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ICU Liberation Bundle: A Multidisciplinary Approach

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Abstract

Practice Problem: Patients with increased ventilator days see dramatic increases in their chances of developing healthcare-related conditions (HAC). Extended ICU stays increase the potential for problematic issues in patients' physical, mental and spiritual health with short-and-long-term consequences.

PICOT: The PICOT question that guided this project was looking at adult ventilated patients in a medical ICU (P) and what is the effect of initiating interdisciplinary ABCDEF-ICU liberation bundle rounding as (I) compared to no ICU liberation bundle rounding (C) has on the length of ventilator days (O) over eight weeks (T).

Evidence: Evidence from quality studies and backing from the Society of Critical Care Medicine suggests that an interdisciplinary, holistic approach is ideal for ICU patients. Decreasing ventilator days includes using a bundle with steps ABCDEF addressed daily while patients are ventilated.

Intervention: The ICU liberation bundle is a systematic approach to patient care. The bundle components: A-assess and manage pain, B-spontaneous awake and breathing trials, C-choice of pain and sedation management, D-assessing and managing ICU delirium, E-early mobility, and F-family involvement.

Outcome: There was no clinical or statistical significance with this project. The ventilator days increased for the project time compared to previous data.

Conclusion: Utilizing a multidisciplinary team approach and the ICU liberation bundle did not improve patient outcomes. This outcome was not consistent with current recommendations.

ICU Liberation Bundle a Multidisciplinary Approach

Intensive care units (ICU) are a place reserved for patients who are critically ill, who require close monitoring and life-supporting measures. However, when we are not meeting the standards of care for ICU patients are we compromising the patients and the expected job? The number of ventilator days on the medical ICU for this project have gone from an average of three days in 2019 to nine days in 2021.

The purpose of this paper was to initiate the use an ICU liberation bundle and multidisciplinary rounding to ensure that the Evidenced Based Practice (EBP) recommendations are instituted and help decrease ventilator days in ICU patients. The ICU liberation bundle includes an ABCDEF approach that includes: A-assess and manage pain, B-both spontaneous breathing/spontaneous awake trials (SBT/SAT), C-choice of analgesia and sedation medication, D-delirium assess and manage, E-early mobility, F-family engagement (Society of Critical Care Medicine [SCCM], 2020). In the initiation of the ICU liberation bundle the use of a multidisciplinary team approach will be used. This approach will ensure that all the bundle components are met and to help increase communication among team members, patients, and families in order to decrease the ventilator days.

Significance of the Practice Problem

Extended stays in ICU increases the potential for untoward consequences for patients physically, mentally, and spiritually. Patients are isolated, sedated, require mechanical life support, and are continually surrounded by noise and lighting that can all have short-and-long-term consequences.

Having an increase in ventilator days can increase chances of developing a healthcare associated condition (HAC). HAC costs the patients an extended time in the hospital and

hospitals incur significant costs as a result. The US spends approximately $28 billion a year due to hospital-related conditions (Centers for Disease Control [CDC], 2021). The number of injuries incurred by patients in the hospital is an astounding one in thirty-one patients (CDC, 2021). There are a number of conditions that patients can develop the longer they are in the hospital.

Ventilator-associated pneumonia (VAP) is one of the most prevalent infections a patient can have while in the ICU and one of the most detrimental to the patient (He et al., 2021). When EBP is not a priority in patient care then the care will inevitably become substandard. This type of care can cause suffering to patients, their families, hospitals, and to the communities. Patients who develop a VAP, which is a complication of prolonged ventilator time, have an increase in hospital days, a higher rate of long-term disability, a higher cost for patient and hospital, as well as a decreased chance of survival (He et al., 2021). The average cost of a VAP in Virginia can be upwards of $29,000 per patient. In the United States, this hospital acquired injury (HAI) alone accounts for approximately $1.5 billion (Virginia, n.d.). The cost of human lives from VAP in Virginia is about 10% which is a small number in general, but to the patients and families who suffer the loss, that is a significant number. Ventilators alone are not the only concern with ICU patients.

Patients who have been on high levels of sedation while on ventilators also have a higher chance of developing delirium, which has the same impact on a patient's length of stay, cost, and mortality as VAP (Kotfis et al., 2020). Delirium during COVID alone has affected about 87% of patients in the ICU. Patients can suffer the effects of withdrawal from medications when stopped to prepare for extubating. Delirium can have lasting effects on patients just like VAP.

Post-intensive care syndrome (PICS) is a condition that once discharged from the ICU is another long-term effect patients and families deal with from sedation use and delirium (Kotfis et

al., 2020). PICS can result in patients and families dealing with post-traumatic stress disorder (PTSD) symptoms, depression, anxiety, sleep disturbances, cognitive issues, and physical issues related to weakness from immobilization while in the ICU.

Patients who have prolonged hospital stays also have increased chances of the loss of life due to the illness itself or the HAC they acquire. Patients and the possible HAC are not the only concerns with prolonged ICU stays. Higher levels of anxiety and depression are a side effect that family members and friends have when a loved one is hospitalized. Families are suffering because loved ones are away from them, in critical condition, and they do not have the ability to communicate often with staff or their family member (Carlson et al., 2015).

In the ICU for this project site, liberation rounding is inconsistent and this potentiates short-and-long-term consequences as described above. The SCCM, American Association of Critical-Care Nurses, and The Joint Commission support the use of the interdisciplinary ABCDEF or ICU liberation rounding bundle to reduce incidences of these and potential harm. It is essential to bridge this practice gap as the demand for more complex care continues to grow due to factors such as the aging population, COVID-19, disease and sequela, and postponed care for chronic conditions manifesting in crisis stressing ICU capacity and care requirements. Interdisciplinary teams approaching care in a holistic manner addresses not only the physical illness and its effects, but also social support, well-being, and future needs.

PICOT Question

The evidenced based project was guided by the following clinical question: In adult ventilated patients on a medical ICU (P) what is the effect of initiating interdisciplinary ICU liberation bundle rounding (I) compared to no ICU liberation bundle rounding (C) on length of ventilator days (O) over eight weeks (T). This project took place at a Level 1 trauma center in a

rural town of Virginia on the medical ICU. The included patients were adults eighteen and older who are requiring mechanical ventilation. The project initiated an interdisciplinary team of staff to perform the ICU liberation bundle rounding on patients. Rounding consisted of a multidisciplinary team meeting each weekday to discuss the patient needs, concerns, and plan. During this time the components of the bundle were addressed for each patient. The comparison were previous data retrieved from electronic health records (EHR) and the length of ventilator days prior to the ICU liberation bundle rounding team. The identified pre-intervention current practice on this unit was to use parts of the ABCDEF bundle with no cohesive or team approach. Tasks done by a bedside RN include CPOT, CAM-ICU, BMAT, RASS and alerting PT/OT of patient readiness. Pharmacy and MD discussed medications during rounds, and RT performing a SBT without collaboration with nursing staff. The outcome was to see a decrease in the ventilator days of these patients is with the initiation of the ICU liberation bundle rounding.

