult ICU patients. | 57 | 5 | 12 | 18 | 30 | 35 |
| 50 | Physical therapists assist with early mobilization on this unit. | 58 | 3 | 5 | 21 | 43 | 28 |
| 51 | This unit has an early mobility team. | 58 | 9 | 19 | 22 | 33 | 17 |
| 52 | This unit has sufficient equipment to perform daily mobilization/exercise. | 59 | 5 | 31 | 24 | 32 | 8 |
| | **Family** | | | | | | |
| 53 | This unit has a plan in place to include families in orienting loved ones and assisting with their movement and we have open communication between staff, patients and families about plans for each day. | 57 | 7 | 18 | 28 | 42 | 5 |
| 54 | In this unit, family members are frequently present during interprofessional rounds. | 58 | 19 | 28 | 17 | 36 | 0 |
| 55 | I believe that daily Spontaneous Awakening Trials (SATs) also known as daily sedation interruptions (DSIs) are dangerous for most patients. | 58 | 43 | 40 | 10 | 5 | 2 |
| 56 | We perform daily Spontaneous Awakening Trials (SATs) on most of the patients in this unit. | 58 | 0 | 10 | 16 | 57 | 17 |
| 57 | We perform daily Spontaneous Breathing Trials (SBTs) on most of the patients in this unit. | 58 | 2 | 3 | 16 | 57 | 22 |
| 58 | It is important to complete Spontaneous Awakening Trials (SATs) prior to | 58 | 0 | 0 | 10 | 55 | 34 |

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| | Spontaneous Breathing Trials (SBTs). | | | | | | |
| 59 | I have heard of the ABCDEF bundle for the management of pain, agitation and delirium. | 59 | 0 | 2 | 5 | 32 | 61 |
| 60 | My whole unit uses the ABCDEF bundle in our language when discussing patients' care and management. | 58 | 2 | 19 | 28 | 41 | 10 |
| 61 | A few individuals in my unit refer to the ABCDEF bundle when discussing patients' care and management, but it is not a unit wide practice. | 58 | 3 | 24 | 29 | 34 | 9 |
| | **Protocols and Policies** | | **Yes** | **No** | **Unsure** | | |
| 62 | Does this unit use a validated pain assessment tool? | 59 | 80 | 0 | 20 | | |
| 63 | Does this unit have a pain management protocol in place? | 59 | 58 | 10 | 32 | | |
| 64 | Does this unit have a protocol in place for daily Spontaneous Awakening Trials (SATs), also known as daily sedation interruptions (DSI)? | 58 | 90 | 2 | 9 | | |
| 65 | Does this unit have a protocol for Spontaneous Breathing Trials (SBTs) daily? | 59 | 93 | 2 | 5 | | |
| 66 | Does this unit use a validated sedation/agitation (arousal) assessment tool? | 58 | 78 | 0 | 22 | | |
| 67 | Does this unit have a sedation protocol? | 58 | 59 | 16 | 26 | | |
| 68 | Does this unit use a validated delirium assessment tool? | 59 | 81 | 0 | 19 | | |
| 69 | Does this unit have a delirium management protocol? | 58 | 47 | 21 | 33 | | |
| 70 | Does this unit have a protocol for early exercise/mobilization? | 103 | 48 | 16 | 37 | | |
| 71 | I have read journal articles, websites or attended a lecture about the ABCDEF bundle. | 59 | 90 | 8 | 2 | | |
| 72 | Does this unit have a formal ABCDEF bundle policy or protocol? | 58 | 81 | 10 | 9 | | |