Evidence-Based Practice Framework & Change Theory

A framework provides an outline to the EBP question, which guides the rest of the process from the question, how the question is relevant, and what evidence is out there to support the question (Heale & Noble, 2019).

Evidenced-Based Practice Framework

The Johns Hopkins Nursing Evidence-Based Practice Model (JHNEBP) is a dynamic critical thinking model and will be used to guide this project. There are three phases of the Johns Hopkins Model: practice question, evidence, and translation (Dang & Dearholt 2017). Within these phases there are nineteen steps guiding the project that work the team through the development. The project began with creating an interprofessional team that looked at the project question of using the ICU liberation bundle and rounding to decrease ICU patient ventilator

days. A literature search was performed to find strong supporting evidence to help develop and support the project. The team then used the information to create the plan, gain buy-in, implement the actions, and evaluate the data. The findings were revealed from the EBP project and conveyed to the unit.

Change Model

The Kotter eight step change model is an appropriate change model for this EBP project as it is going to involved a behavior change among the staff and is steeped in multidisciplinary communication (Kotter, n.d.). The eight steps include: create a sense of urgency, build a coalition, form a vision, enlist volunteer army, remove barriers, generate short-term wins, sustain, and institute change. The sense of urgency was already created since quality patient care is in question. There was an interprofessional team created to carry out the tasks needed to complete this project. The project team created the future steps of the EBP project from its vision, buy-in, action, goals, and to ensure behavior change was successful in decreasing ventilator days for ICU patients.

Evidence Search Strategy

Performing an in-depth search of the literature to support the topic is key to implementing and creating relevant EBP change supported by quality evidence. A literature search for this project was completed utilizing the CINAHL and PubMed databases. The keywords used for the first search in the database were “ABCDE”, “ABCDEF”, “pain agitation delirium”, “PAD guideline”. The second search included “ICU”, “intensive care unit”, “critical care”, “liberation bundle”. Boolean phrase “OR” was used during searches to link varying names for topics and similar topics titles. Each search outcome was further narrowed through applying a publication year filter from 2016 to 2022. Inclusion criteria then narrowed the articles to include those

completed in the ICU or critical care area, whose participants were adults and ventilated subjects. Research studies considered include peer-reviewed articles and studies that used the ABCDE/ABCDEF or liberation bundle or PAD guideline. Those studies excluded from the search were any setting within the pediatric populations, any commentary or editorial journal articles, and letters or Q&A articles. Exclusions also applied to studies performed outside the inpatient or ICU setting and studies where access to the original article was unavailable. No MeSH terms were found or used for this search in either database. This strategy was designed for this literature search to help evaluate articles and utilize those with solid evidence to support using ICU liberation bundles.

Evidence Search Results

According to the Johns Hopkins EBP model, the second step in developing a strong project is with the search and appraisal of evidence (Upstate Medical University, 2021). Having substantial literature to support the practice question is key to building a solid EBP change project. For this search, as mentioned above, two databases CINAHL and PubMed were used and returned a total of one-hundred and twenty-three articles for review. In this PRISMA model seen in Figure 1 you will be able to follow the basic process of the article selection and exclusion for this project.

The criteria used for the exclusion process included not using studies or articles that were conducted in an area outside of the ICU, pediatric patients as the primary subject; no use of the ABCDE/F liberation bundle, or individual bundle components. Also excluded were commentary articles, Q&A articles, and any article without full-text availability. After all these exclusions were applied, there was a total of ten articles that met criteria and were included which can be viewed in Appendix A. This Appendix will reflect the articles' quality score, grading, level of evidence, and basic information regarding the population, design, comparison group, and general

outcomes from the source. The highest level of evidence was Level II and most were quasi-experimental studies. The quality rating for the Level II was between high and good with a grading of B meaning that they were reasonably consistent in results. Next was Level V, peer-reviewed articles from experts in the field. Quality rating for Level V was low, and the grading was between a B and C for being expert opinion only. Level III were non-experimental studies. The quality grading was between low and good quality, due to inconsistent results and smaller sample sizes. The grading for these articles was between a B and C.

Understanding the articles, you are using for an EBP project is key to building a solid project. The evidence in the articles selected here varies some, but they all support the change that needs to come from this project with the use of ICU liberation and multidisciplinary rounding.

Themes with Practice Recommendations

ICU liberation rounding is not a new topic in medicine, and there are many studies and articles to help support this idea. A total of ten original studies and articles were chosen for this paper, with varying levels of evidence to support the use of an ICU liberation bundle.

Themes

In reviewing the literature, some themes regarding the ABCDE/F bundle or components were found and can be seen in Appendix B.

Intervention

The majority of articles used related to the PICOT directly by using the entire ABCDE or ABCDEF bundle. Some of the studies used were comparing the use of the bundle on patient outcomes versus the patient outcomes from before the implementation of some form of the bundle (Bardwell et al., 2020; Gunther et al., 2021; Kallet et al., 2018; Louzan et al., 2017;

Oliveira et al., 2019). These directly related to this project as this is the approach used to assess the ICU liberation bundle and components. Collinsworth et al. (2020) study looked at the use of the bundle and compared the compliance in two groups, high compliance and low, to view patient outcomes. A similar approach that Pun et al. (2019) took in their study looked at partial use of the bundle vs. complete use of the bundle. Barnes-Daly et al. (2018) and Barr et al. (2020) took a different look at the ICU liberation bundle. They surveyed staff to assess barriers and assess the organization's culture about implementing the bundle (Barnes-Daly et al., 2018; Barr et al., 2020). Finally, Ramirez et al. (2020) looked to see if adherence to oxygen weaning protocol once patients met criteria. This study showed that people did not actively wean patients exposing them to higher levels of oxygen than was necessary (Ramirez et al., 2020).

Mechanical Ventilator Time

Two good quality, quasi-experimental pre and post studies by Bardwell et al. (2020) and Gunther et al. (2021) found similar results concerning decreased patient mechanical ventilation time when the bundle was used. There was also a significant decrease in mechanical ventilation time when partial or individual components of the ICU bundle and rounding were used daily in two pre- and post-intervention studies of good quality (Kallet et al.,2018; Louzan et al., 2017). Oliveira et al. (2019) was a high-quality quasi-experimental study that looked at using a protocol to increase identifying patients ready for weaning from the ventilator. The patients were identified in the experimental group for this study, and weaning began almost two days earlier than those in the control group (Oliveira et al., 2019). Pun et al. (2020) performed a large multicenter cohort study and found that the use of the ICU bundle components showed a decreased need for mechanical ventilation in those patients the next day.

ICU length of stay

In one study, using a protocol was found to guide the care of patients for SBT/SAT resulting in a significant decrease in ICU length of stay by five days (Kallet et al., 2018). Another study used an RN-RT lead protocol for weaning off the ventilator. The intervention group had a two-day LOS reduction compared to the control group, where physician-led weaning was used (Gunther et al., 2021). An ICU length of stay decreased from ten days to eight days when patients were identified and ventilator weaning began earlier (Oliveira et al., 2019). In another study, the ICU length of stay decreased by five days when a pharmacy-led team performed bundle rounding (Louzan et al., 2017).

Multidisciplinary team

Using a collaborative and interprofessional approach to engage patients and families in the ICU bundle is essential for success (Barnes-Daly et al., 2018). Gunther et al. (2021) state that with their study of using a multidisciplinary team of RN and RT, there was a decrease in ventilator time compared to a physician-led weaning protocol. Louzon et al. (2017), in their conclusion, found that the use of the multidisciplinary pharmacy-led team is what contributed to better patient outcomes with a significant decrease in ventilator time, sedation use, and ICU LOS.

Practice Recommendations

The intervention of initiating interdisciplinary rounding to assess ICU liberation bundle adherence is supported by the literature. The SCCM supports using a multidisciplinary rounding team is used to help improve patient outcomes in ventilated patients of the ICU (see Figure 2). Given the evidence from these studies and articles, there is a positive correlation between ICU bundle components and better patient outcomes directly addressing the PICOT question guiding project.

Some studies had little statistical significance, but strong clinical significance stating the use of the ICU liberation bundle and components provide better patient care outcomes. Improvement in overall patient outcomes shown in each component across a majority of the studies. A multidisciplinary approach to the bundle, in general, gives a more holistic approach to patient care and better outcomes. Creating a more collaborative environment in the ICU with a multidisciplinary team and the goals of improving patient outcomes is an essential factor in the success of the ICU liberation bundle and decreasing ventilator days for patients.

Setting, Stakeholders, and Systems Change

Setting

The project site is a Level-1 Trauma and teaching hospital located in a rural health system. This hospital has seven adult intensive care units, including trauma/surgery, vascular, cardiac, and neuro. The unit that this project will be performed on is the medical ICU that sees various patient types. Patients similarly are septic, suffer from ARDS, and over half require mechanical ventilation. As COVID has brought about new challenges within the medical world, this unit had been struggling with increased ventilator days that have only worsened with the pandemic. The culture of this organization is to provide care within the defined guidelines set forth, and as Magnet hospital, nurses are at the forefront of quality initiatives. Nurses are in many leadership positions helping to ensure proper care. The ongoing COVID-19 pandemic has added additional burdens to the patient population and health system, reinforcing the need for high quality care. This project was designed for the medical ICU by providing them with tools to provide quality care and to improve adherence with guiding statements from accrediting bodies.

Stakeholders

The identified stakeholders and their roles are shown in Appendix C. To be successful, there needs to be a great deal of interdisciplinary collaboration, starting with the approval from IRB within the facility and then to the educator for the unit to prepare staff. The bedside staff who work directly with the patients will make up the bulk of this team, and success is helped by the support of the nurse leadership team. Indirectly there will be a team of people to help gather data, create data tools, and help from statisticians to interpret this data. Multiple disciplines are utilized for this project and opening the communication lines between them to improve patient outcomes.

SWOT

SWOT stand for S-strength, W-weakness, O-opportunities, and T-threats. In looking into this facility to see those involved, a SWOT analysis was performed. The SWOT analysis can be seen in Appendix D. One area of concern is the ongoing pandemic with COVID, which affects the population on this unit. Staffing issues could be a concern due to the national shortage of workers in healthcare and increased travel staff. A strength in this facility is the nursing support, facility support from leaders supporting change, and the desire to provide better quality care to patients.

System change/sustainability

Impacting one environment in healthcare affects all three levels within a facility. Macro-level change happens within the whole hospital system or organization (Sawatzky et al., 2021). A meso level of change focuses more on the quality improvement by leaders to help with performance. This project change was a micro-level of change that is going to be used later to incorporate a macro level of change based on the information learned. Micro-level change

involves those areas of clinical practice that affect decisions relating to patient care. Each of these levels, though they run independently are also working together to provide quality care.

Sustaining the changes made by this project is dependent on the facility culture. Monitoring was how issue was discovered and this monitoring is part of the plan for sustaining the change (Silver et al., 2016). Monitoring by the quality department at a senior level and unit level in this facility helps check on the continuation of the change. The other most important factor in sustaining change is involving staff. Staff for this project were educated, checked on frequently, and encouraged to share their thoughts on the process to make positive change habits. Utilizing all levels of in the facility, opening communication lines, and adapting the change for long-term benefit is how this change was set up to be successful.

Implementation Plan with Timeline and Budget

Project Plan & Timeline

This project design is a pre/post intervention comparison to analyze the use of the ICU liberation bundle and multidisciplinary team rounding decreased the ventilator days for medical ICU patients.

The completed proposal outlining the project was submitted to the University staff for final approval. The approved proposal was turned in to the IRB at the facility for review to determine the need for approval and permission to proceed. The project ran for eight weeks in the MICU. Setting the scene with staff to point out the need for change, answer questions, and educate on the process change and expectations was the beginning. The onsite preceptor is the unit educator. She was able to guide the student through the change process, intervention steps, and evaluation. The staff at the University worked closely with the preceptor and student to keep the project on track and within the time frame. The RN is the one at the bedside with the patient

most of the day, and they had to communicate with the other disciplines often. The RN was not alone in this process as the pharmacist will be aware of the project and participate in suggestions for medication management. The RT's were to work side-by-side with the RN to help coordinate SBT and wean the ventilator as needed based on their job duties. The PT was in charge of mobilizing the patient, whether in bed or out of bed, as determined by the patient's ability. OT tends to spend their day with PT while on this unit, so this was a reasonable team effort to work with patients' mobility. Of course, physicians were in charge of ordering medications, participating in rounds to help make appropriate decisions based on patient medical status. Help from the IT department for data extraction and statisticians for evaluation of data was an important step in the process. The timeline for this project proposal steps can be seen in Appendix E. The final steps were taking retrospective patient data and comparing this to the project data. This project, as mentioned, utilizes the entire ICU team and open the lines of communication, approaches the patient more holistically and directs conversations to manage care for patients.

Having a good project manager at the lead of a project is key to success or failure as they lead from beginning to end. Project managers need to be good at reading the team members to delegate tasks adequately, give team members autonomy, and influence and inspire (Leading Effectively Staff, 2021). To be effective as a leader, you have to have effective communication to inspire success, coach members, and improve the culture. Integrity, self-awareness, and learning agility are essential traits in a leader. Knowing your strengths and weaknesses and approaching situations that you do not know much about is a valuable tool for leaders. The courage to do what is right, address conflict, and keep the project moving will be necessary for a

project leader in healthcare. Lastly, a good leader needs to have respect for each member of the team and a sense of empathy to be successful.