| | Answer questions #73-83 only if you answered "Yes" to question #72 | | | | | | |
|---|---|---|---|---|---|---|---|
| | | **Item(n)** | **Strongly Disagree** | **Disagree** | **Neutral** | **Agree** | **Strongly Agree** |
| 73 | I understand the components of the ABCDEF bundle. | 47 | 0 | 2 | 15 | 64 | 19 |
| 74 | I am confident in my ability to use the ABCDEF bundle. | 47 | 0 | 4 | 19 | 62 | 15 |
| 75 | I believe the ABCDEF bundle improves patient outcomes. | 46 | 0 | 0 | 13 | 57 | 30 |
| 76 | The ABCDEF bundle is too complex to carry out in everyday practice. | 46 | 13 | 48 | 24 | 9 | 7 |
| 77 | On this unit we use the "Opt out" method for the ABCDEF bundle, meaning patients receive all of the bundles' components daily unless a physician/Advanced Practice Provider places an order not to do so. | 45 | 2 | 18 | 40 | 33 | 7 |
| 78 | This unit uses the ABCDEF bundle on the majority of our patients. | 46 | 2 | 2 | 24 | 59 | 13 |
| 79 | I am provided regular feedback on ABCDEF compliance on this unit. | 46 | 2 | 28 | 22 | 41 | 7 |
| 80 | I am provided regular feedback on patient outcomes on this unit. | 46 | 7 | 20 | 20 | 43 | 11 |
| 81 | Those providers who do not perform the ABCDEF bundle are held accountable on this unit. | 45 | 4 | 31 | 47 | 13 | 4 |
| 82 | The most challenging obstacle to effective ABCDEF bundle implementation is…… (Free text) | 21 | - Nurses resistant to change/new policies/new responsibilities have been difficult. I remind coworkers to fill out bundle worksheet and they give me push back. Only the nurses on the bundle team seem engaged, and maybe a few others, but many do not buy into the bundle at all. And they are even hostile to the thought of new tasks in their day. Hard to hold people accountable when they never bought in in the first place.<br>- coordinating beyond the SAT/SBT to the next steps<br>- Time, willingness<br>- we haven't finished revising it<br>- Mobility and sedation and delirium management. Mobility because of staffing (requires rep + nurse) and sometimes it is impossible to get what you need to treat agitation or delirium<br>- lack of staff (particularly RN & PT & RT)<br>- Not enough staff, need more support staff<br>- staff too busy to safely complete all components and/or | | | | | |

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| | | | don't have enough help to safely do so<br>- making sure the whole team is involved (RT, PT, OT, MDs, RNs, CSTs)<br>- No one extubates when passing<br>- lack of education<br>- learning it<br>- Getting the nurses to recognize that family CAN listen to rounds<br>- getting everyone on board<br>- documentation in epic<br>- nursing 'buy-in' (lack there of)<br>- nursing buy in for daily awakenings<br>- Physicians do not ask for input from nursing or rt<br>- The complete cooperation and understanding of all caregivers involved.<br>- Needing additional physical assistance<br>- Time |
| 83 | The thing that would help the most with effective ABCDEF bundle implementation is ……. (Free text) | 19 | - I've bought into the bundle because I think it is great that we are a pilot program, and I truly think it improves pt outcomes. I am proud to be a part of it. I am also a relatively new RN and think I am more open to change than others on my unit. I think staff needs more reminders about why the bundle is important and isn't just another responsibility. A reminder that the worksheet only take 10 seconds, for example. Something needs to happen to help the nurses buy into it. Maybe they perceive that RNs are the only ones whose daily tasks are always increasing- everyone else's work level stays the same. Maybe tell the nurses that the physicians put a lot of work into the bundle too. I think resistance is probably due to low morale on the unit and being perpetually short staffed.<br>- aid in mobilization<br>- more staff! respiratory and nurses. it would be nice if NAS could help more with physical therapy. But we also don't have enough NAS anyway<br>- worthwhile intro mtgs- it's clear some speakers care more than others about the project<br>- more support staff<br>- increased feedback on how it is helping in our unit specifically, not a standardized research thing<br>- doctor's trusting RN judgment AND RN's being willing to take risks to try new treatments<br>- more staff<br>- we have to wait until day shift<br>- more education<br>- practice<br>- Nurses turning off sedation<br>- more staff<br>- posting protocols everywhere to confirm ; nursing<br>- nursing 'buy-in' a better name (ABCDEF= 6 syllables) e.g alphabet bundle (3 syllables)<br>- better flow into EMR<br>- Teamwork. It is not practiced on the MICU. It is a dictatorship run by physicians. They will NOT listen to the nurses or RTs. And if they do, it is like they are placating us just to make it look like they are. it is a culture that will |

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| | | | never change, certainly not with this project. Nothing has changed and won't change without a concerted effort by the physician leadership!<br>- Having additional equipment<br>- Continued reinforcement. Adequate resources-staff equipment, etc. |

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