Objectives

One objective during this project was to increase communication between disciplines within eight weeks. The interdisciplinary team met five days a week for eight weeks to discuss patient and address ICU bundle compliance. The goal was to provide better care, and this is done by increasing communication among team members by participation in interdisciplinary rounding (IDR). The team gathered information on patients, relayed progress, and identified needs to satisfy this goal. The tool created for this project was completed weekly to bi-weekly (Appendix F).

Another objective of concern for this project was to use of the ICU bundle. The goal was for team members to utilize 100% of the ICU bundle components on identified patients daily during the eight weeks. This area of the project was the data portion of the project. This information was charted in the EHR and extracted and used for the data portion.

The primary goal of this project was to decrease ventilator days in medical ICU patients. The objective was to decrease by 50% the days that identified patients require mechanical ventilation in the MICU over eight weeks. This goal was to be achieved by utilizing the ICU bundle and a multidisciplinary team approach to the patient's daily care. The actual time a patient is on a ventilator, from intubation to extubation determines the success of this goal.

Framework for change

JHNEBP guided this project from beginning to end (Dang & Dearholt, 2017). This project incorporated EBP and had strong literature to support the suggested change.

Kotter's change model will be the guide for this project over the course of the eight weeks. Step one is creating a sense of urgency which was done prior to the implementation phase over a week. Utilizing a through literature search for evidence to support the project and statistics from the unit over the last few years to show staff the need for change. Letting staff know this number is associated with increased patient costs, hospital costs, risks of other illnesses, and a cascade of long-term problems for patients. Step two was building the coalition which was done prior to implementation to get the buy-in from staff and stakeholders and took 1-2 weeks (Kotter, n.d.). Step three was creating the proposal that guided the project and outline the goals to better care and patient outcomes. Step four is essential in this project as it is building the multidisciplinary team or volunteer army. Step five and six were addressed with a strong project manager with good communication. They will involve the staff participating, continued to keep barriers at bay during implementation and showed the team the goals and wins along the way. Finally step seven was the push to keep progressing to the end. Successful implementation of this change process would have been evident by decreasing ventilator days, and improving patient outcomes. The eighth step was taking this intervention and continuing use daily beyond the project time to continue meeting standards and providing better care.

Budget

The overall cost for this project is minimal, with some cost for educational materials for staff to introduce the project and materials for data extraction purposes. The majority of the project cost was wrapped up in staff salaries. A more detailed report and breakdown of costs can be reviewed in Table 1.

Results

The project proposal approval process at University of St. Augustine for Health Sciences (USAHS) is by an EBP review council (EPRC) which is an expediated IRB process for the School of Nursing. The EPRC council at USAHS and the facility IRB committee both determined this project does not meet the requirements of human research. Acceptance was granted from both committees as a quality improvement project.

Data was extracted from the EHR to include: age, gender, race, diagnosis, admission date, intubation date, extubation date, days worked with therapy, averages for the ICU Liberation bundle RASS, CPOT, BMAT, SBT completion, SAT completion, CAM-ICU, and days on a ventilator. The components of the ICU Liberation bundle as described by the SCCM are licensed and embedded into the facility's EHR for rapid integration into workflow and documentation of each measure. Each tool is recognized as evidence based with determined validity.

Retrospective data was gathered by the health analytics research team member at the facility who has access and is trained on how to run the reports. Retrospective data was gathered for a time comparable to that of the project same months of March, April, and May of 2019. The data collected by the analytics team was sent using a password-protected email system on the facility server and stored in the One Drive, which is also password protected. This allowed the health information to be protected and allowed for proper storage of sensitive patient information. The data was only shared with the preceptor and student.

Prospective data was collected by the researcher and stored on password protected OneDrive. RN and RT entered data into the EHR for the SAT and SBT. RN then entered the other ICU liberation bundle components. The prospective data was gathered by the project lead at the facility and the student utilizing the tool created for this purpose. Information was pulled from the EHR individually for each component of the ICU Liberation bundle. The use of EHR

for adherence to interventions is widely accepted (Crowie et al., 2017). Using this source as the primary tool for data extraction for gender, diagnosis, and medications helps reduce errors in information.

The results for demographic categories such as gender, race, and diagnosis will be nominal data, and age and ventilator days will produce scale data. Demographic comparison data can be seen in Table 2.

The total number of ventilator days, retrospective (n-=1897), and prospective (n=252) were evaluated to answer the project PICOT question. The difference in the group sample size was significant. A goal for clinically significant change would have been to see a decrease in ventilator days by one day. See results in Table 3. SAT was not consistently completed on patients. Therefore, clinical significance was unable to be determined concerning utilizing the ICU Liberation Bundle and to decrease ventilator days. This project had higher ventilator days when compared to the retrospective data see Figure 3.

The components of the ICU Liberation Bundle for categories can be seen in Table 4. One component of the CAM-ICU use was altered when an EHR upgrade before the project removed access from the charting flowsheet. Two of the thirty-three patients did not have this component completed and some other patients had days CAM-ICU that was not completed.

SAT and SBT were calculated individually by dividing the number of days each component was completed by the number of ventilator days minus one day to account for the day of intubation. This calculation gave us a percentage that could be used and allowed the program to run a correlation report. This number showed no significance when a correlation analysis report was completed.

Therapy days were calculated first by how many days the patient had been seen by therapy divided by how many days the patient had an order for therapy. This calculation gave us a percentage. When looking at this data, twenty-three of the thirty-five patients were not seen during their time on the ventilator. Eight of the remaining twelve patients were seen fifty to sixty percent of their ventilator time.

The main objectives for this project were to decrease ventilator days with the use of the ICU Liberation Bundle by 50%; this was not achieved with this project. The results of this comparison can be seen in Table 3. Median value was used due to the size of the groups being significantly different. SAT and SBT were not completed daily on patients, and the percentage of these numbers can be seen in Table 4. The second objective of this project was to increase communication between disciplines on the patient care team. Monday through Friday, interdisciplinary rounding was done with the case manager, social worker, unit director/office manager/nursing practice improvement facilitator (NPIF), RN, and physician team. RT was invited to attend meetings and was encouraged by their management team in the beginning of the project. However, RT did not attend IDR rounds during the project and communication between RN and RT was a crucial coordination for success. This was complicated by the fact the RT had other units to cover. Lack of communication could be seen when SBT was done on patients that had not received an SAT and vice versa. The last objective for this project was to use ICU Liberation bundle components. See Table 4 for ICU liberation components and percentage of completion during the project.

Impact

The SCCM supports an evidenced-based bundle that has shown to decrease ventilator days. The ICU Liberation bundle was chosen to address the practice problem of increased ventilator days of ICU patients.

This project required nursing staff to document information embedded into the nursing flowsheet for ICU patient assessments. The components of RASS, CPOT, CAM-ICU, and BMAT were part of the routine charting prior to the project. There was clinical significance found in completion of the bundle. RASS and CPOT were done at 100%. The BMAT and family sections were done at 98% daily. CAM-ICU mentioned above was 96% only due to EHR setup during upgrade. The addition of the family and SAT portions was new for nursing documentation and required education on criteria to performing. SAT was not routinely used for the COVID population due to patients' severity and acuity of the illness. The requirement of nurses to turn off sedation and monitor patients during this time and chart the success/failure based on updated facility criteria was challenging because staff were used to sedated and quiet patients. RNs were reluctant to turn off the medications for sedation and pain. Also, there was confusion by nursing staff regarding how to properly perform and chart the SAT. The RT staff completed SBT in a flowsheet that was added prior to the ICU Liberation bundle. As with the SAT, the SBT was a new change within the facility for staff could which could be why it had not been fully adopted into their daily routine.

This project came about prior to a facility-wide go-live for the ICU liberation bundle. The project information will be used to address issues found for proper incorporation of the ICU liberation bundle. The hope is that the project can help increase compliance for SAT and SBT on other units. The unit directors for each unit will be charged with completing an analysis of the completion of ICU Liberation bundle components either themselves or with the help of the

outcomes managers or the NPIF on the units. Clinical nurse specialists within the hospital will also be looking at this data and help report results for quality, education, and policy revision purposes. Increased ventilator days increases the morbidity, mortality and cost. The increase in poor outcomes will involve the hospital quality department, nursing practice committee, nursing quality and critical care committee. These departments will be invested and will track the ICU Liberation bundle compliance.

Funding for this project to maintain sustainability is minimal since the EHR upgrade already included the ICU Liberation Bundle. The only other cost related to this topic for the hospital is the education needed for staff (computer material, in-person education, hand-outs) which has also been recently done. The research analytics team will be able to build a report for this data so that reports can be efficiently run and seen by those people mentioned. The hospitals that can see significant decreases in ventilator days will save money with each patient when we decrease the cascade of complications that arise from increased ventilator days.

Barriers to this project's success became apparent as the project progressed. There was buy-in from all parties at the beginning; however, as the project moved forward focus shifted. This was more evident in those who were more heavily involved in patient care activities such as the RN and RT. As mentioned, this may have been partly due to the staff being only familiar with COVID patients and not understanding that SAT and SBT are necessary actions to help our patients. This unit had a significant loss of experienced RN and support staff during COVID of 89%. The lack of experienced home staff to encourage change, lead, and support the younger staff with these behaviors is another limitation. Another barrier for this project was confusion from staff with EHR charting. Education and in-person follow-up will help with this concern for RT and RN charting for these patients.

Resource help with travel staff was another barrier for bundle compliance. Travel staff do get a basic one to three days of orientation and they do not have access to education on all topics or the expectations for each unit. They are also held to a different standard as they are managed by a different manager the r unit, causing inconsistencies among RN and RT staff working each day.

A final barrier to this project is the accountability of staff for expectations. We ask staff to complete many tasks and charting on each patient throughout the day. SAT/SBT will be a new task added to the daily staff routine, and this will take time; however, having an idea of how they will be held accountable for a task that has proven beneficial for our patients is going to be essential for future success.

A significant limitation of this project was the number of patients that were included the project. There was a vast difference in the number of ventilated patients from 2019 to 2022. An excellent place to start for future studies would be to incorporate multiple units or utilize multiple facilities with similar populations to help increase the sample size. More participants would help give a more inclusive report and one that could be generalized better for the community.

Dissemination

Internal dissemination consisted of report outs to the unit staff, respiratory department, quality, research, and practice councils. The information gathered from this project was disseminated to the unit team members at in-person and virtual staff meeting across affected multidisciplinary departments. Additionally, a project presentation to the councils via the monthly quality huddle was delivered. An executive summary of the project will be published in the facility's peer-reviewed publication REACH for wider dissemination amongst stakeholders.

External dissemination of this project, including successes and barriers, consists of a project presentation at the Respiratory Nursing Society and Interprofessional Collaboration conference in August 2022. Information regarding results and impact on RN and RT staff will be a part of the presentation. Further, an oral poster presentation for the DNP Scholarly Project Symposium hosted by the Alpha Alpha Alpha chapter of Sigma Theta Tau is scheduled for August 2022. The final manuscript publication to the Scholarly Open Access Repository increases dissemination to a broad external reach.

Conclusion

When caring for patients at the most vulnerable times in their life, it is of utmost importance to do so with their overall well-being in mind. The care of ICU patients is a well-orchestrated event that involves many players. Using the ABCDEF ICU liberation bundle to help decrease ventilator days in adults through a multidisciplinary approach is a proven method to help improve patient outcomes.

Many articles and studies were found to support this idea of a team approach to the ICU liberation bundle in adult ICU patients through a detailed literature review. A team approach can help decrease ventilator days, mortality and increase communication between team members. This project uses the popular JHNEBP model and Kotter's eight-step change theory to guide introducing a change process into a unit needing to change for better EBP care and better patient outcomes.

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Table 1

Project Budget Proposal

Expenses		**Revenue**	
Direct- included in regular operating costs	$15940	Institutional budget support- regular operating costs	$15940
Indirect- Included in regular operating costs	$0	Billing	$0
Supplies – office	$175	Grants- Office Supplies	$0
Estimate Total Expenses	$175	Estimate Total Revenue	$0
		Net Balance	**$-175**

Table 2

Frequency Demographics Qualified Patients for ABCDEF Bundle

Demographic Variable	Frequency (n)	Percentage (%)
Retrospective Review		
Gender		
Male	75	56%
Female	60	44%
Age		
18 to 29	4	3%
30 to 39	11	8%
40 to 49	15	11%
50 to 59	34	25%
60 to 69	35	26%
70 to 79	22	16%
80 to 89	11	8%
90 to 99	3	2%
Ethnicity		
White or Caucasian	103	76%
Black or African American	28	21%
Hispanic	2	1%
Biracial	1	1%
Unknown	1	1%
Prospective Review		
Gender		
Male	15	47%
Female	17	53%
Age		
18 to 29	0	0%
30 to 39	6	19%
40 to 49	7	22%
50 to 59	7	22%
60 to 69	6	19%
70 to 79	4	13%
80 to 89	2	6%
90 to 99	0	0%
Ethnicity		
White or Caucasian	26	81%
Black or African American	6	19%
Hispanic	0	0%
Biracial	0	0%
Unknown	0	0%

Note. Percentages may not equal 100% due to rounding errors.

Table 3

Percentage of Ventilator Weaning Parameters and SBT Completion Rates

Review Period	Potential	Daily Completion Rates of Ventilator Weaning[a]	
	N	*n*	*%*
Retrospective			
Complete	1897	250	13%
Incomplete	1897	1647	86%
Prospective			
Complete	252	76	30%
Incomplete	252	176	70%

Note: *N* = patient daily episode of care per identified period with totality of episode of care regardless of length on a single encounter equating to one episode, represents potential. *n* = unique patient episodes within total of patient episode of care per review period with documentation of ventilator weaning and SBT completion during episode of care.

[a] Reflects results as determined by documentation audits presented in aggregate.

Table 4

Percentage of Daily Compliance ICU Liberation

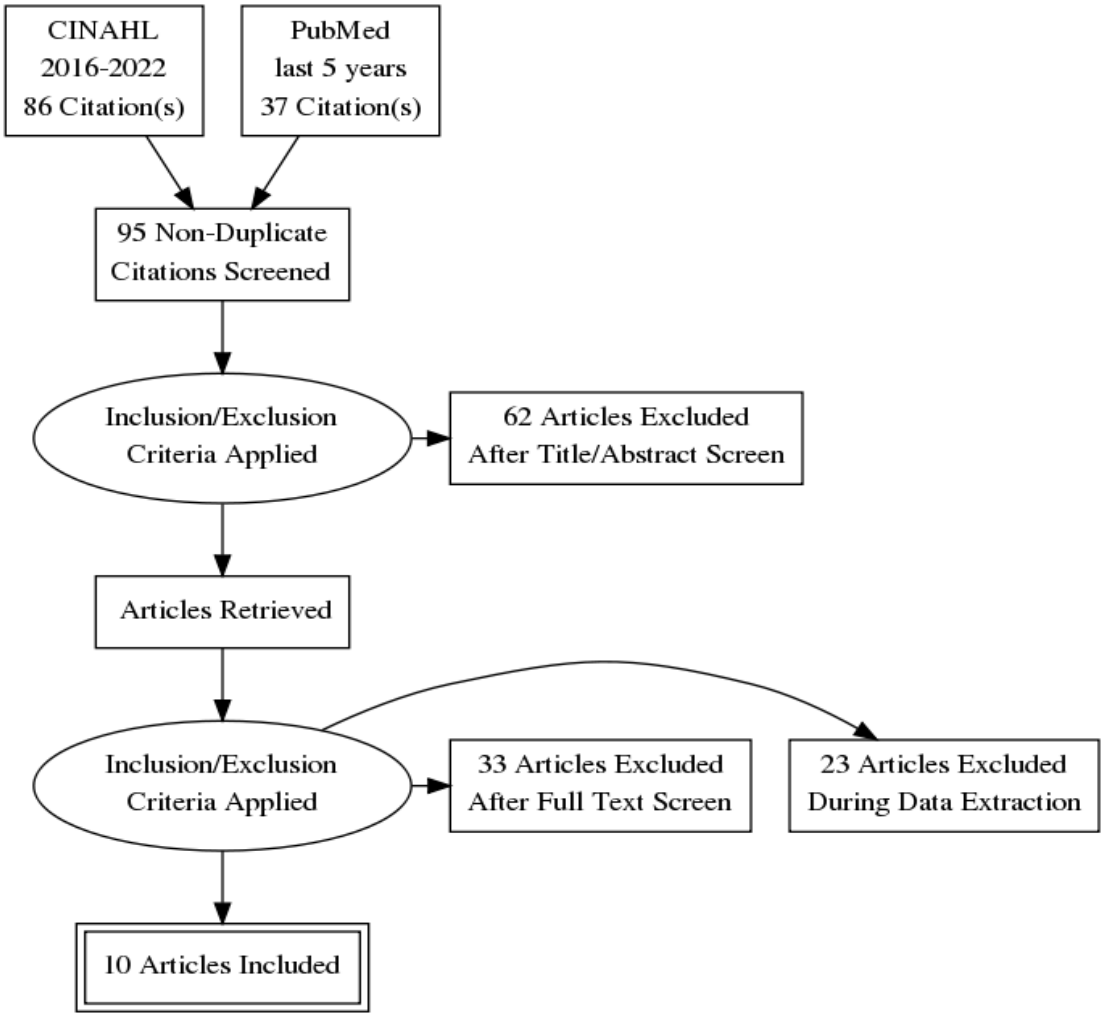
Instrument/Component Bundle	Daily Compliance Rates of ICU Liberation[a]	
	n	*%*
A=CPOT	252	100%
B=SAT	91	36%
B=SBT	76	30%
C=RASS	252	100%
D=CAM-ICU	242	96%
E=BMAT	247	98%
F=Family Involvement	247	98%

Note: *N* = 252, patient daily episode of care per identified period with totality of episode of care regardless of length on a single encounter equating to one episode, represents potential. *n* = unique patient episodes within total of patient episode of care per implementation period with documentation of instrument or component bundle completed during episode of care.

[a] Reflects results as determined by documentation audits presented in aggregate.

Figure 1

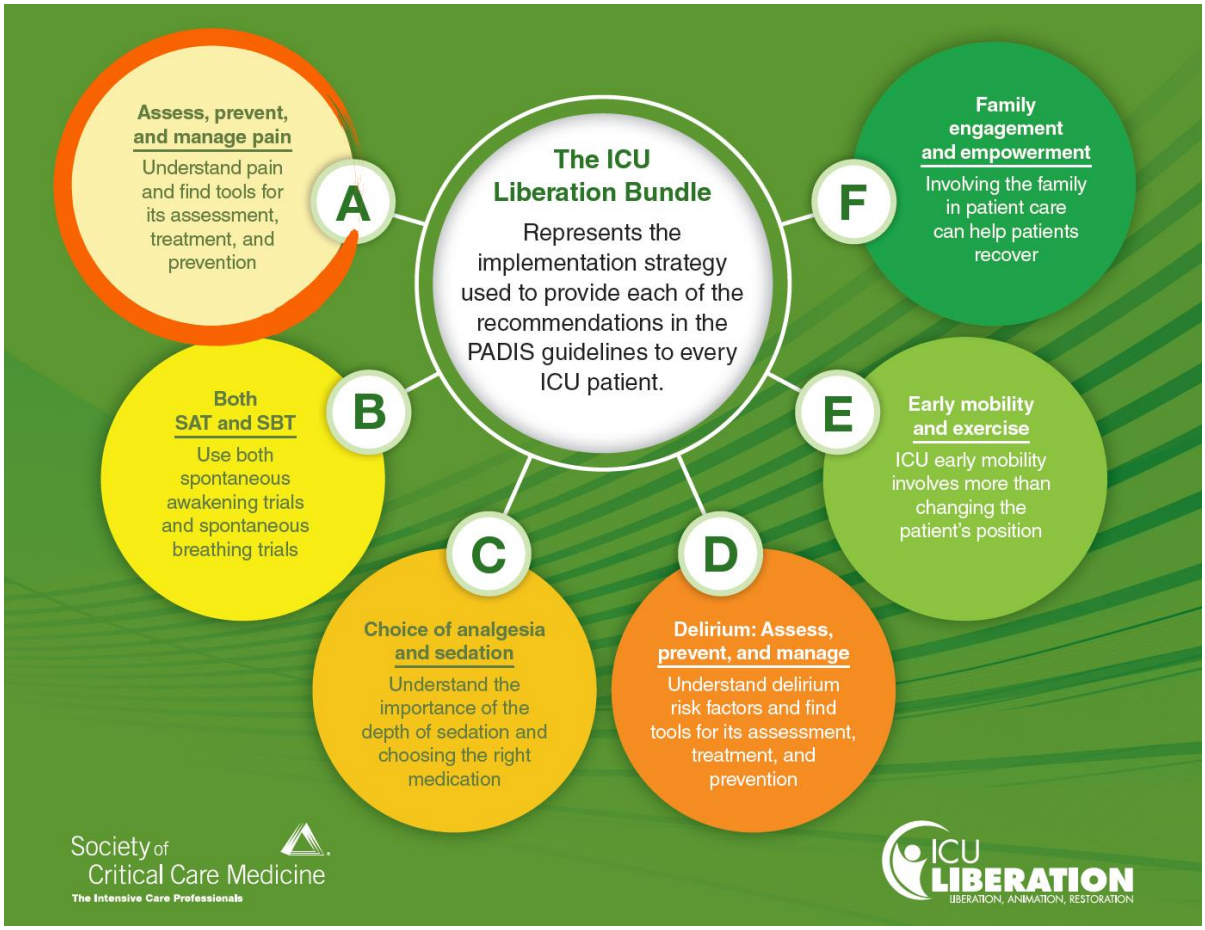
PRISMA Flow



Note. Prisma flow chart diagram generated from the PRISMA Flow Diagram Generator (http://prisma.thetacollaborative.ca/) adapted from "Preferred Reporting Items for Systematic Reviews and Meta-analyses: The PRISMA Statement," by D. Moher, A. Liberati, J. Tetzlaff, & D.G. Altman, 2009, Annals of Internal Medicine, 151(4), p.267 (http://dx.doi.org/10.7326/0003-4819-151-4-200908180-00135). Copyright 2009 by The American College of Physicians.

Figure 2

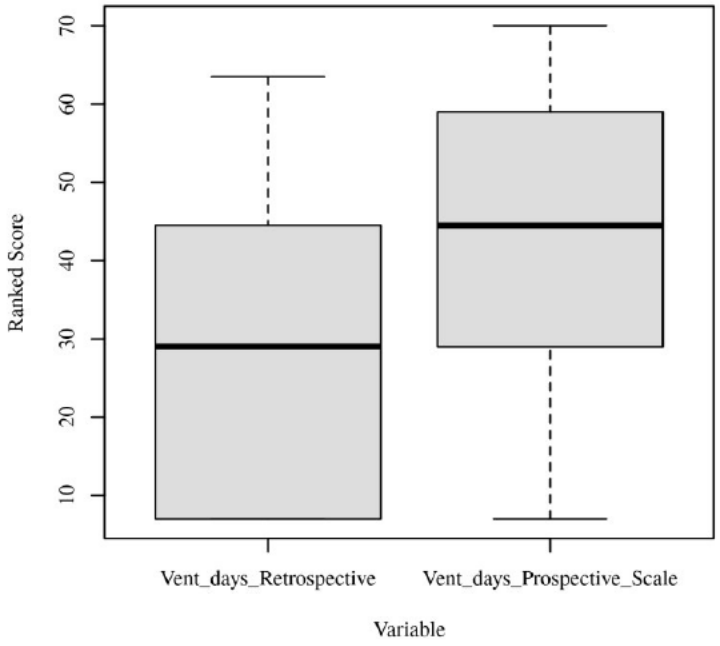
Society of Critical Care Medicine (SCCM) ICU Liberation Bundle



Note. Description of the Liberation bundle components. From "ICU Liberation Infographic" by Society of Critical Care Medicine, 2020. (https://www.sccm.org/getattachment/Clinical-Resources/ICULiberation/ABCDEF-Bundles/ICULIB-Infographic-Final-(1).pdf?lang=en-US).

Figure 3

Ventilator Days Retrospective and Prospective Comparison



Appendix A

Summary of Primary Research Evidence

Source	**Target Population** **Age** **Race/ ethnicity** **Location**	**Study design** **Study type** **Initial sample size** **Dropout rate** **JH Level of Evidence**	**Intervention** **Type** **Focus** **Delivery** **Duration** **Measurement (subjective/ objective)**	**Comparison or control**	**Outcomes** **Intervention vs comparison** **----** **Other outcomes of interest**	**Grading of evidence** **JH Quality Rating**
CINAHL Bardwell et al., 2020	**Age**: 18 and older **Location**: Longview, TX	Before and after study **Size**: 50 **JHEBP**-II	ABCDE bundle chart data gathered during study	Chart data gathered from before ABCDEF bundle	Decrease in ventilator days by 50% post bundle, decrease in sedation 50%,	GOOD B
Barnes-Daly et al., 2018	Collaborative implementation	Article peer reviewed **JHEBP**-V				LOW C
Barr et al., 2020	**Age**: **Location**: Michigan Health and Hospital Association	Survey **Size**: 73 **JHEBP**-III	Implementation of ABCDE bundle components		Less than half implement pain protocol, 60% use SABT protocol, 57% sedation protocol, 42% use a delirium protocol, and only 36% use early mobility, and over half did not involve families	LOW C
Collinsworth et al., 2020	**Age**: 18 and older **Location**: Dallas, TX	Prospective Cost-effective study, Quasi-experimental **Size**: 2953 **JHEBP**-II	ABCDE bundle High adherence	ABCDEF bundle low adherence	Adherence to ABCDE bundle, mortality rate, length of stay, discharge status, cost to hospitals	HIGH B
Gunther et al., 2021	**Age**: 18 & older **Location**: NYC	QI project Quasi-experimental with retrospective **Size**: 105 **JHEBP**-V-II	Protocol-directed weaning with RN/RT	Conventional weaning guided by physician	Duration on vent, LOS, reintubation rates, staff satisfaction with protocol	GOOD B
Kallett et al., 2018	**Age**: Adult	Retrospective study pre/post	Post-SBT/DSI	Pre-SBT/DSI	Duration of ventilation ICU LOS	HIGH

	Location: San Francisco, CA	**Size**: 1053 **JHEBP**-II				B
Louzon et al., 2017	**Age**: Adult **Location**: Orlando, FL	Case Study **Phase 1 Size**: 70 **Phase 2 Size:** 436 **JHEBP**-V	Use of ABCDE-multidisciplinary team pharmacy led	Standard Care physician driven	Decrease, LOS in ICU, decrease ventilator use, decrease, sedation use, and decrease hospital costs	GOOD **B**
Oliveria et al., 2019	**Age**: **Location:** Northern Portugal	Quasi-experimental Prospective vs retrospective Qualitative **Size**: 122 **JHEBP**-II	Weaning protocol	Baseline care	Increased weaning	HIGH B
Pun et al., 2019	**Age**: Adults **Location**: Multiple	Prospective cohort study, multicenter, QI **Size**: 15,226 **JHEBP**-II	ABCDEF bundle complete use	ABCDEF bundle partial use	Compliance with ABCDEF bundle and patient outcomes	HIGH B
Ramirez et al, 2020	**Age**: 18 and older **Location**: San Antonio, TX	Retrospective Study **Size**: 30 **JHNEBP**-IV	Use of Oxygen weaning parameters		Time to wean from start of mechanical ventilation Adherence to oxygen protocol	GOOD C

Legend: JHNEBP-Johns Hopkins Nursing Evidence Based Practice, ICU-intensive care unit, ABCDEF-A-spontaneous awake trial, B-spontaneous breathing trial, C-choice of analgesia, D-delirium assessment, E-early mobility ,F-family involvement, VAP-ventilator associated pneumonia, LOS-length of stay, SABT-spontaneous awake and breathing trial, SBT-spontaneous breathing trial, DSI-daily sedation interruption, RN-registered nurse, RT-respiratory therapist, QI-quality improvement, DC-discharge, Pts.-patients

Appendix B

Themes in Literature

Citation	Q	G	ICU LOS	MD Team	Ventilator Time	Decreased Sedation	Decreased Mortality	Pre/Post Before/After Intervention
Bardwell et al., 2020	Good	B			X	X		X
Barnes-Daly et al., 2018	Low	C		X				
Barr et al., 2020	Low	C						
Collinsworth et al., 2020	High	B					X	
Gunther et al., 2021	Good	B	X	X	X		X	X
Kallet et al., 2018	High	B	X		X			X
Louzon, et al., 2017	Good	B	X	X	X	X		X
Oliveira et al., 2019	High	B	X		X			X
Pun et al., 2019	High	B			X		X	
Ramirez et al., 2020	Good	C		X				

Legend: LOS=Length of stay, ventilator time=time patient is on the ventilator from intubation to removal of tube, hospital los=total time in the hospital, ICU los=portion of time the patient spent in the ICU, Q=quality, G=grad, MD=multidisciplinary

Notes: Summary of literature review themes.

Appendix C

Stakeholders Identified

Stakeholder	Reason Needed
RN	Direct impact, involved in bundle for charting and performing tasks (informing team during IDT rounds on components, performing SAT, assessment and titration of meds for pain, agitation, and delirium, coordinating patient care with other disciplines
RT	Direct impact, involved in charting, and performing tasks (SBT-coordinating with RN on SAT)
Physician team (MD/DO/Fellow/Resident)	Direct impact-coordinating with RT and RN in patient care, prescribing medications and coordinating with pharmacy for proper management
Pharmacy	Direct care-coordinating with RN and Physician team for proper medication changes and management
PT/OT	Direct impact-responsible for assessing patients needing orders, early mobility of patients
Unit Educator	Direct impact-providing education of the ICU liberation bundle components, how to chart, expectation, and format for IDT rounding
Unit Director	Indirect impact-responsible for approving project for the unit,
CM/SW/chaplain	Indirect impact-participants in the IDT rounding team, can ensure components questions answered
Quality Department	Direct impact-first noticed issue for unit, deemed the need for a change, aware of project, receives reports
Statistician	Indirect impact-will be possibly utilized in the processing of data from project
Information Technology	Indirect impact-responsible for grouping bundle in EPIC for charting
Data Analytics	Indirect impact-assistance needed for collection of retrospective data.
IRB	Indirect impact-has to review proposal determine need for formal approval, ensures quality, and patient safety throughout

Legend: IDT-interdisciplinary team, SBT-spontaneous breathing trial, SAT-spontaneous awake trial, RN-registered nurse, RT-respiratory therapist, PT-physical therapy, OT-occupational therapy, MD-medical doctor, DO-doctor of osteopathy, Fellow-pulmonary critical care physician in training for specialty, CM-case management RN, SW-social worker,

Appendix D

SWOT Analysis

STRENGTHS S	WEAKNESSES W	OPPORTUNITIES O	THREATS T
• Magnet hospital with strong nurse lead quality team • Staff knowledge • Unit leadership support • Facility leadership support • Good collaboration between staff within varying disciplines • Good teamwork • Existing daily huddle team • Education team available • Evidence supported by National patient safety guidelines, Institutes for Healthcare Improvement, and Society of Critical Care Medicine • Electronic health record and technology access	• Staff resistant to change or perceptions of difficulty incorporating into daily flow • No huddle team on the weekends • Staff turnover • Use of outside unit help for RN-RT • Lack of use in all components of the ABCDEF bundle • Staff education of bundle components and charting needs	• Increasing collaboration between disciplines • Improvement in patient care • Educational points for staff in all disciplines • Bringing awareness to a problem/gap in quality care	• COVID complicating patient population • Staff burnout • Staff shortages

Appendix E

Project Schedule

	NUR7801								NUR7802								NUR7803							
Activity	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15
Create and get approval for PICOT question																								
Meet with preceptor																								
Prepare project proposal																								
Build Multidisciplinary Team																								
Discuss project with research department																								
Reach out to IRB to follow initial steps																								
Meet with unit leadership to discuss project and plans																								
Submit final proposal to university for approval																								
Submit final proposal to facility IRB																								
Meet again with leadership to discuss plan for education																								
Meet with team to discuss plans																								
Meet with technology department about information needed, use of password protected drive for storage, and documentation																								

	NUR7801								NUR7802								NUR7803							
Activity	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15
Gather baseline data- from EHR retrospective																								
Meet with statistician																								
Provide education to staff about the ABCDEF bundle, needs, charting, purpose, address questions																								
ROLE OUT																								
Collect Data from EHR																								
Analyze Data																								
Communicate with staff																								
Create project results analysis, discussion, conclusion,																								
Dissemination of project results and recommendation to unit director, staff, leadership																								

Appendix F

ABCDEF rounding tool

Name/MRN	
Age	
Room #	
Gender	
Ethnicity	
Admission date	
Length of stay	
Days in ICU	
Days ventilated	

	Date	**Date**	**Date**	**Date**	**Date**
A=Pain					
CPOT/FACES/Number					
Appropriate y/n					
Plan					
B=SAT/SBT					
SAT Safety Screen					
SAT passed/failed					
SBT Safety Screen					
SBT passed/failed					
SBT Performed					
Extubation					
C=Choice analgesia/sedation					
RASS					
Appropriate					
Plan					
D=Delirium					
CAM-ICU score					
Appropriate					
Plan					
E=early mobility					
BMAT					
PT/OT consult yes/no					
PT/OT seen					
Frequency					
F=family					
At bedside yes/no					
Phone Call yes/no					
Input					